

**TEMPORAL ANALYSIS OF ENDURANCE ATHLETES' COPING DURING
COMPETITIVE SUFFERING EPISODES**

MICHAEL BLAIR EVANS

B.A., Laurentian University, 2008

A Thesis

Submitted to the School of Graduate Studies
of the University of Lethbridge
in Partial Fulfillment of the
Requirements for the Degree
MASTERS OF ARTS

Department of Kinesiology
University of Lethbridge
LETHBRIDGE, ALBERTA, CANADA

© Michael Blair Evans, 2010



Library and Archives
Canada

Published Heritage
Branch

395 Wellington Street
Ottawa ON K1A 0N4
Canada

Bibliothèque et
Archives Canada

Direction du
Patrimoine de l'édition

395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file *Votre référence*
ISBN: 978-0-494-68775-8
Our file *Notre référence*
ISBN: 978-0-494-68775-8

NOTICE:

The author has granted a non-exclusive license allowing Library and Archives Canada to reproduce, publish, archive, preserve, conserve, communicate to the public by telecommunication or on the Internet, loan, distribute and sell theses worldwide, for commercial or non-commercial purposes, in microform, paper, electronic and/or any other formats.

The author retains copyright ownership and moral rights in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

In compliance with the Canadian Privacy Act some supporting forms may have been removed from this thesis.

While these forms may be included in the document page count, their removal does not represent any loss of content from the thesis.

AVIS:

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque et Archives Canada de reproduire, publier, archiver, sauvegarder, conserver, transmettre au public par télécommunication ou par l'Internet, prêter, distribuer et vendre des thèses partout dans le monde, à des fins commerciales ou autres, sur support microforme, papier, électronique et/ou autres formats.

L'auteur conserve la propriété du droit d'auteur et des droits moraux qui protègent cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

Conformément à la loi canadienne sur la protection de la vie privée, quelques formulaires secondaires ont été enlevés de cette thèse.

Bien que ces formulaires aient inclus dans la pagination, il n'y aura aucun contenu manquant.


Canada

Abstract

This study aimed to distinguish the coping efforts of athletes who endured shorter, and longer, durations of competitive suffering. Eleven male and 15 female endurance athletes ($M_{age} = 35.8$, $sd = 12.1$) completed a 5km competitive suffering running time-trial task. Following the task, threat perceptions and coping function use (problem focused, PFC; emotion focused, EFC; and avoidance, AvC) were measured in 200 meter intervals using video mediated recall. Control beliefs were also assessed. Those who suffered for shorter durations used more EFC during initiation and at the peak of competitive suffering, as well as less AvC during initiation, in comparison to longer duration sufferers. PFC use did not distinguish competitive suffering duration. Non-significant correlations were revealed between control beliefs and both suffering duration and coping function use. Overall, the results imply that emotion-focused coping is the most appropriate coping function to decrease competitive suffering duration, regardless of control beliefs.

Acknowledgements

I would like to thank those everyone in the Lethbridge running community who participated in my thesis, have facilitated my efforts to find other participants, or who have provided a forum through which I can present what I have learned to the community. Specifically, Shawn and Erin Pinder specific went above and beyond what could be reasonably expected of them. The time volunteered by Courtney Link and Jenna Reimer to assist with my study was greatly appreciated as well. Regardless, my appreciation will never amount to the number of participants' laps each of you cheerfully recorded. Cody Kempster, also provided his time in support of my thesis project, and was an important source of motivation throughout the past two years.

My thesis would not have materialized had it not been for the patience and dedication of Dr. Sharleen Hoar. She demonstrated a genuine interest in ensuring every possible opportunity was available for me to develop as a student and as an individual.

Several other faculty members at the University of Lethbridge are also very deserving of acknowledgement. Dr. Jochen Bocksnick and Dr. Kerry Bernes provided valuable insight into the development of this project. I would also like to extend my appreciation towards Dr. Kent Kowalski from the University of Saskatchewan for taking the time to contribute as my external committee member.

Finally, the support of my family and friends made me who I am today, all the while ensuring that I don't forget there is a whole world outside of 'these two ears.' This support has continued with Brianne, who not only contributed physically to my thesis but also turned down many of her own opportunities to ensure that I see mine through.

Table of Contents

	Page
List of Tables	viii
List of Figures	ix
List of Appendices	x
Epigraph.	xi
Chapter 1. Introduction	1
Chapter 2. Literature Review	3
2.1 Emotion in Sport	3
2.1.1 Cognitive-motivational-relational theory of emotion	3
2.2 Individual Differences in Athletes' Coping	12
2.2.1 Moderators of the coping process	13
2.2.2 Mediators of the coping process	16
2.3 Coping Effectiveness and Outcomes of Coping	18
2.4 Measurement and Research Design	21
2.4.1 Retrospective measurement	21
2.4.2 Video-mediated recall and ecological momentary assessment	22
2.5 Exertion Pain, Suffering, and Coping in Endurance Sport	24
2.6 Summary and Purpose of Study	29
Chapter 3. Methods	33
3.1 Participants	33
3.2 Recruitment	34

3.3 Procedures	37
3.3.1 Phase I: Competitive suffering task	37
3.3.2 Phase II: Measurement of threat, perceived control and coping during competitive suffering.	39
3.3.3 Ethical considerations	40
3.4 Measurement Tools	41
3.4.1 Demographic and time-trial goal questionnaire	41
3.4.2 Assessment Instrument of Threat in Endurance Sports	41
3.4.3 Assessment Instrument of Coping Resources in Endurance Sport	43
3.4.4 Beliefs of Perceived Control Scale	44
3.4.5 Perceived goal attainment scale	44
3.4.6 Coping function assessment	47
3.5 Revisions to Protocol and Recall Procedures	50
3.5.1 Feedback structure	50
3.5.2 Continuous recall revisions	50
3.5.3 Integration of continuous and code-specific recall procedures	51
3.6 Data Analysis Plan	52
3.7.1 Preliminary analyses	52
3.7.2 Main data analysis procedures	52
Chapter 4. Results	54
4.1. Manipulation Check of Competitive Suffering, Preliminary Analysis, and Descriptive Statistics	54

4.2 Testing Research Hypotheses	55
4.2.1 Control beliefs	55
4.2.2 Coping function use	58
4.2.3 Idiosyncratic profiles of competitive suffering	62
Chapter 5. Discussion	67
5.1 Coping Function Use	68
5.1.1 Coping function effectiveness across temporal phases of competitive suffering	68
5.1.2 Temporal shifts in short and long duration group members' coping function use	73
5.1.3 Idiosyncratic competitive suffering profiles	75
5.2 Perceived Control	77
5.2.1 The relationship between control beliefs and competitive suffering duration	77
5.2.2 The relationship between perceived control beliefs and coping function use	78
5.3 Limitations of the Research	80
5.4 Future Directions	83
5.5 Summary and Theoretical Implications	86
5.6 Summary and Practical Implications	87
5.7 Conclusions	88
References	90
Appendix	99

List of Tables

		Page
Table 3.1	Participants' primary sports of competition	35
Table 3.2	Demographic composition of study sample	36
Table 4.1	Descriptive statistics	56
Table 4.2	Intercorrelations between coping function use and control beliefs	57
Table 4.3	Mean coping function use during three suffering phases, by duration group	59
Table 4.4	Mixed Analysis of Variance for coping function use	60

List of Figures

		Page
Figure 2.1	Summary of sport coping process	11
Figure 2.2	Competitive suffering model	26
Figure 3.1	Photograph of study participant watching their time-trial video	46
Figure 3.2	Coping function use card	49
Figure 4.1 (a-c)	Group mean problem focused, emotion focused, and avoidance coping endorsement during three phases of suffering	61
Figure 4.2	Participant A continuous rating graph and coping function use	64
Figure 4.3	Participant B continuous rating graph and coping function use	65
Figure 4.4	Participant C continuous rating graph and coping function use	66

List of Appendices

		Page
Appendix A	Recruitment script	100
	Recruitment poster	101
	Consent form	102
Appendix B	Demographics questionnaire	105
	Time trial goal questionnaire	106

...“Somewhere during my bike in the Ironman, between the climb up to Yellow Lake and then the second torturous climb up to Twin Lakes, I decided to drop out. It just wasn’t worth it anymore. Tears rolled silently down my cheeks as I grieved the loss of my race. I cried over the months and months of training, the planning, the inordinate cost to get there, and all the mental preparation that had gone into this race. I cried because I felt like a failure. I felt embarrassed and ashamed. I faced my ugliest, most inner demons on those last 12 miles on the bike. ... here I was asking myself, ‘Is this really worth it? All this suffering?’ ”

Later in the race: “An unfamiliar feeling began to rise within: a glimmer of hope. Today was just not my day. The Ironman gods had decided that this journey was going to be about something deeper, something much more personal and meaningful than superficial speed.”...“As I peeled back layer after layer, I realized I wanted to finish. My reason for doing this suddenly resounded loud and clear: because it makes me feel strong. Something hit a chord with me, and the light bulb went on. I kept telling myself, ‘I am strong, I am strong,’ all the way to Main Street. Suddenly, I had hope.”

*Female 2009 Ironman Competitor race report
Blog entry, 2009*

CHAPTER 1

INTRODUCTION

Emotions are defined as psychophysiological responses to an event or stimulus in the environment (often either interpersonal or social) that the individual deems as relevant (Lazarus, 2000). Endurance athletes' continual assessment of perceived goal achievement during competition presents relevant stimuli for subsequent emotional responses. Specifically, successful goal achievement leads to positive emotions, and failure to reach goals leads to negative emotions (Daniels et al., 2009). Furthermore, Baron, Moullan, Deruelle and Noakes (2009) have postulated that increases in negative emotional affect will decrease an endurance athlete's desire to sustain a given intensity, thus impacting performance. Despite the importance of the emotional processes for sport performance in endurance sport, little is known about the subject.

A negative emotional state related to inadequate goal achievement is conceptually understood as competitive suffering. Competitive suffering occurs when an athlete realizes, while *competing*, that an important goal will not be reached (Bueno, 2000). This realization is brought about when the athlete perceives a threat to his goal (e.g., cramping or being passed) and believes that he is helpless to improve the situation. Athletes, nevertheless, will engage in coping to regulate the impact of competitive suffering (Bueno, Weinberg, Fernández-Castro & Capdivela, 2008). Coping is a process of cognitive and behavioral attempts to deal with demands that exceed one's resources (Lazarus, 1991). It is theorized that an athlete's appraisal of an event, his coping response, and resulting emotions exhibit a tightly-knit reciprocal relationship (Lazarus,

1991). Due to the reciprocal nature of this relationship, the temporal and multidimensional nature of emotional environments must be addressed to appreciate the context that coping efforts occur within.

Competitive suffering is one type of sport context (brought about as a result of specific threat appraisal and inadequate coping resources) through which the emotional regulation process can be investigated. The objective of the current study was to describe the sequence of coping efforts utilized by athletes throughout competitive suffering episodes and to identify the types of coping efforts that are related to shorter (more adaptive) and longer (less adaptive) suffering episodes. This research seeks to add to the literature in two important ways. First, this study will provide information about the types of coping exerted within the competitive suffering context. Second, the study will examine the temporal nature of coping throughout competitive suffering episodes.

CHAPTER 2

LITERATURE REVIEW

2.1 Emotion in Sport

Emotions play an integral role in sport experiences in general, and with performance specifically (Lazarus, 2000). The dominant theory for understanding competitive emotional experiences such as competitive suffering is the cognitive-motivational-relational theory of emotion (CMRT; Lazarus, 1991; Lazarus & Folkman, 1984). The CMRT outlines a framework through which individuals appraise, experience, and regulate emotions. This cognitive-affective-somatic process has been studied extensively in sport (e.g., Cerin & Barnett, 2006; Hammermeister & Burton, 2001; Nicholls, Polman, Levy, Taylor & Colby, 2007). Sport *coping* research has been particularly prevalent in light of the potential for performance and well-being to be influenced by coping efforts (Nicholls, 2010). Competitive suffering offers a specific emotional encounter, through which several tenets of the CMRT can be addressed. This section will explain the CMRT and review current sport coping literature. Further, the negative affective state of competitive suffering will be oriented within this model, and the relevant appraisals and coping efforts will be addressed.

2.1.1 Cognitive-motivational-relational theory of emotion (Lazarus, 1991).

The cognitive-motivational-relational theory of emotion (CMRT, Lazarus, 1991; Lazarus & Folkman, 1984) postulates that emotion arises from a relationship the individual has with their internal and/or external environment. This relationship is a function of both person and environment characteristics. First of all, sport environments vary according to

the underlying demands that are placed on the individual, including: (a) novelty, (b) predictability, (c) event uncertainty, (d) imminence, (e) duration, (f) temporal uncertainty, (g) ambiguity, (h) preparation and (i) self/other comparison (Thatcher & Day, 2008). For example, the environmental demands for a young figure skater at their first national event (e.g., novelty and self-other comparison) are different from those of a university student before an exam (e.g., imminence and preparation). People also view their environment differently, and a number of personal characteristics contribute to emotional encounters. For example, trait anxiety influences the degree of threat that is perceived in a given environment (Smith, Smoll, & Wiechman, 1998). Overall, emotions, the person, and the environment are involved in a transacting relationship that is uniquely displayed in each emotional encounter an individual experiences and is labeled the person-environment event.

Although person-environment events are never identical (involving both inter- and intra-individual differences) they often share a common “relational meaning” (Lazarus, 2000). Relational meaning is an appraisal of the significance of what is occurring in relation to a person’s well-being, and determines the emotions that are experienced (Lazarus). This meaning is continually constructed by the individual through an appraisal process.

Primary appraisal involves determining whether what is happening in the person-environment event is relevant to the individual’s well-being (Lazarus, 1991). It is an automatic and unconscious process that is developed through the interaction of three appraisal themes: goal relevance, goal congruence, and the type of ego-involvement

(Lazarus, 1999). Goal relevance refers to whether an event is deemed to be relevant to attaining a sense of well being. If there is relevance an emotion will be generated, and if not then an emotion will not be generated. Goal congruence refers to the degree to which the situation matches with what is desired. Whether there is (or is not) congruence determines whether positive (or negative) emotions result, respectively. Finally, ego involvement refers to the “role of diverse goals for shaping an emotion” (Lazarus, 1999, p. 92). For example, in a marathon, ego involvement may refer to the amount of self-esteem that may be “at stake” for an athlete if he has to walk a portion of the race.

In addition to determining the relevance of what is happening for an individual’s well being in the person-environment event (i.e., primary appraisal), athletes also utilize a secondary appraisal to assess *what can be done* within the person-environment event (Lazarus, 1991). Secondary appraisal occurs along with, rather than in succession to, primary appraisal and has three focuses: (a) an evaluation regarding blame or credit for a particular occurrence, (b) coping potential, or the belief that one can or can not act successfully to deal with a demand, and (c) future expectancy regarding the person-environment event (Lazarus, 1999).

The interaction of primary and secondary appraisals results in one of four general types of relational meaning: (a) an anticipated loss, considered to be a threat, (b) an anticipated gain, referred to as a challenge, (c) an occurred loss, called harm, and (d) an occurred gain, which is a benefit (Lazarus, 2000). Emotional responses occur as a result of the relational meanings appraised within a person-environment event. For example, the emotion ‘anxiety’ is proposed to occur as a result of threatening appraisals (Lazarus).

Threat and challenge are often the most relevant relational meanings in sport research, and threat is the primary relational meaning appraised during competitive suffering (Bueno et al., 2008).

Theoretically, it is proposed that the type(s) of coping efforts put forth will also influence the type of emotional response evoked during a person-environment event (Lazarus, 1991). Coping takes place when the person-environment event is appraised to be threatening, harmful, challenging, or a source of loss for the athlete and is a process of cognitive and behavioral attempts to deal with demands that exceed one's resources (Lazarus). Endurance athletes can utilize a variety of coping efforts to deal with threatening or challenging appraisals; such as goal reappraisal, adjusting pace, supplementation/hydration, and seeking social support (Buman, Omli, Giacobbi, & Brewer, 2008b). These efforts are termed coping strategies and describe the specific behaviors and/or thoughts the athlete enlists to deal with the person-environment event. Currently, little is understood about which types of coping contribute to or alleviate competitive suffering.

Skinner and Zimmer-Gembeck (2007) suggest that there are hundreds of different coping strategies an athlete may use and it is important to further distinguish coping efforts within the literature through categorical systems. Most commonly in the sport literature, coping efforts are categorized by their function, or purpose. The two generally agreed upon categories being problem-focused and emotion-focused (Nicholls & Polman, 2007). Problem-focused coping refers to attempts to change the reality of the situation, while emotion-focused coping refers to attempts to regulate emotions (Lazarus, 1991).

For example, an athlete who is failing to maintain the pace that she'd hoped for in a race might use a problem-focused coping effort to overcome/eliminate a perceived threat and bring about the best result possible. Additionally the same athlete is also likely to use emotion-focused coping efforts to decrease emotional distress (e.g., reducing the significance of the race). Endurance athletes report using different types of problem-focused and emotion-focused coping to manage a variety of threats that occur over the course of a competitive person-environment event (Hammermeister & Burton, 2001). Sport researchers have argued for the inclusion of other coping functions in addition to problem- and emotion-focused coping, such as avoidance coping (Anshel, 2001) and distraction oriented coping (Gaudreau & Blondin, 2004). Avoidance coping refers to efforts put forth by athletes to *abandon* a goal, behavior, or effort in order to remove themselves from the situation (Anshel). One example of this type of coping includes slowing down one's pace, turning up the volume of music on a personal music player, and singing along to a favorite song to forget about a performance time goal. Distraction oriented coping is similar to avoidance coping but differs in that the athlete is not removing him/herself from efforts to achieve a goal. Rather he/she is focusing on stimuli that are not critical for performance. For example, an endurance athlete may maintain effort to reach a goal, but turn up the volume of music on her personal music player as distraction from the pain she is experiencing. In general, avoidance coping has received the most acceptance within the sport coping research, and it is commonly mentioned as a main category along with problem- and emotion-focused strategies (Nicholls & Polman, 2007).

Although individuals' coping can be classified by a predominant coping function, the functions of a coping effort are not mutually exclusive (Lazarus, 1991). That is, a single coping effort may be directed towards several coping functions. For example, the coping effort of double-knotting shoe laces before a race by a runner may serve several functions, including problem-focused (ensuring that the shoe doesn't come untied), emotion-focused (a comforting routine he uses) and/or avoidance (diverting his gaze from competitors) coping functions. Furthermore, it is ultimately the perception of the *individual* that determines the degree to which this coping effort is directed towards each coping function (Lazarus). Therefore, when categorizing coping efforts according to coping function it is important that the athlete identify the intended coping function(s) of the effort.

The coping efforts selected by an athlete, and their intended function, are constantly changing according to the changing demands the individual is faced with. Temporal changes in the demands of a single person-environment event are associated with shifts in appraisals, emotions, and coping (Lazarus, 1999). For example, a barrage of emotional encounters occur throughout the person-environment event of a competitive race as runners contend with varying temporal demands (i.e., the crowded starting line, maintaining appropriate pace during the race, or meeting with a coach to debrief about performance after the race). Furthermore, coping changes across contexts (Cerin & Barnett, 2006). For example, a runner may be confronted with different stressors from one situation (i.e., local road race) to another (i.e., national-level competition) and subsequently engage in different coping efforts. As a result, coping efforts are said to be

constantly changing (Lazarus). Gaudreau and Miranda (2010) claim that while most sport coping researchers adopt this process-oriented approach, what it means for coping to be “constantly changing” remains undefined. Thus, Gaudreau and Miranda offer two operations of change, which describe changes in coping over time and across situations; namely, stability and consistency. Stability refers to the degree that individuals’ coping efforts remain similar, or change, over *time* within the same situation. Meanwhile, consistency is the extent to which individuals’ coping efforts remain similar across distinct *situations* and/or contexts.

Coping researchers are encouraged to investigate temporal and situational changes in coping by examining the momentary use of coping efforts in a particular situation at a specific point in time to account for the influence of stability and consistency (Lazarus & Folkman, 1984). To do so, Lazarus and Folkman advocate isolating phases within an event that are defined by demands that are likely to produce corresponding differences in coping use. In sport, three general stages of competition (before, during, and after) have been applied, as situational demands differ across these three phases (e.g., Calmeiro & Tenenbaum, 2007; Cerin & Barnett, 2006). More specific phases of an emotional encounter have also been successfully applied to investigate the coping process, derived from shifts in demands and resources rather than pre-existing phases of competition. For example, Bianco, Malo & Orlick (1999) identified three phases of injury that are associated with distinct demands and levels of distress: (a) the injury-illness phase, (b) the rehabilitation-recovery phase, and (c) the return to full activity phase. Similarly, competitive suffering may be viewed as an emotional

encounter that occurs over a series of phases. In the current study, competitive suffering was assumed to occur in three phases that were associated with distinct demands: (a) initiation, or when threat was increasing, (b) peak, or when threat was the greatest, and (c) reintegration, or when the threat was dissipating.

In summary, the cognitive-motivational-relational theory of emotion (Lazarus, 1991; Lazarus & Folkman, 1984) describes the process of emotion generation. Emotional experiences result from the interaction between person and environment variables within the person-environment event. The individual forms an appraisal of the relational meaning of the person-environment event and determines whether he will put forth a coping effort. Coping efforts are most relevant when a threatening or harmful relational meaning is formed. The use of coping efforts, in turn, changes the relational meaning of the event. Although this description may appear to be linear, an important feature of the CMRT is the contextual and temporal nature of emotional encounters, and the relationship between the changing environment and the coping process is reciprocal and unfolds over stages in time (see Figure 2.1).

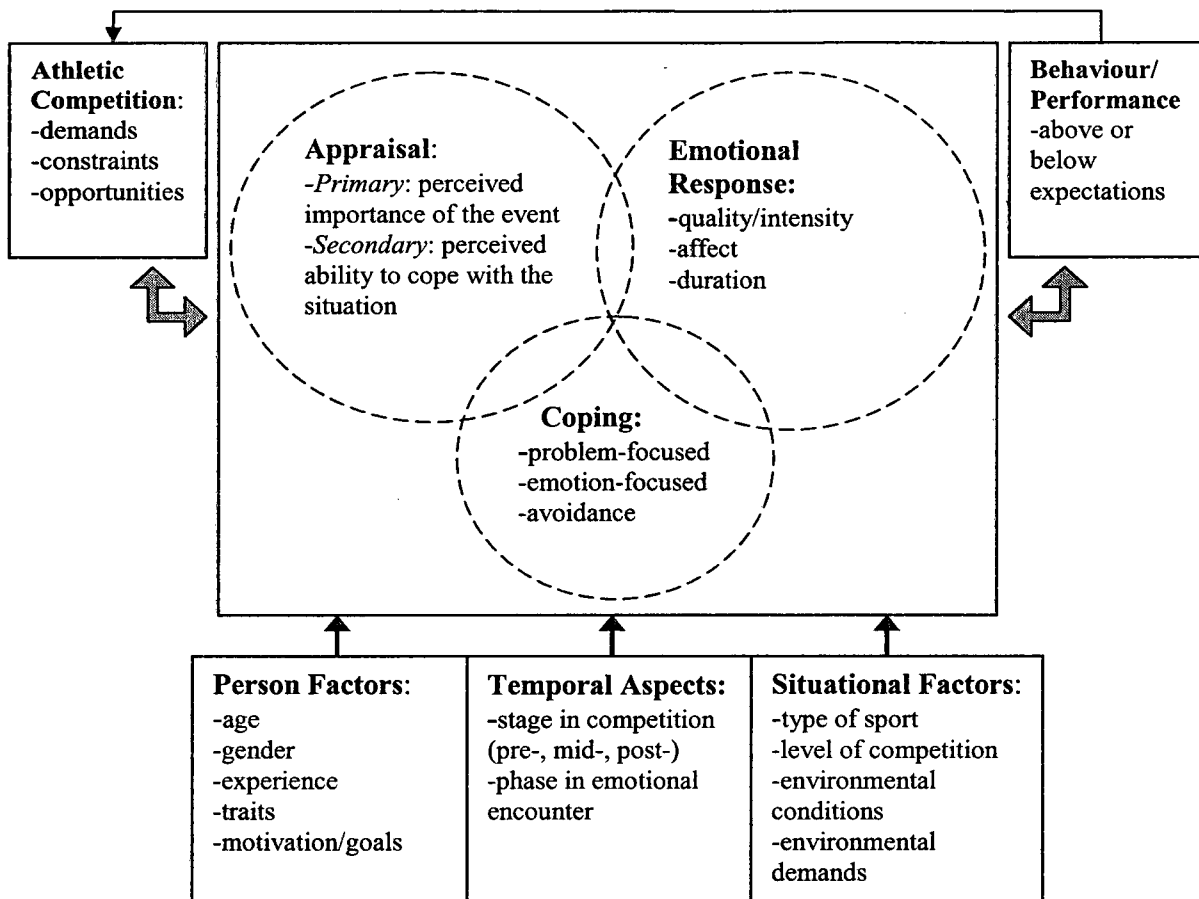


Figure 2.1 Summary of the sport coping process. This model illustrates the main aspects of the coping process as outlined by the cognitive-motivational-relational theory. Adapted from Cerin et al. (2000)

2.2. Individual Differences in Athletes' Coping

A considerable amount of sport research has examined athletes' coping. These investigations have contributed towards understanding of key person and situational factors influencing the coping process including, but not limited to, the role of specific appraisals (Hadd & Crocker, 2007; Kim & Duda, 2003), skill level (Cleary & Zimmerman, 2001), sport type (Nicholls, Polman, Levy, Taylor, & Cobley, 2007), performance goals (Amiot, Gaudreau, & Blanchard, 2004; Holt, Berg, & Tamminen, 2007), gender (Hammermeister & Burton, 2004; Hoar, Crocker, Holt, & Tamminen, 2010), and temporal factors (Cerin & Barnett, 2006). While a complete review of this work reaches beyond the scope of this study, specific areas pertinent to the current study will be reviewed, including potential mediators and moderators of the coping process during competitive suffering (Gaudreau & Blondin, 2004; Hammermeister & Burton, 2004).

Moderator variables are investigated to establish the effect that a third variable has on the strength and/or direction of the relationship between the person-environment event (independent variable) and coping (observed phenomenon; Nicholls & Polman, 2007). Like moderator variables, mediator variables are a 'third' variable that influences the relationship between the person-environment event and coping process. However, mediator variables are distinguished as transformation processes that are internal to the organism and that intervene with the effects of stimuli on behavior (Baron & Kenny, 1986; Nicholls & Polman, 2007). Mediator variables influence factors such as the likelihood of choosing a coping method, the appraisal evoked, and the effectiveness of

certain styles of coping (Hatzigeorgiadis, 2006; Pensgaard & Roberts, 2003). When delineating the two terms, Baron and Kenny identify moderating variables as affecting the *strength* of the relationship between two variables, while mediating variables *directly account* for some degree of the relationship between two variables. Coping moderator variables that are relevant to the current study include gender, age, and skill level. Relevant mediator variables include goal expectancy and perceived control. Past sport research examining the moderating and mediating influences of these variables will be described in the following two sub-sections.

2.2.1 Moderators of the coping process. One moderator variable that is proposed to generate individual differences in endurance athletes' coping is gender (Lazarus, 1991). Ample sport research substantiates this proposition and it has been concluded that male and female athletes *in general* cope differently (Hoar, Kowalski, Gaudreau, & Crocker, 2006). However, much discrepancy exists in determining how gender affects specific aspects of the coping process (Hoar et al., 2010; Kaiseler & Polman, 2010). Methodological and conceptual concerns have been identified that may contribute to discrepancies between studies. Methodologically, coping has been operationalized differently across studies (e.g., as a strategy or as a function) and gender differences are often examined in a post hoc fashion (Hoar et al., 2010). Conceptually, several research studies have not controlled for important coping process variables such as source of stress and stress appraisal which are theoretically proposed to influence gender differences in coping responses (Kaiseler & Polman).

In a carefully planned study, Hammermeister and Burton (2004) controlled for stress appraisals in their investigation of gender differences in the pre-competitive coping process among triathletes, cyclists, and distance runners. Two important findings emerged. First, males and females had different levels of perceived control, with females perceiving less control over pre-competitive stress compared to that of males. Second, when threat perceptions between males and females were equal, females used more emotion-focused and fewer problem-focused coping strategies compared to males. The presence of gender differences in the coping process supports the contention that coping studies should either focus on only one gender, or should control for the differences between genders.

Age is another moderator of the coping process which is relevant to this research. Coping is theoretically proposed to be developmental in nature (Lazarus, 1991; Skinner & Zimmer-Gemeck, 2007) in that coping is impacted by physical, cognitive, emotional, and social maturation. In sport, with the exception of Nicholls, Polman, Morley, and Taylor (2009), coping development has not been studied according to maturation. Rather, sport studies have inferred developmental differences in coping through the examination of age-related differences (Hoar & Evans, 2010). In a review of the sport coping literature, Hoar and Evans (2010) examined coping differences among athletes of different age groups: (a) school-age childhood, ages 6-11, (b) early adolescence, ages 12 to 14, (c) middle adolescence, 15 to 17 years, (d) late adolescence and college-age, 18 to 22 years, (e) early adulthood, 23 to 35 years, (f) middle-aged adulthood, 36 to 59 years, and (g) older adulthood, 60 to 75 years. It was concluded that as individuals progress

through these stages their coping repertoires develop from that of primarily behavioural coping efforts, to the combined use of both cognitive and behavioural coping efforts. For example, the ability to cognitively reframe a threatening event may not be possible until middle adolescence when abstract thinking has firmly matured. Coping also continues to change throughout adulthood and into old age. In comparison to individuals in early- and middle-aged adulthood, older adults report fewer emotional encounters (Aldwin, Sutton, Chiara & Spiro, 1996), lower levels of control (Gross et al., 1997), increased use of emotion-focused efforts, and decreased use of problem-focused efforts (Folkman, Lazarus, Pimley & Novacek, 1987). For these reasons, it is important to define the age group of the individuals being studied and to avoid generalizing results across different age groups.

The third moderator variable relevant to the current work is the expertise-level of an athlete. Early sport research investigating the influence of expertise (viz. novice vs. expert status) on the coping process, defined the construct with varying operational definitions. For example, expertise was evaluated as differences in age, number of years in a competitive sport, competitive status, and familiarity with the sport environment (Hoar & Gammage, 2010). This early research produced equivocal results regarding the impact of expertise on the coping process and was potentially hampered by varying definitions of expertise (Hanton, Cropley, Niel, Mellailieu & Miles, 2008). More recently, sport researchers study the effects of expertise on the coping process using the operational definitions of *skill level* and *competitive experience*. Highly skilled athletes have been reported to cope differently than lesser-skilled athletes, displaying more

facilitative interpretations of anxiety (Cleary & Zimmerman, 2001) and increased use of performance oriented cognitive coping strategies (Buman et al., 2008). Despite these differences, Hanton and Jones (1999) have suggested that competitive experience may be a more sensitive construct in comparison to skill-level. Competitive experience is typically measured as the number of years competing in their primary sport at or above a specified competition level. Hanton et al., (2008) compared anxiety appraisal and the types of coping employed by national-level athletes of high and low experience levels. Individuals with high experience had lower anxiety levels and viewed the use of problem and avoidance-focused coping strategies as more effective than those with low experience. Thus, experience and skill level are potential moderating variables in the coping process, and will be controlled for in the current study.

2.2.2 Mediators of the coping process. Goal attainment expectancy is the first of two mediating variables of endurance athletes' coping process that are considered in the current study. Goal attainment expectancy is defined as the expectancy that one will attain a specific goal and is based upon available and relevant feedback about goal achievement (Hatzigeorgiadis, 2006). A recent study revealed that rowers with high goal attainment expectancies use primarily approach coping behaviors (i.e., increasing effort and planning), whereas those with low goal attainment expectancies increase their use of avoidance coping efforts (i.e., behavioural and mental disengagement; Hatzigeorgiadis, 2006). Although this research did not assess mediation directly, goal attainment expectancies have been advanced as a potential mediator in light of their influence on approach and avoidance coping. Furthermore, it is reasoned that because low goal

expectancy is embedded in the conceptual definition of competitive suffering (Bueno et al., 2008), increased avoidance coping will be observed among endurance athletes who experience this emotional state.

The second mediator considered in this research is perceived control beliefs. Perceived control beliefs refer to the individual's expectation that he or she can engage in the actions/cognitions necessary to produce desired (or undesired) outcomes within the person-environment event (Kowalski, Crocker, Hoar & Neifer, 2005). As a mediating variable, it is posited that coping efforts are a direct result of an individual's perceived control belief that he can produce desired coping actions (i.e., specific coping efforts), as well as the belief that the coping actions will result in the attainment of desired outcomes. Two types of control beliefs for coping are distinguished in sport: (a) situational control beliefs or the individual's perceived ability to change the situation, and (b) emotional control beliefs or the individual's perceived ability to control his emotions (Kowalski et al.).

Research has indicated that high perceived control is related to increased use of problem-focused coping strategies (Anshel & Kassidis, 1997; Kim & Duda, 2003). Conversely, low perceptions of control have been related to increased use of emotion-focused and avoidance strategies (Anshel & Kassidis; Cresswell & Hodge, 2001). These findings suggest that when an athlete perceives that she can control the outcome of the situation, she will direct coping efforts towards changing the situation itself (i.e., use problem-focused coping). Meanwhile, if the athlete does not perceive that she can control the outcome of the stressful situation she will focus coping efforts internally, to

her emotions, or towards avoidance of the event. Furthermore, research using the two types of control beliefs identified by Kowalski et al., (2005) has revealed that control of the situation is positively related to problem-focused coping, but not related to emotion-focused coping. Meanwhile emotional control beliefs positively relate with emotion-focused coping, and do not relate with problem-focused coping (e.g., Kowalski et al.; Poliseo, 2009).

Overall, several factors may influence the strength of the relationship (i.e., moderators such as gender, age, and skill level) or may directly account for some degree of the relationship (i.e., mediators, such as goal expectancy and perceived control) between coping variables. It is important to recognize the potential influence of these relationships when studying the coping process.

2.3 Coping Effectiveness and Outcomes of Coping

In sport, the mismanagement of distress has the potential to negatively influence both performance (Baron et al., 2009) and emotions (Ntoumanis & Biddle, 1998), and increase the likelihood of injury (Bianco et. al 1999) as well as burnout (Hill, Hall & Appleton, 2010). On the other hand, effective sport coping strategies have the potential to increase performance (Pensgaard & Duda, 2003), reduce anxiety (Campen & Roberts, 2001), and promote pleasant emotional experiences (Ntoumanis & Biddle). Consequently, Folkman and Moskowitz (2004) assert that an essential objective of coping research should be to identify *effective coping*, in light of the potential for this research to provide guidance to practitioners and individuals hoping to promote adaptive coping outcomes.

Coping effectiveness is defined in the sport coping literature as “the degree in which a coping strategy or combination of strategies is or are successful in alleviating stress” (Nicholls, 2010, p. 264). This broad definition has been applied in different ways across studies, including: (a) athletes’ perceptions of effectiveness (e.g., Nicholls, Holt, & Polman, 2005), (b) achievement of objective outcomes (e.g., Pensgaard & Duda, 2003), (c) achievement of subjective outcomes (e.g., Holt, Berg, & Tamminen, 2007), or (d) positive/negative affective responses (e.g., Ntoumanis & Biddle, 1998). This work has led to the contention that the most adaptive types coping in sport are problem-focused efforts. For example, problem-focused coping efforts have been associated with positive emotion during competitive events, while emotion-focused and avoidance functions have been related to higher levels of anxiety and negative emotion in athletes (Hammermeister & Burton, 2001; Ntoumanis & Biddle, 1998). However, recent studies have also reported positive correlations between emotion-focused coping and positive affect (e.g., Hadd & Crocker, 2007). Moreover, as discussed earlier, Hatzgeorgiadis (2006) suggests that in situations where goals are viewed to be unattainable, avoidance coping is an adaptive choice. Thus, while problem-focused coping efforts are typically more adaptive (in comparison to emotion-focused and avoidance coping), each function has the potential to demonstrate adaptive qualities.

Given the potential for each function to be effective, sport coping effectiveness research has supported the theoretical tenet that coping efforts are neither inherently effective nor ineffective (Lazarus, 1991). Rather, the adaptive qualities of coping are related to the contextual demands and personal goals that are influencing the coping

process (Lazarus, 2000). For example, the coping effort of ignoring cramping may be viewed to be effective for a marathon runner near the end of a race, but is ineffective earlier on in a race or during training. Thus, Folkman and Moskowitz (2004) advocate identifying coping effectiveness in two ways: (a) identifying appropriate outcomes for the context and (b) placing consideration on the quality of fit between coping efforts and the demands of the situation. For example, during competitive suffering an adaptive coping response would shorten the duration or lessen the intensity of the negative affective state, and “fit” well with the appraisal of situational demands.

The ability of a coping effort to meet the demands of the situation is labeled the goodness-of-fit, and has received the greatest attention in the sport literature as an operational definition of coping effectiveness (Nicholls & Polman, 2007). The goodness-of-fit model predicts that coping effectiveness is greatest when there is compatibility between the appraisals of controllability over the person-environment event (i.e., perceived control) and the coping effort chosen (i.e., coping function; Folkman, 1992). For example, there is evidence that problem-focused coping will be effective if the athlete has a high perception of control over the situation, while emotion-focused coping is more effective with appraisals of low-control over the situation or high appraisal of control over emotions (Kim & Duda, 2003). Perceived control has also been combined with perceived threat and coping resources to predict the compatibility of a coping strategy to situational demands (Hammermeister & Burton, 2001). Overall, the demands and resources available within the specific context should be taken into account when assessing the effectiveness of a coping effort.

2.4 Measurement and Research Design

Both quantitative and qualitative methods are commonly used to assess coping. This range in methods is necessary to fully appreciate the complex nature of coping. Quantitative methods used for sport coping research has primarily taken the form of questionnaires. Important questionnaires in sport include the coping strategies in Coping Strategies in Sport Competition Inventory (ISCCS; Gaudreau & Blondin, 2002), the modified COPE inventory (Crocker & Graham, 1995), and the coping function questionnaire (CFQ; Kowalski & Crocker, 2001). Traditionally, these inventories are completed prior to or following a recent stressful event (e.g., competition). Qualitatively, several different procedures have been utilized including qualitative interviews, concept mapping, and the use of diaries. One limitation of many of the methods stated above is the extensive use of retrospective recall. Retrospective recall is the post hoc recall of emotional encounters which were experienced at an earlier point in time, such as during a competition (Brewer, Van Raalte, Linder & Van Raalte, 1991).

2.4.1 Retrospective measurement. In consideration of the many practical challenges that hamper the collection of information from athletes *during* competitive events (i.e., little or no time available to respond to research questions), researchers typically gather coping information some time after the conclusion of the event using retrospective recall. Despite the efficiency of retrospective measurement, there are several limitations that are inherent in recalled data. One challenge associated with retrospective recall is that knowledge of performance will change the athlete's perception of the contest in hindsight (Brewer et al., 1991). There are also concerns about the

deterioration of memory and reliability of data over time (Brauer, Thomsen, Loft & Mikkelsen, 2003). These limitations are termed distortion and deterioration, respectively, and are further augmented via two additional effects: telescoping and omission (Ayhan & Isiksal, 2004). Omission is the tendency to remove particular details of the experience, while telescoping is the tendency to focus on particular aspects disproportionately to how they were truly experienced.

Sport research comparing retrospective recall (72hrs following competition) to the measurement of emotions directly before a competition revealed that while there were many similarities between retrospective and actual reports, athletes underestimated the intensity of negative precompetitive emotions (Tenenbaum & Elran, 2003). In addition, Cerin and Barnett (2006) question the value of retrospective recall for assessing the contextual and temporal nature of coping.

2.4.2 Video-mediated recall and ecological momentary assessment. Coping researchers have applied two methodological procedures to overcome the limitations demonstrated in traditional retrospective recall methods: (a) assessing the data during the emotional encounter (viz. ecological momentary assessment; Cerin & Barnett, 2006), and (b) improving the quality of recall (viz. video mediated recall; Welsh & Dickson, 2005). Ecological momentary assessment (EMA) permits the monitoring of the natural flow of daily affective and cognitive experiences in athletes' normal environment (Cerin & Barnett). EMA is commonly employed through the use of technology (such as pagers or smart phones) in that participants are prompted to provide responses across several points in time. Another form of ecological momentary assessment utilized in sport psychology

research is the Think-Aloud procedure (Nicholls & Polman, 2008). This procedure uses recordings of the athlete's verbalizations (athletes are asked to constantly speak their thoughts aloud) to measure the emotional process in real time. Schomer and Connolly (2002) used a similar method in endurance sport, having athletes wear headsets as they trained. Ecological momentary assessment techniques provide direct access to athlete's emotional processes in real-time. However, they are difficult to apply in many athletic competitions, are intrusive, and may bring about increased associative thinking in athletes (Buman et al., 2008; Cerin & Barnett).

The use of video to prompt recall is a less intrusive method that has been suggested for sport research investigating coping during acute emotional encounters (Crocker, Mosewich, Kowalski & Besenski, 2010). Although video-mediated recall (VMR) has not been adopted within sport coping research, it has been used to enhance recall in the general psychology literature (e.g., Lorber, 2007; Sanders & Dadds, 1992). In VMR, video-recorders are employed to capture a particular experience involving the participant and then the video is replayed for the participant, prompting a relived experience (Gottman & Levenson, 1985). The relived experience has been operationalized in research as the correspondence of various physiological levels (such as heart rate and skin conductance) between the actual experience and those during recall (Lorber, 2007). The relived experience is suggested to increase the validity of recall in measuring an emotional experience (Gottman & Levenson, 1985). A study comparing the use of ecological momentary assessment and video mediated recall demonstrated that both procedures are effective measurement tools for the valid and reliable assessment of

coping data in comparison to a retrospective recall method (Lodge, Tripp & Kim Harte, 2000). Lodge et al. suggest that the choice of assessment procedure should be governed by the purpose of the assessment, the context, and the resources available.

2.5 Exertion Pain, Suffering, and Coping in Endurance Sport

Suffering is conceptualized as a distinct negative affective state (Bueno, 2000). However, the terms suffering and pain are often used interchangeably, and the two are often associated with one another. Thus, when defining suffering in endurance sport it is first important to consider the construct of exertion pain, as it relates to negative emotion and often coincides with the competitive suffering experience (Cherny, Coyle, & Foley, 1994). Exertion pain is a prevalent experience in endurance sport, and is defined as injury-free pain felt as the result of a prolonged energy-expending effort (Kress & Statler, 2007; Masters & Lambert, 1989). There are two aspects of the exertion pain experience. One aspect is the physiological or concrete experience, and involves one or more of the following: (a) an elevated heart rate, which has exceeded a comfortable level, (b) a buildup of lactate, (c) a depletion of muscle glycogen from the body's stores, (d) fatigue of the respiratory muscles, and (e) dehydration (Brooks, Fahey, & White, 1998). The second aspect is the athlete's perception of the pain, such as described during encounters with hitting the wall or bonking. These subjective experiences may include generalized fatigue, unintentionally slowing pace, increased desire to walk, and shifting focus to survival (Buman et al., 2008). The connection between pain and suffering has been effectively described in palliative care, and is applied to understand the relationship between exertion pain and competitive suffering in sport (e.g., Chapman & Gavrin, 1993;

Gregory & Russell, 1999). Specifically, although an experience may be painful, upsetting, and/or distressing it does not necessarily constitute suffering (Cassell, 2004). Pain is merely a symbol of both biological and psychosocial threat, that may (or may not) lead to suffering (Chapman & Gavrin, 1993).

Meanwhile, suffering is defined as a “complex negative affective and cognitive state characterized by perceived threat to the integrity of the self, perceived helplessness in the face of threat, and exhaustion of psychosocial and personal resources for coping” (Chapman & Gavrin, 1993, p. 5). Chapman and Gavrin entrench suffering within the coping process in their definition by highlighting threatening appraisals, which evoke distress in individuals who view themselves as helpless. Suffering will persist until the threat has passed, the integrity of the person is restored or when suffering is healed through the healing of self (Gregory & Russell, 1999). Suffering can also be relieved in the presence of continued pain by making the source of the pain known, by demonstrating control over the situation, and knowing that an end is in sight (Cassell, 2004).

Feelings of threat and helplessness are central to the conceptualization of competitive suffering in the sport context (Bueno, 2000). However, *competitive suffering* and *suffering* (in the medical literature) are conceptually distinct in that: (a) athletes suffer because they are striving to reach a competitive goal and (b) competitive suffering is an acute (rather than chronic) emotional state. The study of competitive suffering has been initiated through the seminal work of Javier Bueno and colleagues (Bueno, 2000; Bueno, Capdevila & Fernandez-Castro, 2002; Bueno, et al., 2008; see Figure 2.2).

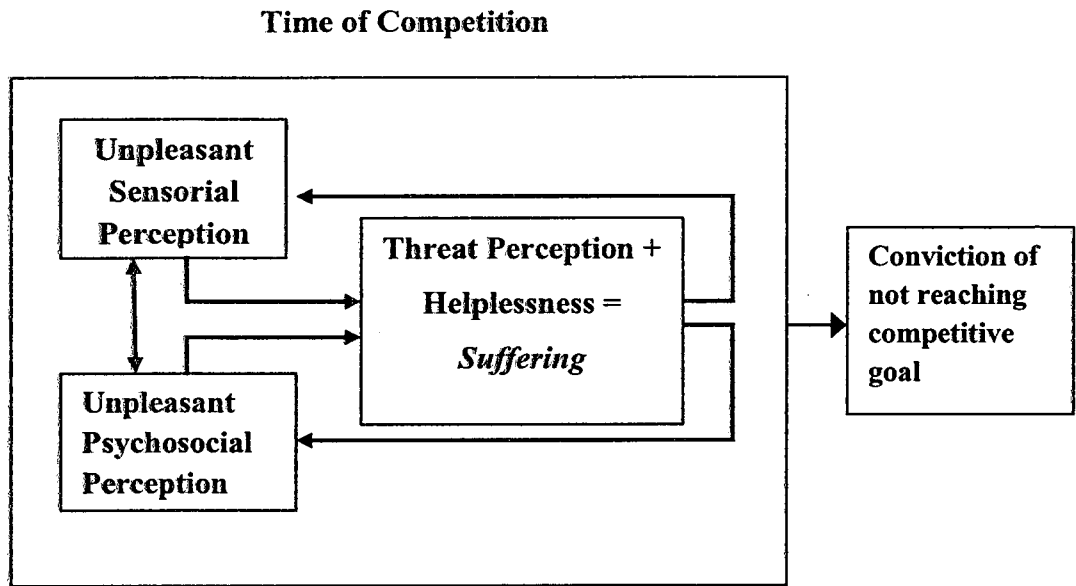


Figure 2.2 Competitive suffering model, adapted from Bueno et al. (2008)

Competitive suffering is hypothesized to take place when an athlete realizes while *competing* that an important goal will not be reached. The feelings of threat and helplessness which are brought about because of this realization result in a suffering experience (Bueno). Thus, two main perceptions are important for competitive suffering: perceived control and perceived availability of coping resources. Although suffering is not an emotion per se, Bueno et al., (2008) recognizes it to be a prevalent person-environment event in endurance sport that is associated with a specific relationship between cognitive appraisal and coping processes (see Figure 1.2).

An example of competitive suffering is presented in the opening anecdote of this paper (see page xii). The Ironman triathlete described in the anecdote encountered intense intestinal discomfort during the bike section of the race and she was unable to maintain her pace. The athlete initially attempted to reduce her discomfort and to regain her pace, but after several attempts (i.e., nutrition, pain killers, etc.) she realized that she would not be able to reach her goal time. She also fell behind several of her age-group competitors. This resulted in a negative affective state (i.e., competitive suffering) that continued for the duration of the bike portion, after which the athlete was able to regain a desire to finish the race. She appeared to regain this desire by (a) supplementing with food/drink and (b) reappraising the situation and setting a new objective of overcoming her discomfort and successfully completing the race.

Bueno (2000) suggests that three types of threat are central to competitive suffering among endurance athletes: (a) psychosocial threat, (b) general threat, and (c) respiratory threat. Psychosocial threat relates to worries about interactions between

themselves and other people in the environment, (e.g., coaches, athletes and officials). General threats are worries related to sensorial, psychological, and muscular affects on performance, (e.g., perceptions of leg pain). Lastly, respiratory threats are related to worries about breathing, (e.g., feeling out of breath). Overall, increased threat is associated with greater competitive suffering and poorer performance (Bueno et. al, 2008). The presence of threat, however, is insufficient in and of itself to produce competitive suffering. Endurance athletes must also perceive coping resources to be inadequate for appropriately managing their threat.

Bueno et al., (2008) has identified six types of coping strategies that are related to competitive suffering: (a) dissociation, (b) self-blame, (c) social support, (d) positive reappraisal, (e) decreasing or increasing effort, and (f) association. Dissociation is labeled as attention to irrelevant thoughts to avoid a threat or discomfort. Self-blame is embodied in the athlete's criticism, either to themselves or their performance. Social support is related to using other runners to improve or maintain their own performance. Positive reappraisal involves effort to perceive the threat in a more positive light, such as "running to the next food station" rather than "running for the next twenty kilometers". Decreasing/increasing effort refers to the amount of effort put forth in response to a threat. Finally, association is related to attention towards relevant aspects of the competition to cope with perceived threat, such as focusing on breathing rhythm. Research has reported that both self-blame and positive reappraisal were used more when athletes experienced increased threat. Self-blame resulted in negative, and positive reappraisal resulted in positive, *performance* outcomes in runners (Bueno et al., 2008).

However, it is unclear which coping efforts are more or less effective for alleviating competitive suffering and how these efforts are applied throughout competitive suffering episodes.

Other research has identified the coping that is employed by endurance athletes during competition in general. For example, cyclists use a variety of coping efforts to manage exertion pain such as self-talk, accepting the pain, maintaining optimism, trying to maintain control of the pace, breathing control, and focusing on technique (Kress & Statler, 2007). Meanwhile, Buman et al., (2008) indicated marathon runners' strategies for managing "hitting the wall" and categorized the coping efforts into four dimensions: (a) cognitive strategies (e.g., association), (b) emotion-focused coping strategies (e.g., obtaining social support), (c) race-related efforts (e.g., supplementation), and (d) no strategy (e.g., hopeless attitude). Other authors have chosen to assess the coping functions used by endurance athletes during competition. Hammermeister and Burton (2001) demonstrated that endurance athletes reported using a *combination* of emotion-focused and problem-focused coping strategies. In sum, this literature reveals that endurance athletes use a range of coping efforts and that coping efforts are primarily directed towards problem- and emotion-focused coping functions.

2.6 Summary and Purpose of Study

Negative emotional states, such as competitive suffering, and the individual's response to them are rooted in an athlete's appraisal of both the significance of the situation, and what can be done within this context. These factors (i.e., emotion, coping, and appraisal) are known as the coping process, which is a transactional process that

unfolds over time (Lazarus, 1999). The coping process is particularly relevant for sport research, in light of the implications of coping for the performance and well-being of athletes (Nicholls & Thelwell, 2010). Coping is both moderated (e.g., age, gender, experience) and mediated (e.g., perceived control, goal attainment expectancy) by individual differences, which influence the types coping efforts that are used and the effectiveness of specific coping efforts. For example, when an athlete perceives the potential for personal control over a threat, (a) he is likely to direct coping efforts towards a problem-focused function (Kowalski et al., 2005), and (b) problem-focused coping is suggested to be the most effective coping function (Folkman, 1992). Furthermore, the coping process is influenced by temporal changes (shifts in environmental demands, constraints, or resources) in any given emotional encounter. Temporal coping use has primarily been investigated during the pre- and post-competitive phases (e.g., Cerin & Barnett, 2006). The investigation of temporal coping use *during* competition has not been studied extensively, despite the importance of coping for competitive emotions and performance (Cerin et al., 2000; Gaudreau et al., 2002).

Competitive suffering is an in-competition emotional state that may be measured according to temporal changes in emotional demands. Endurance athletes use a wide variety of coping efforts to manage different phases of competitive suffering. However, the types of coping efforts used, the coping functions endorsed, the temporal application of these functions, and coping effort effectiveness is poorly understood in this context. The investigation of coping use during this emotional state will provide information about how athletes are able to manage their emotions during competition. Consequently,

the purpose of this study was to investigate endurance athletes' coping function use during the different temporal phases of competitive suffering episodes. Coping functions were assessed because of demonstrated relationships with adaptive outcomes (e.g., Kim & Duda, 2003). Additionally, the relationships between (a) coping function use and perceived control over competitive suffering, and (b) coping function use and duration of competitive suffering were explored.

A number of hypotheses are advanced for this work. First, it was hypothesized that coping function use would change across three phases of competitive suffering (Lazarus, 2000; Cerin et al., 2000), and that specific types of coping function use would be associated with the adaptive outcomes of coping efforts used during competitive suffering. Short competitive suffering episodes were viewed as a more adaptive response in relation to episodes which last longer. Specifically, it was hypothesized that problem-focused coping would be associated with the reintegration from competitive suffering episodes, and be used to a greater extent by those who suffer for shorter durations (Ntoumanis & Biddle, 1998). Meanwhile, it was predicted that emotion-focused and avoidance coping would be associated with longer competitive suffering duration and would be used to the most during the initiation phase among all participants (Gaudreau et al., 2002).

The second hypothesis of this study was that overall control beliefs would be positively related to competitive suffering duration (Folkman, 1992). This was expected because heightened control beliefs have been related with adaptive outcomes in sport (e.g., Kim & Duda, 2003). The third hypothesis was that perceived control beliefs would

be related to coping function use. It was predicted that perceived control of the situation would be positively related with problem-focused coping, but not related with emotion-focused coping. It was predicted that emotional control beliefs would positively relate with emotion-focused coping, and not relate with problem-focused coping (Kowalski et al., 2005; Poliseo, 2009).

CHAPTER 3

METHODS

In this chapter, an outline and rationalization of the methods used to test the research hypotheses will be discussed, as well as the revisions made to these procedures following a pilot study. In this study, subjects were asked about their emotional and coping responses in response to a simulated suffering episode, induced through a 5 km running time trial.

3.1 Participants

Male and female adult long distance runners were sought for participation in this study. Long distance runners were targeted because (a) a demanding time-trial run was to be completed as part of the study procedures, and (b) the ability to access the population in the local area. In addition, by targeting both genders it is argued that a greater number of participants can be accessed and that this range will provide an inclusive understanding of competitive suffering.

Three delimiting factors were imposed on participant selection. First of all, an age range of 18 to 60 years of age was chosen to limit the variance in the coping process due to developmental differences (Skinner & Zimmer-Gembeck, 2007). Secondly, participants had to be actively training at least five times a week during the data collection period, to ensure competency at the running task and that the study procedures (i.e., running time trial) were personally relevant. Finally, participation was restricted to those who had at least two years of experience training for and competing in races. This

criterion was chosen so that participants were likely to have knowledge and experience available to determine personal time goals.

Four male participants ($M_{\text{age}} = 25.3$, $SD = 5.9$) took part in a pilot study. These runners were not included in the final sample. Following the pilot study, 31 participants completed the main study. Four of these participants did not experience competitive suffering, and one participant was outside of the sample parameters (having competitive experience of less than one year). Therefore, the final sample consisted of 15 female and 11 male participants, ranging in age from twenty to sixty years of age ($M_{\text{age}} = 35.8$, $SD = 12.1$). The participants were competitively active in different types of endurance sports (see Table 3.1). Demographic information about the final sample appears in Table 3.2.

3.2 Recruitment

Human Subject Research Committee ethical approval was obtained prior to subject recruitment. A variety of methods were used to recruit athletes for this study. During the first step of recruitment the primary researcher contacted leaders of local running clubs and running teams, through phone and e-mail, to obtain consent to attend meeting times for recruiting purposes. Once access was permitted, the primary researcher visited meeting times and delivered a short subject recruitment presentation. The primary researcher also utilized a snowball sampling technique, by encouraging runners, running club leaders and participants of the study to share study information with other runners.

A variety of additional recruitment efforts were made. Posters were placed on information boards at local running stores, fitness clubs, and around the University of

Table 3.1

Main sports of participation (N = 26)

Sport	Frequency (%)
Road running, less than 21km	6 (23.1)
Road running, equal to or more than 21km	11 (42.3)
University track team member	2 (7.7)
Triathlon, less than half-ironman distance	3 (11.5)
Triathlon, equal to or more than half-ironman distance	4 (15.4)
Total	26 (100)

Table 3.2

Demographic composition of study sample (N = 26)

Demographic Variables		
Income (dollars)	Mode (<i>f</i>)	30-39,999 (5), 60-79,000 (5)
	Range	10,000-150,000 plus
Education (years)	Some college or university	9
	University or college degree	17
Recent race date (prior to study)	Less than a week	4
	One week to one month	13
	More than a month	9
5km study run time (mm:ss)	<i>M</i> (<i>SD</i>)	0:24:14 (0:03:25)
	Range	0:16:15 to 0:31:27
Competitive experience (years)	<i>M</i> (<i>SD</i>)	7.8 (6.9)
	Range	2 to 26 years
Training volume (hours/week)	<i>M</i> (<i>SD</i>)	7.3 (3.3)
	Range	4 to 15 hours

Lethbridge campus. The primary researcher also attended three separate local race registration days. On these days the researcher set up a table with free sport drink available, and discussed the study with passers-by. Interested individuals were provided with pamphlets and encouraged to provide their contact information on a participation sign-up sheet. Appendix A contains the script, poster and pamphlet used in recruiting procedures.

3.3 Procedures

During athlete recruitment, study procedures were verbally explained to potential participants. It was explained that athletes would be asked about emotion and coping strategies used during the completion of a 5 km running time trial. Written consent was obtained from all participants prior to commencing the study. At the time of consent, participants also completed the Physical Activity Readiness Questionnaire (PAR-Q; Reading & Shepard, 2002) to ensure adequate health to complete the study. Immediately following, participants completed a demographic questionnaire and time-trial goal questionnaire; the latter being used to determine a challenging but realistic goal time for the time-trial.

3.3.1 Phase I: Competitive suffering task. Participants were guided to the indoor 200 meter track and completed a 1000m warm-up at a comfortable pace. No feedback devices (e.g., watch, clock or iPod) were available to runners during the entire time-trial run and two researchers were present. A research assistant videotaped the run, while the primary researcher guided the participants through the study procedures and provided feedback during the run. After the warm-up, participants were reminded of the

time goal they set for the time trial and told to start the 5 km time trial from the start-point when they felt ready.

Pace time and elapsed time were provided verbally and written on a white board near the start/finish line following every 1000 meter interval. Participants were also provided with encouragement and the distance covered continually throughout the run. General encouragement provided by the primary researcher included phrases such as “great work”, “keep it up”, “you’re looking strong”, “keep those feet moving”, and “use everything you’ve got”. During each participant’s time trial, competitive suffering was induced through failure-oriented feedback procedures established by Bueno and colleagues (2008). The pace and elapsed times provided to the participant were 5% slower than the actual pace and time elapsed at each feedback point (i.e., from kilometer one through five). Thus, the times provided to the runners were considerably slower than what they were actually running. For example, if an individual completed two kilometers in 0:08:00 meaning they were on pace to run the trial in 0:20:00, the time and pace provided would be 0:08:24 and 0:21:00 respectively. Altered times were determined using a table that had been created to link specific interval times with their altered interval time, and altered pace time. During the three trials when the 5% difference was not great enough to create a pace that was slower than the runner’s goal time because the runner was substantially improving upon their goal time, the feedback was changed to ensure that the pace provided was a *minimum* of 30 seconds slower than the goal time. Altered feedback was provided with the intent of producing a competitive suffering state.

3.3.2 Phase II: Measurement of threat, perceived control and coping during competitive suffering. Immediately following the time trial, participants were asked to cool down, for as long as necessary. Then, the participants walked with the primary researcher to the laboratory to complete the remaining assessment procedures. At this juncture, participants were provided with complimentary food and drink options, including water, energy bars, fruit snacks, and sport drink. The primary researcher was the only other person in attendance for the second phase of the study.

Athletes first completed three questionnaires in the laboratory setting: The Assessment Inventory for Threat in Endurance Sports (AITES; Bueno et al., 2002), the Assessment Inventory for Coping Resources in Endurance Sport (AICRES; Bueno et al., 2002), and the Control Beliefs Questionnaire (Kowalski et al., 2005). Next, runners were subjected to a structured video-mediated recall interview regarding perceptions of threat and coping used throughout the time-trial run (Welsh & Dickson, 2005).

At the conclusion of the interview, participants were informed that the assessment procedures were complete. Full disclosure of the study objectives was provided to the participant and he or she was provided with the actual completion time of the running time trial. This information was provided to reduce the potential for the study manipulation procedures to bring about adverse feelings or beliefs in the participants (Bueno et al., 2008). Participants were also asked not to comment on the use of deception in this study with others. It was explained that the success of the research relied upon the participants' naiveté of the research protocol. Finally, the participants were then thanked for their contribution to the study. Participants who indicated that they

would like to be informed of the results were provided with an executive summary of the results, via e-mail, following data analysis.

3.3.3 Ethical considerations. Special ethical considerations for this study included participant deception, heavy physical work, and a negative emotional experience. The first ethical consideration concerned participants' ability to complete a physically taxing run. Although the physical exertion of the study task was arguably similar to what the sampled runners would typically experience during training/competition, individuals were asked to complete the PAR-Q before participating in the study. No participants expressed negative consequences from the exertion expended during the task.

The participants in this study were also subject to deception in the form of false negative feedback regarding their running times. This deception was required to ensure participants' confidence in the negative feedback, which was provided to bring about competitive suffering. While competitive suffering occurs as a negative affective state, it is accepted by athletes as a potential experience during competition (Atkinson, 2008). Often, runners are unable to reach their goal time during normal training conditions. Thus, it was anticipated that the negative affect induced through the use of feedback deception would have negative short-term consequences (i.e., uncomfortable and undesirable to the runner), but would not have a long-term psychological effect on the participants. That said, it was still prudent to mitigate any potential long-term consequence by providing participants with the true time achieved during the time trial once they had completed the study.

3.4 Measurement Tools

A number of measurement tools were applied in the research. Each instrument is described in detail in the following subsections. All original instruments, created for this study, appear in appendix B.

3.4.1 Demographic and time-trial goal questionnaire. The demographic information that was assessed included age, gender, socioeconomic status, years of competitive experience in long distance running, weekly training hours, and recent race times. This information assisted in description of the studied sample.

A challenging personal goal time for completing a 5 km trial was also obtained through a goal efficacy scale. The goal efficacy scale ranged from fifteen to thirty-four minutes, increasing in thirty second intervals. Similar scales have been used in prior research (e.g., Hadd & Crocker, 2007). Participants first listed the fastest time that they were 100 percent confident (total confidence) that they would achieve. Then confidence of achieving each faster 30s interval was assessed until participants reached a time that they were zero percent confident in achieving (i.e., the time was perceived to be unattainable). Participants finally selected a goal time within the range of 60 to 90 percent confidence that they felt would be challenging but highly achievable on the day of testing.

3.4.2 Assessment Instrument of Threat in Endurance Sports. The Assessment Instrument of Threat in Endurance Sports (AITES; Bueno et al., 2002) retrospectively assesses the perception of threat during an endurance task. The AITES (and AICRES, see section 3.4.3) were originally developed in the Spanish language. The English

versions of the questionnaires were created by the primary researcher via back translation procedures (see Gallasch, Alexandre, & Amick, 2007). Specifically, the questionnaire was first translated from Spanish to English by an individual with Spanish as their first language. This English version was then translated back to Spanish, by an individual with English as their first language. The resulting Spanish version was then compared to the original, and substantial deviations in the meaning of questions signified areas where improvement in the English translation was necessary. The English version was modified according to the noted differences between the Spanish copies, creating a final version for use in this study. The AITES (and AICRES) scales are yet to be validated with a North American sample, and thus were not used as primary dependant or independent variables in this study.

The AITES consists of 19 items that inquire about three types of threat experienced by endurance athletes including general threat, psychosocial threat, and respiratory threat. Athletes respond to the items using a ten point Likert scale ranging from 0 (representing “*not at all*”) to 10 (representing “*very much so*”). The questionnaire was modified for use in this study. Rather than asking how much the participants worried about the aspects during the *competition*, they were asked about feelings during the *time trial*. For question 3 the term “time trial” was used, rather than race. One question, “comments from or presence of teammates” was removed as it is not relevant to the testing situation. Questions 17 and 18 were also reworded. Question 17 was originally worded “comments or presence of specific opponents” and was reworded to “comments

from or presence of other runners on the track.” Question 18 was reworded from “comments or presence of coach” to “comments or presence of researcher.”

Responses can be totaled for each subscale, resulting in subscale scores ranging from zero to 90 (general threat, nine questions), 40 (psychosocial threat, four questions), and 40 (respiratory threat, four questions). Subscales are also added together to create a composite threat score. Heightened scores on any subscale or on the composite score indicate heightened levels of perceived threat. Cronbach’s alpha values for AITES subscales within this study were adequate for general threat ($\alpha = .78$), but were poor for psychosocial ($\alpha = .52$) and respiratory ($\alpha = .51$) threat.

3.4.3 Assessment Instrument of Coping Strategies in Endurance Sports. The Assessment Instrument of Coping Strategies in Endurance Sports (AICRES; Bueno et al., 2002) retrospectively assesses coping strategies used by endurance athletes to deal with perceived threat while running. The AICRES is used in conjunction with the AITES to indicate suffering, as athletes who report high perceived threat in combination with high coping strategy use are predicted to have greater suffering. It uses 28 items to assess the use of six types of coping strategies (dissociation, self-blame, social support, positive reappraisal, decrease/increasing effort, and association). Athletes rate the use of each strategy using a ten point Likert scale ranging from 0 (representing “*not at all*”) to 10 (representing “*very much so*”). Similar to the AITES, aspects of the questionnaire was modified. First of all, the word *competition* was reworded to *time trial* in the instructions. The entire social support subscale (4 questions) of this questionnaire is removed for this study because social support was generally not available to participants. Question 13 was

reworded from “I paid attention to mountains, buildings, stands, traffic signals and any other irrelevant thing” to “I paid attention to objects outside the windows, stands, banners around the track, exercise equipment, and any other irrelevant thing.” Questions 2, 10, and 15 were also reworded, changing the terms “competition” or “race” to “time trial.

Responses can be totaled for each subscale, resulting in subscale scores ranging from zero to 50 (association), 60 (dissociation), 40 (self-blame), 40 (positive reappraisal), and 50 (decreasing/increasing effort). Subscales are also totaled to create a composite coping score. Heightened scores on any subscale or on the composite score indicate increased application of strategies which fall within a specified category (subscale) or increased coping application overall (composite). Cronbach’s α values for AICRES subscales within this study were adequate for dissociation ($\alpha = .73$), self-blame ($\alpha = .79$), and effort ($\alpha = .85$) but were poor for reappraisal ($\alpha = .59$) and association ($\alpha = .61$).

3.4.4 Beliefs of Perceived Control Scale. The Beliefs of Perceived Control Scale (Kowalski et al., 2005) consists of six items to assess perceived control over (a) changing the situation and (b) controlling emotions surrounding a challenging and stressful competition. Items are rated on a 5-point Likert scale ranging from 1 (*not at all agree*) to 5 (*totally agree*). Scale scores range between 3 and 15 for situational control and emotion control. Adequate psychometrics of this scale has been empirically reported (Kowalski et. al, 2005). In addition, Cronbach’s α values for the situational ($\alpha = .74$) and emotional ($\alpha = .86$) control subscales were adequate in the current study.

3.4.5 Perceived Goal Attainment Scale. The perceived threat of not reaching an established running time-trial goal time was assessed using the perceived goal

attainment scale during the structured video-mediated interview. Each participant watched his or her video-taped time trial run and was instructed:

“As you watch your race, think about how you *felt* about your ability to reach your time-trial time goals. Rate the feelings you had regarding your time trial goal on this scale, ranging from zero to ten (on the sliding scale that you have been given); with zero representing primarily *negative feelings* about your ability to reach your time goal, and ten representing primarily *positive feelings* about your ability to reach your time goal. Specifically, we are not asking whether or not you thought you could reach your time goal, but how you felt about this ability at each point in time. Please continually rate this level by raising or lowering the dial to reflect your thoughts at that time.”

This method of obtaining recall is termed continuous video mediated recall (Lorber, 2006) and similar continuous affective rating scales have been employed to understand emotional state fluctuations throughout athletic competitions (Calmeiro & Tennenbaum, 2007). The perceived goal attainment scale appeared in a semi-circle form on a mechanical device (see Figure 3.1). Participants swung a revolving arm to the value that best reflected their perceptions at the corresponding point in time in the video. Scale scores ranged from zero, indicating *primarily negative perceptions towards goal attainment*, to ten, indicating *primarily positive perceptions towards goal attainment*. The researcher recorded the values indicated at 200m intervals throughout the viewing. In total 25 goal attainment perception scores (each 200 m) were obtained for each participant. The time interval between rating scores ranged from 40 to 77 seconds for participants ($M_{\text{lapttime}} = 58.8$, $SD = 8.4$) due to differences in speed throughout the trials.

Competitive suffering was operationalized using the perceived goal attainment scores. A state of competitive suffering was indicated when perceived goal attainment

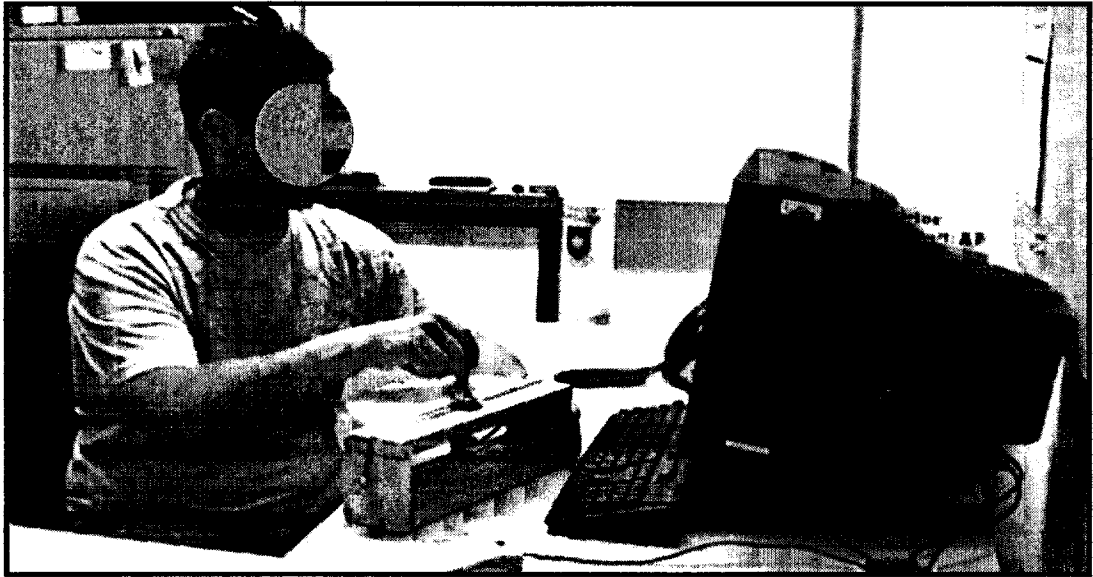


Figure 3.1. Photograph of study participant watching video of their run, and providing continuous recall ratings, during video mediated recall. Note the semicircular spring-loaded mechanism used by participant.

dipped below five (Bueno, 2000). A subsequent perception score of at least five indicated the resolution of competitive suffering. Competitive suffering duration was evaluated as the number of 200 m intervals of competitive suffering (i.e., perceived goal attainment scores between 0 and 4). Increased numbers of intervals suggested longer durations of competitive suffering.

Additionally, phases of competitive suffering were identified to better understand the coping processes over the course of competitive suffering (Bianco et al., 1999; Lazarus, 1991). Three phases of competitive suffering included (a) threat is increasing (initiation of suffering), (b) threat at its peak (peak of suffering), and (c) threat is dissipating (reintegration). Change scores of each participant's perceived goal attainment were used to determine the phase of competitive suffering. The change scores were calculated by subtracting the previous intervals' rating from the rating of the current interval. Negative change scores were coded as initiation, neutral change scores were coded as peak, and positive change scores were coded as reintegration intervals.

3.4.6 Coping function assessment. Information about coping was collected using a code specific recall method during a second viewing of the video-taped time trial (Welsh & Dickson, 2005). Specifically, the video-tape was rewound following the first viewing to the point where the identified competitive suffering episode had taken place. This episode was then replayed, and the tape was paused at 200m intervals. When the tape was paused, participants responded to the question, "to what extent were your coping efforts [such as those obtained from the completed assessment inventory of coping resources in endurance sport] being used for problem-focused, emotion-focused,

and avoidance coping during at this point in your run”. Coping function use was assessed using a single item representing each of three coping functions. Participants were presented with verbal and written definitions (on a sheet) of problem-focused, emotion-focused, and avoidance coping (see Figure 3.2). Participants verbally rated the extent of coping function use in the past 200 m interval on a Likert scale with endpoints of 1 (representing *‘not at all’*), and 5 (representing *‘very much so’*). Coping function use data was collected only during the 200 m interval segments where competitive suffering was identified, as well as the first 200 m interval following competitive suffering (i.e., the final interval in the reintegration phase). The number of 200 m interval segments where coping function use data was collected ranged from 3 to 15 for the sample.

Coping function use data was reduced across phases of competitive suffering. Specifically, participants’ responses for each coping function were averaged within each of the competitive suffering phases, resulting in 9 overall coping function ratings for each participant (three phases x three coping functions).

3.5 Revisions to Procedures and Instrumentation

A pilot study with four male athletes was conducted to test the methodology as outlined and to develop proficiency of the researcher (and research associate) in implementing assessment procedures. As a result of the pilot study, three primary amendments were made to the methodology, including: (a) changes to the feedback structure, (b) revision of continuous recall scale-range, and (c) integration of continuous recall and code-specific recall instrumentation.

3.5.1 Feedback structure. During the pilot study, it became apparent that the feedback structure, whereby slowed feedback was provided at each time interval, was insufficient to bring about competitive suffering in two of the first three participants. One participant stated that he was distrustful of the split times following the first slow 1000m interval. In addition, the long period of time prior to the first feedback point lead several runners to focus primarily on their physical perceptions rather than time feedback. Thus, the negative feedback structure was modified to retain participant trust and interest in the feedback provided. Correct time and pace feedback were provided following the first 200m and first kilometer of the time trial. Feedback that followed was 5% slower than the actual pace and time elapsed. The resulting feedback structure was utilized in all subsequent trials.

3.5.2 Continuous recall revisions. The original continuous recall scale ranged from zero through ten and suffering was predicted to take place when reported values ranged below a rating of five. Using this scale, competitive suffering episode identification was difficult in the pilot study as a result of widely ranging participant

ratings. The ambiguous nature of the predicted neutral point was understood to be the source of this range, as participants were not provided with a definitive neutral point. Thus, a new strictly bipolar scale was developed with a consideration of the bipolar nature of positive and negative affect (Russell & Carroll, 1999). Though Russell and Carroll recommend the use of an ambiguous-likely bipolar scale for assessing affect (no specific neutral point is identified and the respondent is left to define the anchors to the scale), a strictly bipolar scale was chosen. A strictly bipolar scale was selected to provide a definitive and consistent neutral point for establishing the entrance into and out of competitive suffering among all participants. The scale developed for use in the current study ranged from -5 (*primarily negative feelings*) to +5 (*primarily positive feelings*), with zero as a neutral point. The scale instructions were reworded to the following:

“As you watch your race, think about how you *felt* about your ability to reach your time-trial time goal. Rate the feelings you had regarding your time trial goal on this scale, ranging from negative five to positive five (on the sliding scale that you have been given); with negative five representing primarily negative feelings about your ability to reach your time goal, zero representing a neutral state, and positive five representing primarily positive feelings about your ability to reach your time goal. Specifically, we are not asking whether or not you thought you could reach your time goal, but how you *felt* about this ability at each point in time. Please continually rate this level by raising or lowering the dial to reflect your thoughts at that time.”

Thus, the initiation of competitive suffering was defined as when continuous ratings dipped below zero, and the conclusion of competitive of suffering was when ratings retained at least a value of zero.

3.5.3 Integration of continuous and code-specific recall procedures. To shorten the amount of time required to complete the video-mediated recall procedures,

the two phases of recall were integrated. Specifically, rather than completing the code-specific coping function recall phase in a separate viewing of a single suffering episode, this phase was completed during the original viewing. Before the viewing, participants were informed of the continuous recall procedures and it was stated that the tape will be stopped at several periods during the viewing for further questioning. The tape was then played continuously until a recall value of zero was reported. At this point, the tape was stopped for participants to report coping function use. The tape was repeatedly stopped at 200m intervals until continuous recall ratings rose above zero, at which point the tape was again played continually.

3.6 Data Analysis Plan

3.6.1 Preliminary analyses. Independent samples t-tests were completed as a to verify the presence of coping and threat differences (i.e., AITES & AICRES) between the 4 participants who did not report a negative perceived goals attainment score (i.e., no competitive suffering), and the 26 participants who did. All variables were assessed for normality and the presence of outliers using procedures outlined by Tabachnick and Fidell (2007).

3.7.2 Main data analysis procedures. One-way Pearson's *r* correlations were used to assess the relationships between perceived control and competitive suffering duration group membership. One-way Pearson's *r* correlations were also used to assess relationships between perceived control and coping function use.

A mixed 3-factor repeated measures ANOVA [suffering group (short/long) x phase (initiation, peak, reintegration) x function (PFC, EFC, AvC)] was used to

investigate differences in endorsement of problem-focused, emotion-focused and avoidance coping across three phases, between the short and long suffering duration groups. Repeated measures ANOVA's were also applied separately with each group, to assess differences in coping function endorsement across three phases within the groups. Follow-up pairwise comparisons using independent samples t-tests, with Holm's (1979) Bonferroni corrections applied to prevent spurious results, were used to investigate significant interactions. All analyses were tested at an alpha level of .05, and two-tailed ANOVA's and t-test statistics were calculated.

Finally, three individual competitive suffering profiles were selected to provide an idiosyncratic view of the sequence of suffering ratings and coping efforts within specific individual.

CHAPTER 4

RESULTS

4.1. Manipulation Check of Competitive Suffering, Preliminary Analysis, and Descriptive Statistics

Based on AITES and ACRES scale scores, there was no significant (overall) *coping* difference between athletes who reported competitive suffering ($n = 26$) and those athletes who did not ($n = 4$), $t(30) = -1.540$, $p = .13$. There were, however, significant between group differences for *threat*, $t(30) = -3.224$, $p < .01$, ($M_{\text{sufferers}} = 61.3$, $SD = 23.3$; $M_{\text{nonsuff}} = 23.0$, $SD = 8.4$). Athletes who reported experiencing competitive suffering had significantly higher levels of (overall) threat. The 4 participants who did not report experiencing competitive suffering were consequently removed from further preparation and analyses.

All ordinal and interval variables were normally distributed (i.e., skewness and kurtosis values less than three times the standard error of skewness, or kurtosis) and no univariate outliers were present (i.e., all standard scores were < 3.29). Median split determined two suffering duration groups and resulted in one short duration competitive suffering group (suffering duration of 1 to 4 intervals) and one long duration competitive suffering group (suffering duration of 5 to 14 intervals). The short duration group was composed of 5 males and 8 females; ($M_{\text{age}} = 37.15$, $SD = 13.7$) and the long duration group was composed of 6 males and 7 females ($M_{\text{age}} = 34.5$, $SD = 10.6$). Descriptive statistics of the 26 participants retained for analysis, separated by group, are provided in Table 4.1. Independent samples t-tests and chi-square analyses were used to indicate

differences between the two groups on potential control variables, including age, gender, and experience (Nicholls & Polman, 2007). There were no significant differences between the groups for gender, $\chi^2(1, N = 26) = .158, p = .69$, age, $t(24) = .545, p = .59$, or experience, $t(24) = .618, p = .54$. However, there were significant differences for training volume, $t(24) = 2.841, p < .05$. The short duration group trained for fewer hours per week ($M = 5.7$ hrs, $SD = 2.1$) compared to the long duration group ($M = 8.9$ hrs, $SD = 3.5$).

4.2 Testing Research Hypotheses

4.2.1 Control beliefs. It was hypothesized that increased levels of perceived control would predict competitive short-duration suffering group membership. One-way biserial correlations were used to investigate whether suffering duration groups were related to perceived control. Biserial correlation (r_b) is a special version of Pearson's r , used when one variable is continuous (control beliefs) and the other is dichotomous with underlying continuity (suffering duration group). Correlation coefficients were non-significant, implying that neither situational control ($r_b = .12, p = .28$) nor emotional control ($r_b = -.02, p = .47$) was related to duration of competitive suffering.

Perceived control was also hypothesized to influence coping function use. Situational control beliefs were predicted to relate positively to problem-focused coping and emotional control beliefs were expected to be positively related to emotion-focused coping. One-tailed Pearson's r correlations demonstrated significant negative relationships between emotional control beliefs and problem-focused coping at the

Table 4.1

Descriptive statistics

Variable	Score Range	Group	
		Short ^a	Long ^a
Suffering duration (# of 200m intervals)	1 - 25	2.4 (0.9)	8.2 (3.0)
Perceived Control subscales			
Perceived situational control	3 - 15	10.1 (2.8)	10.7 (2.5)
Perceived emotional control	3 - 15	12.2 (2.8)	12.1 (1.4)
AICRES subscales			
Association	0 - 50	26.2 (11.0)	31.5 (5.0)
Dissociation	0 - 60	15.9 (11.4)	20.5 (13.5)
Self-Blame	0 - 40	9.0 (9.7)	14.4 (8.7)
Positive Reappraisal	0 - 40	21.5 (8.9)	25.1 (4.3)
Decreasing/Increasing Effort	0 - 50	21.9 (9.6)	22.5 (8.6)
AITES subscales			
General Threat	0 - 90	32.0 (16.0)	38.0 (12.6)
Psychosocial Threat	0 - 40	11.6 (8.6)	14.5 (8.4)
Respiratory Threat	0 - 40	10.5 (9.1)	11.4 (4.2)

^a*n* = 13 for each group

Table 4.2

Intercorrelations between coping function use and control beliefs scales

Subscale/Coping function	1	2
1. Situational Control	–	
2. Emotional Control	-.03	–
3. Initiation problem-focused	.16	-.40*
4. Peak problem-focused	.18	-.43*
5. Reintegration problem-focused	.20	-.17
6. Initiation emotion-focused	-.23	.18
7. Peak emotion-focused	-.24	.02
8. Reintegration emotion-focused	.17	.04
9. Initiation avoidance	-.17	.05
10. Peak problem avoidance	-.09	.15
11. Reintegration avoidance	-.22	.14

* $p < .05$

initiation and peak suffering phases. No other significant correlations were demonstrated. Table 4.2 displays the correlations.

4.2.2 Coping Function Use. To test the hypothesis that the competitive suffering duration groups would differ in their coping function use, a mixed 3-factor repeated measures ANOVA [suffering group (short/long) x phase (initiation, peak, reintegration) x function (PFC, EFC, AvC)] was used. Table 4.3 displays the coping function means throughout the three phases for each group, and Table 4.4 presents the ANOVA statistics that resulted from the analysis. A significant main effect for coping function demonstrated that coping function use within the entire group differed. Follow-up pairwise comparisons of coping functions indicated that avoidance coping was not utilized to the same degree as problem-focused and emotion-focused coping, and that no significant difference was evident between the latter two functions.

Participants in the two groups (i.e., short and long duration of competitive suffering) differed according to their use of coping functions across phases of suffering, as indicated by a significant interaction between suffering group, phase, and coping function, $F(4, 96) = 2.569, p < .05$, partial $\eta^2 = .097$. Follow-up comparisons indicated that the short duration suffering group reported increased emotion-focused coping use during the initiation, $t(24) = 3.498, p < .01$, and peak phases, $t(24) = 3.126, p < .01$, as well as less use of avoidance coping during the initiation phase, $t(24) = -2.50, p < .05$. Coping function means for each suffering group across the three phases of competitive suffering are displayed in *Figure 4.1 a* (problem-focused coping; PFC), *b* (emotion-focused coping; EFC), and *c* (avoidance coping; AvC).

Table 4.3

Mean coping function use during three suffering phases, by duration group

Coping Function	Phase	<i>M</i>		<i>SD</i>	
		Suffering Group		Suffering Group	
		Short ^a	Long ^a	Short ^a	Long ^a
Problem-focused	1	4.1	3.2	1.1	1.4
	2	3.6	3.7	1.2	1.5
	3	3.2	3.4	1.2	1.4
Emotion-focused	1	4.0	2.5	0.8	1.3
	2	4.5	3.5	0.6	1.0
	3	3.7	3.4	1.3	1.3
Avoidance	1	1.8	3.2	1.2	1.6
	2	1.9	2.9	1.4	1.8
	3	1.7	2.5	1.2	1.8

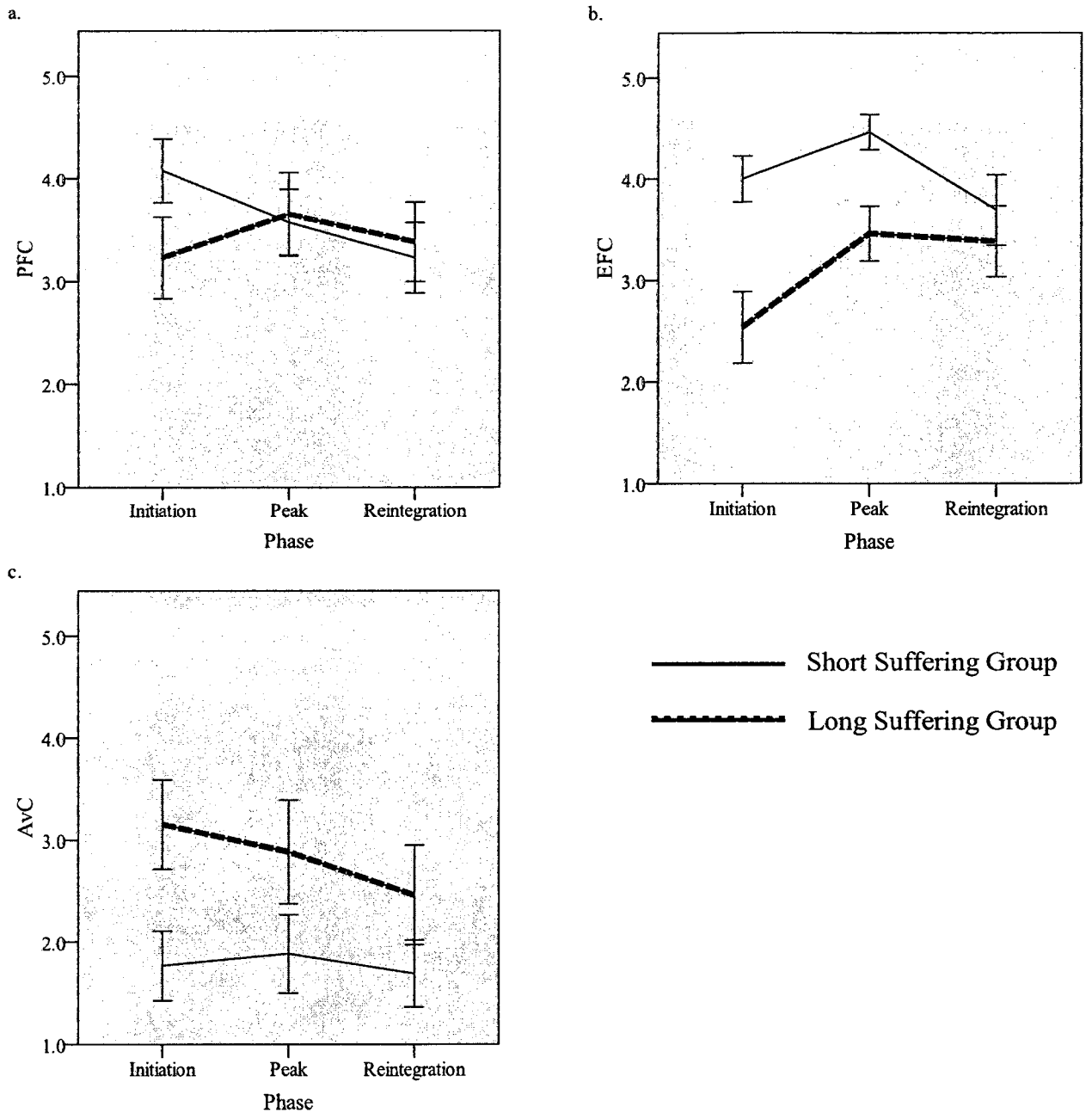
^a*n* = 13 for each group

Table 4.4

Mixed Analysis of Variance for coping function use

Source	<i>df</i>	<i>F</i>	partial η^2	<i>p</i>
Time (g.g)	1.6, 38.1	3.975*	.142	<.05
Function	1.5, 36.3	8.363**	.258	<.01
Time x group	1.6, 36.3	2.237	.085	.13
Function x group	1.5, 36.3	4.001*	.143	<.05
Time x Function	4, 96	2.072	.079	.09
Time x function x group	4, 96	2.569*	.097	<.05

* $p < .05$, ** $p < .01$.



Figures 4.1 a.-c. Group mean problem focused (a.) emotion focused (b.) and avoidance (c.) coping endorsement during three phases of suffering (+/- 1 SE). Significant differences between groups were present at the initiation phase in both emotion-focused and avoidance coping as well as the peak phase in emotion focused coping.

* indicates a significant difference, using Holm's (1979) Bonferroni correction, at an alpha level of $p < .05$.

Two within-group 3 (time) X 3 (coping function) repeated measures ANOVAs were also run for each group separately. A non-significant interaction between coping function and time, $F(4,48) = 2.423$, $p = .06$, partial $\eta^2 = .168$, was found for athletes in the long duration competitive suffering group, indicating that there was no significant difference at the within-group level in coping function use. Alternatively, a significant time x function interaction, $F(4,48) = 3.860$, $p < .01$, partial $\eta^2 = .243$, did emerge for athletes in the short duration competitive suffering group. Follow-up pairwise comparisons indicated that the use of problem-focused coping decreased between the initiation and reintegration phases, $t(12) = 2.856$, $p < .05$. The use of emotion-focused coping also increased from the initiation to peak phases, $t(12) = -2.650$, $p < .05$, and subsequently decreased from the peak to reintegration phases, $t(12) = 2.586$, $p < .05$.

4.2.3 Idiosyncratic profiles of competitive suffering. Three individuals were selected to illustrate idiosyncratic profiles of competitive suffering. Participant A was a 38 year old female triathlete with twenty years of experience in endurance sport. She completed her 5km time-trial run in 0:25:15, experienced three 200 m intervals of competitive suffering, and expressed moderate levels of perceived control (situational = 7, and emotional = 9). Participant B was a 23 year old female marathon runner with two years of competitive experience. She completed her time-trial in 0:24:06, experienced six 200m intervals of competitive suffering, and reported moderate situational (7) and high emotional (12) control beliefs. Participant C was a 37 year old male road runner with two years of competitive experience. He completed his run in 0:22:56, experienced eleven 200m intervals of competitive suffering, and reported moderate situational (8) and

high emotional (12) control beliefs. Figures 4.2, 4.3, and 4.4 illustrate the three participants' continuous recall ratings and sequence of coping efforts throughout their competitive suffering episodes.

The participants each demonstrate different approaches to coping with competitive suffering. Two important ways in which these three individuals' coping differed were: (a) the degree to which each coping function was used differently (i.e., whether one coping function was used primarily) and (b) the stability (or lack there of) of coping efforts throughout each individual's competitive suffering episode.

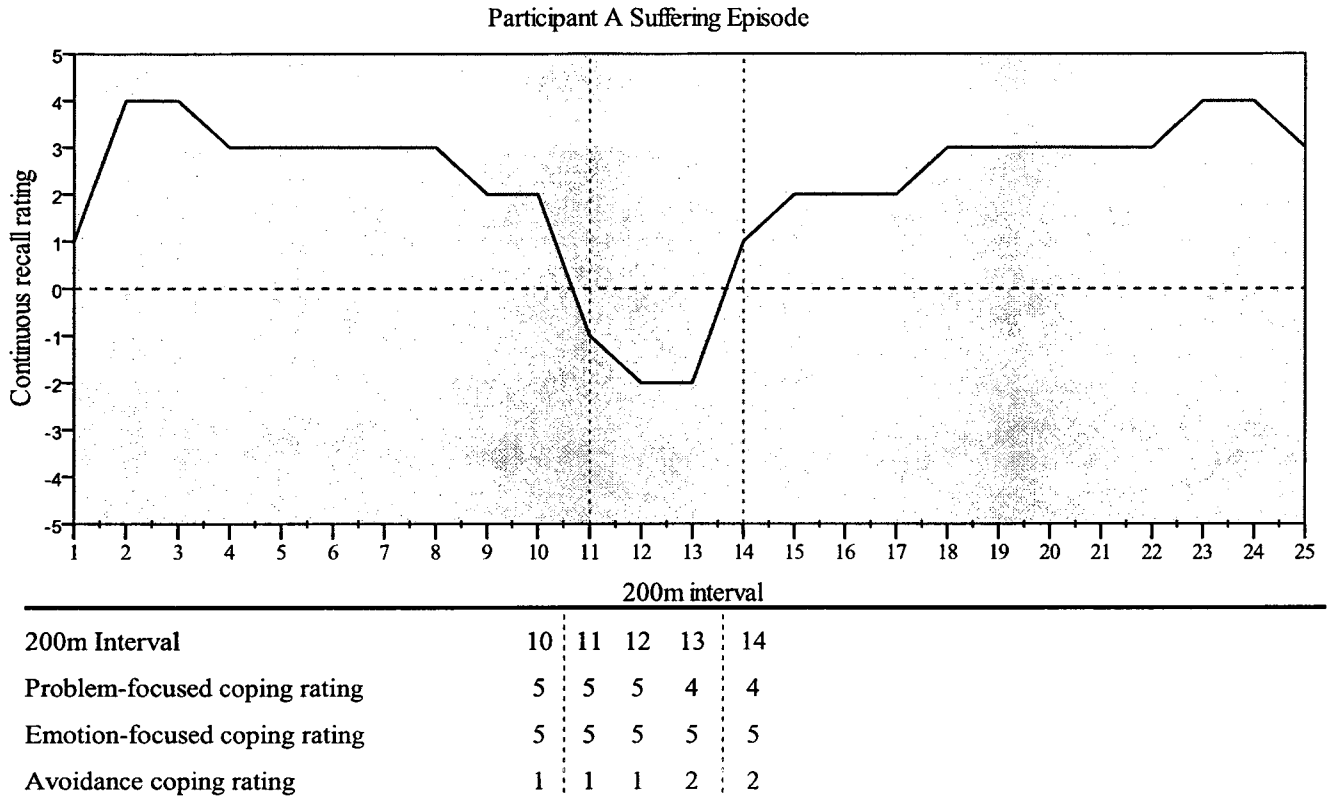
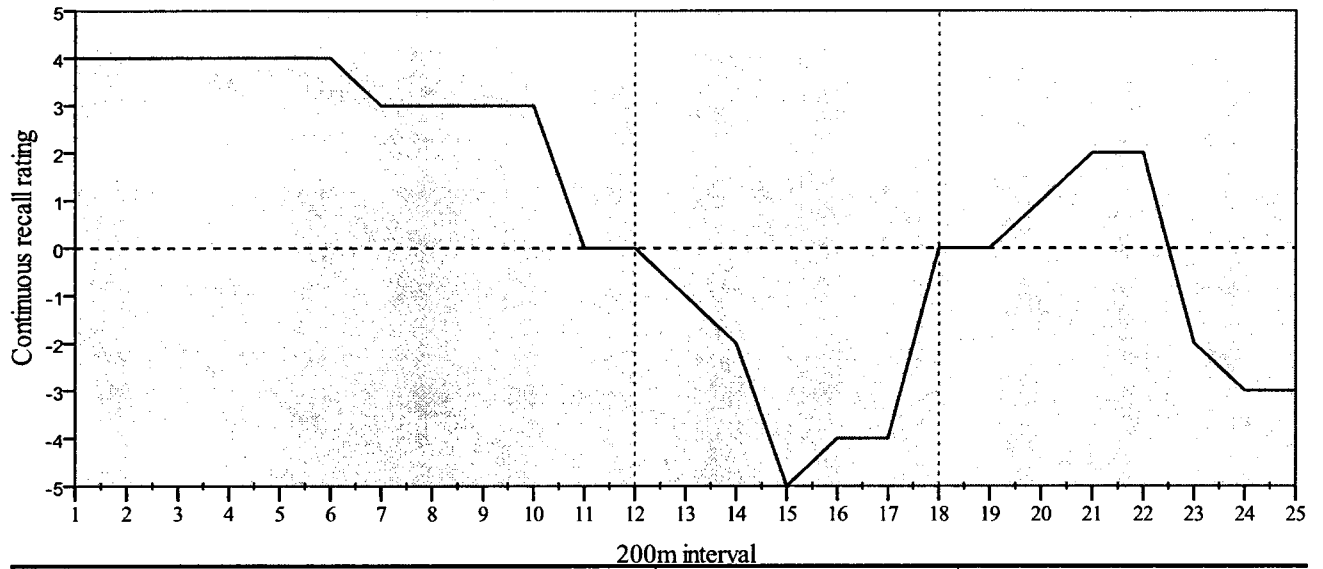


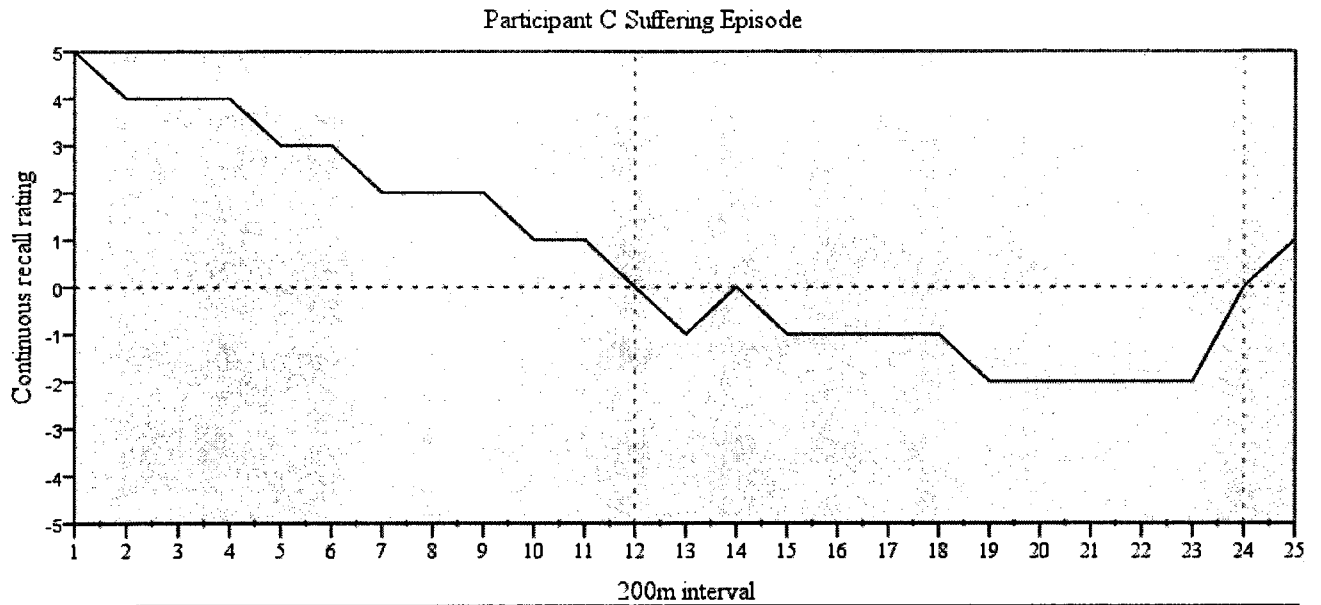
Figure 4.2 The continuous rating graph and coping function rating values for participant A. The dotted horizontal line on the graph indicates the positive-negative rating threshold, and the vertical dotted lines on both the graph and table indicate the beginning (left line) and conclusion (right line) of the suffering episode.

Participant B Suffering Episode



200m Interval	12	13	14	15	16	17	18	19
Problem-focused coping rating	2	3	4	4	3	2	4	4
Emotion -coping rating	1	2	3	4	4	4	2	2
Avoidance coping rating	4	4	3	1	1	1	1	1

Figure 4.3 The continuous rating graph and coping function rating values for participant B. The dotted horizontal line on the graph indicates the positive-negative rating threshold, and the vertical dotted lines on both the graph and table indicate the beginning (left line) and conclusion (right line) of the suffering episode.



200m Interval	12	13	14	15	16	17	18	19	20	21	22	23	24
Problem-focused coping rating	3	3	3	3	3	4	4	4	4	4	3	3	3
Emotion-focused coping rating	3	3	3	3	3	4	4	4	4	4	3	3	3
Avoidance coping rating	4	4	4	4	4	4	4	4	4	4	4	4	4

Figure 4.4 The continuous rating graph and coping function rating values for participant C. The dotted horizontal line on the graph indicates the positive-negative rating threshold, and the vertical dotted lines on both the graph and table indicate the beginning (left line) and conclusion (right line) of the suffering episode.

CHAPTER 5

DISCUSSION

The purpose of this study was to identify the coping functions used during the different temporal phases of competitive suffering and to examine whether coping function use influenced the duration of competitive suffering. Additionally, this study assessed whether perceived control beliefs influenced the type of coping function used and the duration of competitive suffering episodes. Competitive suffering was defined as a negative affective state that “arises when an athlete discovers, while competing, that an important goal will not be reached” (Bueno et al., 2008, p. 788). Longer competitive suffering duration was viewed as a less adaptive outcome, associated with athletes’ less effective coping efforts. In comparison, shorter competitive suffering episodes were viewed as a more adaptive outcome, associated with more effective coping. Lazarus’ cognitive-motivational-relational theory (CMRT; Lazarus, 1991) was also applied to orient the research. Three main hypotheses were addressed: (a) that coping function use would differ over time (i.e., across phases of competitive suffering) and in relation to competitive suffering duration, (b) that perceived control would be greater among those who suffer for shorter periods of time, and (c) that control beliefs would demonstrate relationships with coping function use.

The first hypothesis was partially supported, as athletes who competitively suffered for a shorter duration demonstrated decreased avoidance coping at the initiation phase and increased emotion-focused coping at the initiation and peak phases compared to longer duration sufferers. Problem-focused coping use did not distinguish between

long and short competitive suffering duration. Problem-focused and emotion-focused coping were also the primary coping functions used by all participants. Follow-up within-group and idiosyncratic assessments demonstrated that coping function use varied across suffering phases for those who suffered for shorter durations, and that individuals demonstrated unique patterns of coping, respectively. The second and third hypotheses were not supported. Control beliefs were not related to competitive suffering duration, and few relationships emerged between control beliefs and coping function use. This chapter will discuss these results in light of the current sport literature and indicate potential limitations and future directions of this study.

5.1 Coping Function Use

5.1.1 Coping function effectiveness across temporal phases of competitive suffering. The results of this study revealed important information about endurance athletes' functional use of coping during competitive suffering episodes. Based upon the CMRT and previous sport coping research, it was expected that participants' coping function use would change throughout competitive suffering episodes and that specific types of coping would be more adaptive for alleviating competitive suffering (Cerin & Barnett, 2006; Lazarus, 1991; Ntoumanis & Biddle, 1998). It was predicted that problem-focused coping would be used more by the short duration sufferers, and would be predominately used during the reintegration (final) phase of competitive suffering. Comparatively, it was expected that both avoidance and emotion-focused coping would be used most during the initiation (first) and peak (second) phases of competitive

suffering, and would be used less by athletes experiencing comparatively short competitive suffering episodes.

The results demonstrated that the use of problem-focused coping did not distinguish between short and long durations of competitive suffering. This finding did not support the hypothesis and indicates that all athletes who experience competitive suffering utilize problem-focused coping equally. In view of this, the athletes' use of emotion-focused and avoidance coping might be the principal functions related to the effectiveness of coping to efficiently resolve competitive suffering. The use of emotion-focused coping did distinguish between the duration of athletes' competitive suffering. Specifically, athletes whose competitive suffering was short in duration used more emotion-focused coping at the initiation and peak phases (compared to those who experienced longer durations). This finding was contrary to what was expected but supports recent sport research (e.g., Crocker & Hadd, 2007) reporting the benefits of emotion-focused coping when managing distress in specific sport contexts, such as competitive suffering. Athletes' use of avoidance coping in the current study also supports theoretical and empirical reports. Athletes who used comparatively less avoidance coping at the initiation phase experienced a shorter competitive suffering episode.

The results of this study conflict with past sport coping research reports that have established associations between problem-focused coping and adaptive outcomes, as well as emotion-focused coping and less-adaptive outcomes. For example, expert performers direct coping primarily towards a problem-focused function, while emotion-focused

efforts are used more by non-experts in sport (Gaudreau & Blondin, 2002). Emotion-focused coping also predicts negative affect (Ntoumanis & Biddle, 1998) and is used more by individuals experiencing cognitive anxiety (Hammermeister & Burton, 2001). However, sport researchers have recently called for a re-conceptualization of the adaptability of emotion-focused coping. It is proposed that emotion-focused coping may have a *positive* role in specific situations (Crocker & Hadd, 2007). The use of emotion-focused coping has significantly predicted positive affect in adolescent swimmers (Crocker & Hadd) as well as collegiate athletes (Poliseo, 2009). Positive reappraisal which is commonly categorized as an emotion-focused coping strategy has also been positively related to performance (Bueno et al., 2008). The results of this study provide support for this recent work and suggest that emotion-focused coping may have adaptive qualities in competitive suffering contexts.

The positive role of emotion-focused coping may be explained through the goodness-of-fit model of coping effectiveness (Folkman, 1992). This model posits that compatibility between cognitive appraisals of the person-environment event and coping efforts will lead to more adaptive outcomes. For example, Skinner and Brewer (2002) suggest that in the face of threat appraisals, emotion-focused coping is most appropriate. Alternatively, challenge appraisals are better suited for problem-focused coping. The goodness-of-fit model also posits that individuals' perceptions of control are associated with coping function use. Specifically, emotion-focused coping will be most effective when low levels of control are appraised while problem-focused coping will be most effective when accompanied by high perceptions of control (Folkman). In consideration

of this model, competitive suffering is conceptualized to include low levels of control and threatening appraisals. Thus, emotion-focused coping presumably fits this context. This proposition is supported by the current research, as athletes who used more emotion-focused coping during the initiation and peak phases of a competitive suffering bout also experienced competitive suffering for a limited duration.

The goodness-of-fit model may also explain why problem-focused coping did not distinguish competitive suffering duration despite the prevalent use of this function in this study, and the positive role of problem-focused coping in past research. The goodness-of-fit model (Folkman, 1992) suggests that problem-focused coping best fits when situational demands arise from *challenging* appraisals. Competitive suffering, by definition, is not associated with challenging appraisals (Bueno et al., 2008) and the problem-focused coping efforts exerted by runners were likely viewed as irrelevant for managing a threatening appraisal. This is not to say that these efforts (i.e., changing pace or drinking fluids) were not important during competitive suffering. Rather, it is concluded that while problem-focused coping is likely to contribute towards resolution of competitive suffering, this function is incapable of accounting for adaptive or maladaptive outcomes in this context.

Compared with avoidance coping efforts, problem-focused and emotion-focused coping are *both* generally viewed as more effective coping functions, particularly in the management of performance levels and negative emotion (Folkman, 1992; Hanton et al., 2008; Masters & Lambert, 1989; Nicholls, 2010). The results of the current study support this assertion. Avoidance coping was the least-used coping function among all

participants, and was used to a greater extent by athletes who experienced longer competitive suffering episodes. Nevertheless, some sport researchers argue that avoidance coping should not be entirely discounted as a potentially adaptive coping effort (e.g., Hatzgeorgiadis, 2006). There may be specific situations in sport, and in the experience of competitive suffering, where the use of avoidance coping may be valuable for athletes. For example, Hatzgeorgiadis (2006) reported that rowers with low goal attainment expectancies (i.e., provided with an unattainable goal) used more avoidance coping in comparison to those with high goal attainment expectancies. It was suggested that avoidance efforts may be essential to disengage from goals, thus limiting perceptions of helplessness and negative emotions associated with persistence for unattainable goals. The results of the current study appear to conflict with Hatzgeorgiadis' inference, when applied to competitive suffering. Considering the occurrence of avoidance coping differences between competitive suffering duration groups (i.e., occurring during initiation phase), the use of avoidance coping early-on in competitive suffering may *delay* an athlete's use of more active coping efforts to manage/modify goal-related emotions and cognitions.

Overall, increased use of emotion-focused coping during the initiation and at the peak of competitive suffering best defined the coping profiles resulting in the most adaptive outcomes. This may be because emotion-focused efforts are the most appropriate with threatening appraisals. Problem-focused coping was used commonly as well, but did not contribute to more (or less) adaptive outcomes. This may have been because problem-focused efforts were not appropriate for managing the (threatening)

demands of competitive suffering. As expected, the results indicated that avoidance coping use early-on in competitive suffering resulted in longer competitive suffering episodes. Finally, there were no differences in coping function use between the short duration and long duration competitive suffering groups during the reintegration phase. This may indicate that a specific combination of coping efforts is required to overcome competitive suffering. The next section discusses whether/how coping use was adapted across the three phases of competitive suffering *within* each competitive suffering duration group.

5.1.2 Temporal shifts in short and long duration group members' coping function use. It was predicted that participants would modify their coping function use across the three phases of competitive suffering (Gaudreau & Miranda, 2010; Lazarus, 1991). Specifically, it was hypothesized that increased use of emotion-focused and avoidance coping would be associated with the initiation stage of competitive suffering and that problem-focused coping would be associated with the reintegration phase of competitive suffering. It was also assumed that each group would demonstrate a distinct profile of coping use. Partial support was found for these hypotheses. First, there were no significant differences within the long duration competitive suffering group. The hypotheses were not supported with this group. Intuitively, it is unlikely that coping function use did not change over time at the individual level (see section 5.1.3, idiosyncratic profiles). Rather it appears that these individual changes did not occur in the same pattern amongst long competitive suffering duration group members (Gaudreau & Miranda). On the other hand, significant temporal differences in coping function use

were found for athletes in the short duration competitive suffering group. However, the reported differences were not in the expected direction. Problem-focused coping use declined across the phases of competitive suffering. Emotion-focused coping use intensified between the initiation and peak phases, and subsequently lessened during the reintegration phase of competitive suffering. These results suggest that while there are many possible types of coping profiles related to ineffective coping (e.g., non-significant long duration group differences), consistency in a pattern of coping is demonstrated in those with more adaptive outcomes.

The dual process framework (Branstadter & Renner, 1990; Branstadter & Rothermund, 2002) may explain the nature of the coping pattern demonstrated by short suffering duration participants. Brandtstadter and Renner propose that individuals use two distinct *modes* of coping, or coping decision making, activated by perceived goal discrepancies (divergences between the perceived goal attainment and intended goals). The two modes of coping decision making are labeled assimilative (or tenacious goal pursuit) and accommodative (or flexible goal adjustment). The modes are conceptualized as generalized patterns of cognition or action and act in opposed, but at the same time complementary, ways. The assimilative mode includes choosing coping efforts to adapt the situation to bring it in line with personal goals. In contrast, individuals align personal goals to suit the current situation and available resources in the accommodative mode. The authors suggest that adaptive regulation of these modes by individuals in the pursuit of goals includes balancing the use of tenacious goal pursuit (to maintain focus on the goal at hand) with flexible goal adjustment (to compensate for new/unexpected

circumstances). In other words, while tenacious goal pursuit is necessary for goal attainment, tenacious adherence to *unattainable* goals is related to maladaptive outcomes. Thus, individuals need to effectively appraise their goal attainment, and flexibly adjust goals which are perceived to be unattainable.

The decreasing use of problem-focused coping across temporal phases by individuals experiencing shorter competitive suffering duration may be explained as a decrease in tenacious goal pursuit. This appears to be adaptive within this context, as (by definition) the threat of an unattainable goal characterizes competitive suffering encounters. In addition, the dual process model predicts that decreases in tenacious goal pursuit will correspond with a shift to flexible goal adjustment. This shift was demonstrated by the athletes who were more effective in managing competitive suffering through their use of emotion-focused coping efforts to the greatest degree at the peak of competitive suffering.

In sum, those who experienced shorter competitive suffering episodes demonstrated specific patterns in their reported coping function use. The assimilative and accommodative modes of coping are evident in these changes. Meanwhile, a pattern of coping was not identified among the long duration group. The next section will elaborate upon the competitive suffering encounters at the individual level.

5.1.3 Idiosyncratic competitive suffering profiles. The CMRT predicts a high degree of inter- and intra-individual variability in an individual's coping use that accompanies adaptive performance and/or emotional management (Lazarus, 1999). Therefore, many factors contribute to individuals' coping processes, and the use of

nomothetic (group-level) analysis of this data isolates portions of the complete picture (Cerin, 2000). Idiosyncratic research permits the consideration of the many contributing factors to individual coping patterns and has been completed within sport coping and emotion research to develop deeper understanding of athletes' coping (e.g., Calmeiro & Tenenbaum, 2007). In this study, idiosyncratic profiles of competitive suffering are analyzed to complement the coping function use results and develop a deeper understanding of coping efforts during competitive suffering by endurance athletes. Visual assessment of the profiles illustrate inter-individual differences in the coping function use across phases of competitive suffering and reveal the challenges of using group-based data analytic tools for illuminating such differences. The following two paragraphs will describe apparent differences between these individuals' coping, including: (a) coping stability and (b) coping content.

First of all, coping stability refers to the extent an individual's coping remains stable (or varies) over time (Gaudreau & Miranda, 2010). Both participant *A* (who reported suffering duration of three intervals) and participant *C* (who reported a suffering duration of 11 intervals) reported relatively stable coping use over time. In contrast, participant *B* (who reported a suffering duration of six intervals) reported a more dynamic coping profile. *B* shifted from primarily using avoidance coping efforts at the initiation, to emotion-focused coping at the peak, and (finally) primarily problem-focused coping at reintegration. The distinct shifts in coping use did represent a shift away from avoidance coping to more active coping functions. Overall, participants reported a wide range in the stability of their coping.

The coping content refers to whether specific functions were used primarily (as opposed to all functions being used equally). Participants *A* and *B* both used primarily one (or two) coping function(s) at each interval of time, even though *B* shifted the primary function several times. For example, at any given interval *A* reported high use of problem- and emotion-focused coping, and low use of avoidance coping. On the other hand, participant *C* used each coping function comparatively equally, ranking his use of each coping function as either a three or four (out of five) across his entire competitive suffering episode. Thus, it appears that this participant did not direct his coping towards any one function directly.

Overall, three distinct profiles have emerged from these participants. *A* used emotion- and problem-focused coping functions to a great degree throughout her competitive suffering encounter. She had the shortest competitive suffering episode. *B* used avoidance coping early-on but appeared to dynamically modify her coping to bring an end to her competitive suffering. Finally, *C* applied all three coping functions with relative indifference, and did not modify the application of coping over time despite the ineffectiveness of these efforts in alleviating competitive suffering. He had the longest competitive suffering duration.

5.2 Perceived control

5.2.1 The relationship between control beliefs and competitive suffering duration. It was expected that (overall) perceived control beliefs would be negatively related with competitive suffering duration. This hypothesis was based on the assertion that increased control beliefs promote adaptive outcomes (Folkman & Moskowitz, 2004).

This proposition was not supported in the current study. Results demonstrated that (overall) perceived control beliefs were not related to competitive suffering duration. Thus, perceived control beliefs did not have an impact on whether relatively short or long competitive suffering durations were experienced.

One factor that may have contributed to these non-significant findings is the conceptualization of competitive suffering as a state involving perceived helplessness (Bueno et al., 2008). Helplessness is, theoretically, an essential aspect of competitive suffering. Therefore, it could be deduced that low perceived control levels are an important antecedent of competitive suffering. Although this proposition cannot be confirmed in the current study because a non-competitive suffering control group was not assessed, it would suggest that perceived control levels were limited among all participants regardless of the competitive suffering duration experienced. Participants in both the long and short duration groups did not have the means to appraise high levels of control of the situation, because they were *all* experiencing competitive suffering. Thus, it appears that participants' more (or less) adaptive outcomes were in spite of their control beliefs, rather than as a result of them.

5.2.2 The relationship between perceived control beliefs and coping function use. An additional basis for the prediction that control beliefs would relate to competitive suffering duration was the prediction that perceived control would also be related to coping function use. Several specific relationships between perceived control beliefs and coping function use were hypothesized. First of all, it was predicted that problem-focused coping would be related to perceived control over the situation, but not

with perceived control over emotions. Additionally, it was expected that emotion-focused coping would relate to perceived control over emotions, but not with control over the situation (e.g., Kowalski et al., 2005; Poliseo, 2009).

Among the 18 relationships used to assess whether coping function use was related to perceived control beliefs, only two significant relationships emerged. Emotion-focused coping was negatively related to perceived situational control at both the initiation and peak phases. Despite these significant findings, the overall lack of significance leads to the conclusion that perceived control beliefs are unrelated to coping function use.

Compas, Banez, Malcarne and Worsham (1991) provide a potential explanation for these results in a seminal article on control beliefs. It was advanced that during encounters with emotional distress emotion-focused coping is used primarily in comparison to problem-focused efforts, *regardless* of control beliefs. In other words, athletes will choose efforts that address their emotions (rather than the situation) when experiencing emotional distress (Compas et al.). These suggestions have not been demonstrated in the sport literature, and should be applied with caution. However, competitive suffering is a source of emotional distress in athletes, suggesting that emotion-focused coping would be most relevant regardless of control beliefs. This may explain why few relationships emerged between control beliefs and coping function.

The conceptualization of perceived *behavioural* control within the theory of planned behaviour also contributes to the understanding of the results of this study. The conceptualization of perceived behavioural control includes two constructs: (a) perceived

control or the extent that a behaviour is perceived to be under an individuals' control, and (b) perceived difficulty or the degree to which a behaviour is viewed as easy or difficult to perform (Sparks, Guthrie & Shepard, 2006). Furthermore, research has reported that perceived difficulty is a greater predictor of behaviour than perceived control (Trafimow, Sheeran, Conner & Finlay, 2002). Although the conceptualization of perceived control within the coping literature is comprised of situational and emotional control alone, perceived difficulty may be relevant to the appraisal of person-environment events as well. For example, an athlete in the current study may have viewed a coping effort (such as increasing their pace) to be directly under their own control. At the same time, the athlete may have seen it as being difficult to perform, and subsequently used a more feasible effort. Thus, the inclusion of perceived difficulty when measuring control beliefs may have better identified the relationships between control beliefs and coping function use, in comparison to situational and emotional control alone.

In sum, perceived control was not associated with either competitive suffering duration or coping function use. Several factors may have contributed to these results, including: (a) the presence of perceived helplessness as an essential aspect of competitive suffering, (b) the use of emotion-focused coping (regardless of control beliefs) during emotional distress, and (c) the absence of perceived difficulty from the assessment of control beliefs.

5.3 Limitations of the research

Though this research advances understanding about the coping process during competitive suffering episodes, it is important to address the limitations of this work.

One limitation of this study involves the techniques used to analyze video-mediated recall data. To permit the use of ANOVAs, participants' coping function responses were averaged across three phases. This reduced the sensitivity of participants' responses in comparison to the original structure (i.e., responses from each 200m interval). Between-subject variance in coping function reporting/use also further reduced statistical power. Pooled time series analysis (PTSA; see Ostrom, 1990) would have better taken advantage of the richness of the data provided by participants through the video-mediated recall procedure. PTSA is a multiple regression technique where separate subjects' time-series (i.e., a competitive suffering episode) are concentrated into a single, pooled, time series that treats each observation from each subject as a separate case. To illustrate, if you have 10 participants with 20 responses each the overall pooled time series would analyze 200 separate cases. This technique allows for the partialling-out of between-subject variance and the control of serial dependence (the tendency for responses close together in time to be similar to one another). Pooled time series analysis provides considerable statistical power when analyzing small sample sizes (Soliday, Moore, & Lande, 2002) and is a promising technique in sport research. While the use of an advanced regression technique such as PTSA was beyond the scope of this thesis project, it is important to consider the use of more advanced statistical techniques in future work of this nature.

The measurement procedures used to assess perceived control beliefs may have also limited the ability to identify significant relationships between perceived control beliefs and the other variables of interest. Perceived control beliefs were only assessed at a single point in time: following the time-trial for each participant. As a result the

temporal nature of appraisal, and more specifically perceived control beliefs, was not addressed (Cerin & Barnett, 2006; Compas et al., 1991; Skinner, 1995). Participants' control belief appraisals may have changed over time. As a result, coping function use may have been influenced differently by perceived control beliefs across the phases of competitive suffering. The assessment of perceived control beliefs through video-mediated recall (alongside coping function reports) would have provided control beliefs values that were temporally matched with coping function use. This procedure would have better reflected how control beliefs impact coping function use across distinct phases of competitive suffering. Future research examining the temporal nature of coping should consider the repeated measurement of participants' temporal appraisals (e.g., perceived control beliefs) in addition to coping effort use to reflect the changing context of emotional encounters.

A final limitation included the diversity of participants in the current study. The study examined a small sample of endurance athletes who ranged in status on important mediators and moderators of the coping process, such as gender, expertise, experience, and age. As none of these variables were identified as between-group covariates, such diversity may be argued to provide a comprehensive understanding of competitive suffering. However, the inclusion of a range of participants paired with the relatively small number of participants in this study also limited the opportunity for relationships to emerge. For example, male and female athletes' coping is often different, even within similar contexts (e.g., Hammermeister & Burton, 2001). The use of a more distinct sample (e.g., elite male track athletes) may have provided a smaller range of

responses in this study, making significant differences and relationships more likely to occur with a small sample size. Conversely, the use of a larger sample size would have permitted a deeper investigation into the influence of important mediating/moderating variables on athletes' coping with competitive suffering.

5.4 Future directions

Several aspects of this study will be of interest for sport researchers and will have implications for future research. The video-mediated recall (VMR) procedures used have particularly strong implications for future research. Sport coping research has typically used retrospective questionnaires, asking participants to reflect on their feelings during a past event as if the entire encounter was only one point in time (Tenenbaum & Elran, 2003). This style of retrospective research does not give a true representation of change, loses sensitivity in regards to how outcomes are impacted throughout an emotional encounter, and has provided few reliable outcomes related to effective coping (Poliseo, 2009). In contrast, VMR may be used to reveal the sequential interaction of coping efforts, overall appraisal, and the outcomes associated with this process. The relived experience that is produced through the use of VMR (Gottman & Levenson, 1985) regenerates earlier emotional and cognitive patterns long after they were initially experienced. Video of many athletic competitions is accessible, efficient, and can be unobtrusive in comparison to ecological momentary assessment techniques. Although the use of video to improve athletes' recall is supported as a promising procedure for investigating acute emotional encounters, these procedures have not been applied in previous sport research (Crocker et al., 2010). Thus, an important feature of the current

study is the use of video-mediated recall to facilitate participants' recall of coping during competition.

As applied in the current study, VMR is particularly valuable for investigating the temporal process of coping as well as coping effectiveness. Additionally, VMR could also be readily applied to a variety of diverse research methodologies. For example, qualitative researchers could integrate video of athletic events with structured interviews to improve the recall quality. Regardless of the nature of the research, several considerations are important to ensure the effective application of VMR in sport. First of all, the duration of time between the end of competition and the beginning of the VMR interview should be minimized to reduce the influence of time on recall (Ayhan & Isiksal, 2004). A researcher's use of VMR should also take into account the development of a relived experience (Gottman & Levenson, 1985). In other words, video-mediated recall interviews should be structured in such a way to promote the occurrence of athletes' relived experiences (e.g., by minimizing distractions). Finally, researchers must either develop new measurement tools or modify existing tools to assess athletes' in-competition emotions and/or cognitions using VMR. For example, continuous and code-specific procedures used in general psychology research (i.e., Welsh & Dickson, 2005) were adapted for the assessment of perceived threat and coping function use in the current study. Overall, video-mediated recall may be effectively applied in competitive settings, and these procedures have the potential to advance our understanding of athletes' emotions and cognitions during competition.

Another future direction is the investigation of efforts to cope with competitive suffering over long periods of time, such as a competitive season. Sport coping researchers investigating the temporal patterning of emotions have typically been interested in changes before, during, or directly after a specific competitive event (Gaudreau & Miranda, 2010). Meanwhile, the changes in this process over a longer period of time (e.g., between competitions) have been overlooked (Cerin et al., 2000). This is despite an abundance of research that demonstrates the influence of maturation and learning on coping across the lifespan (Hoar & Evans, 2010). Such long-term changes are particularly relevant for endurance athletes, given that repeated goal attainment failure is a possible cause of burnout (Raedeke & Smith, 2004) and prior competitive suffering experiences impact athletes' later coping efforts (Bueno et al., 2008). A longitudinal investigation of coping and emotional adaptation across events and potentially seasons would reveal the relationships between competitive suffering, coping efforts, and long-term outcomes.

Finally, there is a paucity of research which documents the application of coping interventions to improve sport outcomes (Arathoon & Malouff, 2004). This may be attributable to the lack of understanding regarding adaptive coping efforts, and how coping efforts should be applied over time to accomplish intended outcomes. This study has advanced understanding of these aspects during competitive suffering. However causality cannot be inferred from the strictly *correlational* findings reported. In light of this, the identification of adaptive coping function use should be further investigated through experimental coping intervention research. Past coping intervention research has

employed an experimental design, whereby some participants are subject to a coping intervention (based upon current knowledge of adaptational coping efforts) and others experience control and/or placebo conditions (Anshel, Gregory, & Kaczmarek, 1990). This research is essential for providing practical suggestions to practitioners, coaches, and athletes regarding the application of coping efforts during competition.

5.5 Summary and Theoretical Implications

The work described in this thesis supports development of conceptual understanding of the coping process. The results support the assertion that *adaptive* coping efforts include those which best match the appraisal of the person-environment event (Folkman, 1992). Together, the context and the individual's appraisal of this context are essential elements to understanding the effectiveness of coping. Furthermore, the current study supports the contention that (a) coping shifts across several phases of an emotional encounter and that (b) specific patterns of coping may be linked with adaptive coping outcomes. Thus, the current research holds two implications for theory and future research in the investigation of temporal coping efforts. First of all, phases that are specific to the emotional context being investigated can be identified and used to develop greater understanding into the coping process. In comparison to general phases (i.e., pre-, during-, and post-competition), developing context-specific phases may provide a greater depth of understanding of emotional encounters. A second implication is that further steps may be required to identify the nature (i.e., specific cognitions, demands, and behaviours) of the phases identified in the current study. Qualitative research would be

well-suited to this objective, as qualitative research in the past has identified distinct stages in injury recovery (Bianco et al., 1999).

A third theoretical implication from this work concerns a re-conceptualization of the relationship between perceived control beliefs and coping efforts. Specifically, the influence of perceived control beliefs upon coping efforts may be mediated by situational or individual differences (Compas et al., 1991). For example, the presence of emotional distress may have brought forth emotion-focused coping *regardless* of control beliefs in the current study. There may also be aspects of control beliefs that are not addressed by its current conceptualization in sport. For example, perceived difficulty may be an aspect of control beliefs that has not been addressed in past sport research. Thus, while plenty of sport research has reported the importance of control beliefs in the coping process (e.g., Kowalski et al., 2005), there may be additional factors involved in the development of control beliefs, and their influence on the coping process.

5.6 Summary and Practical Implications

This research also provides important practical implications for sport professionals working with endurance athletes. Specifically, the findings of this study suggest that several aspects of individual's coping profiles are related to adaptive or maladaptive outcomes in those experiencing short durations of competitive suffering. Athletes experiencing competitive suffering should be discouraged from using avoidance coping (e.g., using distractions or distancing oneself from the situation). The use of avoidance coping efforts appears to delay an athlete's use of more active coping efforts. Rather, athletes who primarily reacted to competitive suffering with coping efforts to

manage both the situation and their emotions were able to emerge from competitive suffering in less time. Problem-focused efforts should be maintained throughout the emotional experience to some extent, even though problem-focused efforts were not related to an efficient resolution of competitive suffering. Emotion-focused coping efforts seem most appropriate to promptly manage competitive suffering. These coping efforts may include a variety of efforts, such as adjusting current goals to match the situation or reducing the significance of an event.

Overall, although effective coping does not assure that a goal will be achieved, athletes who cope effectively will experience shorter competitive suffering episodes. Thus, effective coping will promote positive emotional encounters, along with the performance and well-being outcomes associated with positive emotion (Baron et al., 2009; Bueno et al., 2008).

5.7 Conclusions

This study of coping during competition is both theoretically and practically important for researchers, practitioners, and anyone interested in improving sport experiences. The results revealed through this study contribute to the advancement of coping research during competition. The purpose of this thesis was to identify the coping function use related to both short and long durations of competitive suffering, to identify the relationships between perceived control and coping function use, and the relationships between perceived control and competitive suffering duration. In light of the results from this research, it was suggested that: (a) problem-focused coping was widely used but did not distinguish competitive suffering duration, (b) emotion-focused coping is the most

appropriate coping function for reducing competitive suffering duration, and (c) avoidance coping was associated with longer competitive suffering duration when applied early-on in competitive suffering. Perceived control beliefs did not relate to either coping function use or to competitive suffering duration. The results were interpreted in light of the goodness-of-fit (Folkman, 1992) and dual-process (Branstadter & Renner, 1990) models. Emotion-focused coping was viewed as effective in threatening situations, and may be a manifestation of flexible goal adjustment when faced with a conviction of goal failure. Perceived helplessness, a characteristic of competitive suffering, also explained the suitability of emotion-focused coping as well as the small number of relationships demonstrated by perceived control.

The sport coping field presents a variety of challenging factors for the researcher to accommodate. Potential future directions or considerations for research that can be gleaned from this research include: (a) the use of video-mediated recall to investigate coping, (b) the establishment of context-specific phases of emotional encounters, (c) further investigation into the development and composition of control beliefs. The results, implications, and limitations of this research demonstrate the value of creatively (and carefully) applying methods that address the nature of emotional encounters; particularly the temporal aspect.

References

- Aldwin, C.M., Sutton, K.J., Chiara, G., & Spiro, A. (1996). Age differences in stress, coping, and appraisal: Findings from the Normative Aging Study. *Journals of Gerontology: Series B: Psychological Sciences and Social Sciences*, *51b*, 179-188.
- Amiot, C. E., Gaudreau, P., & Blanchard, C. M. (2004). Self-determination, coping, and goal attainment in sport. *Journal of Sport and Exercise Psychology*, *26*, 396 – 411.
- Anshel, M. H. (2001). Qualitative validation of a model for coping with acute stress in sports. *Journal of Sport Behavior*, *24*, 223-234.
- Anshel, M.H., Gregory, W.L., & Kaczmarek, M. (1990). The effectiveness of a stress training program in coping with criticism in sport: A test of the COPE model. *Journal of Sport Behaviour*, *13*, 194-217.
- Anshel, M.H., & Kaissidis A.N. (1997) Coping style and situational appraisals as predictors of coping strategies following stressful events in sport as a function of gender and skill level. *British Journal of Psychology*, *24*, 329-53.
- Arathoon, S.M., & Malouff, J. (2004). The effectiveness of a brief cognitive intervention to help athletes cope with competition loss. *Journal of Sport Behaviour*, *27*, 213-229.
- Atkinson, M. (2008) Triathlon, suffering and exciting significance. *Leisure Studies*, *27*, 165-180. doi: 10.1080/02614360801902216
- Ayhan, H.O., & Isiksal, S. (2004). Memory recall errors in retrospective surveys: a reverse record check study. *Quality and Quantity*, *38*, 475-493. doi:10.1007/s11135-005-2643-7
- Baron, B., Moullan, F., Deruelle, F., & Noakes, T.D. (2009) The role of emotions on pacing strategies and performance in middle and long duration sport events. *British Journal of Sports Medicine*, *19*, 220-238.
- Baron, R. M., & Kenny, D. A. (1986). The moderator – mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173 – 1182. doi:10.1037/00223514.51.6.1173
- Bianco, T., Malo, S., & Orlick, T. (1999). Sport injury and illness: Elite skiers describe their experiences. *Research Quarterly for Exercise and Sport*, *70*, 157–169.

- Brandtstadter, J., & Renner, G. (1990). Tenacious goal pursuit and flexible goal adjustment: Explication and age-related analysis of assimilative and accommodative strategies of coping. *Psychology and Aging, 5*, 58–67. doi:10.1037/0882-7974.5.1.58
- Brandtstadner, J., & Rothermund, K. (2002). The life-course dynamics of goal pursuit and goal adjustment: A two-process framework. *Developmental Review, 22*, 117-150. doi:10.1006/drev.2001.0539
- Brauer, C., Thomsen, J.F., Loft, I.P., & Mikkelsen, S. (2003). Can we rely on retrospective pain assessments? *American Journal of Epidemiology, 157*, 552-557. doi:10.1093/aje/kwg017
- Brewer, B.W., Van Raalte, J.L., Linder, D.E., & Van Raalte, N.S. (1991). Peak performance and the perils of retrospective introspection. *Journal of Sport and Exercise Psychology, 8*, 227-238.
- Brooks, G. A., Fahey, T.D., & White, T.P. (1996). *Exercise physiology: Human bioenergetics and its applications*. Mountain View, CA: Mayfield Publishing.
- Bueno J. (2000) Sufrimiento competitivo y rendimiento en atletas de resistencia [Competitive suffering and performance in endurance athletes]. Unpublished doctoral dissertation, Universitat Autònoma de Barcelona.
- Bueno, J., Capdevila, L., & Fernandez-Castro, J. (2002). Sufrimiento competitivo y rendimiento en deportes de resistencia [Competitive suffering and performance in endurance sports]. *Revista de Psicología del Deporte, 11*, 209–26.
- Bueno, J., Weinberg, R.S., Fernández-Castro, J., & Capdivela, L. (2008) Emotional and motivational mechanisms mediating the influence of goal setting on endurance athletes' performance. *Psychology of Sport and Exercise, 9*, 786-99. doi:10.1016/j.psychsport.2007.11.003
- Buman, M. P., Omli, J.W., Giacobbi jr., P.R., & Brewer, B.W. (2008). Experiences and coping responses of "Hitting the Wall" for recreational marathon runners. *Journal of Applied Sport Psychology, 20*, 282-300. doi:10.1080/10413200802078267
- Calmeiro, L., & Tenenbaum, G. (2007). Fluctuation of cognitive-emotional states during competition: An idiographic approach. *Revista de Psicología del Deporte, 16*, 85-100.
- Campen, C., & Roberts, D.C. (2001). Coping strategies of runners: perceived effectiveness and match to precompetitive anxiety. *Journal of Sport Behavior, 24*, 144-152.
- Cassell, E.J. (2004) *The nature of suffering and the goals of medicine* (2nd ed.) New York: Oxford.

- Cerin, E., & Barnett, A. (2006) A processual analysis of basic emotions and sources of concerns as they are lived before and after a competition. *Psychology of Sport and Exercise, 7*, 287-307. doi:10.1016/j.psychsport.2005.07.002
- Cerin, E., Szabo, A., Hunt, N., & Williams, C. (2000) Temporal patterning of competitive emotions: A critical review. *Journal of Sports Sciences, 18*, 605-626. doi:10.1080/02640410050082314
- Chapman, C. R., & Gavrin, J. (1993). Suffering and its relationship to pain. *Journal of Palliative Care, 9*, 5-13.
- Cherny, N.I., Coyle, N., & Foley, K.M. (1994). Suffering in the advanced cancer patient: A definition and taxonomy. *Journal of Palliative Care, 10*, 57-70.
- Cleary, T. J., & Zimmerman, B. J. (2001). Self-Regulation differences during athletic practice by experts, non-experts, and novices. *Journal of Applied Sport Psychology, 13*, 185-206. doi:10.1080/104132001753149883
- Compas, B.E., Banez, G.A., Malcarne, V., & Worsham, N. (1991) Perceived control and coping with stress: A developmental perspective. *Journal of Social Issues, 47*, 23-34. doi:10.1111/j.1540-4560.1991.tb01832.x
- Cresswell, S., & Hodge, K. (2001) Coping with stress in elite sport: A qualitative analysis of elite surf life saving athletes. *New Zealand Journal of Sports Medicine, 29*, 78-83.
- Crocker, P.R.E., & Graham, T.R. (1995). Coping by competitive athletes with performance stress: Gender differences and relationships with affect. *The Sport Psychologist, 9*, 325-338.
- Crocker, P.R.E., Mosewich, A., Kowalski, K.C., & Besenski, L.J. (2010). Coping: Research and design issues. In A. R. Nicholls (Ed.), *Coping in sport: Theory, methods, and related constructs* (pp. 53-76). Hauppauge, NY: Nova Science Publishers.
- Daniels, L.M., Stupinsky, R.H., Pekrun, R., Haynes, T.L., Perry, R.P., & Newall, N.E. (2009). A longitudinal analysis of achievement goals: From affective antecedents to emotional effects and achievement outcomes. *Journal of Educational Psychology, 101*, 948-963. doi:10.1037/a0016096
- Folkman, S. (1992). Making the case for coping. In B.N Carpenter (Ed.), *Personal coping: Theory, research, and application* (pp. 31-46). Westport, CT: Praeger.
- Folkman, S., Lazarus, R. S., Pimley, S., & Novacek, J. (1987). Age differences in stress and coping processes. *Psychology and Aging, 2*, 171-184. doi:10.1037/0882-7974.2.2.171

- Folkman, S., & Moskowitz, J.T. (2004) Coping: Pitfalls and promise. *Annual Reviews in Psychology*, 55, 745-774. doi: 10.1146/annurev.psych.55.090902.141456
- Gallasch, C.H., Alexandre, N.M.C., & Amick, B. (2007) Cross-cultural adaptation, reliability, and validity of the work role functioning questionnaire to Brazilian Portuguese. *Journal of Occupational Rehabilitation*, 17, 701-711. doi: 10.1007/s10926-007-9103-2
- Gaudreau, P. & Blondin, J.P. (2002). Development of a questionnaire for the assessment of coping strategies employed by athletes in competitive sport settings. *Psychology of Sport and Exercise*, 3, 1-34.
- Gaudreau, P., Blondin, J.P., & Lapierre, A. M. (2002). Athletes' coping during competition: relationship of coping strategies with positive affect, negative affect, and performance-goal discrepancy. *Psychology of Sport and Exercise*, 3, 125-150. doi:10.1016/S14690292(01)00015-2
- Gaudreau, P., & Blondin, J.P. (2004). Different athletes cope differently: a cluster analysis of coping. *Personality and Individual Differences*, 36, 1865-1877. doi:10.1016/j.paid.2003.08.017
- Gaudreau, P., & Miranda, D. (2010). Coping across time, situations, and contexts: A conceptual and methodological overview of its stability, consistency, and change. In A. R. Nicholls (Ed.), *Coping in sport: theory, methods, and related constructs* (pp. 15-32). Hauppauge, NY: Nova Science Publishers.
- Gottman, J. M., & Levenson, R. W. (1985). A valid procedure for obtaining self-report of affect in marital interaction. *Journal of Consulting and Clinical Psychology*, 53, 151-160. doi:10.1037/0022-006X.53.2.151
- Gregory, D.M., & Russell, C.K. (1999) *Cancer stories: On life and suffering*. Ottawa, Canada: Carleton University Press.
- Gross, J.J., Carstensen, L.J., Pasupathi, M., Tsai, J., Skorpen, C.G., & Hsu, A.Y.C. (1997). Emotion and aging: Experience, expression, and control. *Psychology and Aging*, 12, 590-599. doi:10.1037/0882-7974.12.4.590
- Hadd, V.N., & Crocker, P.R.E. (2007) The effect of stress-related factors on post-performance affects in competitive adolescent swimmers. *International Journal of Sport and Exercise Psychology*, 2, 142-157.
- Hammermeister, J., & D. Burton (2001). Stress, appraisal, and coping revisited: examining the antecedents of competitive state anxiety with endurance athletes. *Sport Psychologist*, 15, 66-90.
- Hammermeister, J., & Burton, D. (2004). Gender differences in coping with endurance sports: Are men from Mars and women from Venus? *Journal of Applied Sport Psychology*, 27, 148 – 164.

- Hanton, S., Cropley, B., Neil, R., Mellalieu, S.D., & Miles, A. (2007). Experience in sport and its relationship with competitive anxiety. *International Journal of Sport and Exercise Psychology*, 5, 28-48.
- Hanton, S., & Jones, G. (1999) The effects of a multimodal intervention program on performers: Training the butterflies to fly in formation. *The Sport Psychologist*, 22-41.
- Hanton, S., Niel, R., Mellalieu, S.D., & Fletcher, D. (2008). Competitive experience and performance status: An investigation into multidimensional anxiety and coping. *European Journal of Sport Science*, 8, 143-152. doi:10.1080/17461390801987984
- Hatzigeorgiadis, A. (2006). Approach and avoidance coping during task performance in young men: The role of goal attainment expectancies. *Journal of Sports Sciences*, 24, 299-307. doi:10.1080/17461390500188645
- Hill, A.P., Hall, H.K., & Appleton, P.R. (2010) Perfectionism and athlete burnout in junior elite athletes: the mediating role of coping tendencies. *Anxiety, Stress, and Coping*, 23, 415-430. doi:10.1080/10615800903330966
- Hoar, S.D., Crocker, P.R.E., Holt, N.L., & Tamminen, K.A. (2010). Gender differences in adolescent athletes' coping with interpersonal stressors in sport: More similarities than differences? *Journal of Applied Sport Psychology*, 22, 134-150. doi:10.1080/10413201003664640
- Hoar, S. D., & Evans, M. B. (2010). Athletes' coping across the lifespan. In A. R. Nicholls (Ed.), *Coping in sport: theory, methods, and related constructs* (pp. 95-118). Hauppauge, NY: Nova Science Publishers.
- Hoar, S.D., & Gammage, K.L. (2010) Anxiety in sport and exercise. In Crocker, P.R.E. (Ed.) *Sport and Exercise Psychology* (pp. 111-137)
- Hoar, S.D., Kowalski, K.C., Gaudreau, P., & Crocker, P.R.E. (2006). A review of coping in sport, in Hanton, S. & Mellalieu, S.D. (Eds.), *Literature Reviews in Sport Psychology*. (pp. 47-90). New York, N.Y.: Nova Science Publishers.
- Holt, N.L., Berg, K.J., & Tamminen, K.A. (2007) Tales of the unexpected: Coping among female collegiate volleyball players. *Research Quarterly for Exercise and Sport*, 78, 117-133.
- Holm S. (1979). A simple sequentially rejective multiple test procedure. *Scandinavian Journal of Statistics*, 6, 65-70.
- Kaiseler, M., & Polman, R.C.J. (2010) Gender and coping in sport: Do male and female athletes cope differently? In A. R. Nicholls (Ed.), *Coping in sport: Theory, methods, and related constructs* (pp. 79-94). Hauppauge, NY: Nova Science Publishers.

- Kim, M. S., & Duda, J.L. (2003). The coping process: cognitive appraisals of stress, coping strategies, and coping effectiveness. *Sport Psychologist, 17*, 406-425.
- Kowalski, K.C., & Crocker, P.R.E. (2001). Development and validation of the Coping Function Questionnaire for adolescent in sport. *Journal of Sport and Exercise Psychology, 36*, 257-272.
- Kowalski K. C., Crocker P.R.E., Hoar S.D., & Niefer C.B. (2005). Adolescents' control beliefs and coping with stress in sport. *International Journal of Sport Psychology, 36*, 257-72.
- Kress, J. L., & Statler, T. (2007). A naturalistic investigation of former Olympic cyclists' cognitive strategies for coping with exertion pain during performance. *Journal of Sport Behavior, 30*, 428-452.
- Lazarus, R.S. (1991). *Emotion and adaptation*. New York, NY: Oxford University Press.
- Lazarus, R. S. (1999). *Stress and emotion: A new synthesis*. New York: Springer.
- Lazarus, R. S. (2000). How emotions influence performance in competitive sports. *The Sport Psychologist, 14*, 229-252.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal and coping*. New York: Springer.
- Lodge, J., Tripp, G., & Harte, D.K. (2000). Think-Aloud, Thought-Listing, and Video-Mediated Recall procedures in the assessment of children's self-talk. *Cognitive Therapy and Research, 24*, 399-418. doi:10.1023/A:1005575618941
- Lorber, M.F. (2007). Validity of Video-Mediated Recall procedures for mothers' emotion and child ratings. *Journal of Family Psychology, 21*, 520-528. doi:10.1037/0893-3200.21.3.520
- Masters, K.S., & Lambert, M.J. (1989). The relations between cognitive coping strategies, reasons for running, injury, and performance of marathon runners. *Journal of Sport and Exercise Psychology, 11*, 161-170
- Morgan, W.P., Horstman, D.H., Cymerman, A., & Stokes, J. (1983). Facilitation of physical performance by means of a cognitive strategy. *Cognitive Therapy and Research, 7*, 251-264. doi:10.1007/BF01205139
- Nicholls, A.R. (2010). Effective versus ineffective coping in sport. In A. R. Nicholls (Ed.), *Coping in sport: Theory, methods, and related constructs* (pp. 263-276). Hauppauge, NY: Nova Science Publishers.
- Nicholls, A.R., Holt, N.L., & Polman, R.C.J. (2005). A phenomenological analysis of coping effectiveness in golf. *The Sport Psychologist, 19*, 111-130.

- Nicholls, A.R., & Polman, R.C.J. (2007). Coping in sport: A systematic review. *Journal of Sports Sciences, 25*, 11-31. doi:10.1080/02640410600630654
- Nicholls, A. R., & Polman, R.C.J. (2008). Think Aloud: Acute Stress and Coping Strategies during Golf Performances. *Anxiety, Stress & Coping, 21*, 283-294. doi:10.1080/10615800701609207
- Nicholls, A.R., Polman, R., Levy, A.R., Taylor, J., & Colby, S. (2007) Stressors, coping, and coping effectiveness: gender, type of sport, and skill differences. *Journal of Sports Sciences, 25*, 1521-1530. doi:10.1080/02640410701230479
- Nicholls, A.R., Polman, R., Morley, D., & Taylor, N.J. (2009) Coping and coping effectiveness in relation to a competitive sport event: Pubertal status, chronological age, and gender among adolescent athletes. *Journal of Sport and Exercise Psychology, 31*, 299-317.
- Nicholls, A.R., & Thelwell, R.C. (2010). Coping conceptualized and unraveled. In A. R. Nicholls (Ed.), *Coping in sport: theory, methods, and related constructs* (pp. 3-14). Hauppauge, NY: Nova Science Publishers.
- Ntoumanis, N., & Biddle, S. J. H. (1998). The relationship of coping and its perceived effectiveness to positive and negative affect in sport. *Personality and Individual Differences, 24*, 773 – 778. doi:10.1016/S0191-8869(97)00240-7
- Ostrom, C.W. Jr. (1990). *Time series analysis: Regression techniques* (2nd ed.). Sage University Paper Series on Quantitative Applications in the Social Sciences. Newbury Park, CA: Sage.
- Pensgaard, A. M., & Duda, J. L. (2003). Sydney 2000: The interplay between emotions, coping, and the performance of Olympic-level athletes. *The Sport Psychologist, 17*, 253 – 267.
- Pensgaard, A. M., & G. C. Roberts (2003). Achievement goal orientations and the use of coping strategies among Winter Olympians. *Psychology of Sport & Exercise, 4*, 101-116. doi:10.1016/S1469-0292(01)00031-0
- Poliseo, J.M. (2009). Coping effectiveness in competitive athletes. Unpublished Master's Thesis, Purdue University.
- Rasedeke, T.D., & Smith, A.L. (2004). Coping resources and athlete burnout: An examination of stress mediated and moderation hypotheses. *Journal of Sport and Exercise Psychology, 26*, 525-541.
- Reading, J., & Shephard, R.J. (1992). Revision of the Physical Activity Readiness Questionnaire (PAR-Q). *Canadian Journal of Sport Science, 17*, 338-345.
- Russell, J.A., & Carroll, J.M. (1999) On the bipolarity of positive and negative affect. *Psychological Bulletin, 125*, 3-30. doi:10.1037/0033-2909.125.1.3

- Schomer, H.H., & Connolly, M.J. (2002). Cognitive strategies used by marathoners in each quartile of a training run. *South African Journal of Research in Sport, Physical Education and Recreation*, 24, 87-99.
- Skinner, E.A. (1995) *Perceived control, motivation and coping*. Thousand Oaks, CA.: Sage.
- Skinner, N., & Brewer, N. (2002). The dynamics of threat and challenge appraisals prior to stressful achievement events. *Journal of Personality and Social Psychology*, 83, 678-692. doi:10.1037/0022-3514.83.3.678
- Skinner, E.A., & Zimmer-Gembeck, M.J. (2007). The development of coping. *Annual Review of Psychology*, 58, 119-44. doi:10.1146/annurev.psych.58.110405.085705
- Smith, R. E., Smoll, F. L., & Wiechman, S. A. (1998). Measurement of trait anxiety in sport. In J. Duda (Ed.), *Advances in sport and exercise psychology measurement* (pp. 129–148). West Virginia: Fitness Information Technology.
- Soliday, E., Moore, K.J., & Lande, M.B. (2002). Daily reports and pooled time series analysis: Pediatric Psychology Applications. *Journal of Pediatric Psychology*, 27, 67-76. doi:10.1093/jpepsy/27.1.67
- Sparks, P., Guthrie, C.A., & Shepard, R. (2006). The dimensional structure of the perceived behavioural control construct. *Journal of Applied Social Psychology*, 27, 418-438. doi:10.1111/j.1559-1816.1997.tb00639.x
- Stone, A.A., Schwartz, J.E., Neale, J.M., Shiffman, S., Marco, C.A., Hickcox, M., & Paty, J. et al., (1998). A Comparison of coping assessed by ecological momentary assessment and retrospective recall. *Personality Processes and Individual Differences*, 74, 1670-1680.
- Tabachnick, B.G., & Fidell, L.S. (2007). *Using multivariate statistics*, 5th ed. Boston: Allyn and Bacon.
- Tenenbaum, G., & Elran, E. (2003) Congruence between actual and retrospective reports of emotions for pre- and post-competition states. *Journal of Sport & Exercise Psychology*, 25, 323-340.
- Thatcher, J., & Day, M.C. (2008) Re-appraising stress appraisals: The underlying properties of stress in sport. *Psychology of Sport and Exercise*, 9, 318-335. doi:10.1016/j.psychsport.2007.04.005
- Totterdell, P. (2000) Catching moods and hitting runs: Mood linkage and subjective performance in professional sport teams. *Journal of Applied Psychology*, 85, 848-859. doi:10.1037/0021-9010.85.6.848

Trafimow, D., Sheeran, P., Conner, M., & Finlay, K.A. (2002) Evidence that perceived behavioural control is a multidimensional construct: Perceived control and perceived difficulty. *British Journal of Social Psychology, 41*, 101-121.
doi:10.1348/014466602165081

Welsh, D.P., & Dickson J.W. (2005). Video-recall procedures for examining subjective understanding in observational data. *Journal of Family Psychology, 19*, 62-71.
doi:10.1037/0893-3200.19.1.62

APPENDIX A
RECRUITMENT SCRIPT
RECRUITMENT POSTER
CONSENT FORM

Recruitment Script

My name is Blair Evans, and I am a graduate student in Sport Psychology at the University of Lethbridge. I am doing research on emotion and coping in long-distance runners under the supervision of Dr. Sharleen Hoar. The purpose of the study is to better understand the emotional experience of athletes when striving for a specific goal time, during a 5km time trial. We would like to know if any of you would be interested in participating in this study.

You would be asked to attend a single 90-120 minute session. During this session, you will be asked to complete a five kilometer time-trial, within a set goal time that you feel you can achieve. After the run, you will review the run and you will be asked to describe your thoughts at various points in the race. You will complete the study with my assistance (principal researcher) as well as a research assistant. There will be only one session, scheduled during the time period from September first to November 30th, 2009.

Your participation in this study is strictly voluntary and you will be able to withdraw at any time, without any penalty. All data will be kept in a safe place, which will be accessible to the researchers only. None of your personal information will be disclosed at any point in time. Anonymity and confidentiality are assured.

Participation in this study will contribute to the development of endurance sport specific research in sport psychology, an area of the field that is relatively limited despite the demand for this information. This work will directly help mental trainers gain knowledge about the emotional experiences that endurance athletes may encounter when attempting to perform at their best, and how they cope with these over time. This information will also be made available to athletes and coaches, in order to aid mental preparation for competitive events. Your contribution is invaluable in terms of furthering our efforts to understand the psychological aspects of endurance sport.

You will not receive compensation for participating in this study. Refreshments will be provided, however, and the study will provide an opportunity for you to complete a timed 5km time trial in a controlled environment.

If you agree to participate, please write your name and telephone number on the appropriate sheet and we will be in touch with you. If you participate, and wish to receive a summary of the results they will become available to you in February, 2010.

Thank you for your time, and have a great day!

Recruitment Poster

Volunteers Needed!

Managing Emotional Demands of Competitive Running



We are looking for:

Males, aged 18-60 currently training for an upcoming or recently completed running race of at least 5km

You will be asked to *run a 5km time trial*, complete related questionnaires, and partake in a brief interview

Participation is *individual, confidential, and anonymous!*

If you are interested, contact Blair Evans (b.evans @uleth.ca)
Department of Kinesiology and Physical Activity
University of Lethbridge

CONSENT TO PARTICIPATE IN RESEARCH

We are inviting you to participate in our study about emotions during endurance sport. The following information is provided so that you can decide whether you wish to participate in this study.

If you have any questions, feel free to contact Blair Evans (403) 332-5207; b.evans@uleth.ca
This research is being supervised by Dr. Sharleen Hoar (403) 329-2591; sharleen.hoar@uleth.ca

PURPOSE OF THE STUDY

The purpose of this study is to better understand the emotional and coping experiences of long distance runners during a 5km time trial.

PROCEDURES

Your participation in this study is completely voluntary and will consist of completing a 5km time trial run and partaking in an interview regarding your thoughts and actions during the run. You will also be asked to complete questionnaires which will ask you to: a) report on specific personal information, b) determine a goal for your time trial, and c) describe your thoughts and feelings at specific points throughout the time trial. The study will occur during a single session, and will take a total of 90 to 120 minutes of your time.

POTENTIAL RISKS AND DISCOMFORTS

It is likely that you will experience some physical and emotional discomfort as you strive to achieve a goal time during the time trial. This discomfort is similar to what would be expected during competition, or any time when you are exerting your best effort to reach a goal time. You are permitted to discontinue your participation at any point of the study.

POTENTIAL BENEFITS TO PARTICIPATION AND/OR TO SOCIETY

The data that you provide will directly help researchers and sport psychology consultants gain knowledge about the emotional experiences that endurance athletes may encounter when attempting to perform at their best, and how they cope with these over time. This information will also be available to coaches and athletes, to help prepare for competitions. Your contribution is invaluable in terms of furthering our efforts to understand the psychological aspects of endurance sport.

By completing this study you may also become more aware of your thoughts and actions in competitive/performance running situations. The study will also provide the opportunity to complete a time trial indoors, with results and split times at 1000m intervals. You will be provided with refreshments and snacks throughout the study.

INFORMATION ABOUT STUDY RESULTS

A summary of the study results will be sent to those who include an e-mail or mailing address at the end of this form, in February 2010.

PAYMENT FOR PARTICIPATION

Your participation will be voluntary and you will receive no financial compensation. You will be provided with a parking pass for the First Choice Savings Centre as well as nourishment during the session.

CONFIDENTIALITY

Any information obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission

Any information obtained during the study is completely private and will be kept in a locked filing cabinet or secure computer server in the sport psychology research laboratory. This data will be kept for a minimum of 5 years, at which point all paper will be shredded and computer files will be deleted. Access to this information will be granted only to the researchers and research assistants. Consent forms and any other forms with personal information will be coded and kept separately from other data. Your identity will never be revealed in any reports regarding this study.

PARTICIPATION AND WITHDRAWAL

Your participation is voluntary. **You may withdraw at any time without consequences** of any kind. If you elect to withdraw, you will be given a choice of whether we may retain any information provided you to that point, or if you wish **for us to delete the data**. You may also refuse to answer any questions you don't want to answer and still remain in the study.

RIGHTS OF RESEARCH PARTICIPANTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have concerns or questions about your rights as a participant or about the way the study is conducted, you may contact: Office of Research Services, University of Lethbridge, Phone: (403) 329-2747.

CONSENT

I have read the information presented in the information letter about a study being conducted by Blair Evans and Dr. Sharleen Hoar of the University of Lethbridge. I have had the opportunity to ask questions about my involvement in this study, and to receive any additional details I wanted to know about the study. I understand that I may withdraw from the study at any time, if I choose to do so, and I agree to participate in this study. I have been given a copy of this form.

Name of Participant (please print)

Signature of Participant

Signature of Principal Researcher

Please provide your Email or mailing address if you wish to obtain a summary of the results (please print clearly)

Appendix B
Demographics questionnaire
Time trial goal questionnaire

Demographic Questionnaire

How old are you (years)? _____

Which of the following is your best guess at the total income, before taxes and deductions, of all household members from all sources in the past year?

- | | | |
|---|--|--|
| <input type="radio"/> No Income | <input type="radio"/> \$30,000 – \$39, 999 | <input type="radio"/> \$80,000 – \$99, 999 |
| <input type="radio"/> \$5000 - \$9999 | <input type="radio"/> \$40,000 – \$49, 999 | <input type="radio"/> \$100,000 - \$119, 999 |
| <input type="radio"/> \$10, 000 – \$14, 999 | <input type="radio"/> \$50,000 – \$59, 999 | <input type="radio"/> \$120, 000 – 149, 999 |
| <input type="radio"/> \$15,000 – \$19, 999 | <input type="radio"/> \$60,000 – \$79, 999 | <input type="radio"/> \$150, 000 or more |
| <input type="radio"/> \$20,000 – \$29, 999 | | |

What is your highest level of education?

*Less than a high
school diploma*

*A high school
diploma*

*Some college or
university*

*A university or
college degree*

How many years have you been running competitively in distances over 5km? _____

Approximately how many hours have you spent training (or completing moderate/intense physical activity) per week, averaged over the last two months? _____

What was the distance of your most recent running race? _____

❖ How long ago was the race? _____

❖ What was your finishing time at the race? _____

Time Trial Goal Questionnaire

The following table provides a list of possible **5km** goal times. Please write down the percent of certainty that you feel you could obtain each of the following times in the upcoming time trial. You can use any number from 1 to 100

- **0%** = entirely certain that you **could not** achieve that time
- **100%** = entirely certain that you **can** achieve that time

Note: work from the top down, and begin with the last number you feel 100% certain of achieving. Continue downwards until you reach a time where you feel 0% certain of achieving

Time	Certainty(%)
27:00	
26:30	
26:00	
25:30	
25:00	
24:30	
24:00	
23:30	
23:00	
22:30	
22:00	
21:30	
21:00	
20:30	
20:00	
19:30	
19:00	
18:30	
18:00	
17:30	
17:00	
16:30	
16:00	
15:30	
15:00	

**note: a second time-trial goal questionnaire was developed for participants expecting to run a time greater than 27:00. This tool ranged from 20:00 to 32:00.*