Victoria University of Technology
School of Human Movement, Recreation and Performance

On Making Warriors Out of Worriers:
The Management of Trait Anxiety in Competitive Sports

Thesis submitted to satisfy the requirements for the Degree of Doctor of Philosophy

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DOCTOR OF PHILOSOPHY DECLARATION

I, Chris Larner, declare that the PhD thesis entitled ‘On Making Warriors Out of Worriers: The Management of Trait Anxiety in Competitive Sports’ is no more than 100,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

Signature

02-04-2009

Date

ABSTRACT

There were three broad aims for this thesis. These included (1) an investigation of the relationships between the intensity and directional dimensions of trait anxiety, state anxiety and performance in sport, (2) a detailed exploration of mechanisms mediating observed relationships, using the theory of Rational Emotive Behaviour Therapy (REBT) as a framework, and (3), based on the findings of this exploration, an assessment of the efficacy of a tailored REBT treatment as a means of modifying harmful trait anxiety directional interpretations, resulting in changes at the state level and ultimately changes in performance. A total of 189 competitors from the sports of freestyle skiing, athletics, and ten-pin bowling participated in Study 1. Each competitor provided general demographic information, information pertaining to their overall skill level, and also completed the Competitive Trait Anxiety Inventory version 2 – directional (CTAI-2-D), Sport Anxiety Scale (SAS), and Competitive State Anxiety Inventory version 2 – directional (CSAI-2-D) just prior to a competition. Following competition they went on to rate their performance on a scale from very poor to excellent. The results of Study 1 revealed that measures of anxiety correlated as predicted, and provided further support to the utility of directional measures of anxiety as a more precise predictor of skill level and performance than intensity alone measures. In Study 2, six bowlers who obtained negative directional trait anxiety scores on both of the cognitive and somatic subscales of the CTAI-2-D, and six bowlers who obtained positive directional trait anxiety scores on both of the cognitive and somatic subscales of the CTAI-2-D were interviewed on two separate occasions. Interviews were designed to assess the presence and typology of cognitions associated with emotional responses based on the ABC framework adopted in the theory and practice of REBT. Findings from Study 2 provided insight into specific cognitive mechanisms behind directional measures of anxiety, and highlighted the value of REBT as a theoretical model for conceptualising various components of anxiety in sport. In particular, competitors with debilitative interpretive styles were found to endorse self-directed demands, and awfulising, and exhibited secondary emotional disturbance most frequently associated with somatic and behavioural interpretations. In the final study, a total of 60 ten-pin bowlers were allocated to either a six-week course of REBT, a six-week course of a more traditional treatment entailing imagery and relaxation, or a control condition entailing six weeks of befriending. REBT was found to significantly moderate negative directional interpretation scores of anxiety symptoms, and to reduce competitors'

endorsement of irrational beliefs (whilst concurrently increasing their endorsement of rational or non-judgemental thinking styles) to a greater extent than the traditional intervention (relaxation and mental imagery), and control condition. Further, although not statistically significant, competitors who underwent the course of REBT showed greater performance gains than the bowlers in the other two conditions. The main implications of these findings are that anxiety research and management practices should focus on the causal role of underlying beliefs, and the relationship competitors have with these beliefs, in the experience of anxiety. Further, the results of this study highlighted that REBT has a significant role to play in the theory and management of anxiety in sport.

ACKNOWLEDGEMENTS

I set out on this PhD with a moderate hike in mind. Having trekked for a number of years now, the experience has evolved into an expedition. During my travels I was supported in many ways by a number of people. I would like to take this opportunity to thank everyone who has facilitated my journey and mention the following people explicitly:

I am particularly grateful to Professor Tony Morris for his considerable patience, expert guidance and encouragement. He has helped me to get back on course time and time again. I have gained considerably from Tony's knowledge and experience, and ability to stay focussed on the "greater plan" when I have tended to wander. Deepest appreciation and love is also extended to my wife Tania, who has chosen to put up with my oscillating moods during the few highs and many lows. She certainly didn't choose to do a PhD, but has obligingly gone through much of the stress involved. And of course a big thanks to my sons, Nathan and James. I can only hope that I can make up for being distracted for so long. Thanks also go to Lucy and James Finnegan who have always been there to provide support in this process. In different ways you, and many others I have not mentioned, have all provided immeasurable support throughout this process. I would also like to thank Dr. Daryl Marchant for his assistance in supervision. And finally the competitors, especially the bowlers, who put aside a considerable amount of time to participate in this series of studies, your enthusiasm and patience made the experience well worthwhile.

TABLE OF CONTENTS

DOCTOR OF PHILOSOPHY DECLARATION 2

ABSTRACT 3

ACKNOWLEDGEMENTS 5

TABLE OF CONTENTS 6

LIST OF TABLES 11

LIST OF FIGURES 13

CHAPTER 1: INTRODUCTION 15

CHAPTER 2: LITERATURE REVIEW 18

INTRODUCTION 18

THE THEORETICAL DEVELOPMENT AND MEASUREMENT OF ANXIETY IN SPORT 18

Definitions *18*

Unidimensional Theories of Arousal *19*

Anxiety-Based Approaches *22*

State-Trait Anxiety Theory 22

Sport Specific Measures 25

Multidimensional Conceptualisation of Anxiety 26

Directional Interpretation of Anxiety Symptoms 41

Potential Mechanisms Underlying Directional Observations 50

Theoretical Conceptualisations *56*

Reversal Theory 57

Zones of Optimal Functioning Model 57

Summary of the Theoretical Development and Measurement of Anxiety in Sport . *60*

APPLIED ANXIETY MANAGEMENT IN SPORT 60

Major Interventions Applied by Sport Psychologists *61*

Relaxation 63

Imagery 66

Combined Relaxation and Imagery 74

Attentional Control Training 75

Goal Setting 77

Self Talk 80
Summary of Applied Anxiety Management in Sport *85*
THE PRESENT THESIS 86
CHAPTER 3: STUDY 1: EXPLORING MEASURES OF ANXIETY 88
INTRODUCTION 88
Predicted Internal Consistency of Anxiety Questionnaires *89*
Predicted Between-Scale Correlations within Anxiety Questionnaires *89*
Predicted Relationships Between Subscales of Trait Anxiety Questionnaires *90*
Predicted Relationships Between Trait and State Anxiety Measures *91*
Predicted Relationships Between Dimensions of Anxiety and Performance Outcome Measures *93*
METHOD 95
Participants *95*
Measures *96*
Procedure *99*
Analysis *99*
RESULTS 99
Observed Internal Consistency of Anxiety Questionnaires *100*
Correlational Analyses *101*
Observed Between-Scale Correlations within Anxiety Questionnaires *103*
Observed Relationships Between Subscales of Trait Anxiety Questionnaires *104*
Observed Relationships Between Trait and State Anxiety Measures *104*
Observed Relationships Between Dimensions of Anxiety and Performance Outcome Measures *105*
DISCUSSION 112
Methodological Issues *119*
Future Research *121*
CONCLUSIONS 123
CHAPTER 4: IDENTIFYING A THEORETICAL FRAMEWORK 124
INTRODUCTION 124
GENERAL THEORIES OF EMOTION 125
The James-Lange Theory *125*

The Cannon-Bard Theory ... *127*
Schachter's Two-Factor Theory ... *127*
Lazarus's Cognitive Appraisal Theory of Emotion ... *128*
GENERAL THEORIES OF ANXIETY ... 130
Trait Anxiety Theories ... *130*
Eysenck's Unified Theory of Anxiety and Cognition ... *131*
ELLIS'S THEORY OF EMOTIONAL DISTURBANCE ... 133
Background ... *133*
The Theory of REBT ... *134*
Basic Biological Tendencies ... 134
REBT and Emotions ... 134
The ABC Framework of REBT ... 135
Activating Events ... 136
Beliefs ... 139
Consequences ... 144
Disputation ... 148
Secondary Emotional Problems ... 149
Summarising the ABC's of REBT ... *151*
REBT Research and Measurement ... *151*
Measurement of Beliefs in REBT ... 152
Meta-analyses of REBT ... 154
REBT in Sport ... *156*

CHAPTER 5: STUDY 2: EXPLORING ANXIETY-CAUSING COGNITIONS ... 166

INTRODUCTION ... 166
METHOD ... 169
Participants ... 169
Measures ... 169
Procedure ... 170
Analysis ... 171
RESULTS ... 172
ABC Frequency Counts ... *173*
ABC Pathway Analyses ... *180*
DISCUSSION ... 189

Methodological Issues *193*
Future Research *195*
CONCLUSIONS 197
CHAPTER 6: STUDY 3: MANAGING ANXIETY IN SPORT WITH REBT 198
INTRODUCTION 198
METHOD 200
Participants 200
General Measures 201
Specific and State Measures 202
Procedure 205
Data Analysis 206
RESULTS 206
Preliminary Data Analysis 206
DISCUSSION 228
Methodological Issues *231*
Future Research *232*
Implications for Practice *234*
CONCLUSIONS 234
CHAPTER 7: DISCUSSION 236
METHODOLOGICAL ISSUES 241
FUTURE RESEARCH 245
IMPLICATIONS FOR PRACTICE 249
CONCLUDING REMARKS 251
REFERENCES 253
APPENDICES 281
Study 1 Participant Details Form 282
Study 1 Competitive State Anxiety Inventory-2-D 283
Study 1 Competitive Trait Anxiety Inventory-2-D 284
Study 1 Sport Anxiety Scale 285
Study 1 Participant Invitation Letter 286

Study 1 Participant Instructions 287

Study 1 Informed Consent form 288

Study 2 Informed Consent form 289

Study 2 Interview Schedule 290

Study 2 Rational Cognitions Coding Tree 295

Study 2 Irrational Cognitions (Self directed) Coding Tree 296

Study 2 Irrational Cognitions (Other directed) Coding Tree 297

Study 2 Irrational Cognitions (Life directed) Coding Tree 298

Study 3 Social Desirability Scale 300

Study 3 Shortened General Attitude and Belief Scale 301

Study 3 Mental Readiness Form-L-D 302

Study 3 REBT Intervention Structure 303

Study 3 Relaxation Imagery Intervention Structure 305

Study 3 Invitation to Participate 306

Study 3 Participant Instructions – Following Inclusion 307

Study 3 Informed Consent form 308

LIST OF TABLES

Table 2.1 *Effect Sizes (ES) with Trait Anxiety/Neuroticism Measures for Various Types of Therapy (Jorm, 1989, p. 24)* 25
Table 3.1 *Means, SD's, and Internal Consistency of the CSAI-2-D and SAS* 100
Table 3.2 *Intercorrelations Between Subscales of Anxiety Measure, and Performance Outcomes* 102
Table 4.1 *Inappropriate and Appropriate Negative Emotions and their Cognitive Correlates (Dryden & DiGuiseppe, 1990)* 147
Table 4.2 *Productive and Unproductive Arousal Chains (Goldman, 2003).* 161
Table 4.3 *Common Examples of Activating Events, Defeating Self-Talk, and Unproductive Outcomes (Goldman, 2003).* 162
Table 4.4 *Common Examples of Disputation (Goldman, 2003).* 163
Table 4.5 *Common Examples of Activating Events, Rational Self-Talk, and Productive Outcomes After Disputing (Goldman, 2003).* 164
Table 5.1 *Major Bowling Goals* 173
Table 5.2 *Activating Events - Frequency of Reporting* 174
Table 5.3 *Number of Demands/Preferential Citations Falling into Major Themes* ... 175
Table 5.4 *Number of Demands/Preferential Citations Falling into Major Themes for Debilitative and Facilitative Bowlers* 176
Table 5.5 *Number of Evaluative Citations Falling into Major Themes for Debilitative and Facilitative Bowlers* 177
Table 5.6 *Number of Emotional Consequence Citations Falling into Major Themes* 178
Table 5.7 *Frequency of Citations for Each Response Dimension and Directional Interpretations for Debilitative and Facilitative Trait Anxiety Competitors* 179
Table 6.1 *Internal Reliabilities of Scales* 208
Table 6.2 *Correlations among Trait Anxiety Subscales (CTAI-2-D) and State Anxiety Subscales (MRF-L-D) at Game 1.* 210
Table 6.3 *Correlations among subscales of the CTAI-2-D and the SGABS* 211
Table 6.4 *Means and Standard Deviations for Each SGABS Subscale for Each Condition Pre and Post-intervention* 214

Table 6.5 *Means and Standard Deviations for Each Composite CTAI-2 Subscale for Each Condition Pre and Post-intervention* 216

LIST OF FIGURES

Figure 2.1. The relationship between performance and arousal as predicted by drive theory. 20
Figure 2.2. The Relationship between Performance and Arousal as Predicted by the Inverted-U Hypothesis. 21
Figure 2.3. Influence of State and Trait Anxiety on Sport Performance (Spielberger, 1966, p.17). 23
Figure 2.4. A Control Model of Debilitative and Facilitative Competitive State Anxiety (Jones, 1995, p. 466). 55
Figure 2.5. The Cusp Catastrophe Model (Hardy, 1996). 59
Figure 2.6. A Framework for Understanding Mental Skills Training in Sport (Vealey, 2007, p. 291). 61
Figure 2.7. An Applied Model of Mental Imagery Use in Sport (Martin, Moritz, & Hall, 1999, p. 248). 68
Figure 2.8. Interactions Between Internal and External Factors and Attentional Processing (Boutcher, 2002, p. 449) 76
Figure 3.1. Mean CSAI-2-D Cognitive and Somatic State Anxiety Intensity Scores Across Skill Groups. 107
Figure 3.2. Mean CSAI-2-D Cognitive and Somatic State Anxiety Direction Scores Across Skill Groups. 108
Figure 3.3. Mean CTAI-2-D Cognitive and Somatic State Anxiety Intensity Scores Across Skill Groups. 109
Figure 3.4. Mean CTAI-2-D Cognitive and Somatic State Anxiety Direction Scores Across Skill Groups. 110
Figure 3.5. Mean SAS Concentration Disruption, Somatic, and Worry Across Skill Groups. 111
Figure 4.1. The James-Lange Theory of Emotion. 126
Figure 4.2. The Cannon-Bard Theory of Emotion. 127
Figure 4.3. Schachter's (1964) Two-Factor Theory of Emotion. 128
Figure 4.4. Lazarus's (1991) Cognitive Appraisal Theory of Emotion. 129
Figure 4.5. Eysenck's (1997) Four-Factor Theory of Trait Anxiety 132
Figure 4.6. The Expanded ABC's of REBT. 135
Figure 4.7. Possible Interactions among A's, B's, and C's (Ellis, 1994). 137

Figure 4.8. Processes Associated with the A Component of REBT (Adapted from, Wessler & Wessler, 1980). 137
Figure 4.9. A Model of Private Thought (Bernard & Joyce, 1984, p. 57). 141
Figure 4.10. Single Continuum Showing no Differentiation between Anxiety and Concern (Dryden, 1994, p. 55). 146
Figure 4.11. Two Continua Showing Differentiation between Anxiety and Concern (Dryden, 1994, p. 55). 146
Figure 4.12. Primary and Secondary Emotional Disturbances. 150
Figure 5.1. Goal Setting Hierarchical Index Tree. 171
Figure 5.2. Anxiety Pathway Map for the Entire Sample. 181
Figure 5.3. Anxiety Pathway Map for the Debilitative Trait Anxiety Group. 182
Figure 5.4. Anxiety Pathway Map for the Facilitative Trait Anxiety Group. 183
Figure 5.5. Anger Pathway Map for the Entire Sample. 184
Figure 5.6. Annoyance Pathway Map for the Entire Sample. 185
Figure 5.7. Concern Pathway Map for the Entire Sample 186
Figure 5.8. Focussed Pathway Map for the Entire Sample. 187
Figure 5.9. Happiness Pathway Map for the Entire Sample. 188
Figure 6.1. Somatic State Anxiety Intensity Across Games 219
Figure 6.2. Average Pre- and Post-Intervention Somatic State Anxiety Intensity Scores. 220
Figure 6.3. Cognitive State Anxiety Intensity Across Games 221
Figure 6.4. Average Pre- and Post-Intervention Cognitive State Anxiety Intensity Scores 222
Figure 6.5. Somatic State Anxiety Direction Scores Across Games 223
Figure 6.6. Average Pre- and Post-Intervention State Somatic Anxiety Direction Scores 223
Figure 6.7. State Cognitive Anxiety Direction Scores Across Games 225
Figure 6.8. Average Pre- and Post-Intervention Cognitive State Anxiety Direction Scores 225
Figure 6.9. Average Game Scores for all Participants Across the Study. 227
Figure 6.10. Average Pre- and Post-Intervention Game Scores 227

CHAPTER 1: INTRODUCTION

Differences between elite sport competitors in underlying fitness and skill are frequently negligible (Jones & Swain, 1995). It is often the mental state of the competitor, both prior to and during the event that is the primary determinant of success or failure (Watson, 1984). A critical aspect of sports competitors' mental state that is reported by the majority of performers entering important sporting events is anxiety (Anshel, 1995). The importance of anxiety and other emotions in sports competition has been recognised for many years (e.g., Martens 1971a; Singer, 1975). In a survey of more than 200 college athletes, Smith (1980) observed that more than 40% of respondents reported experiencing high levels of anxiety that they felt interfered with their performance. Murphy (1988) reported that over 50% of consultations among athletes at an Olympic festival were related to stress- or anxiety-related problems. Jones (1995) noted that this state of affairs is not surprising given that competitive sport is generally characterized by a demand to perform at optimum levels in high pressure situations.

Athletes' experience of this anxiety is important because it can potentially have a profound impact on performance. This situation is not unique to elite competition, because both youth and sub-elite competitors have consistently reported the adverse effects of anxiety on performance (Bird & Horn, 1990; Jones & Hardy, 1990; Meyers & Schleser, 1980). Furthermore, high levels of competitive anxiety have been identified as one of the prime motives for youth dropout from sport (Gould, Feltz, Horn, & Weiss, 1982; Klint & Weiss, 1986).

In response to this situation, researchers and applied practitioners' have devoted considerable attention to the construct of anxiety. Early distinctions were based on measures designed to identify athletes' general tendency to be anxious, and their immediate anxiety states (Spielberger, 1966). This distinction predicts that people's trait anxiety, or acquired behavioural disposition to experience a range of situations as distressing, should result in disproportionately intense state anxiety reactions (Spielberger, 1966).

A second dimension of the anxiety construct that has emerged from the research concerns its cognitive and somatic components, the former being characterised by unpleasant thoughts and worry (Morris, Davis, & Hutchings, 1981) and the latter referring to the subjective interpretation of physical manifestations of anxiety (Martens, Vealey, & Burton, 1990).

In the sports setting, the majority of research has focussed on the measurement and modification of the intensity of the state anxiety response. This anxiety dimension has typically been interpreted as negative and hurtful to performance (Jones & Swain, 1995). Theories based on anxiety intensity have generally predicted that cognitive state anxiety intensity is negatively related to performance, and that somatic state anxiety intensity forms an inverted-U relationship with performance (Martens et al., 1990). There has been little consistency in findings across numerous studies testing these hypotheses (Gould & Udry, 1994; Hassmén, Raglin, & Lundqvist, 2004; Jones & Hardy, 1990; Jones, 1995).

One major development that has the potential to explain some of the inconsistencies observed in past research, and advance the theoretical conceptualisation of anxiety, is the proposal of directional interpretations of anxiety symptoms. Research applying this approach has indicated that athletes' directional interpretation of their anxiety experience, not the intensity of their anxiety symptoms, may have the greatest impact on subsequent performances (Jones, Swain, & Hardy, 1993; Parfitt & Hardy, 1993). For example, research has revealed that elite performers interpret both cognitive and somatic trait anxiety symptoms as being significantly more facilitative to performance than non-elite performers (Jones & Swain, 1995). Such findings provide a rationale to further investigate the relationship between directional interpretations of trait anxiety and performance.

Past research has also tended to focus heavily on the modification of the state anxiety response, based on the premise that trait anxiety is highly stable and inflexible (Jorm, 1989). Research from the clinical psychology setting has indicated that the trait components of anxiety may be modifiable (Jorm, 1989). Notably, interventions employing a Rational Emotive Behaviour Therapy (REBT) framework have produced a reduction in trait anxiety intensity of around 1.25 standard deviations across a substantial number of studies in clinical settings (Jorm, 1989). At present, there is little research concerning the modification of cognitive and somatic dimensions of trait anxiety, or even the modification of directional interpretations of generalised unidimensional trait anxiety in sport.

If findings indicating the modifiability of trait anxiety intensity, and the close relationship between trait and state anxiety dimensions can also be applied to directional interpretations of anxiety, the potential exists for a new and highly efficient form of anxiety management. More specifically, an intervention programme carefully aimed at

modifying dysfunctional directional interpretations of cognitive or somatic trait anxiety should be mirrored in more appropriate state anxiety interpretations, and, ultimately, result in significant performance improvements. Cognitive behavioural techniques, such as REBT, would appear to be well-suited forms of intervention because they target individuals' predispositions to interpret their thoughts, emotions, behaviour, and environment negatively, and offer alternative thought patterns that promote individual goal attainment.

In Study 1 of this thesis, I set out to test the prediction that directional aspects of anxiety are significantly associated with skill level and performance. Results from this analysis indicated that anxiety interpretations play a significant role in competitors' experience of anxiety and in performance outcomes. As a result, in Study 2, I went on to explore the constitutional make-up of these directional anxiety interpretations using the theoretical framework of Rational-Emotive Behaviour Therapy (REBT). Qualitative analysis of interviews conducted with bowlers indicated that those competitors who reported harmful directional trait anxiety also presented with a range of beliefs predicted by the theory of REBT to be associated with emotional disturbance. In the third and final study of this thesis, I went on to examine the efficacy of applied REBT as a means of helping competitive bowlers moderate unhelpful directional trait anxiety and improve performance outcomes.

CHAPTER 2: LITERATURE REVIEW

Introduction

The conceptualisation of anxiety has undergone considerable refinement over time. To gain a complete understanding of the current state of anxiety theory, measurement, and treatment, it is necessary to consider conceptual breakthroughs chronologically. The literature reviewed in this thesis is divided into three separate, but interrelated, parts. In the first part of the literature review, I outlined the theoretical development and measurement of anxiety from its beginnings as a uni-dimensional construct in the educational and clinical literature, to current multidimensional approaches adopted in the sports setting. I explored both theory and measurement as one because major theoretical advances in anxiety have often been driven by the development of measures. In the second part of the literature review, I discussed how theoretical developments have been interpreted in the applied setting by examining common applied management techniques, with a focus on cognitive interventions. In the final part of the literature reviewed for the purposes of this thesis (see Chapter 4), I explored general theories of emotion as a basis to evaluate the potential role of REBT in the management of anxiety in sport.

The Theoretical Development and Measurement of Anxiety in Sport

Definitions

The concept of anxiety has been used synonymously with both arousal and stress (Jones, 1995). Researchers in the sports setting continue to confuse these constructs, despite the fact that they are measured differently, and require different regulation strategies (Gould & Krane, 1992). For the purposes of this thesis, the following operational definitions will be used for the terms stress, arousal, and anxiety. Seyle (1975) originally defined stress as a response of the body to a demand placed on it. Jones (1990) has defined stress as a state resulting when demands are placed on an individual that require that person to engage in some form of coping behaviour. Perhaps the clearest description of stress was provided by Martens et al. (1990), who defined it as “the process that involves the perception of a substantial imbalance between environment demand and response capabilities under conditions in which a failure to meet demand is perceived as having important consequences and is responded to with increased levels of cognitive and somatic anxiety” (p. 10). Importantly, Lazarus (1999) highlighted that stress refers to a relationship between the individual and their environment. Lazarus went on to argue that a transactional, rather than interactional,

perspective should be adopted to emphasise the relationship meaning construed by an individual operating in a particular environment. Based on this, Fletcher, Hanton and Mellalieu (2007) defined stress as:

> An ongoing process that involves individuals transacting with their environments, making appraisals of the situation they find themselves in, and endeavoring to cope with any issues that may arise (p. 45).

Marchant and Morris (2004) defined arousal as a reflection of "the level of activity of various physiological indicators of the body, such as heart rate, respiration rate, galvanic skin response, hormonal activity, brain wave activity (EEGs) and temperature" (p. 75). It is a physiological response that is represented on a continuum ranging from sleep to high excitation.

Anshel, Freedson, Hamill, Haywood, Horvat, and Plowman (1991) defined anxiety as a "subjective feeling of apprehension or perceived threat, sometimes accompanied by heightened physiological arousal" (p. 9). Gould and Krane (1992) contended that anxiety can be considered "the emotional impact or cognitive dimension of arousal" (p. 121). It is what results when individuals doubt their ability to cope with a situation that causes them stress (Hardy, Jones, & Gould, 1996). It is also important to note that, until recently, anxiety has generally been characterised as a negative or unpleasant experience (e.g., Jones & Hanton, 2001). A more general conceptualisation of anxiety will be proposed in this thesis, following on from general theories of emotion. This conceptualisation highlights the understanding that anxiety is comprised of cognitive, physiological, and behavioural components (Jones, 1990).

Unidimensional Theories of Arousal

Until the early 1980's, the literature on the competitive anxiety-performance relationship was largely dominated by arousal theories. These were heavily influenced by research conducted in the educational and clinical psychology settings. Two basic theories have been used commonly to describe the arousal-performance relationship in the sport psychology setting, Drive theory and the Inverted-U hypothesis. Drive theory proposes a linear relationship between arousal and performance, whereas the Inverted-U hypothesis applies a quadratic curve to describe this relationship.

Drive Theory

Developed by Hull (1943), and later modified by Spence and Spence (1966), Drive theory predicts that athletes' performance on a task is a function of their arousal multiplied by how well they have learned the task. Although the theory has a range of

conceptual nuances, one of its basic tenets that has been widely adopted by sport psychologists is the prediction that arousal and performance will form a positive linear relationship. Athletic performance on complex or novel tasks is predicted to be highest with low levels of arousal, whereas performance on simple or well-learned tasks is predicted to be best with a higher level of arousal. This relationship is illustrated in Figure 2.1.

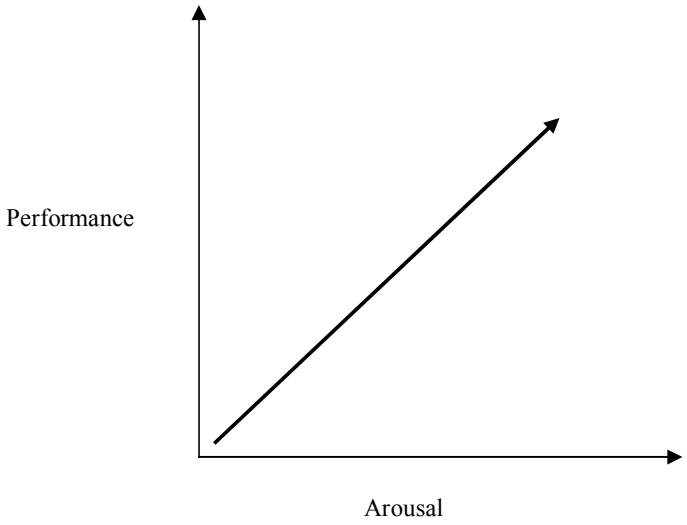

Figure 2.1. The relationship between performance and arousal as predicted by drive theory.

Martens (1971) noted that support for this theory is not consistent. More arousal does not necessarily predict improved performance and, despite modifications to the model, the predicted linear relationship has since been found to be simplistic. Of particular relevance to sport is the observation that the model fails to accommodate the effects of complex tasks (Martens, 1971; Tobias, 1980; Weinberg, 1979), which means it is too simple to explain arousal and motor/sport performance relationships (Fisher, 1976). A final and important limitation of the model lies in its failure to consider the role of thought or appraisal in the arousal-performance relationship (Gill, 1994).

The Inverted-U Hypothesis

With its origin in the work of Yerkes and Dodson (1908), the Inverted-U hypothesis posits that for every type of behaviour there exists an optimal level of arousal, usually of moderate intensity, that produces maximum performance. Levels of arousal above and below this optimum are predicted to produce inferior performances. The theory further postulates that as the complexity of a task increases, the arousal needed for optimal performance will decrease. The Inverted-U relationship is illustrated

in Figure 2.2. The simplicity of this model in relating arousal to sports performance has advanced its dissemination as an illustrative model by many sport psychologists.

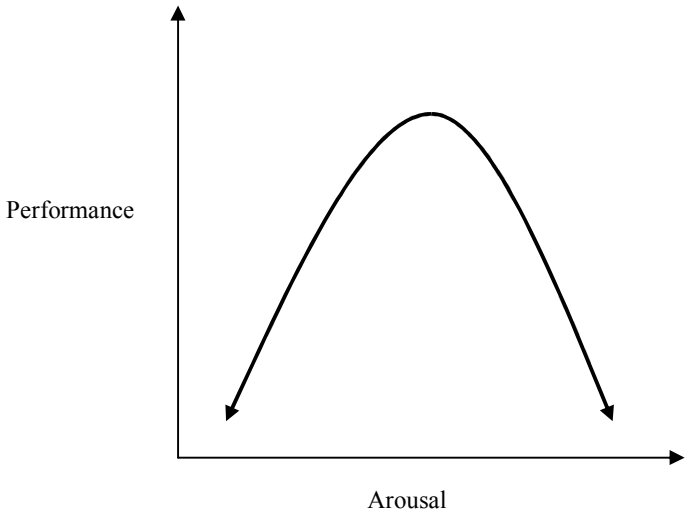

Figure 2.2. The Relationship between Performance and Arousal as Predicted by the Inverted-U Hypothesis.

Criticisms of the Inverted-U hypothesis have focussed on its inability to explain why performance is impaired at arousal levels above and below the optimum (Eysenck, 1984; Landers, 1980). As one would expect, this model is also virtually impossible to disprove because extremely high or low levels of arousal (panic or sleep) would necessarily impact on performances in most circumstances (Landers, 1994). The model's simplicity has also been criticised in that it only relates to general effects on global performance effectiveness, rather than specific effects upon information-processing efficiency (Eysenck, 1984). Applied knowledge also brings into question the shape of the curve on the grounds that rapid performance declines are often observed when arousal reaches a harmful level, and that it may be unrealistic to assume that an over-aroused performer can simply reduce their arousal level to regain optimal performance (Fazey & Hardy, 1988; Hardy, 1990; Hardy & Fazey, 1987). Finally, the model is unable to account for the often-observed differences in the performance of athletes who are exposed to the same stressor (Humara, 1999).

In response to these criticisms, there has arisen a general dissatisfaction with the use of arousal as a unitary concept that incorporates the emotion of anxiety. This was driven in part by more accurate delineations between the concepts of arousal, anxiety, and stress (Gould & Krane, 1992; Jones, 1990; Jones & Hardy, 1989; Krane, 1992), and partly by the understanding that anxiety is a multidimensional, and not unidimensional,

construct, comprising cognitive, physiological, and behavioural components (Jones, 1990). As already indicated, cognitive psychologists have been particularly concerned with the absence of cognitive appraisal in these models (Gill, 1994).

In summary, unidimensional approaches have contributed to the understanding of the relationship between arousal, anxiety, and performance. As Marchant and Morris (2004) noted, however, these approaches have failed to capture considerable support, and have struggled to assimilate ongoing developments in the measurement and management of anxiety in sport.

Anxiety-Based Approaches

State-Trait Anxiety Theory

Cattell and Scheier (1961) have been credited with first differentiating between state and trait aspects of anxiety, resulting from a series of factor analytic studies they conducted. Following their lead, Spielberger (1966) developed the State-Trait Anxiety Theory, which provided a general framework for examining the major variables that comprise anxiety, and enabled predictions to be made concerning the possible relationship between these variables. Spielberger defined state anxiety as a transitory experience, characterised by "subjective, consciously perceived feelings of apprehension and tension, accompanied by or associated with activation or arousal of the autonomic nervous system" (p. 17). Anshel et al. (1991) defined state anxiety as "an immediate emotional experience that is characterised by apprehension, fear, and tension, and is sometimes accompanied by physiological arousal" (p. 145). These definitions emphasise the situational nature of state anxiety.

Spielberger (1966) defined trait anxiety as "a motive or acquired behavioral disposition that predisposes an individual to perceive a wide range of objectively non-dangerous circumstances as threatening and to respond to these with state anxiety reactions disproportionate in intensity to the magnitude of the objective danger" (p. 17). Trait anxiety, may, therefore, be thought of as more of a world view or personality feature that individuals draw on when coping with situations in their environment. It is a relatively permanent aspect of personality that is inferred from predictable responses to particular circumstances (Anshel, 1995). Eysenck (1992) has reflected that "the state-trait distinction relates mainly to temporal duration; States typically last for relatively short periods of time, whereas traits remain essentially unchanged for considerably longer" (p. 38).

The antecedents, thoughts, and processes of anxiety, and relationships between state and trait anxiety as conceptualised by Spielberger (1966) are illustrated in Figure 2.3.

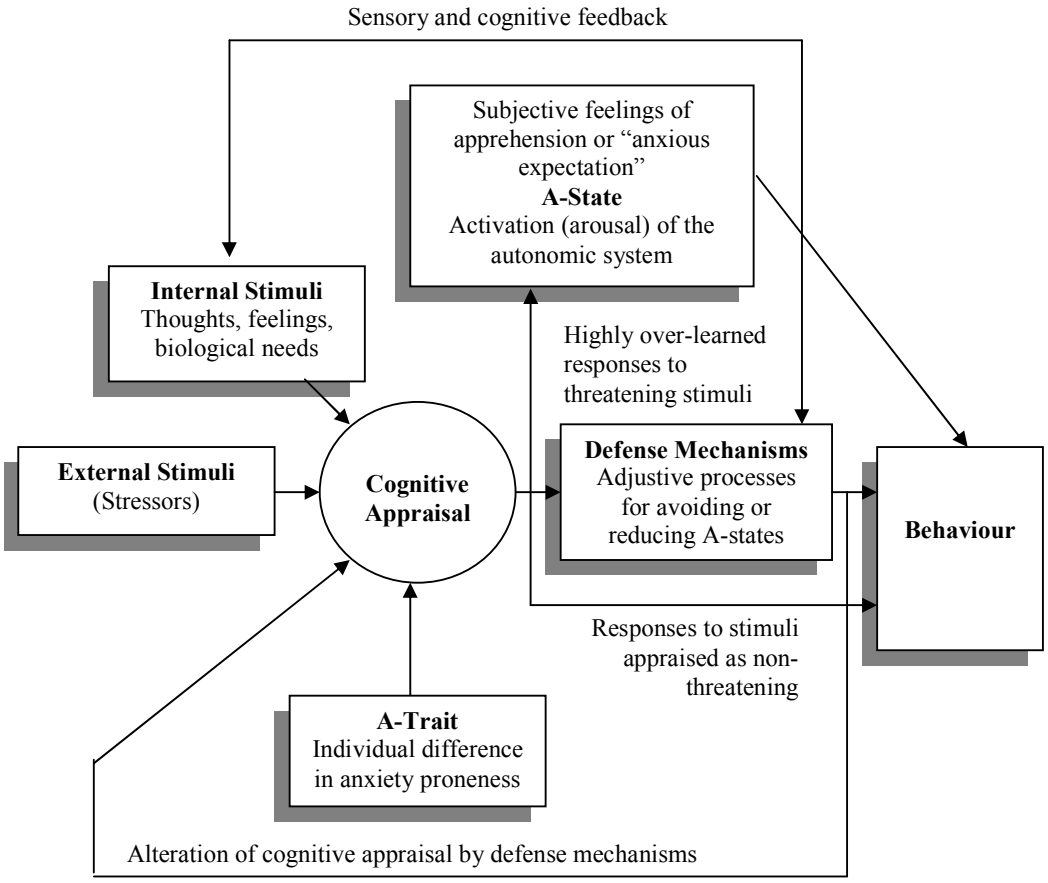

Figure 2.3. Influence of State and Trait Anxiety on Sport Performance (Spielberger, 1966, p.17).

This model applies a stimulus-cognition-response paradigm to competition. Spielberger hypothesised that arousal of an A-state nature involves a sequence of events in which individuals appraise a stimulus as threatening, resulting in an A-state reaction. This A-state reaction is hypothesised to initiate behaviour designed to avoid the danger or alter the appraisal. Individual differences in A-trait anxiety are predicted to affect the appraisal process by influencing the direction of attention towards stimuli that are seen as threatening. According to this model, individuals who are high in A-trait anxiety are hypothesised to appraise certain circumstances more threateningly than individuals low in A-trait anxiety.

The State-Trait Anxiety Inventory (STAI) was developed to measure state and trait anxiety in the clinical setting (Spielberger, Gorsuch, & Lushene, 1970). Following

the conception of the STAI, it has been used extensively in both clinical and sports research settings (Spielberger, 1984). Research that has explored the relationship between pre-competitive trait and state anxiety in sport has generally supported the hypothesised relationship that individuals high in trait anxiety will respond to specific pre-competition situations with heightened state anxiety (e.g., Gould, Horn, & Spreeman, 1983a; Murphy & Woolfolk, 1987; Powell & Verner, 1982; Sonstroem & Bernardo, 1982).

Clinical research undertaken by MacLeod (1990) indicated that individuals who are predisposed to high levels of trait anxiety and who are state anxious, have a tendency to attend to more threat-related information than individuals predisposed to low levels of trait anxiety who are state anxious. Moreover, Endler and Parker (1990) observed that individuals who exhibited high levels of trait anxiety tended to cope with stressful situations in a relatively passive way, using "avoidance-oriented" strategies. They also observed that low trait anxious individuals more often used "task-oriented" or active coping strategies. Eysenck (1992) generalised these latter findings by proposing that individuals reporting high trait anxiety are more vulnerable to state anxiety, because they possess less adequate coping strategies than persons low in trait anxiety.

Generally, trait anxiety is held to be a stable personality attribute, which reflects a predisposition to react with heightened levels of anxiety (Jorm, 1989). Given that trait anxiety is correlated with state anxiety, Jorm went on to conduct a meta-analysis of clinical therapy outcome studies to determine whether trait anxiety is modifiable, and whether trait-based interventions may be efficaciously used to influence individuals' state anxiety responses. Jorm noted that trait measures are generally stable over time, but that the magnitude of the correlations between such measures would still allow for a considerable amount of individual change. In addition, he noted that, in the past, it has generally been held that individual differences in traits are largely attributable to genetic factors (based on twin studies). Jorm challenged this assumption by citing research that has indicated that less than half of the variation in trait anxiety is attributable to genetic factors, and in some studies this figure has been as low as 20% (e.g., Scarr, Webber, Weinberg, & Wittig, 1981). Such observations leave considerable scope for experientially-based change. In a meta-analysis of 63 studies, employing a range of treatments designed to modify trait anxiety, Jorm found that many therapies influenced trait anxiety levels. The relative impacts of these various therapeutic techniques on trait anxiety are illustrated in Table 2.1.

Table 2.1

Effect Sizes (ES) with Trait Anxiety/Neuroticism Measures for Various Types of Therapy (Jorm, 1989, p. 24)

Type of Therapy	*N*[a]	Mean *ES*	*SD* of *ES*	95% *CI*
Rational-emotive and related therapies	6	1.25	0.45	0.78 to 1.72
Systematic desensitisation	16	0.62	0.50	0.35 to 0.88
Stress inoculation	4	0.62	0.62	0.36 to 1.61
Placebo therapies	10	0.46	0.32	0.24 to 0.69
Muscular relaxation	19	0.43	0.36	0.25 to 0.60
Anxiety management training	10	0.42	0.40	0.13 to 0.70
Meditation	5	0.42	0.42	-0.10 to 0.93
Study skills training	4	0.27	0.28	-0.17 to 0.71
Group counselling	3	0.26	0.34	-0.59 to 1.01
All therapies	100	0.53	0.48	0.44 to 0.63

[a] Number of effect sizes

Table 2.1 clearly highlights that a range of therapies have noteworthy effects on trait anxiety. In particular, Jorm observed that rational-emotive and related therapies were the most promising for reducing levels of trait anxiety, with an average effect size of 1.25 standard deviations, more than twice the impact of any other intervention type. At present, there is little research concerning the modification of trait anxiety in sport, and these findings highlight that this as a fruitful area for further investigation.

Sport Specific Measures

Evidence from non-sport areas of psychology has reinforced the importance of employing anxiety measures that are sensitive to the unique characteristics of different situations (e.g., Mandler & Sarason, 1952; Mellstrom, Cicala, & Zuckerman, 1976; Paivio & Lambert, 1959; Watson & Friend, 1969). As a result, sport psychology researchers did not predict that competitive trait anxiety would influence performance directly, since performance is the result of a combination of person and situation factors. They, therefore, tended to more often use measures of state anxiety in both research and applied settings.

When comparing successful and less successful competitors on a unidimensional measure of anxiety, research generally shows that less-experienced and non-elite performers experience a steady increase in anxiety right up to and even during

performance. Experienced and elite performers demonstrate a similar pre-event increase, but then a reduction just prior to and during performance (e.g., Mahoney & Avener, 1977). Cerin, Szabo, Hunt, and Williams (2000) summarised the current temporal patterning literature by stating that, in general, analysis of the temporal patterning of one-dimensional competitive anxiety shows that, over a one-week pre-competitive period, state anxiety increased as the competition neared.

When considering the role of trait anxiety in such observed patterns, further support for the distinction between state and trait anxiety is apparent. For example, in examining team sports, Huband and McKelvie (1986) noted that the state anxiety of low trait anxious athletes did not change one day before, just before, and one day after the event, whereas high trait-anxious athletes peaked in state anxiety just before the competition. At the individual level, Donzelli, Dugoni, and Johnson (1990) reported similar state anxiety in high and low trait-anxious athletes one week before competition, but more intense state anxiety in the high trait-anxious group on post-competition assessments.

With the aid of sport specific measures, the predicted association between state and trait measures of anxiety has gained support. In a study with elite golfers, measures of self-consciousness and trait anxiety interacted with pre-competition mood states, as well as with subsequent golf performance (Hassmén, Koivula, & Hansson, 1998). These results have not been easily replicated, however. For example, Hassmén, Raglin, and Lundqvist (2004) found that trait anxiety scores were not consistently associated with pre-competition state anxiety responses in a group of eight elite golfers. Such a small sample size limits the generalisability of such findings.

Combined, these findings not only provide general support for the predicted relationship between trait and state anxiety, but also highlight the modifiability of trait anxiety. Given that trait anxiety can be unobtrusively assessed and potentially modified away from competition, and that it is predicted that changes in trait anxiety will be reflected in state anxiety responses, further research examining measures of trait anxiety is warranted.

Multidimensional Conceptualisation of Anxiety

Despite early conceptualisations of anxiety as being a unidimensional construct, general theories of emotion defined anxiety in terms of cognitive, physiological, and behavioural components (e.g. Ellis, 1994). Such broad-ranging definitions may have

provided the initial impetus for researchers to attempt to incorporate subcomponents into their measures that addressed these conceptual dimensions.

Cognitive and somatic anxiety. Educational psychologists Liebert and Morris (1967) first distinguished between somatic and cognitive sub-components of state anxiety. They introduced the concepts of worry and emotionality in their two-component model of test anxiety. This was accomplished through the utilisation of the Worry-Emotionality Inventory (WEI; Liebert & Morris, 1967). Following on from this distinction, clinical psychologists Davidson and Schwartz (1976) moved towards a more extensive multidimensional theory of anxiety involving two factors: somatic and cognitive anxiety. Their supposition was bolstered by the demonstration that they could effectively negate either form of anxiety through selective relaxation therapy, i.e., focusing on one, or both, of the factors. Concurrently, Schwartz, Davidson, and Goleman (1978) developed a multidimensional trait scale, the Cognitive Somatic Anxiety Questionnaire (CSAQ), cementing this conceptual distinction. Morris, Davis, and Hutchings (1981) have since concluded that the cognitive-somatic distinction is essentially the same as Liebert and Morris's (1967) worry-emotionality distinction.

The complete assimilation of the concept of a multidimensional theory of anxiety into the field of sport psychology came about through Martens, Burton, Vealey, Bump, and Smith's (1990) development of the Competitive State Anxiety Inventory-2 (CSAI-2). The CSAI-2 is a sport specific, multidimensional, state anxiety questionnaire that measures the intensity of cognitive and somatic anxiety, as well as self-confidence. It borrows from the cognitive and somatic conceptualisations made by Morris et al. (1981), who defined cognitive anxiety as "negative expectations and cognitive concerns about oneself, the situation at hand and potential consequences" (p. 541). Morris et al. defined somatic anxiety as "one's perceptions of the physiological-affective elements of the anxiety experience, that is, indications of autonomic arousal and unpleasant feeling states such as nervousness and tension" (p. 541).

More recent conceptualisations reflect the original definitions. For example, Hardy (1999) has distinguished cognitive and somatic anxiety in terms of focus. Hardy described cognitive anxiety as "performers' concerns about performing well and the consequences of failing to do so" (p. 227), whilst he explained somatic anxiety as "performers' perceptions of their physiological response to psychological stress" (p. 227).

Evidence for the cognitive-somatic distinction has been based on the proposal that cognitive and somatic anxiety may be elicited by different classes of antecedents. For example, threat of electric shock had its primary effect on somatic anxiety, whereas social or performance evaluation had a stronger eliciting effect on cognitive anxiety (Smith et al., 1990). It has also been observed that cognitive and somatic anxiety have differential effects on performance, depending on the nature of the task. For example, in test situations, worry correlates with performance, but somatic anxiety generally does not, whereas, on tasks requiring fine motor control, such as pistol shooting, the inverted-U relationship tends to hold for state somatic anxiety and performance (Hanton, Jones, & Mullen, 2000). Finally, there has been some evidence provided for matching treatments with the dominant anxiety symptoms experienced (Davidson & Schwartz, 1976). For example, in a study conducted with field hockey players, Maynard and Cotton (1993) found that anxiety reduction techniques that were directed at the individual's dominant anxiety type (cognitive or somatic) were more effective.

As with Spielberger (1966), Hardy's (1999) definition of somatic anxiety was based on competitors' perceived autonomic arousal, not a direct measure of that arousal itself. This critical distinction has often been overlooked by researchers, resulting in ambiguous theoretical development and fundamentally flawed research. For example, Anshel (1995), citing Smith, Smoll, and Schutz (1990) noted that anxiety is primarily a manifestation of psychological processes, such as cognitive appraisal and expectancies, but then went on to make the point that researchers have also recognised the importance of somatic anxiety in affecting sport performance. In the sport psychology literature, the concept of "somatic anxiety" does not refer to a direct measure of physiological reactivity, but reflects individuals' interpretations of this. As a result, this interpretation is a form of cognitive appraisal. Anshel et al. (1991) further complicated this delineation by defining state anxiety as a "state of arousal engendered by a stressful or threatening situation" (p. 145). This is just one example of the undercurrent of confusion that has plagued the sport psychology field in differentiating between arousal and anxiety, particularly in relation to the interpretations of somatic anxiety.

In their multiprocess theory, Davidson and Schwartz (1976) proposed the matching of applied anxiety management techniques with symptoms or cognitions. For example, Davidson and Schwartz predicted that relaxation therapies, systematic desensitisation, and biofeedback are better suited to the reduction of somatic anxiety, whereas cognitive therapies should be more effective at reducing cognitive anxiety.

Davidson and Schwartz failed to note that most of the measures used to test their hypothesis only address cognitive appraisal. Perhaps this explains why research has indicated that there is a need to treat both cognitive and somatic anxiety simultaneously, as only addressing the physical symptoms would not be predicted to have a strong influence on a measure of cognitive appraisal, albeit a measure related to interpretations of somatisations. Maynard and Cotton (1993) provided a typical example of this confusion when they suggested that the matching hypothesis could be tested by applying a cognitive technique to both a cognitively anxious population and a somatically anxious population, claiming that such an approach would be investigating the effects of a compatible versus a non-compatible treatment. Maynard, Smith, and Evans (1995) went on to conduct such an investigation. They distinguished cognitive and somatic components based on definitions by Burton (1988) by delineating cognitive anxiety as the mental component of anxiety, whereas somatic anxiety was defined as the physiological or affective component of anxiety that is directly related to autonomic arousal. Although such a conceptualisation makes semantic sense, it does not match those variables being addressed by multidimensional measures. Maynard et al. used Positive Thought Control as a form of cognitive anxiety intervention, applied to both matched and mismatched groups (designated by high intensity scores on either of the cognitive or somatic scales of the CSAI-2). Maynard et al. failed to appreciate that both cognitive and somatic anxiety interpretations would be expected to respond well to a cognitive intervention, as they both entail cognitive appraisal. As one would expect, both perceived cognitive and somatic anxiety intensities and directional interpretations changed in a positive direction. The authors mistakenly took this to indicate that there was a cross-over effect. Notably these changes were greater for the directional interpretations, again as one would expect, given the intervention was a cognitive one that emphasised interpretations or appraisal of perceived cognitive and somatic symptoms. Maynard et al. went on to suggest that their findings (if replicable) could have “profound” implications for stress management prescription, suggesting that small changes in intensity scores may reflect large changes in dimensional interpretations. Again, one would expect such results, if the primary intervention was a cognitive one, because individuals are not taught to deny the perceived intensity of their emotional affect, but to interpret this intensity in a more realistic or positive manner.

Even Martens et al. (1990), the developers of the CSAI-2, have suggested that somatic anxiety has its origins in a classically-conditioned response to the competitive

environment in which the body's autonomic nervous system becomes activated. Such an association would seem problematic when classical conditioning research adopted direct measures of physiological reactivity, not perceived physiological reactivity. The main point is that the primary difference between cognitive and somatic anxiety in the context of multidimensional measures, such as the CSAI-2, is the content of the appraisal (perceived cognitions or perceived somatisations).

Related to the previous discussion, researchers have often observed low correlations between physiological and psychological measures of anxiety (Cottyn, De Clercq, Pannier, Crombez, & Lenoir, 2005; Karteroliotis, & Gill, 1987; Landers, 1980). Such observations would suggest that interventions aimed at changing individuals' interpretations of the intensity of their anxiety symptoms may be more efficient than encouraging them to directly address those symptoms. Alternatively, a combined intervention addressing actual physiological reactivity, and interpretations of this reactivity may be most effective. There has been some research employing direct physiological measures. For example, Anshel, Brown, and Brown (1993) examined the effectiveness of coping strategies on participants' dart throwing performance, emotion, and muscular tension immediately after receiving critical feedback. The intervention strategies resulted in higher levels of performance and fewer unpleasant feelings, but muscular tension, as measured by electromyography, was uninfluenced. Sonstroem (1984) noted that there is no single physiological response to the anxiety state. Based on this, it is possible that muscular tension was not a characteristic anxiety symptom for this sample. Importantly, there is also no single cognitive or behavioural response that delineates anxiety. Thus, a combined theoretical conceptualisation of anxiety and multimodal measures, covering a range of content, should result in a greater ability to explain the variance in performance.

The state-trait association has also been explored from the perspective of a multidimensional conceptualisation of anxiety, providing general support for the predicted relationship between trait and state anxiety dimensions (Albrecht & Feltz, 1987; Crocker, Alderman, & Smith, 1988; Karteroliotis & Gill, 1987; Maynard & Howe, 1987). In a typical study, Ryska (1993) assessed 270 tennis players on competitive trait and state anxiety during their season. Based on previously observed unidimensional trait-state relationships, Ryska hypothesised that high-trait anxious tennis players would report significantly higher cognitive and somatic state anxiety intensity scores than low-trait anxious players. Ryska found that unidimensional trait

anxiety was correlated 0.37 with cognitive state anxiety and 0.47 with somatic state anxiety, and follow up analyses revealed that these correlations were significant. Such findings, however, have not been unanimously forthcoming. For example, Man, Stuchlikova, and Kindlmann (1995) did not find support for the predicted relationship between state and trait anxiety in a study that employed 45 top-level soccer players as participants. Man et al. suggested that the status of the soccer players many have influenced this relationship, noting that players compete in important games regularly, and so become desensitised to pre-competition anxiety responses. To further support this claim, Man et al. cited unpublished studies that have indicated that highly skilled soccer players are generally unresponsive to measures of anxiety.

Although cognitive and somatic state anxiety have often been treated as entirely independent sub-components, a number of researchers have drawn attention to the finding that these dimensions actually correlate to some extent with each other (e.g., Jones, Cale & Kerwin, 1988; Petlichkoff & Gould, 1985). Researchers have explained these observations by highlighting that certain situations that cause a great deal of stress would be predicted to elicit both a physiological and a cognitive response, and one might assume at least a moderate relationship between physiological arousal and somatic anxiety to be observed in such circumstances (Martens et al., 1990; McNally, 2002). A more likely explanation is apparent when one considers that both cognitive and somatic scales of the CSAI-2 are measures of cognitive appraisal. In other words, both of these scales assess appraisal, the former associated with cognitions and the latter with somatisations. The important point being that neither is a direct measure of either cognitions or somatisations. The relationship between these scales may not be predicted to be that strong, however, because the two types of cognitive appraisal differ in terms of the focus of their content. In other words, the cognitive intensity subscale of the CSAI-2 measures competitors' interpretation of the intensity of cognitive symptoms, for example, 'I have self doubts', whereas the somatic intensity subscale measures competitors' interpretation of somatic symptoms, for example, 'my heart is racing'. Other areas of possible content may include the behaviour of the competitor, for example, 'I am bowling badly', or aspects associated with their experience with the world, for example, 'people are watching me'.

In summary, multidimensional anxiety theory has considerably expanded the scope of anxiety research in the sports setting. Despite considerable overlap, research findings support the validity of distinguishing between various sub-components of the

anxiety response, even if these only relate to differences in the content of interpretations. In the following section, I outline in more detail specific observations that have been generated from a multidimensional conceptualisation of anxiety.

The anxiety performance relationship. One of the primary hypotheses held by researchers in the past has been that cognitive anxiety diverts attention away from task-relevant cues, and, as a result, is predicted to negatively impact performance (e.g., Wine, 1980). Early research investigating the prediction of a linear relationship between worry and performance found support in some situations, for example, swimming (Burton, 1988), pistol shooting (Gould, Petlichkoff, Simons, & Vevera, 1987), and volleyball (Cox, 1986). Conversely, it has been predicted that the relationship between somatic anxiety and performance takes the form of an inverted-U curve. In other words, there is an optimal level of anxiety intensity above or below which performance declines (Martens et al., 1990).

In an investigation of the relationship between anxiety and performance, Burton (1988) employed the CSAI-2 with a sample of elite level swimmers. The performance outcome for this study was the swimmers' times. Results indicated that cognitive anxiety was more consistently and strongly related to performance than was somatic anxiety. Further, polynomial trend analysis confirmed that somatic anxiety showed an inverted-U relationship with performance, whereas cognitive anxiety and performance were negatively related.

It is difficult to fully appreciate the anxiety –performance relationship without considering the role of temporal patterning in the experience of anxiety. In summarising the findings of temporal patterning research with unidimensional anxiety, Cerin, Szabo, Hunt, and Williams (2000) observed that, over a one-week pre-competitive period, state anxiety increased as competition neared. Further increments were seen one hour prior to, and immediately before the start of the event, after which time some authors have noted a decline in anxiety once the competition has started (e.g. Durtschi & Weiss, 1984), and then anxiety drops immediately following the event. Cerin et al. indicated that the findings for specific anxiety dimensions were less clear. They suggested that the temporal patterning of the CSAI-2 sub-components show that somatic anxiety tends to increase rapidly close to the start of the competitive event and dissipate once the competition is over. Observations for cognitive anxiety intensity were similar but less pronounced.

In a study of the temporal patterning of the anxiety response, Martens et al. (1990) administered the CSAI-2 to a selection of athletes, 48 hours, 24 hours, 2 hours, and 5 minutes before a critical event. Their results indicated that the cognitive component of multidimensional state anxiety remained relatively stable before the start of the event, but the somatic component began to increase prior to the onset of the event. Such an observation was also supported by Burton (1988), but his findings suggested that the cognitive component of anxiety showed a stronger relationship to performance decline than the somatic component. Combined, these findings tend to suggest that the interrelationships between anxiety dimensions and performance are not as simple as original, multidimensional theory might predict.

Kleine (1990) conducted a meta-analysis of the anxiety-sport performance research and reported that only 10 studies actually tested for an inverted-U relationship, and within these only equivocal results occurred. Kleine also noted that the effects on performance are sometimes negative and sometimes positive.

In summarising the findings of research into some of the predictions of multidimensional theory, inconsistent evidence for the predicted relationships has been observed, and anxiety as a construct generally does not explain a significant proportion of the variance in performance (e.g., Barnes, Sime, Dienstbier, & Plake, 1986; Gould et al., 1984; Krane & Williams, 1987; Martens et al., 1990). Notably, Jones et al. (1993) claimed that only Burton (1988) has been able to provide empirical evidence to support all predictions made by multidimensional anxiety theory concerning performance.

Jones (1995) summarised some of the primary weaknesses identified in this research, which may help to explain why it fails to support the theoretical predictions. Firstly, investigators have tended to rely upon between-subject, cross-sectional designs as opposed to within-subject, longitudinal designs as first advocated within the competitive anxiety literature by Sonstroem and Bernardo (1982). Secondly, investigators have tended to explore the existence of linear, as opposed to curvilinear, relationships, thus, precluding the possibility of support for the predicted somatic anxiety-performance relationship (Gould, Petlichkoff, Simons, & Vevera, 1987; Parfitt et al., 1990). Finally, the performance measures (e.g., win/loss, performance times) have tended to be global in nature and may not be sufficiently sensitive to detect statistically significant anxiety effects (Parfitt, Jones, & Hardy, 1990). Jones (1995) went on to mention additional limitations associated with poor operationalisation of the construct of anxiety in the primary measures being employed (i.e., the confusion that exists when

competitors are not actually experiencing anxiety, but excitement). On this point, Eysenck (1992) has proposed that global performance measures commonly employed may not be sufficiently sensitive to allow detection of anxiety effects. In response, Jones encouraged the development of standardised, reliable, ecologically valid and sensitive performance measures. Further, based on some of the work by Lazarus (1993), Jones highlighted that a more general focus on emotion, rather than just anxiety may be more informative. Related to this suggestion, two additional explanations have been offered for the findings that performance can sometimes improve under higher levels of anxiety. Carver and Scheier (1986) proposed that anxiety may have an energising effect on the individual, and Eysenck (1982) suggested that competitors may invest additional effort in response to their perceived heightened anxiety symptoms. The implication of these explanations is that anxiety has the potential to exert either a positive or a negative influence on performance, depending on the attentional demands of the task and the perceived probability of success.

Hassmén, Raglin, and Lundqvist (2004) highlighted that another factor influencing the anxiety-performance relationship may be associated with intra-individual variability in the anxiety response. Hassmén et al. highlighted the observation that one competitor may have a very consistent anxiety response for each competition, whereas a second may vary greatly, and have suggested that where the variability is large, anxiety may play a bigger role in the prediction of performance.

In response to these limitations, Jones (1995) proposed that the use of integrative approaches that attempt to measure multiple facets of the anxiety response are more likely to be effective predictors of performance. Jones (1995) cited Gill (1994), who noted that there is a requirement for models that "highlight cognitive appraisal in a multidimensional system of interrelated psychobiological variables" (p. 25). In addition, Jones suggested that methods attempting to predict performance well before that actual performance, may not reasonably be expected to be all that successful based on the understanding that more accurate performance predictions would be expected just prior to performing by which time the majority of perceived threats to success would become apparent. In response, Jones suggested the development of short self-report measures and the use of physiological indices.

Other moderating variables. Researchers have identified a number of potentially moderating variables that have emerged from research employing a multidimensional conceptualisation of anxiety. These include the competitors' level of skill or ability, the

gender of the performer, the type of sport studied, antecedents of anxiety, temporal patterning of the anxiety response, and the frequency of cognitive and somatic intrusions.

Kerr and Cox (1991) studied individual differences in the level of arousal, psychological preparation, and players' cognitive reactions under competitive situations in the sport of squash. Prior to analyses, participants were assessed for skill level. Results indicated that skilled players engaged in more mental strategies related to attention and concentration prior to competing and were more successful at achieving their desired arousal level. These players appeared to show more stable and more appropriate mood states (in particular less anxiety) than less skilled players.

Based on a review of the literature, Mahoney and Meyers (1989) concluded that skilled athletes are less negatively influenced by feeling anxious, tend to pace their anxiety more effectively before competition, and are less focussed on their anxiety and more focussed on the immediate task demands during their performance. Higher quality athletes appear to cope more effectively with their anxiety, and, as a result, suffer fewer of the negative consequences to their performance. Possibly related to the competitors' skill, Thuot, Kavouras, and Kenefick (1998), found that adolescents, regardless of gender, experienced significantly higher levels of cognitive and somatic anxiety and lower levels of self-confidence, as the ability of opponents increased.

In conducting research that has explored gender differences in anxiety experiences, Jones, Swain, and Cale (1991) noted that, among males, cognitive and somatic anxiety is more strongly affected by individuals' interpretation of opponents' ability and probability of winning, whereas for females, cognitive anxiety and self-confidence were determined by readiness to perform and the importance they personally placed on doing well. Humara (1999) highlighted that these gender differences are indicative of the need to develop interventions that are tailored to individual needs, and the importance of considering all factors when developing an intervention.

Additional findings reported by Jones, Swain, and Cale (1991) suggest that gender may act as a mediating variable when determining the effects of anxiety and confidence. Jones et al. found that predictors of cognitive anxiety and self-confidence in females tended to be associated with personal goals and standards, whereas predictors of these variables in males were associated with interpersonal comparison and winning. To complicate these relationships further, research has also highlighted the differential

role skill level plays in gender predictions (Hanton & Jones, 1995). In summary, the need for researchers and practitioners to consider gender in anxiety research is apparent.

There is some evidence in the literature that pre-competition state anxiety may be greater among individual sport athletes than team athletes (Martin & Hall, 1997; Simon & Martens, 1979). For example, recent research conducted by Zeng (2003) indicated that team sport competitors shared lower levels of cognitive and somatic state anxiety than their individual sport counterparts, but the level of trait anxiety between these two conditions was not observed to be significantly different.

Empirical findings also support the proposition that cognitive and somatic anxiety have different antecedents (Gould, Petlichkoff, & Weinberg, 1984; Jones et al., 1990). Researchers have adopted the multidimensional anxiety notion and have noted that this provides a more detailed perspective because it has aimed to identify the antecedents of specific types of anxiety symptoms. The antecedents of cognitive anxiety, and also those of self-confidence, are hypothesised to be those factors in the environment that are related to athletes' expectations of success, including perception of one's own and opponents' ability (Jones, 1995). Antecedents of somatic anxiety are thought to be non-evaluative, of shorter duration, and consist mainly of conditioned responses to stimuli, such as changing room preparation and pre-competition warm-up routines (Gould, Petlichkoff, & Weinberg, 1984; Martens et al., 1990).

Further findings reported by Jones, Swain, and Cale (1991) suggest that the antecedents of anxiety and confidence are also a function of sex. They found that predictors of cognitive anxiety and self-confidence in females tended to be associated with personal goals and standards, whereas predictors of these variables in males were associated with interpersonal comparison and winning. Generally, recent findings suggest that anxiety antecedents differ across sport and also as a function of skill level (Hanton & Jones, 1995).

Jones (1995) highlighted that there is a need for the adoption of both quantitative and qualitative research methodologies in order to provide a more detailed and clearer perspective on the experience of competitive anxiety and its effects upon performance. Jones noted that qualitative methodologies have been underplayed in competitive anxiety research. Qualitative studies of the sources of stress in elite athletes (e.g. Gould, Ecklund, & Jackson, 1991; Hanton, Fletcher, & Coughlan, 2005; Holt & Hogg, 2002; Jones & Hardy, 1990, Noblet & Gifford, 2002; Scanlan, Stein, & Ravizza, 1991) have begun to identify stressors that confront elite performers, such as refereeing decisions

and tournament organisation, coach and team-mate influences, and lack of social support (Hardy & Jones, 1994).

In one such qualitative study, Hanton, Fletcher, and Coughlan, (2005) compared the content and quantity of competitive and organizational stressors in elite athletes. Ten international performers were interviewed about sources of stress. Content analysis of the data involved categorising the demands associated primarily and directly with competitive performance under the dimension "performance issues", and the demands associated primarily and directly with the sport under one of the following four dimensions: environmental issues, personal issues, leadership issues, and team issues. The findings from this study indicated that elite athletes experience and recall more demands associated primarily and directly with the sport organization than with competitive performance.

The temporal patterning of the anxiety response has drawn considerable attention in the anxiety performance literature. Swain, Jones, and Cale (1990) reported the relationship between cognitive and somatic anxiety, in general, to be low and non-significant one week before competition, but highlighted that this relationship becomes progressively stronger as the competition approaches. More specifically, empirical results from analyses of the temporal patterning of the CSAI-2 sub-scales has indicated that somatic anxiety tends to increase rapidly close to the start of the competitive event, whereas cognitive anxiety remains relatively stable prior to competition, unless there is new information that changes the competitors' evaluation, such as an injury to a key opponent (Karteroliotis & Gill, 1987; Slaughter, Selder, & Patterson, 1994). This disassociation of cognitive and somatic anxiety as the event approaches provides further support for the partitioning of the two anxiety components. Jones (1995) has commented, however, that the patterning of the multidimensional competitive state anxiety components differs as a function of a range of individual difference variables, further complicating the nature of this relationship. Research that has been conducted to investigate these predicted relationships as a function of the proximity of competition has indicated that the relationship between cognitive and somatic anxiety is generally low and non-significant one week before competition, but becomes progressively greater as the competition approaches (Jones, 1995).

One of the major limitations in assessing the temporal patterning of anxiety facets relates to the measurement instruments themselves. Self-report measurement instruments tend to be rather time consuming to complete and difficult to administer in

the phase close to the onset of competition, because they are often an unwanted distraction for the performer who is immersed in both physical and psychological preparation.

Research findings reported by Swain and Jones (1993) indicated that, although the intensity of cognitive anxiety symptoms in a sample of track and field athletes remained relatively stable during the week preceding competition, the frequency with which they experienced these symptoms increased substantially and progressively during this period. Although the intensity of the symptoms may not change, there is a clear difference between a cognitive state in which worries about an upcoming event are occurring 5 per cent of the time one week before, compared to one in which such worries are occurring 90 per cent of the time on the day of competition, that is, the athletes are thinking these thoughts almost all the time. Such findings highlight the relevance of measuring frequency to provide additional information about the temporal patterning of the anxiety response.

Two major meta-analyses published in 2003, provide considerable insight into the anxiety-performance relationship. Woodman and Hardy (2003) conducted a meta-analysis to determine the relative impact of cognitive anxiety and self-confidence upon sport performance. They excluded somatic anxiety from their analysis based on the suggestion that there is no clear rationale for justifying an inverted-U relationship between performance and an indirect measure of physiological arousal. Admittedly somatic anxiety, as conceptualised by the CSAI-2, is an indirect measure of arousal, but given that it has been used in this manner by most researchers, and would be predicted to correlate at least moderately with direct physiological measures, it seems their decision to discard it from the meta-analysis may not have been warranted. Fundamentally, cognitive anxiety is also an "indirect measure" because we do not have the technology to directly measure cognitions, and as a result have to rely on subjective reports.

Despite this omission, Woodman and Hardy investigated three hypotheses. Firstly, they assessed the predictions of multidimensional anxiety theory in terms of the predicted relationships between cognitive anxiety and performance. Secondly, Woodman and Hardy explored the relative magnitude of effect sizes for cognitive anxiety and performance studies. Finally, Woodman and Hardy examined some variables thought to be possible mediators in the relationship between anxiety and performance. These possible mediators included measurement style, type of sport,

standard of competition, and gender. Findings revealed a weak negative mean effect size for cognitive anxiety (r = -0.10), and only moderately higher effect size for self-confidence (r = 0.24). Both of these effect sizes were found to be significant, providing support for multidimensional theory. In addition, both gender and competitive standard were found to be significant mediating variables for the relationship between cognitive anxiety and performance. More specifically, pre-competitive cognitive anxiety was observed to have a greater impact on men than women. In response to their results, Woodman and Hardy encouraged the development of alternate measures of the anxiety construct.

In a second meta-analysis, Craft, Magyay, Becker, and Feltz (2003) explored the relationships between cognitive and somatic anxiety intensity (as measured using the CSAI-2) and performance as predicted by multidimensional anxiety theory. In addition, Craft et al. went on to investigate the relative importance of a range of mediating variables in the anxiety-performance relationship. Their findings were at odds with Woodman and Hardy (2003), in that Craft et al. observed an overall small (0.01), but positive, correlation between cognitive anxiety intensity and performance. Craft et al. indicated that such an observation was unsupportive of one of the primary hypotheses of multidimensional theory. Explanations given for such results included the possibility that the relationship predicted by the theory may simply be incorrect, that the CSAI-2 is unable to adequately assess cognitive anxiety because of how items are phrased, that researchers have failed to employ the CSAI-2 in an effective manner (for example, too far from the competition), and, finally, that the relationship may be too complex to predict using cognitive anxiety alone.

Most researchers have used linear measures when assessing the relationship between somatic anxiety and performance. Close to zero Pearson's r values have generally been observed. Craft et al. (2003) suggested that if this relationship were actually curvilinear, a close to zero relationship would be expected to be observed by these researchers as low Pearson's r values would result. Alternatively, close to zero Pearson's r values may indicate that performance and somatic anxiety are only weakly, if at all, associated variables.

Additional exploratory modelling by Craft et al. (2003) revealed that cognitive and somatic anxiety are more influential in individual, rather than team sports. This finding followed on from earlier observations by Kleine (1990), who also observed differences between team and individual sports. Craft et al. also noted a stronger

relationship between anxiety and performance for open sports (i.e., skills performed in environments that are constantly changing, such as tennis or football) as opposed to closed sports (i.e., skills performed in environments that are relatively stable, such as gymnastics or diving). Further, Craft et al. observed that both cognitive and somatic anxiety were positively related to performance for elite competitors, however, this relationship was close to zero for entry level competitors. These findings lend support to the observation of other researchers that elite level performers may be able to interpret their anxiety symptoms in a more positive manner than their entry level counterparts. Finally, Craft et al. observed that the CSAI-2 has the most predictive power 31-59 minutes prior to competition, and that this relationship weakens as the time of the competition draws nearer. Craft et al. suggested that such findings may be the result of the competitors' reluctance to complete a wordy questionnaire at a time when they are either planning for their performance, or trying to reach a favourable emotional state, instead of an illustration of the temporal patterning of the anxiety response. An additional explanation may be that the competitors are repressing, or in denial of their anxiety at this time. The findings of Craft et al. have cast considerable doubt on the validity of employing the CSAI-2 in its current form, when conducting research studying the relationship between performance and anxiety. Having said this, at present there are few well-tested and notable alternatives.

In summary, the advent of a multidimensional theory of anxiety, comprising of cognitive and somatic sub-components, has encouraged considerable research into the anxiety construct. A once overly-simplistic predicted relationship between a uni-dimensional conceptualisation of anxiety and performance, has now been considerably complicated by a range of variables, each of which warrant further investigation. These have included the competitors' level of skill or ability, the gender of the performer, the type of sport studied, antecedents of anxiety, temporal patterning of the anxiety response, and the frequency of cognitive and somatic intrusions. In addition to these developments in conceptual complexity, researchers have also become aware of considerable limitations in theoretical descriptions and measurement of anxiety. In particular, Jones (1991) highlighted the fact that the primary measure used in most anxiety research (the CSAI-2) is based on a fairly limited dimension of the anxiety response. Specifically, it measures the intensity of perceived symptoms that are thought to characterise the competitive anxiety response, but it fails to address individual competitors' interpretations of those perceived symptoms. Jones et al. (1993) suggested

that such a situation may have arisen, because the concept of anxiety has generally been viewed as negative and detrimental to performance.

Directional Interpretation of Anxiety Symptoms

In a review of anxiety in sport, Jones (1995) noted that until the early 1990's, the experience of anxiety was generally viewed as negative, and anxiety was thought to have a harmful impact on performance. Different interpretations of anxiety symptoms (positive and negative) have been considered in the test anxiety literature since the early 1960's. Alpert and Haber (1960) found that a scale that measured both debilitative and facilitative interpretations of anxiety, the Achievement Anxiety Test (AAT), was a more sensitive predictor of academic performance than a conventional scale based on a "debilitative only" conceptualisation of anxiety. A number of subsequent investigations that have employed the AAT have demonstrated the value of distinguishing between debilitative and facilitative interpretations of symptoms associated with anxiety in the academic/educational setting (e.g., Carrier, Higson, Klimoski, & Peterson, 1984; Couch, Garber, & Turner, 1983; Gaeddert & Dolphin, 1981; Hudesman & Wiesner, 1978).

Some time after Alpert and Haber's (1960) developments in the test anxiety literature, Mahoney and Avener (1977) noted the relevance of symptom interpretation in the sport setting. In a study comparing US gymnasts, who were and were not selected for the Olympic team, Mahoney and Avener found that those gymnasts who achieved selection had a pre-existing tendency to interpret their anxiety symptoms as performance enhancing, whereas those gymnasts who were unsuccessful had a tendency to interpret their anxiety symptoms as performance blocking. The notion of directional interpretations of anxiety was introduced into the sport psychology literature 15 years after Mahoney and Avener's insight (Jones, 1991), and this conceptualisation has since received considerable attention. In fact Wang, Morris, and Marchant (2004) noted that, at least at the state level, it is now standard practice to measure directional interpretations in sport anxiety research.

Directional interpretations relate to competitors' interpretations of their anxiety symptoms prior to competition. More specifically, these interpretations are a measure of where competitors perceive the intensity of their anxiety symptoms, on a continuum from highly facilitative through neutral (i.e., that the interpretation of anxiety intensity was deemed unimportant to upcoming performance), to highly debilitative, in relation to their ensuing performance (Jones & Hanton, 2001). For example, some competitors may interpret perceived symptoms, such as an increased heart rate or a racing mind, as a

direct threat to their performance goals (debilitative). Other competitors may interpret the same perceived symptoms as an indicator that they are in an appropriate physical and mental state to perform optimally. Jones (1995) clarified that this process may best be described as a further level of cognitive appraisal, which has the function of interpreting the meaningfulness of perceived cognitive and physiological symptoms experienced in relation to the competitor's goals.

It is important to highlight that, at present, there are no measures of directional interpretation of anxiety that have been exclusively designed for this purpose. Directional scales have been added to standard measures of the perceived intensity of anxiety symptoms. The majority of research has been conducted on state anxiety direction using a modified version of the CSAI-2. In the directional version of this measure (the CSAI-2-D), competitors are asked to rate whether they interpret their self-reported intensities for various cognitive and somatic symptoms (as indicated by the CSAI-2) as helpful or harmful to their ensuing performance.

Jones (1995) noted that the CSAI-2 does not easily lend itself to developing harmonious synchrony between the experience of anxiety and measures of performance. Edwards and Hardy (1996) pointed out that the incorporation of the directional scale significantly adds to the time it takes to complete the original questionnaire. Given that pre-competitive state anxiety is generally measured just before the start of a competition, longer questionnaires may have a significant impact on responses, and the viability of using this measure in the applied setting. Despite these limitations, in a relatively brief time, the addition of directional scales to the CSAI-2- D and CTAI-2-D has added considerably to the conceptualisation and measurement of anxiety in sport.

In an in-depth investigation of intensity and direction dimensions of anxiety, Swain (1992) reported that different competitors with the same anxiety intensity scores could experience very different emotions and cognitive states. Swain investigated various dimensions of anxiety with a sample of university basketball players. Specific findings indicated that players could have the same intensity score on a measure of somatic or cognitive state anxiety, whilst that experience could be perceived as positive on one occasion and negative on another.

In a study conducted with an elite group of swimmers, Jones, Hanton, and Swain (1994) found that anxiety intensity levels were higher in participants who interpreted their anxiety as debilitative, than those who reported it as being facilitative. Similar

results have been found for gymnasts (Jones, Swain, & Hardy, 1993), and basketball players (Swain & Jones, 1996).

Jones et al. (1993) investigated the relationship between intensity and directional scales of the CSAI-2-D. They observed that there was no significant relationship between cognitive anxiety intensity and direction, which they interpreted as evidence that two different dimensions are being measured. In addition, they observed a significant negative relationship between somatic anxiety intensity and direction. Jones et al. interpreted these findings as evidence that as somatic anxiety increases, directional interpretations become less favourable.

In a more recent study, Robazza and Bortoli (2003) observed that both the intensity and the direction of cognitive state anxiety and somatic state anxiety differentiated athletes across a range of individual or team sports as a function of the competitive standard. Elite athletes reported lower levels of cognitive and somatic state anxiety symptoms, and experienced those symptoms as less debilitative than those of non-elite athletes.

Small associations between intensity and directional measures of anxiety have been reported when considering trait anxiety (e.g. see Hanton, O'Brien, & Mellalieu, 2003; Jones & Hanton, 2001) suggesting the interdependence of these scales. When considering trait anxiety, directional interpretations have been primarily measured using a modified version of the CTAI-2 (the CTAI-2-D). For example Albrecht and Feltz, (1987) with baseball and softball players, and Jones and Swain (1995) with competitive cricketers, Cunningham and Ashley (2002) with competitive golfers, and Hanton, O'Brien, & Mellalieu (2003) with competitors from open skilled sports including cricket, rugby union, and soccer.

Research exploring the association between performance and anxiety direction remains sparse and is unclear in its findings. Although early research suggested that there is a relationship between skill level and anxiety direction, further research exploring the relationship between these variables is warranted.

Using a sample of 233 elite and non-elite competitors from a range of open skilled sports, Hanton et al. (2003) explored debilitative and facilitative trait anxiety levels as a function of skill level. Although only low to moderate effect sizes were observed, they did observe main effects between direction variables as a function of skill level. Hanton et al. highlighted the difficulty in operationalising and standardising skill level across a range of sports. Hanton et al. suggested that the primary variable

associated with these observations may be perceived control over outcome goals. Similar observations were made by Hanton and Conaughton (2002). Although early research suggested that there is a relationship between skill level and anxiety direction, further research exploring the relationship between these variables is warranted.

Hanton, Mellalieu, & Hall, (2002) reported correlations between trait anxiety intensity and state anxiety directional scores. They found that low trait anxiety athletes presented with more facilitating interpretations of cognitive and somatic state anxiety symptoms than their high trait anxiety counterparts. No associations between directional scores at the state and trait levels were found in the literature.

The directional interpretation of the anxiety-performance relationship. As a result of research conducted employing directional interpretations, a number of situational and individual difference variables have emerged. In this section, I outline the observed relationship between directional interpretations of anxiety and performance, and consider some of the important individual difference variables emerging from the research.

Given that the primary reason that competitors often seek psychological services is to improve their performance, the majority of sport psychology interventions have been directly aimed at performance outcomes. For example, Jones, Swain, and Hardy (1993) examined the inter-relationships between intensity and direction dimensions of competitive state anxiety, and beam performance for a sample of 48 adolescent, female gymnasts. Gymnasts were asked to complete the CSAI-2-D 10 minutes prior to performing. In subsequent analyses, the gymnasts' performances were split at the median to delineate between good and poor performance groups. Results revealed no significant difference between the two groups on cognitive and somatic anxiety intensity scores or on somatic anxiety direction scores. The good performance group, however, reported their cognitive anxiety intensity as being more facilitating and less debilitating to performance than the poor performance group. Stepwise multiple regression analyses did not provide support for the prediction that direction of anxiety would be more strongly related to performance than intensity, although it was found to be equally effective as a predictor variable. Given that directional measures of anxiety had not previously been used in the sport psychology research domain, these preliminary findings provided a significant impetus for further research exploring this dimension.

Swain and Jones (1995) compared the relative value of the intensity and direction dimensions of cognitive and somatic anxiety in predicting basketball performance. Their research revealed that cognitive anxiety direction was a more accurate predictor of performance than cognitive anxiety intensity. In addition, Swain and Jones found that somatic anxiety direction was a more sensitive predictor than somatic anxiety intensity.

Edwards and Hardy (1996) explored the interactive effects of state anxiety intensity and direction on the performance of 45 (18-31 year old) netball players. Results indicated that direction explained no further variance in performance over and above intensity alone. Edwards and Hardy proposed that this may be partly because the directional scale has not as yet been validated, and is difficult for competitors to complete close to competition. They also suggested that the results they obtained may have related to their "all female" participant pool.

Jerome and Williams (2000) suggested that performance measures are inherently problematic. They argued that an ideal sport for clarifying the anxiety-performance relationship would be one "in which each performer received valid, comprehensive, and equivalent scores and a similar average performance score that can serve as a measure of typical past performance . . . such as golf and bowling" (p. 238). Jerome and Williams also suggested that some of the discrepancies in previous research may have been due to differences amongst athletes in their willingness to give open and honest responses. Williams and Krane (1989) tested this assumption with golfers and found that those who scored highly on social desirability were less likely to admit to competitive trait anxiety and cognitive state anxiety prior to competition, than golfers who scored low on social desirability. William and Krane (1992) went on to term competitors who deny elevated levels of anxiety even when their behaviour and physiological symptoms suggest otherwise as repressors. Jerome and Williams (2000) investigated whether, for athletes who have a repressive coping style, the repression process indirectly influenced the anxiety-performance relationship, and whether removal of the results of participants identified to be repressors would enable greater prediction of performance variance than obtained when including all participants. Their research supported the importance of assessing repressive coping styles when measuring the relationship between anxiety and performance. Despite these promising findings, Jerome and Williams failed to clarify exactly what degree of repression constituted a repressive coping style.

Overall, research investigating the relationship between directional interpretations of state anxiety intensity and performance appears to indicate the presence of an association, and there is some evidence that implies that the relationships may be stronger than those observed for intensity alone measures (Jerome & Williams, 2000; Jones, Swain, & Hardy, 1993; Swain & Jones, 1995). Research also indicated that a mediating variable in this relationship may relate to competitors willingness to give open and honest responses (Jerome & Williams, 2000). These findings highlight the importance of further research aimed at exploring the nature and role of directional interpretations in anxiety research.

Other moderating variables. Despite the somewhat equivocal findings from examination of the relationship between performance and directional interpretations of perceived anxiety symptoms, research has revealed a relatively consistent pattern of findings when comparing elite with non-elite performers on both state and trait anxiety responses (Hanton & Connaughton, 2002; Hanton & Jones, 1997; Jones, Hanton, & Swain, 1994; Jones & Swain, 1992, 1995; Mahoney & Avener, 1977; Perry & Williams, 1998). In relation to skill level, investigations have generally revealed that whereas elite and non-elite performers show little if any difference in the perceived intensity of their symptoms, elite performers report significantly more facilitative interpretations of perceived symptoms associated with competitive anxiety than their non-elite counterparts.

Research by Mahoney and Avener (1977), using a unidimensional measure of anxiety, also showed that successful performers reported their anxiety as more facilitative than did less successful performers. Having said this, the study by Mahoney and Avener involved a very small sample size and failed to differentiate between sub-classes of anxiety.

In an investigation of the psychometric properties of the CSAI-2-D Jones and Swain (1992) drew response sets from the sports of rugby union, basketball, soccer, and field hockey. They found no differences in the intensity of perceived cognitive state anxiety or somatic state anxiety, or in the direction of perceived somatic state anxiety between high and low competitive groups. They did, however, observe that those competitors participating in a higher level of competition reported their cognitive state anxiety as being more facilitative and less debilitative than those competitors who were participating in a lower level of competition.

Jones et al. (1994) reinforced the importance of performance level as an individual difference variable in a sample of elite and non-elite swimmers. Despite finding no differences in the intensity of cognitive and somatic state anxiety between the two groups one hour prior to competing, Jones et al. reported that the elite performers interpreted both anxiety states as being more facilitative to performance than the non-elite performers. Additional analyses showed that anxiety intensity levels were higher for the debilitated, when compared to the facilitated, swimmers in the non-elite group, but no such differences were evident in the elite group.

Jones and Swain (1995) replicated the previous study by Jones et al. (1994), but in the context of trait anxiety responses amongst competitive cricketers. Their findings revealed no differences between the two groups on the intensity of cognitive and somatic trait anxiety symptoms, but significant differences were observed between the groups on both cognitive and somatic trait anxiety direction, with the elite cricketers showing significantly more facilitative interpretations than the non-elite players. Further analyses indicated that cricketers in the non-elite group, who reported their anxiety as debilitative, had higher cognitive anxiety intensity levels than those who reported it as facilitative.

More recent studies have provided further support for the mediating role of skill level in predicting directional interpretations (Hanton & Connaughton, 2002; Hanton & Jones, 1997; Jones et al., 1994; Jones & Swain, 1995; Robazza & Bortoli, 2003, 2006). These findings suggest that elite and non-elite performers have predispositions to interpret their anxiety intensities differently, and provide some preliminary evidence of relationships between direction and intensity dimensions at the trait level.

Related to skill level, Gould, Petrchlikoff, and Weinberg (1984) noted that years of experience is another predictor of competitors' cognitive anxiety directional style. This finding has also been observed in the sports of tennis (Perry & Williams, 1998) and swimming (Jones et al., 1994), rugby union, and golf (Mellalieu, Hanton, & O'Brien, 2004). It remains unclear whether such findings are due to increasing skill level of athletes with time in sport, or exposure to the sporting environment. Notably, in a study of recreational tennis players, Ryska (1998) observed that ability level, rather than overall playing experience, was significantly related to decreases in competitive state anxiety intensity. This finding seems logical because participation alone may not necessarily encourage skill development in relation to managing competitive anxiety.

Further research is required to see if this finding can be extrapolated to directional anxiety.

Another mediating variable, highlighted in previously discussed meta-analyses is that of gender. For example, Perry and Williams (1998) examined the relationship between competitive trait anxiety and performance amongst three different skill groups of male and female tennis players. They hypothesised that the groups would not differ in anxiety intensity scores, but that, as skill level increased, interpretations of anxiety as facilitative would increase. Perry and Williams also hypothesised that females would report higher cognitive anxiety intensity levels, and interpret this anxiety to be more debilitative. Findings from this research supported the predicted relationship between directional interpretations of anxiety symptoms and skill level. In addition, Perry and Williams observed that females reported their anxiety symptoms as significantly more debilitating than males.

Although researchers have used the CSAI-2-D to examine individual differences in the interpretation of anxiety symptoms across various types of sports, at this stage it is difficult to make any definitive comments about this relationship. Some authors have claimed that competitors' affective response to competition depends on the characteristics and requirements of their sport (Hassmen & Blomstrand, 1995; Jones et al., 1994; Krane & Williams, 1987; Martens et al., 1990). Hanton et al. (2003) noted that an open-skill team sport, in which the outcome is the product of interactive performances in a frequently changing environment, may represent a different context where the nature of the goals set and the perceptions of control may differ from those of an individual, closed-skill sport environment. Such a context may be predicted to indirectly influence directional interpretations of anxiety symptoms.

On this matter, Jones (1995) hypothesised that high intensity anxiety symptoms would be predicted to be interpreted as facilitative for short duration, explosive sports, but debilitative for longer duration, more finely controlled sports. Mellalieu, Hanton, and O'Brien (2004) went on to test this assumption in the sports of golf and rugby union. The observed main effects for sport type, with gross explosive sports indicating symptoms associated with competitive anxiety as more facilitative to performance than fine motor-skill sports. Schmidt (1991) suggested that running, a task of low cognitive complexity in which no fine motor control is involved, would require relatively high levels of arousal. Other sports of greater cognitive complexity, such as tennis, archery, and fencing, might benefit from emotional states accompanied by less physiological

arousal. If competitors have a pre-determined ideal in terms of the intensity of their affect, and their experience differs, it is possible that such a set of circumstances may be interpreted to be detrimental to performance.

Some preliminary evidence supporting this proposition comes from a study by Hanton, Jones, and Mullen (2000). In an exploration of the intensity and direction of competitive state anxiety across two different sports, Hanton et al. observed that the interpretation of symptoms differed between the sports of rugby and rifle shooting. Specifically, the rugby players reported higher intensities of anxiety to be more facilitative to performance than the rifle shooters. These findings were somewhat limited because the rugby group contained a higher proportion of elite competitors than the shooting participants. Hanton et al. went on to suggest that a cognitive restructuring intervention, involving the relabelling of symptoms as facilitative, may be warranted in situations whereby competitors are interpreting the high intensity of their anxiety response as being harmful, despite the requirement of this state in that particular sport.

Directionality has also been addressed with reference to the antecedents and temporal patterning of the anxiety response (Hanton & Jones, 1997; Wiggins, 1998), the use of psychological skills (e.g., Fletcher & Hanton, 2001), and hardiness (Hanton, Evans, & Neil, 2003). It is likely that these avenues of research will further develop our understanding of anxiety in sport.

Jones (1995), and subsequently Burton and Naylor (1997), proposed that the emotional state being observed when cognitive and physiological symptoms are perceived as being facilitative to performance, regardless of intensity, may not represent "anxiety", but instead may be best labelled by the performer as "excitement" or being "psyched up". Such a proposition may indicate that conventional measures of anxiety may be inadvertently measuring the intensity of certain perceived cognitive and somatic symptoms that may not necessarily be congruent with the emotion of anxiety for that individual in that moment. Notably, Perry and Williams (1998) observed that more than half of the participants in their study interpreted their anxiety symptoms as facilitative. Having said this, various researchers have noted that anxiety is generally defined as an unpleasant state (Eysenck, 1992).

Related to this, Jones (1995) has outlined a possible contradiction when using the CSAI-2-D, the notion of "positive anxiety". This contention was strengthened by Lane, Sewell, Terry, Bartram, and Nesti (1999), who found flaws in the factor structure proposed by Martens et al. (1990). Specifically, Lane et al. suggested there is a

limitation of the cognitive anxiety scale within the Martens et al. CSAI-2 which results from phrasing items around the word "concerned", rather than the word "worried". They claimed that being concerned is not be generally perceived as a negative experience by most people.

Jones and Hanton (2001) proposed that this psychological state could be labelled as "confident coping", where individuals interpret thoughts and feelings as facilitative, despite experiencing them at high intensities. Perhaps Jones and Hanton have presented the clearest interpretation of such conflicting findings. They suggested that a negative score on the direction scale of the CSAI-2-D would signify a state of anxiety, whereas, a positive direction score would point to another state, previously mislabelled as anxiety. In an extension of this logic, a negative score may also represent an alternate negative emotion, such as anger or dejection.

In summary, the findings of research on the intensity and direction of anxiety reinforce the value of the directional interpretation of anxiety symptoms as an important aspect in competitive anxiety research. Despite some conceptual concerns (e.g., Burton & Naylor, 1997), preliminary research seems to indicate that directional interpretations may be a more sensitive variable than intensity interpretations when considering performance (Jerome & Williams, 2000; Jones, Swain, & Hardy, 1993; Swain & Jones, 1995). Further, directional interpretations may be mediated by the gender of the performer (Perry & William, 1998), and type of sport being played (Hanton, Jones, & Mullen, 2000). They also appear to be associated with antecedents and temporal patterning of the anxiety response (Hanton & Jones, 1997; Wiggins, 1998), the use of psychological skills (Fletcher & Hanton, 2001), and hardiness (Hanton, Evans, & Neil, 2003). Relatively robust findings are emerging when considering directional interpretations and the variables of skill level (Hanton & Connaughton, 2002; Hanton & Jones, 1997; Jones, Hanton, & Swain, 1994; Jones & Swain, 1992, 1995; Mahoney & Avener, 1977; Perry & Williams, 1998), and years of sporting experience (Jones et al., 1994; Perry & Williams, 1998). Overall, it appears that the directional scale, when used in conjunction with the original CSAI-2 intensity scale, provides a significant contribution to the understanding of competitive anxiety in sport.

Potential Mechanisms Underlying Directional Observations

There has been limited investigation into potential variables underlying the directional interpretation and performance observations, since the emergence of this dimension of anxiety. In one such study, Jones and Hanton (1996) classified swimmers

into positive and negative expectancy groups based on their anticipated goal achievement in a subsequent race. Findings revealed no significant differences in the intensity of pre-competition anxiety between those swimmers who had negative expectations and those who had positive expectations. When directional interpretations were investigated, Jones and Hanton found that swimmers with positive goal expectancy reported more facilitative interpretations of anxiety symptoms than those with negative goal expectancy. It would appear that Jones and Hanton failed to appreciate that directional interpretations are based on performance, which in most cases would be anticipated to rank highly on the competitors' list of goals. Given the predicted variance shared by anticipated goal achievement and anticipated performance, the findings of Jones and Hanton could simply be an outcome of the wording of the CSAI-2-D.

Ntoumanis and Biddle (2000) explored the relationship between the intensity and directional attributes of competitive anxiety with competitors' dominant coping style. This was based on a conceptual model presented by Jones (1995), which predicted that when athletes have positive expectancies of their ability to cope successfully, they will be more likely to interpret their competitive anxiety as being facilitative, whereas negative expectancies are more likely to be associated with debilitative interpretations. Earlier research (e.g., Raffety, Smith, & Otacek, 1997) indicated that high debilitative trait anxiety is associated with avoidance as a form of coping, whereas high facilitative trait anxiety is associated with problem solving and proactive-coping. In their study, Ntoumanis and Biddle asked 223 male and 133 female British university athletes to recall a recent stressful situation in their sport and retrospectively rate the intensity and direction of their anxiety symptoms. Results indicated that high cognitive anxiety intensity was associated with behavioural disengagement and venting, whereas low intensity was associated with distancing (degrading the magnitude of the problem or creating a positive attitude toward it). Further, facilitative directional interpretations of cognitive anxiety intensity were associated with effective coping strategies, whereas interpretations of cognitive anxiety as being debilitative were associated with ineffective coping strategies. Similar findings were observed for somatic anxiety. Ntoumanis and Biddle summarised by stating that athletes with a positive interpretations of their anxiety level are able to more effectively use coping strategies. One limitation of this study was that it was based on a retrospective rating design. It is also unclear how Ntoumanis and Biddle differentiated between different coping styles. For example, the

strategy of distraction, could be seen to be a positive coping strategy in certain circumstances, and yet a negative strategy in a different context. Despite the limitations of this study, the findings provided further support for the relevance of both intensity and directional measures of anxiety, and generated some preliminary explanations for the observed relationships.

More recently, Wang, Marchant, and Morris (2004) examined the relationship between approach and avoidance coping styles, state anxiety intensity and direction, and free throw performance in basketball. An approach coping style is typified by coping strategies that direct cognitive and behavioural efforts toward reducing the intensity of stress, whereas an avoidance coping style refers to coping strategies that direct these efforts away from a threat (Anshel & Weinberg, 1999). Observations of basketballers indicated that competitors, who typically used an approach coping style, were more susceptible to choking under pressure when compared to those who typically used an avoidance coping style. State anxiety data indicated cognitive intensity scores were positively related to an approach coping style, and negatively related to an avoidance coping style. In other words, when under pressure, basketballers who directed attention towards reducing their anxiety, actually ended up experiencing higher intensities than those who directed their attention away from the perceived threat. Analyses of directional findings revealed a significant relationship between an avoidance coping style and facilitative interpretations of state anxiety. What this means is that the basketballers who diverted their attention away from the threat, actually interpreted their anxiety intensity more facilitatively. It is possible that these findings may be associated with a change in focus away from symptoms directly addressed by the CSAI-2-D, resulting in lower intensity scores that may be predicted to be interpreted in a less debilitative manner (although not in a more facilitative way). Such findings add to the small body of literature highlighting the role of coping in anxiety management.

Jones, Swain, and Harwood (1996) observed that performers with a predisposition for high levels of negative affect consistently perceived their symptoms, regardless of intensity, as debilitative. Conversely, competitors who scored highly on positive affect reported symptoms to be more facilitative. Following this, Jones and Hanton (2001) attempted to tease out potentially differing emotional states possibly influencing responses to anxiety measures. In their research, the association between feeling states and directional interpretations of 190 high standard swimmers was assessed. Swimmers completed an exploratory checklist of feeling state labels, which

included positive and negative feeling state labels, during the pre-competition period. In addition they completed the CSAI-2-D. The findings of Jones and Hanton supported the hypothesis that facilitators identified with significantly more positive feelings than debilitators, who identified with significantly more negative feelings. Specifically, descriptive frequency counts of the largest percentage differences between facilitators and debilitators resulted in the selection of the "confident" feeling state label on the positive subscales, with it being identified most frequently by the facilitators. Furthermore, of the negative feelings, the groups selected the label "anxious" most frequently. Such findings further highlight individual differences in the combination of feeling states experienced by performers during competition, and the potential hazards associated with trying to assign one emotional descriptor to what are often complex mixtures of emotions.

This work was further extended by Mellalieu, Hanton and Jones (2003), who examined differences in affective states of performers who reported facilitating or debilitating interpretations of symptoms associated with precompetitive state and trait anxiety. Their findings indicated that facilitators reported significantly greater positive labelling of affective experiences than debilitators, mirroring Jones and Hanton's (2001) findings. Mellalieu et al. also noted that, for some competitors, cognitive interpretations of symptoms changed with proximity to the event. In other words, a competitor might interpret nervousness in practice as being facilitative, whereas that same nervousness in the competition may be perceived as being debilitative. As an intervention strategy, Mellalieu et al. recommended cognitive restructuring that focuses on the interpretations of the individual's affective state, rather than attempting to reduce the intensity of this state.

Recently, Hanton and Jones (1999a) completed two related studies that are particularly relevant to the theory and management of anxiety in sport. In their first study, 13 competitive swimmers underwent structured interviews designed to identify and explore the acquisition of cognitive skills deemed pertinent to the facilitative interpretation of pre-race anxiety. In a second follow-up study, Hanton and Jones (1999b) went on to examine the efficacy of a multimodal intervention comprising of techniques identified in their first investigation, as a means of modifying the directional interpretations of four swimmers suffering debilitative pre-competition anxiety.

Specifically, Hanton and Jones (1999a) examined the acquisition of cognitive skills and strategies by interviewing 10 elite, male, competitive swimmers, who

consistently reported facilitative interpretations of symptoms associated with competitive anxiety. They employed qualitative interview techniques to gain detailed descriptive information associated with these mechanisms. Findings indicated that competitors reported negative interpretations of pre-race anxiety when younger, but indicated that as they matured they had developed a range of skills designed to reinterpret this anxiety. In other words, the swimmers reported that their facilitative interpretation was attained through natural learning experiences. Strategies emphasised by swimmers included imagery, goal setting, and self-talk.

Based on the findings of their first study, Hanton and Jones (1999b) went on to conduct a second study examining the efficacy of a combined intervention package that included goal setting, imagery, and self-talk. Of the four participants who reported debilitative interpretations of anxiety intensity prior to the intervention, three reported facilitative interpretations post intervention. Performance improvements were also evident for these swimmers. Notably, the fourth participant acted as a "control", and reported no changes in directional interpretation or performance. These changes were still evident when the researchers conducted a 5-month follow-up.

Jones (1995) has noted that confidence and perception of control are closely related variables, which are likely to be important sources of variance in directional interpretations. Specifically, Jones hypothesised that performers who have the least confidence in their ability to control both themselves and the environment will experience debilitative anxiety symptoms. Jones went on to propose a model, based on an adaptation and modification of Carver and Scheier's (1988) work. Jones proposed that anxiety is facilitative, provided that the individual's expectancies of being able to cope and of goal attainment are favourable. Expectancies that are unfavourable, on the other hand, are associated with debilitative anxiety. Jones's (1995) incorporation of the notion of control is illustrated in Figure 2.4.

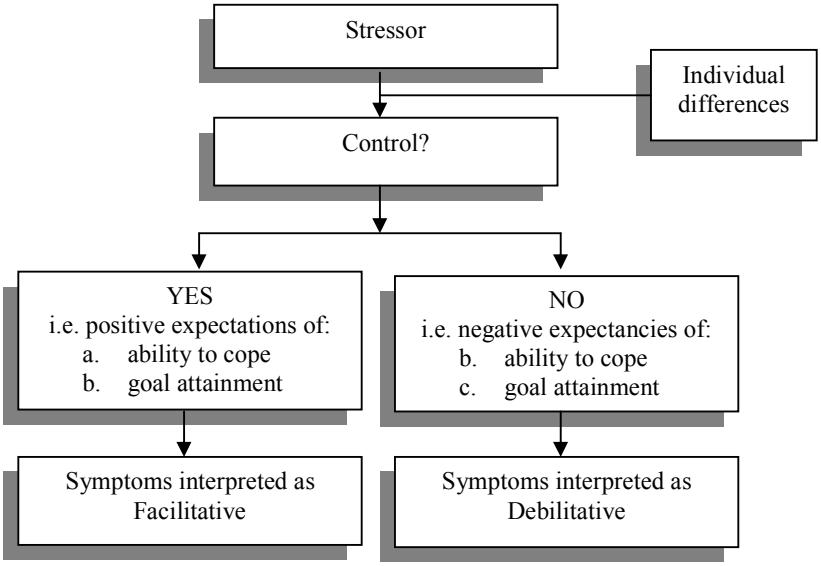

Figure 2.4. A Control Model of Debilitative and Facilitative Competitive State Anxiety (Jones, 1995, p. 466).

In Figure 2.4, control is broadly conceptualised as the cognitive appraisal of the degree of control the performer is able to exert over both the environment and the self.

In an attempt to further explore some of the relationships highlighted by this model and to examine some of the underlying mechanisms involved, Hanton and Connaughton (2002) interviewed elite and sub-elite swimmers concerning their retrospective interpretations and causal beliefs about the link between anxiety symptoms and performance. Findings indicated that perceived control mediated directional interpretations. Cognitive and somatic symptoms deemed under control were consistently associated with positive directional interpretations. This was the case if the swimmers believed there was a rational reason why these thoughts or feelings could improve performance. In contrast, thoughts or feelings that were perceived to be outside the performers' control led to debilitative interpretations and were perceived to have a negative effect on performance. This study highlighted the importance of attributions formulated about symptoms. Specifically, the results emphasised that experiencing anxiety symptoms is not necessarily debilitative to performance, and that negatively perceived thoughts and feelings can have a facilitative effect on performance, if they are viewed to be under the control of the individual. Hanton and Connaughton also highlighted the importance of employing pre-race strategies that control emotional states through techniques such as cognitive restructuring, as well as techniques designed to increase or decrease arousal. In addition, Hanton and Connaughton emphasised the

importance of social evaluation concerns, a point raised by Hassmén, Raglin, and Lundqvist (2004), who made the observation that few sport psychology researchers have moved beyond the cognitive-somatic conceptualisation to include other specific aspects of anxiety that may be of importance in performance situations. Specifically, they suggested that dimensions, such as social anxiety, may be worth exploring, particularly for events in which athletes and spectators are in close proximity.

Finally, although not measuring directional interpretations of anxiety symptoms, a recent study by Conroy and Metzler (2004) offers an alternative framework for future research. Conroy and Metzler noted that cognitive theories of anxiety assert that self-talk lies at the core of anxiety. Using a sample of 440 college-age men and women, they explored the relationship between patterns of state-specific self-talk and three forms of situation-specific trait performance anxiety; fear of failure, fear of success, and sport anxiety. Distinct patterns of self-talk were associated with competitive anxieties in sport, the strongest effects being associated with fear of failure and sport anxiety, in that order. Fear of success was more weakly associated with systematic patterns of self-talk. These results provide support for the application of cognitive theories of anxiety. Conroy and Metzler went on to suggest that self-talk could be used as a form of assessment, diagnosis, and treatment of performance anxiety problems in sport.

In summary, researchers are just beginning to uncover some of the underlying mechanisms mediating the observed relationships between anxiety intensity, direction, and performance. Preliminary findings allude to the importance of goal expectancy (Jones & Hanton, 1996), coping styles (Ntoumanis & Biddle, 2000; Wang, Marchant & Morris, 2004), negative and positive affect (Jones & Hanton, 2001; Jones, Swain, & Harwood, 1996), interpretive styles (Hanton & Jones, 1999a, 1999b), control (Hanton & Connaughton, 2002; Jones, 1995), and self-talk (Conroy & Metzler, 2004). Further research in these areas is clearly required before any definitive statements can be made on the importance of these variables to the future conceptualisation, measurement, and management of anxiety in sport.

Theoretical Conceptualisations

Based on the research findings reported in the previous section, changes to measurement tools and applied strategies have emerged from a range of alternate theories of anxiety. I will briefly outline major theories of anxiety that have received significant research attention in the following section, including reversal theory (Apter,

1982), zones of optimal functioning (Hanin, 2000), and catastrophe theory (Hardy & Fazey, 1987).

Reversal Theory

Reversal theory is based on the premise that individuals' interpretation of their arousal state is central to their emotional experience (Apter, 1982). The theory postulated that arousal can be interpreted differently depending on the individual's present state. Much of the research in this area has focussed on the telic-paratelic pair of metamotivational states (telic characterised by seriousness and arousal avoiding behaviour, and paratelic by playfulness and arousal seeking behaviour). In the telic, arousal avoiding state, low arousal would be predicted to be experienced as relaxation, and high arousal as anxiety. In the paratelic, playful state, low arousal would be predicted to be experienced as boredom, and high arousal as excitement. A reversal occurs when there is a shift from telic to paratelic, and vice versa. The theory predicts that metamotivational states exist together in opposite pairs, and that individuals are capable of rapid changes or reversals in one of two continuums (stress & arousal), which in turn should affect their performance (Hardy, Jones, & Gould, 1996). Reversal theory also distinguishes between metamotivational dominance and state (Apter, 1982), the former being based on individuals' general preferences for one metamotivational state over another, and the latter being associated with specific interpretations. Intervention options may involve either moderating arousal or changing interpretations. Kerr (1987) suggested that it may be possible for sports performers to induce the necessary reversals via cognitive restructuring or imagery. Smith, Smoll, and Ptacek (1990) noted that reversal theory is difficult to test and continues to be based upon a uni-dimensional conceptualisation of arousal and anxiety. Further, Humara (1999) suggested that reversal theory fails to explain the relationship between emotions and performance adequately.

Zones of Optimal Functioning Model

A theoretical approach that has received some consideration in the sport and exercise psychology setting in recent years is the individual zones of optimal functioning (IZOF) model (Hanin, 2000). Consistent with the inverted-U hypothesis, Hanin proposed that individual athletes have a zone of anxiety in which they will most likely achieve peak performances. Hanin stressed individual differences in optimal anxiety levels. Gould and Krane (1992) noted that Hanin's approach provides a rationale for some of the large variability in state anxiety scores typically observed in

anxiety research. The model goes further to provide a specific method for determining athletes' optimal anxiety levels, via systematic observation of their state anxiety and performances.

A shortcoming of this approach is that it is based on a unidimensional conceptualisation of anxiety, which limits its association with more recent approaches and measures. Davis and Cox (2002) argued that that the IZOF model and the directionality hypothesis are intuitively related in that IZOF model predicts that best performance occurs when competitors' anxiety is in their zone of optimal functioning, where directionality theory posits that best performance occurs when pre-competition anxiety is perceived as facilitative. If both of these hypotheses are valid, then when competitors are performing with anxiety in their zone of optimal functioning, they would be predicted to be experiencing best performance and perceive anxiety as facilitative to this performance. Davis and Cox went on to explore the relationship between these models and found that Hanin's IZOF model was not related to Jones's notion of anxiety direction. Davis and Cox's findings may have been influenced by the fact that their participants were relatively low skilled, and as a result their ability to recognise and interpret the direction of anxiety may have been underdeveloped. Davis and Cox highlighted a clear need for further research in this area.

The Cusp Catastrophe Model

As with Inverted-U theory, in catastrophe theory, Hardy and Fazey (1987) predicted that increases in arousal would be associated with performance gains up to a point. In catastrophe theory, however, Hardy and Fazey predicted that beyond this point performance would not drop in a uniform and orderly manner, but would decline dramatically. Hardy and Fazey specifically predicted that the relationship between arousal and performance is dependent on the individual's level of cognitive anxiety. They proposed that when cognitive anxiety is high, and arousal is high there will be catastrophic changes in performance, and this combination will significantly impair individuals' ability to return to an optimal performance level.

The cusp catastrophe model of anxiety and performance directly addressed many of the issues raised by the incongruence between direct measures of physiological reactivity and indirect measures of perceived affect. Unlike the general multidimensional theory of anxiety, this approach focussed on the interactive effects of the two modes of anxiety and how that related to performance. The theory was proposed as a reaction to the poor predictability of multidimensional theory, findings from

research investigating temporal patterning of the anxiety response, the finding that cognitive anxiety does not always have a debilitative effect on performance (even at high levels), and the observation that when performance does suffer, it does so dramatically and it is difficult to recover. The cusp catastrophe model was devised in order to illustrate how one dependent variable can be changed as a result of changes in two independent variables. The model is illustrated in Figure 2.5. Essentially, cognitive anxiety determines whether performance lies on the rear surface of the model or the front surface, whereas physiological arousal places performance on the asymmetrical surface to the right of the model.

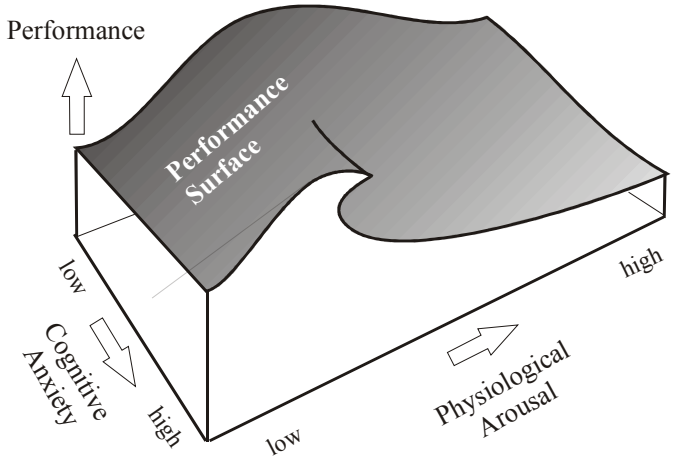

Figure 2.5. The Cusp Catastrophe Model (Hardy, 1996).

Hardy (1996) noted that, in developing the model, physiological arousal was chosen over somatic anxiety, because it was predicted that arousal could influence performance either directly or through perceived somatisations. Multidimensional theory, on the other hand, only allows for the measurement of an indirect influence in this respect. More specifically, the catastrophe model predicts that high cognitive anxiety will lead to enhanced performance when physiological arousal is low, but to impaired performance when physiological arousal is high. Notably, Hardy (1996) highlighted that the surface of the model may have to be slightly altered depending on the specific sport. It is also important to note that this model accommodates directional interpretations.

Although empirical investigation of the cusp catastrophe model in the sport and exercise domain is relatively limited in scope, initial studies on basketball (Hardy & Parfitt, 1991), bowls (Hardy, Parfitt, & Pates, 1994) and softball (Krane et al., 1994) offered support for some of the predictions generated by the model.

Gill (1994) expressed a lack of enthusiasm for the catastrophe model approach, criticising its complexity and over-sophistication. In addition, the model fails to explain how cognitive anxiety and physiological arousal affect performance. McNally (2002) noted that speculation about this has focussed on interference, keeping athletes' concentration away from task relevant cues.

Each of these models considerably improves on the unidimensional approaches used to describe the interrelationships between anxiety, arousal, and performance. Research designed to test the specific predictions made by each model, in addition to exploring some of the causal variables underlying these predictions, will advance the conceptualisation of anxiety considerably.

Summary of the Theoretical Development and Measurement of Anxiety in Sport

Considerable developments have occurred in the anxiety literature since the original uni-dimensional conceptualisations of drive theory and the inverted-U hypothesis. The state-trait theory of anxiety has helped researchers differentiate between the transitory experience of anxiety and more general predispositions to experience anxiety in a range of circumstances. In addition, despite some fundamental conceptual limitations, multidimensional theory and measurement has spawned considerable research into specific components of the anxiety response, and has generally improved our understanding of the anxiety-performance relationship through greater specificity and an improved awareness of potentially mediating variables in this relationship. The more recent conceptualisation of the directional dimension of anxiety has opened up new avenues for research and encouraged alternative perspectives for the applied treatment of emotional dysfunction in sport. Perhaps as a result of this dimension seeming to make good intuitive sense, it has been embraced by practitioners and researchers, despite a clear lack of research reinforcing and explaining the observed associations. Although the link between research and application can, at times, be tenuous in the sport psychology literature, what has been transferred will be outlined in the next section, where I focus in on applied strategies employed by competitors in the management of anxiety in sport.

Applied Anxiety Management in Sport

Sport psychologists use a range of applied techniques to help competitors manage competitive anxiety. In this section, I will describe the core strategies taught by sport psychologists and used by competitors in the management of anxiety, with particular

emphasis on the combined use of imagery and relaxation, mainly because such an approach is widely adopted by sport psychologists.

Major Interventions Applied by Sport Psychologists

Vealey (2007) offered a framework for understanding mental skills training based on a comprehensive review of the literature pertaining to sport. This framework is shown in Figure 2.6.

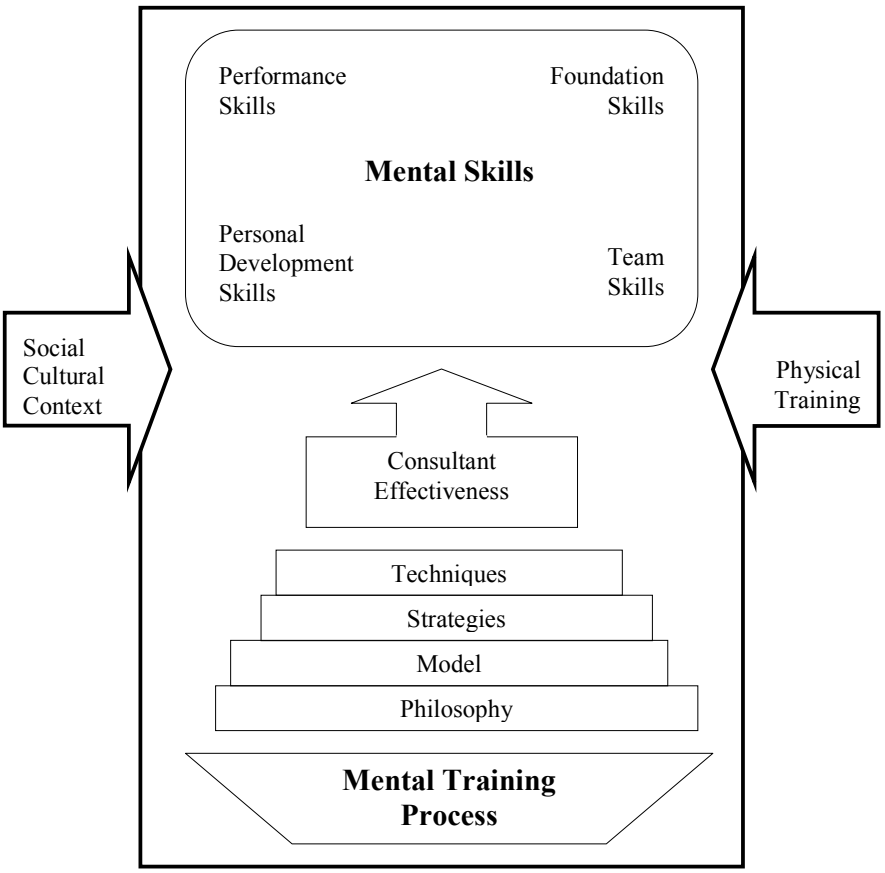

Figure 2.6. A Framework for Understanding Mental Skills Training in Sport (Vealey, 2007, p. 291).

Based on this model, the process of mental training includes, philosophy, model, strategies, and techniques used by the consultant to enhance mental skills. The two arrows on either side of the framework represent the influence of physical training and the socio-cultural influences of society on sport on the mental training process. It is important to note that this model is based on an ideal situation, the reality being that applied techniques are often poorly linked to an overall theoretical framework. Vealey proposed that the most popular mental training techniques used by consultants include imagery, goal setting, thought management, physical relaxation, and arousal generating

approaches. She highlighted that although it is important to test the effectiveness of specific techniques, these techniques should be studied from the standpoint of particular strategies and models, instead of independently of theory.

In terms of the management of anxiety in sport, athletes report that the primary techniques they use to manage this emotion include goal setting, thought control strategies (e.g., positive thinking and cognitive restructuring), relaxation techniques (e.g., diaphragmatic breathing, imagery, and progressive muscle relaxation), and focusing on the task at hand (Gould, Eklund, & Jackson, 1993; Jones & Hardy, 1990; Orlick & Partington, 1988). Other approaches discussed by researchers have included direct physiological interventions, applied relaxation, progressive muscle relaxation, behavioural interventions, performance planning, competition routines, cognitive interventions, anxiety management training, positive thought control, stress inoculation training, attention control training, hypnosis, autogenic training, visual motor behaviour rehearsal, and mixed modality approaches. Smith and Smoll (2004) suggested that the bulk of anxiety management strategies can be categorised under the areas of flooding and exposure techniques, systematic desensitisation, cognitive restructuring, self-instructional training, cognitive-affective stress management training, and stress inoculation training. As these groupings indicate, there are a large range of approaches that are currently used in the management of anxiety in sport.

From competitors' perspectives, Stevens and Lane (2001) examined strategies used by sports competitors to self-regulate moods. They observed that for the emotion of tension, strategies used included, "listening to music" (41.12%), "call, talk to, or be with someone" (37.38%), "control thoughts" (35.51%), and "use relaxation techniques" (28.97%). These findings highlight that competitors used distraction techniques as a primary means of managing anxiety symptoms. Notably, in the study by Stevens and Lane competitors had to choose from a predetermined list and there were no further details associated with the "control thoughts" item.

Ryska (1998) conducted a content analysis of the relevant applied sport psychology literature in order to define the most fundamental interventions used in the management of anxiety, and to further clarify the core components of these interventions. Sources included Williams (1993), Anshel (1990), Weiss (1991), and Singer, Murphey, and Tennant (1993). The approaches identified included relaxation and mental imagery, attention control, goal setting, and positive self-talk. Ryska went on to describe the basic elements of each of these strategies. Ryska indicated that

relaxation strategies generally focus on (a) monitoring muscular tension and engaging in stretching techniques, (b) controlling breathing, and (c) regulating environmental stimuli prior to competition (e.g., listening to music, seeking a private setting). Ryska described the core components of mental imagery as including (a) imagining the employment of specific tactics, (b) imagining appropriate emotional and behavioural responses to performance mistakes, (c) creating a mental image of skill production, and (d) anticipating an opponent's actions. Attention control was characterised by: (a) minimising attention to previous mistakes and future events, (b) attending to sport specific cues, (c) attending to physiological regulation and motivational cues, and (d), focusing on tactics as well as emotional and physical composure during and around competition. Ryska indicated that the core elements of goal setting included: (a) the establishment of specific performance goals for both training and competition, (b) developing a training regimen in order to achieve desired outcomes, and (c) reinforcing goal-directed behaviour through rewards and punishment. Finally, the positive self-talk strategy was described as (a) utilising self-instructional phrases to facilitate skill improvement, (b) rehearsing verbal cues in order to optimize motivation for practice and competition, (c) anticipating competitive situations that typically elicit negative thoughts and replacing them with self-affirmative statements, and (d) checking and correcting irrational beliefs about one's performance in practice and competition. These descriptions give an overview of the components of each of these applied skills, but fail to reflect the wide range of different relaxation, imagery, goal setting and self-talk techniques that are used in the sporting context. In the following section of the thesis, I will discuss these strategies in more detail, with particular emphasis on relaxation and imagery.

Relaxation

Payne (2004) noted that relaxation techniques are commonly used in psychological practice. Two particular methods in widespread clinical use include Benson's relaxation method (Benson, 1975) and progressive relaxation (Jacobson, 1931). Despite the growing acceptance and use of such techniques as a means of managing anxiety, Weinstein and Smith (1992) have noted that the underlying mechanisms that make these approaches work remains poorly understood.

One of the theoretical rationales for relaxation strategies is based on the idea that the process of relaxation deactivates physiological systems that are usually activated, among other systems, as a result of psychological distress (Öst, 1987). It is predicted

that by learning to deactivate a single subsystem, the muscular system, a concordant reduction in the activation of other associated subsystems will occur (Gellhorn & Kiely, 1972). Conrad and Roth (2006) challenged this proposition on the grounds that research does not always find consistent associations between stress activation and muscular activation, that people in clinical settings who have high muscular tension to begin with do not always benefit the most, and that little research has been done to test the assumption that changes in the muscular system necessarily result in changes in affect. It is unclear why some of these limitations have not been further investigated, but most likely this is a result of the simple observation that relaxation strategies generally work well and have minimal side effects. As a result, few researchers have attempted to determine the underlying mechanisms that facilitate change, and little research has been performed to improve the efficacy of these approaches.

Benson (1975) proposed that there are four common elements underlying the elicitation of a relaxation response. These include a quiet environment to minimise external distractions, a comfortable position to reduce muscular tension, an object to dwell on (such as the repetition of a word, which focuses one's attention), and a passive attitude (which not only includes emptying all other thoughts from one's mind, but, when distracting thoughts inevitably come, to merely allow them to pass on while returning to one's previous thoughts). Benson highlighted that his relaxation method is a derivative of meditation. The approach typically involves encouraging a focus on breathing whilst concurrently forming a mental picture of the air passing in and out of the lungs, and whilst breathing out saying a cue word, such as “relax”.

Jacobson (1938) developed Progressive Muscular Relaxation (PMR) based on the suggestion that muscle tension is related to both physiological activities and cognitive states (Jacobson, 1938). He predicted that relaxing muscles by making individuals aware of the “feeling” of a relaxed muscle state, can lead to reduced mental and sympathetic activity (Jacobson, 1938). The protocol for employing PMR generally involves sitting in a comfortable position and working through the contraction and release of various muscle groups, often starting with larger muscle groups. The participant is encouraged to practice tensing each muscle group until they recognise the feeling of even the slightest contraction, and then they learn to release it. After mastering relaxation in a seated position, they are taught how to relax muscles in real-life situations. In-vivo use of PMR often entails minimising tension in the muscles that

are required for some activity, whilst concurrently relaxing those muscles that are not necessary to the enactment of the skill.

Wolpe (1958) adapted PMR for use in his systematic desensitisation therapy. This approach is based on the idea that cues that once elicited anxiety can be conditioned to become cues that inhibit anxiety, when they are linked to a state of elevated parasympathetic tone. Wolpe chose relaxation to enhance the parasympathetic tone. This approach entails first teaching clients a streamlined form of muscle relaxation, then exposing relaxed clients to anxiety-evoking stimuli organised in a hierarchy from least to most distressing. This approach desensitises the client to increasingly stressful triggers as therapy progresses.

In terms of research, Weinstein and Smith (1992) compared the effects of progressive relaxation, which they classified as a somatic technique, and meditation, which they classified as a cognitive technique, on cognitive and somatic state anxiety. They found that both techniques significantly reduced cognitive and somatic anxiety intensity, however, they did not find differential effects for each treatment on each dimension of anxiety. In a later study, Maynard et al. (1995) investigated the effects of an 8-week “applied relaxation” program on cognitive and somatic anxiety. Maynard et al. reported that the intervention group showed significant reductions in somatic anxiety (30.9% reduction) and cognitive anxiety (15.9% reduction) compared to a control group who experienced no significant reduction.

More recently, Gill, Kolt, & Keating (2004) explored the relative effects of Benson's relaxation method and PMR on the intensity of state anxiety in 76 undergraduate university students. Gill et al. observed that both Benson's relaxation and PMR were effective in reducing cognitive and somatic state anxiety. Further, Gill et al. reported no significant differences between the effects of PMR and the relaxation response on either cognitive or somatic anxiety dimensions.

From a clinical perspective, there is good support for the use of relaxation strategies as a means of managing anxiety and associated disorders. In a recent meta-analysis, Jorm et al. (2004) reviewed the clinical effectiveness of relaxation therapy for anxiety as part of a project analysing the evidence for the effectiveness of many complementary and self-help treatments for reducing anxiety. This review included all relevant randomized controlled trials published prior to 2003, totalling more than 60 clinical outcome studies. Jorm et al. concluded that relaxation was as effective as pharmacologic, cognitive, or exposure-based interventions for clinical anxiety

conditions, including panic disorder, generalised anxiety disorder, and dental phobia. Jorm et al. found less evidence for relaxation therapy being as effective as these other therapies in treating specific phobias, social anxiety, obsessive-compulsive disorder, or posttraumatic stress disorder, although relaxation did outperform no-intervention control conditions for these disorders. More recently still, Conrad and Roth (2006) reviewed a number of meta-analyses concerning the utility of relaxation strategies and concluded that a considerable number of published studies have successfully shown that muscle relaxation is beneficial in the treatment of a variety of anxiety disorders.

In relation to anxiety interpretation and relaxation, I found two studies that lend support to the utility of relaxation strategies as a means of moderating debilitative anxiety interpretations. Maynard, Hemmings, and Warwick-Evans (1995), and Maynard, Smith, and Warwick-Evans (1995) conducted separate intervention studies examining the effects of various anxiety reduction techniques on soccer players debilitated by anxiety symptoms. Their results indicated that a reduction in anxiety intensity levels via relaxation techniques was associated with more facilitative interpretations of pre-competitive symptoms.

Imagery

Martin, Moritz, and Hall (1999) indicated that there are more than 200 published studies that have examined the relationship between imagery and sport performance. Collectively, these studies have shown that imagery of a particular skill can improve the execution of that skill (Driskell, Copper, & Moran, 1994; Feltz & Landers, 1983). Such observations explain why imagery is so often incorporated into mental training packages.

Richardson (1969) defined imagery as:

> Those quasi-sensory and quasi-perceptual experiences of which we are self-consciously aware and which exist for us in the absence of those stimulus conditions that are known to produce their genuine sensory or perceptual counterparts (pp. 2-3).

Morris, Spittle, and Perry (2004) noted that this definition fails to distinguish imagery from a range of other mental phenomena. A more specific definition has been provided by White and Hardy (1998), who defined imagery as:

> An experience that mimics real experience. We can be aware of 'seeing' an image, feeling movements as an image, or experiencing an image of smell, tastes, or sounds without actually experiencing the real thing (p. 389).

This definition alludes to the intent of the imager to mimic reality.

Some researchers delineate between imagery and mental practice, although the two are often described in the same context. Marteniuk (1976) defined mental practice as "improvement in performance that results from individuals either thinking about a skill or watching someone else perform it" (p. 224). Morris et al. (2004) noted that a number of terms have been used interchangeably when discussing imagery. These include mental rehearsal, mental practice, visualisation, imaginal practice, imagery rehearsal, symbolic rehearsal, ideomotor training, and visual motor behaviour rehearsal. Notably, some of these terms imply that imagery largely entails the visual representation of experiences, yet the majority of imagery interventions utilise a range of senses in order to more fully re-create the experience. In the following section, notation referring to imagery will include mental practice strategies.

Paivio (1985) developed an analytic framework for the analysis of imagery effects. Based on this model, imagery influences motor behaviour both cognitively and motivationally. In other words, behaviour can be affected by imaging motor skill components and general game or performance strategies (cognitive strategies), and/or imagery associated with goals, activities related to goal achievement, and the physiological and psychological changes that may accompany successes and failures in performance (motivational strategies). Motivational strategies are more concerned with arousal, and are generally employed where imagery is used as a means of managing anxiety. Paivi's model has been used to explain the impact of imagery on anxiety.

Martin, Moritz, and Hall (1999) noted that Paivio's framework fails to accommodate all uses of imagery, fails to include situational or personal factors, such as the context or the athlete's ability, and provides few predictions about the specific types of conditions that lead to motivational and cognitive changes. In response Martin et al., reviewed the literature associated with imagery use in sport and proposed their own applied model for its use. In doing so, they identified four key factors associated with the use of imagery. These include the sporting situation, the type of imagery used, imagery ability, and outcomes associated with imagery use. This model is illustrated in Figure 2.7.

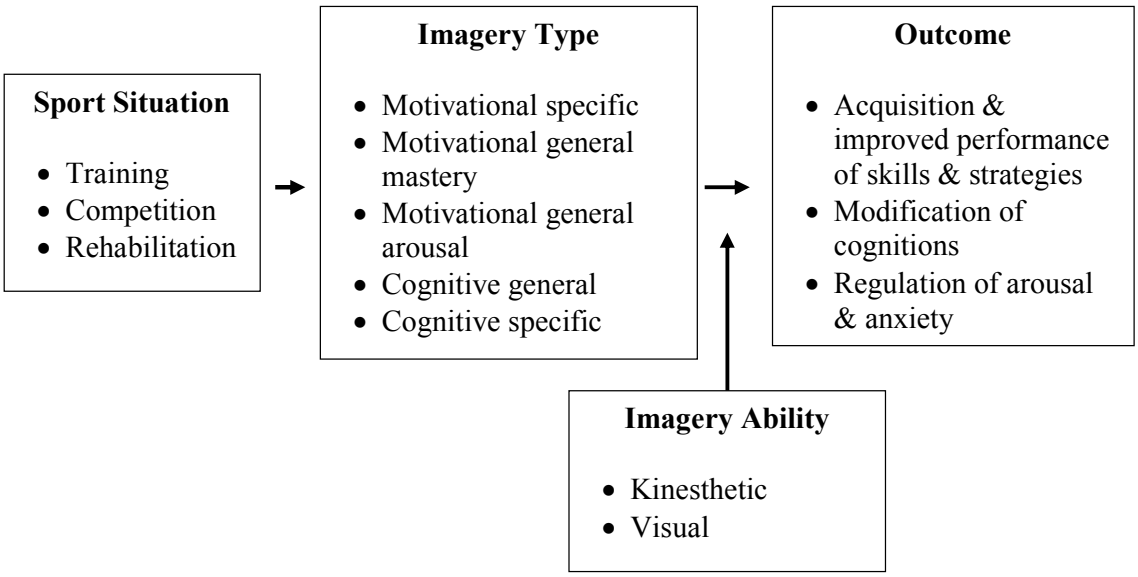

Figure 2.7. An Applied Model of Mental Imagery Use in Sport (Martin, Moritz, & Hall, 1999, p. 248).

According to this model, the type of imagery used may be impacted by the sport situation (where it is to be used) and required outcomes. Martin et al. (1999) adopted the five major types of imagery used in sport that were previously identified by Hall, Mack, Paivio, and Hausenblas (1998). These strategies focus on either cognitive or motivational change, and include Motivational Specific (MS) imagery, Motivational General-Mastery (MG-M) imagery, Motivational General-Arousal (MG-A) imagery, Cognitive General (CG) imagery, and Cognitive Specific (CS) imagery. MS imagery is typically associated with situations whereby athletes imagine specific goals, such as winning or being congratulated on a performance. This form of imagery may influence self-standards against which performance is appraised and evaluated (Hall, 2001). MG-M imagery is that form of imagery that reflects effective coping and mastery of challenging situations. This form of imagery is primarily used when the enhancement of confidence and self-efficacy is important (Hall, 2001). MG-A imagery is primarily associated with the management of stress or arousal levels. This form of imagery is regularly used by competitors to raise arousal levels, or reduce the intensity of competitive anxiety (Hall, 2001). CG imagery is imagery that represents strategies related to a competitive event. For example, a competitor using CG imagery might rehearse overall game plans, strategies, and routines. CS imagery is used when rehearsing very specific elements of a sport, such as a penalty shot in hockey.

Hall (2001) suggested that the particular form of imagery used in a specific situation depends largely on the planned outcomes. Martin et al. (1999) noted that competitors often engage a range of imagery types in order to achieve outcome goals. It is reasonable to predict that any one of these forms of imagery might be predicted to impact competitors' anxiety experience, either directly or indirectly, however, MG-A imagery would be predicted to have the greatest impact on anxiety levels (Martin et al., 1999).

A number of researchers and theoreticians have attempted to explain how imagery works. Hall (2001) noted that these theories have largely focussed on attempting to explain how CS imagery facilitates learning. Sackett (1934) proposed symbolic learning theory, which predicts that actions are symbolically coded as mental plans, and that imagery helps familiarise the individual with these plans, enabling actions to become more automated (Vealey & Walter, 1993). In psychoneuromuscular theory, Jacobsen (1931) posited that imagined actions trigger low level muscular and nervous impulses similar to those produced during the actual physical execution of a skill, but at a far lower intensity. Based on this theory, Vealey and Walter (1993) noted that imagery can strengthen "muscle memory" by having the muscles fire in the correct sequence for an action. In bioinformational theory, Lang (1977, 1979) proposed that an image contains information about stimulus propositions (characteristics of the imagined scene) and response propositions (behavioural outcomes). Response propositions are modifiable and predict how an individual will act in a given situation. As a result, they can have a significant impact on subsequent behaviour. Another prominent theory is the triple code theory which incorporates the meaning of the image to the individual (Ahsen, 1984). In this model, Ahsen highlighted three core components of imagery, including the image itself, the somatic response, and the meaning of the image to the imager. Ahsen proposed that every image imparts a specific meaning to the individual and the same set of imagery instructions will not result in the same imagery experiences between two individuals.

In summary, although not the only explanations of how imagery works, symbolic learning theory, psychoneuromuscular theory, bioinformational theory and the triple code theory are most prominently used to explain imagery in the sport imagery literature. These theories provide a range of rationales as to how imagery helps a competitor prepare both physiologically and psychologically. Irrespective of the theoretical perspective, there is good evidence supporting an association between

imagery and performance. Two major meta-analyses conducted in the sport setting have shown that imagery of a skill can improve physical performance of that skill (Driskel, Copper, & Moran, 1994; Feltz & Landers, 1983).

Beyond its capacity to improve skill execution, imagery has also been associated with the management of anxiety. Morris et al. (2004) highlighted that despite imagery having a myriad of potential applications, one of its primary uses is as a means of managing emotional responses. The process usually entails competitors' imagining themselves coping well in a high pressure situation (e.g., taking deep breaths and focussing on the task at hand).

In the clinical setting, Thompson and Coppens (1994) examined the effects of guided imagery on anxiety levels and on movement of clients undergoing non-emergency Magnetic Resonance Imaging (MRI). Clients who listened to a guided imagery/relaxation tape before their MRI scan and used guided imagery during their scan had lower levels of state anxiety and moved less than a control group.

In a somewhat different study, Sloman (2002) explored the relative efficacy of relaxation and imagery for the management of anxiety and depression in community patients with advanced cancer. In this study, 56 people with advanced cancer, who were experiencing anxiety and depression, were randomly assigned to one of four treatment conditions including: (1) progressive muscle relaxation training, (2) guided imagery training, (3) both of these treatments, and (4) a control group. The intensity of anxiety and depression were tested with the Hospital Anxiety and Depression Scale and the Functional Living Index-Cancer Scale to assess anxiety, depression and quality of life both before and after gaining experience with muscle relaxation and guided imagery techniques. Sloman reported no significant reduction in the intensity of anxiety, but significant positive changes occurred for depression and quality of life in the combined treatment. These findings may indicate that strategies based on relaxation and imagery may be less effective when dealing with real threats, such as a terminal illness.

Competitors regularly report using imagery as a means of calming themselves down (Cancio, 1991; Hall, Mack, Paivio, & Hausenblas, 1998; White & Hardy, 1998). For example, Finch, Gould, Smethurst, and Steffen (1996) found that "mentally tough" college athletes made greater use of mental imagery and relaxation techniques, reported less cognitive and somatic state anxiety, and exhibited higher state self-confidence than their less mentally-prepared counterparts. Despite the observation that competitors, coaches, and psychologists generally accept the tenet that imagery is beneficial to the

management of anxiety in sport (e.g., Gould & Udry, 1994; Orlick , 1990), Martin et al. (1999) noted that there remains an obvious lack of supportive research for the efficacy of this technique. One particular study that has shown support for the use of MG-A imagery was conducted by Vadocz et al. (1997) who explored the relationship between imagery use, imagery ability, competitive anxiety, and performance with 57 junior roller-skating competitors. Using regression analysis, they found that visual imagery predicted both cognitive and somatic state anxiety, and kinaesthetic imagery predicted cognitive state anxiety. Further, they observed that kinaesthetic ability correctly differentiated between medalists and non-medalists.

VanDenberg and Smith (1993) explored the efficacy of imagery as a means of managing anxiety in high school wrestlers. A treatment group participated in an imagery and relaxation program for nine weeks and was compared to a control group. Both groups were administered the CSAI-2 prior to and following the nine week period. Cognitive and somatic state anxiety intensity decreased significantly for the treatment group, but not the control group. These findings suggest that imagery combined with relaxation may reduce the intensity of competitive state anxiety.

Jones, Mace, Bray, MacRae, and Stockbridge (2002) explored the impact of kinaesthetic imagery on the emotional state and self-efficacy levels of novice climbers. A total of 33 novice female climbers participated in four sessions of rock climbing techniques. A control group performed additional light exercise, while an experimental group participated in a scripted imagery training program. The imagery comprised both MG-M and MG-A content. Climbing performances were similar for both groups, but the imagery group reported significantly lower levels of stress associated with performing correct techniques.

Strachan and Chandler (2006) explored the use of imagery by young athletes as a means of controlling cognitions with the aim of moderating anxiety. Seventy-six female baton twirlers were divided into two age cohorts: 7-11 and 12-15 years. Strachan and Chandler found that MG-A imagery was a significant predictor of cognitive anxiety for the younger age cohort, but not the older one. These findings were interpreted by Strachan and Chandler as possibly indicating that different aged competitors may use different motivational functions of imagery in order to handle the pressure of competition. MS imagery was found to be a predictor of cognitive anxiety for both the 7-11 and 12-15 age cohorts. None of the imagery subscales emerged as a significant predictor of somatic anxiety.

More specifically relevant to this thesis, Hale and Whitehouse (1998) investigated the effects of imagery-manipulated appraisal on intensity and direction of competitive anxiety. They employed a within-subjects' design where 24 soccer players relaxed using progressive relaxation and underwent imagery based video and audiotaped manipulation of their appraisal of taking hypothetical game winning kicks with either a "pressure" or "challenge" appraisal emphasis. Hale and Whitehouse's findings suggested that both intensity and direction of competitive anxiety responses can be manipulated via imagery-based differences in interpretation. Specifically, athletes reported a greater amount of cognitive and somatic anxiety, and reported this anxiety as being more debilitative when they perceived a strong possibility of negative evaluation and threat, whereas they reported less cognitive and somatic anxiety and labelled the anxiety they experienced as being facilitative, when imagining challenge situations.

As discussed earlier, Hanton and Jones (1999a) explored previous findings that elite performers, compared to non-elite performers, interpret their anxiety symptoms as more facilitative than debilitative to performance. They observed that swimmers who consistently reported facilitative interpretations reported that, among other things, imagery formed a core technique they used to shift their pre-competitive directional interpretations. In a follow up study, Hanton and Jones (1999b) examined the effects of a multi-modal intervention program on swimmers' debilitated by anxiety. The intervention included the skills of goal setting, imagery, and self-talk. The imagery component of this study involved general exposure to a range of imagery concepts and skills, including stimulus and response propositions, internal and external perspectives, different temporal aspects, physical simulation, emphases on vividness and controllability, successful execution of skills and images of competition mastery. Early on in the intervention Hanton and Jones focussed in rehearsing typical thoughts and feelings experienced before a competition and then rationalising these from a debilitative to a more facilitative perspective. They went on to normalise these thoughts and feelings as part of an appropriate emotional reaction to competition. In addition, swimmers were required to mentally rehearse race processes. Although swimmers did not report changes in the intensity of their anxiety, they did report more facilitative interpretations of precompeititve anxiety. Performance improvements were also evident. Unfortunately, it was not possible to tease out the individual effects of the different

types of skills training, and as a result the relative contribution of imagery remains unclear.

Fletcher and Hanton (2001) noted that research findings differ as to whether psychological skills usage influences intensity and/or direction of anxiety symptoms, and that no research has identified the relative contributions of different psychological skills to different dimensions of the anxiety response. In response, they examined differences in intensity and direction of competitive state anxiety and self-confidence in 114 non-elite, competitive swimmers with varying levels of psychological skills use. They specifically explored usage of relaxation, goal-setting, imagery, and self-talk. Fletcher and Hanton predicted that performers who demonstrated higher psychological skills use would be more likely to interpret pre-competitive anxiety symptoms as being facilitative than those with lower psychological skills usage. Their findings revealed significant differences in the competitive anxiety response between the relaxation, self-talk, and imagery groups, but not for goal-setting usage. Calculation of eta-squared revealed that competitive anxiety scores were influenced primarily by relaxation, followed by self-talk, imagery, and finally goal-setting usage. In other words, swimmers demonstrating high use of relaxation strategies during competition, reported lower intensity and more facilitative interpretations of cognitive and somatic anxiety than those demonstrating low relaxation use. Fletcher and Hanton went on to postulate that the skill level of the swimmers employed in this study may have had some bearing on this result. It may be that non-elite competitors rely more heavily on practical strategies, not that these strategies are more effective. Further, despite citing the finding that these strategies were more strongly associated with facilitative interpretation of competitive anxiety symptoms, Fletcher and Hanton noted that the respondents were still interpreting symptoms less facilitatively than would be predicted in a highly skilled population.

It has been highlighted that worries often follow a narrative to oneself that proceeds from one concern to another, and that these cognitions are generally verbalised using words and not pictorially imagined (Goleman, 1995). This may partly explain why Fletcher and Hanton (2001) found that self-talk has a greater influence on the competitive anxiety response than imagery. Fletcher and Hanton concluded by highlighting that the skills of self-talk and imagery should be encouraged to enhance performers' self-confidence. Specifically, they recommended positive self-talk and MG-M imagery because these techniques are most effective when their content is associated

with success and competence. Having said this, Fletcher and Hanton noted that, from a theoretical standpoint, both reversal theory (Kerr, 1985) and catastrophe theory (Hardy, 1990) propose that, under certain circumstances, cognitive restructuring techniques may be more effective than relaxation strategies in combating the negative effects of anxiety and enhancing performance. Fletcher and Hanton suggested that future research should examine the effectiveness of different interventions, particularly the efficacy of one strategy versus another, in eliciting facilitative interpretations and, importantly, performance improvements. They went on to suggest that interpretive and idiosyncratic research approaches may be particularly useful for investigating some of these issues and increasing our understanding of the relationship between psychological skills and competitive anxiety responses. Fletcher and Hanton concluded by noting that non-elite swimmers primarily use relaxation strategies to reduce anxiety and interpret their anxiety intensity levels as facilitative, relying minimally on other psychological skills. In contrast, Hanton and Jones (1999a) observed that elite swimmers maintained their intensity levels and used goal-setting, imagery, and self-talk strategies to interpret symptoms as facilitative. In considering these combined findings, Fletcher and Hanton suggested that emphasis be placed upon cognitive restructuring techniques that include the psychological skills of goal-setting, imagery, and self-talk, rather than relaxation strategies alone.

After reviewing the imagery literature for applied sport psychology, Hardy, Jones, and Gould (1996), concluded that imagery-based strategies appear to be highly efficacious as a means of helping competitors achieve an appropriate activation state. Imagery is used for a range of reasons, and appears to be a useful method for managing anxiety in sport.

Combined Relaxation and Imagery

Morris et al. (2004) noted that there has been a tradition in mainstream psychology to employ relaxation as part of imagery, however, Murphy and Jowdy (1992) suggested that there is no evidence supporting their combined use. Morris et al. argued that such a statement may be somewhat premature. Martin et al. (1999) noted that the strongest empirical evidence to imagery's anxiolytic effects have been observed when imagery has been combined with other cognitive-behavioural strategies, such as Stress Inoculation Training (Kerr & Leith, 1993; Mace & Carroll, 1985; Mace, Eastman, & Carroll, 1987), and relaxation training (Cogan & Petrie, 1995; VanDenberg & Smith, 1993). For example, in SIT competitors are provided with the opportunity to

practice stress management strategies in imagined situations. When imagery is combined with relaxation training, competitors learn, through rehearsal, to feel calm and relaxed in competitive situations.

Attentional Control Training

Summers and Ford (1995) noted that the importance of attentional factors in producing optimal performance in sport has long been recognised. Not only is attention important for optimal experience, but it also plays a key role in learning. Best (1986) defined attention as the concentration and focussing of mental activity, a focus that is selective, shiftable, and divisible. Diehl and Semegon (2006) defined attentional control as "a person's ability to focus his or her attention on a given task, to control and regulate external and internal distractions, and to work toward a desired goal or outcome" (p. 306).

Boutcher (2002) highlighted that research on attention/performance has developed in three separate fields, information processing, social psychology, and psychophysiology. Information processing theories consider selection, alertness, and capacity aspects of attention (Schmidt, 1988). Important aspects of selective attention are control and automatic processing. Control processing is considered to be slow, requires effort, and is mediated by the individual. This form of processing is generally important when learning new information. Automatic processing, on the other hand, is generally associated with skills that are well learned and that require little attention or effort. Research from the information processing field has indicated that increases in arousal can arrow the attentional field (Landers, 1981). Social psychologists have largely focussed on the disruptive influence of non-relevant task stimuli such as worry and self-consciousness. Findings suggest that in well-learned tasks, inappropriate use of control processing hampers the performance of well-learned skills that are typically under the control of automatic processing (Nideffer, 1990). In sport this would be exemplified by a situation where a competitor may disrupt performance by focussing on distracting information such as worry and fear of failure or consciously attempting to control movement. Psychophysiological perspectives have attempted to identify the mechanisms of attention by studying its component parts. In particular they have studied attention by monitoring cortical and autonomic responses during athletic performance. Such research has indicated, for example, that cardiac deceleration occurs in archers just seconds before they release the arrow (Landers, Landers, Han, Salazar, Petruzello, Kubitz, & Gannon, 1994).

Boutcher (2002) noted that the empirical research that has been conducted on attention in sport has lacked a unifying theory. In response, he has developed a model of attention that integrates relevant aspects of the research and theory from all three perspectives (See Figure 2.8).

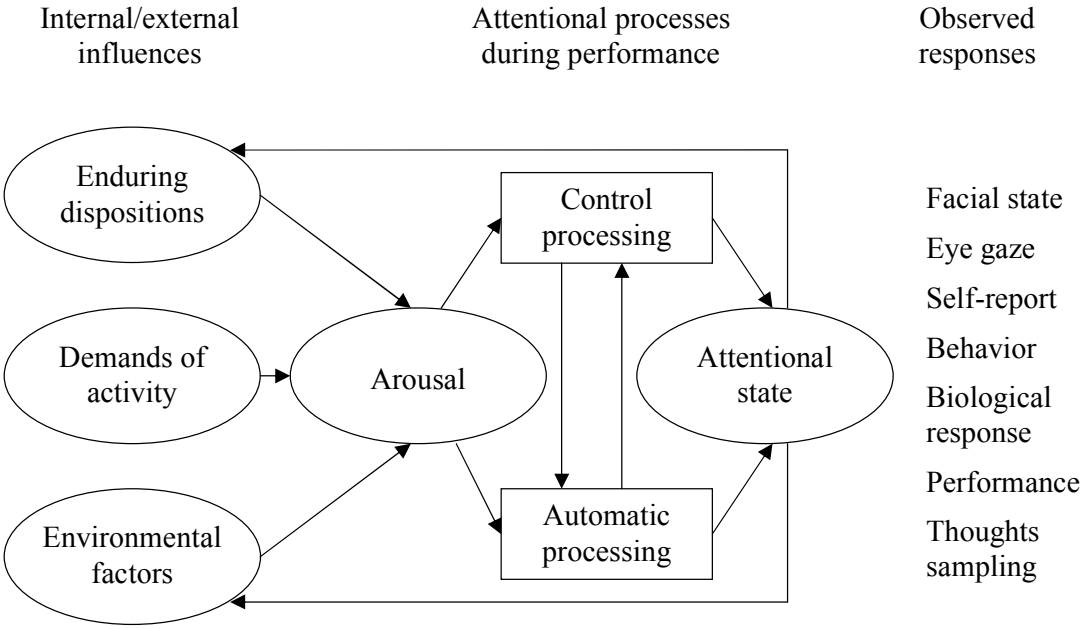

Figure 2.8. Interactions Between Internal and External Factors and Attentional Processing (Boutcher, 2002, p. 449).

In Boutcher's model of attentional processing, enduring dispositions such as trait anxiety, the specific demands of the activity, and environmental factors combine to determine the level of arousal of the individual. When performing a task, this arousal can be processed via control processing automatic processing, or a combination depending on the nature of the task. According to the model, an optimal attentional state is achieved when the individual attains a balance of control and automatic processes essential for the specific task (Boutcher, 2002). The arrows linking back to environmental a factors and enduring dispositions indicate a feedback mechanism that allows the factors to interact and influence attention both during and after performance. When applied to a sporting situation, when a ten-pin bowler with a long sporting history is attempting to close a frame, the perceived importance of the bowl may be predicted to increase physiological arousal and anxiety, which could, in turn reduce the bowlers attentional capacity. This anxiety might be predicted to generate thoughts about missing the bowl, directing attention away from task-relevant cues. Thus the bowler's attention may be focussed primarily on irrelevant information and the bowler might be predicted

to end up working primarily in a control processing mode. Such a situation would be predicted to be detrimental to performance, as a well learned skill would be predicted to primarily utilise an automatic processing mode.

Dimensions of attention that have received considerable attention in the sport psychology literature include direction, which is the source of the stimuli attended to (Nideffer, 1976). Direction is generally divided into external and internal perspectives. An example of an external perspective might entail watching a ball, whereas an internal perspective may involve considering thoughts about a particular play. The width of attention refers to the number of cues that receive attention at any one time (Nideffer, 1976). Selectivity refers to the capacity to focus on task relevant cues. Flexibility is associated with the capacity to switch from one object to another (Nideffer, 1976). Nideffer (1976) argued that, as anxiety increases attention narrows – when anxiety is low to start, narrowing improves focus, once focus reaches optimal level, further anxiety leads to narrowing that cuts out relevant cues, and performance declines. This pattern of association varies from task to task. Research has indicated that the ability to control one's attention is also associated with low to moderate arousal levels, decreased worry and concern, and increased self-confidence (Nideffer, 1993). Nideffer (1995) suggested that using techniques such as centering (taking a breathing break and redirecting your attention to task relevant cues) can help manage the attentional changes that occur under conditions of threat. Process cues, or tactical self-instructions that directly relate to successful performance can be applied here (Nideffer, 1995). For example, a basketballer, when shooting a free throw might center and using their attention focus on self talk such as; “See the target.”

In summary, attentional processes have been highlighted as a vital aspect of sport performance (Boutcher, 2002; Nideffer, 1976). Despite this, research examining the role of attention in sport is underdeveloped, particularly when considering performance outcomes (Boutcher, 2002).

Goal Setting

Hall and Byrne (1988) noted that there is a general acceptance that goal setting will lead to performance enhancements in sport, largely based on the benefits associated with this skill in other domains. Hall and Byrne’s proposal appears to be well supported by the literature. In a meta-analysis that included 36 studies that explored the effects of goal setting on sport, exercise, or motor performance, Kyllo and Landers (1995) reported that setting goals improves performance in sport and exercise by 0.34 of a

standard deviation. Only six years later in an article appearing in the Handbook of Sport Psychology, Burton, Naylor, and Holliday (2001) cited more than 250 studies on the topic. Clearly, as a topic of interest, goal setting is gaining noteworthy attention in the sport psychology literature, and research findings suggest that goal setting is an important mediating variable in sport and exercise performance.

Weinberg and Butt (2005) defined a goal as "that which an individual is trying to accomplish; it is the object or aim of an action" (p. 130). Locke (1966) theorised that specific, difficult, and challenging goals lead to higher levels of task performance than easy goals, no goals, or "do your best" goals. Lock and Latham (1985) hypothesised that goals directly influence behaviour by orienting competitors' attention to important elements of the task, increasing effort and persistence, and facilitating the development of relevant learning strategies.

Goal attribute research focuses on determining what types of goals are most effective in enhancing performance (Burton & Naylor, 2002). According to Cox (2002), there are ten criteria to follow for effective goal setting. These include: (1) make goals specific, measurable and observable, (2) clearly identify time constraints, (3) use moderately difficult goals (they are superior to either easy or very difficult goals), (4) write goals down and regularly monitor progress, (5) use a mix of process, performance and outcome goals, (6) use short-range goals to achieve long-range goals, (7) set team as well as individual performance goals, (8) set practice as well as competition goals, (9) make sure goals are internalised by the athlete, and (10), consider personality and individual differences in goal setting.

Alternately, Burton and Naylor (2002) have suggested six core components of goal setting thought to be pertinent to performance, including goal focus, goal specificity, goal difficulty, goal valence, goal proximity, and goal collectivity. Goal focus refers to what the goal is designed to accomplish, for example performance versus outcome goals (Burton, 1989). Sport goal research has generally found that performance based goals are more effective than outcome based goals (Burton, 1989). Goal specificity research suggested that the precision of the goal enhances performance (Locke, Shaw, Sarari, & Latham, 1981). Locke and Latham's (1990) goal-setting theory predicts a positive linear relationship between goal difficulty and performance, primarily because difficult goal promote greater effort and persistence than easy goals. These authors have also suggested goal specificity interacts with goal difficulty to enhance performance. Goal valence is associated with whether the goal is set in a

positive or negative direction (Burton & Naylor, 2002). Despite the generally held suggestion that goals be phrased in the affirmative, no sport based research could be found to support such a proposition. Although commonly encouraged as a component of goal-setting, support for the performance benefits associated with setting both short- and long-term goals, or goal proximity, remains equivocal (Locke & Latham, 1990). Finally, goal collectivity relates to the process of setting goals for collective performances (Burton & Naylor, 2002). Locke and Latham have suggested that team goals are facilitative of performance when the task is a team task, rather than an individual one.

No specific research was found that directly examined the association between the skill of goal setting and anxiety in sport. In a study exploring the intensity and direction of competitive swimmers' anxiety, Jones and Hanton (1996) observed that swimmers with positive expectancies of goal attainment reported their symptoms as being more facilitative than those with negative expectancies. Other more relevant literature has explored the relationship between the goal orientations people hold and anxiety. For example, Roberts (1986) proposed that individual differences in competitors' achievement goals would render them more or less likely to experience intense state anxiety reactions prior to competing. Roberts argued that because goals reflect the personal meaning of achievement to the competitor, those who maintain a high task-orientation and low ego-orientation are less likely to experience excessive state anxiety. Roberts predicted that these competitors would be able to focus on maintaining personal control over challenge-seeking, and, as a result, their sense of self would not become threatened by interpretations of social comparative failure. In contrast, competitors who endorse a strong ego-orientation and low task-orientation would be predicted to judge success and failure in socially comparative terms, and, when they doubt that their performance rates favourably compared to others, they would experience elevated state anxiety.

Vealey and Campbell (1988) cited direct support for the relationships proposed by Roberts (1986). In a study exploring the associations between goal content and anxiety in ice skaters, Vealey and Campbell reported that those competitors who primarily focussed on social comparison experienced higher levels of precompeititve state anxiety than those who primarily focussed on the task at hand. Hall and Kerr (1997) reported similar findings with a sample of competitive fencers. Such conclusions imply that the meaning of achievement that competitors ascribe to the competition

experience is a significant determinant of whether they will appraise competition as threatening.

These findings have been replicated at the trait level. For example, White (1998) examined the combined effects of task- and ego-orientation on the intensity of competitive trait anxiety among 279 male and female adolescents. White categorised competitors into four goal orientation profile groups: high-task/high-ego, high-task/low-ego, high-ego/low-task, and low task/ low-ego. MANOVA results indicated that the high-ego/low-task group experienced the highest intensities of competitive trait anxiety.

In exploring Smith's (1996) model of performance-related anxiety, Hall, Kerr, and Matthews (1998) examined the links between perfectionism, achievement goals, and anxiety in 119 high school runners. They found that ego-orientation contributed to the prediction of cognitive state anxiety, and that there was some overlap between the constructs of perfectionism and ego-orientation. These findings may provide some preliminary insight into the working of this relationship, although further research is required in this area.

In a more recent study with a sample of 308 junior and high school athletes, Sim (2001) explored the relationship between goals and trait and state anxiety intensity in sport. No clear associations were observed for trait anxiety, casting doubt on White's results. In Sim's study competitors with fewer task-oriented goals presented with higher levels of cognitive state anxiety, whereas competitors with more ego-oriented goals presented with higher levels of somatic state anxiety. Notably, little of this kid of research has been done with elite athletes in competition contexts.

Despite limited empirical support in terms of high-level competitive sport research, Anshel (2005) highlighted that setting realistic, but challenging goals is one of the major strategies used for building mental toughness and resilience against stress and anxiety in sport. Considering that the applied skill of goal setting is a core component of most psychological skills training packages, and has the potential to offer much to the management of anxiety in competitive sport, this research domain offers considerable scope for the future development.

Self Talk

Zinsser, Bunker, and Williams (1998) suggested that confident athletes characteristically experience positive self-talk, images, and dreams. They imagine themselves as being successful in sport. In discussing the development of confidence, Zinsser et al. proposed that competitors learn to understand the interaction of thought

and performance, cultivate honest self-awareness, develop an optimistic explanatory style, and embrace a psychology of excellence. They described the role of self-talk in the process in some detail. Hackfort and Schwenkmezger (1993) defined self-talk as any time you carry out an internal dialogue with yourself. Zinsser et al. noted that this dialogue can occur out loud or in competitors' heads. Zinsser et al. went on to highlight that self-talk can become a liability when it is negative, distracting to the task at hand, or so frequent that it disrupts the automatic performance of skills. More recently, Hardy (2006) has defined self- talk as:

> (a) verbalizations or statements addressed to the self; (b) multidimensional in nature; (c) having interpretive elements association with the content of statements employed; (d) is somewhat dynamic; and (e) serving at least two functions; instructional and motivational, for the athlete (p. 84).

Based on this definition, Hardy went on to discuss a range of aspects of self-talk that may be of interest to researchers including its valence (i.e. positive versus negative), overtness (i.e. covert versus overt), frequency, how self-determined it is, its motivational interpretations, and finally the functions it can serve for the athlete. Hardy also highlighted the lack of theory-based research in this area.

Researchers have noted that planned self-talk can enhance performance (Perkos, Theodorakis, & Chroni, 2002). Perkos et al. suggested that early motor learning is aided when self-talk is used to highlight key aspects of the movements being learned. As skills are mastered, self-talk naturally shifts from a focus on the mechanics of a skill to a focus on strategies that facilitate optimal feelings. Zinsser et al. (1998) noted that the nature of this self-talk would be predicted to be task specific.

In discussing the use of self-talk as a means of changing moods, Zinsser et al. (1998) suggested that self-talk can be used in the management of both anger and anxiety in sport. They suggested that competitors initially monitor their thoughts, and then apply a range of strategies to help manage these thoughts. In a meta-analysis conducted by Meyers, Whelan, and Murphy (1996), larger effect sizes were observed for cognitive restructuring techniques than for goal setting, mental rehearsal, and relaxation strategies. Zinsser et al. suggested eight primary techniques for changing self-talk, including thought stoppage, changing negative thoughts to positive thoughts, countering, reframing, ABC cognitive restructuring, affirmation statements, mastery and coping tapes, and video technology.

Thought stoppage entails getting rid of negative thoughts by using a trigger, such as a cue word, image, or action, such as snapping the fingers (Zinsser et al., 1998). Thought stopping is often combined with imaginal rehearsal in the preliminary stages of learning. Some concerns have been expressed in the literature about this skill, primarily relating to the observation that direct attempts to suppress a thought can actually result in the thought appearing more readily than if it were just left to pass on through consciousness (Janelle, 1999). Despite these proposed risks, Meyers and Schleser (1980) incorporated thought stoppage into an intervention for improving basketball performance and obtained positive outcomes.

As an alternative to removing negative thoughts entirely, changing them to positive thoughts is another option that is often encouraged by sport psychologists (Zinsser et al., 1998). Meichenbaum (1977) suggested that it is important for athletes to specify where the thoughts occur and to quite specifically record the thought content. In line with these procedures, competitors are encouraged design a positive substitute statement with an emphasis on bringing the competitor back to the present occasion.

Based on the premise that simply replacing one example of self-talk with another probably will not change the degree to which the competitor believes in that self-talk, competitors are often encouraged to employ countering techniques as a means of challenging long-standing beliefs (Zinsser et al., 1998). Zinsser et al. defined countering as an internal dialogue that uses facts and reasons to refute underlying negative beliefs and assumptions that drive negative thinking.

Reframing is a process whereby athletes create an alternative frame of reference or different way of looking at the world (Gauron, 1984). In other words, athletes may acknowledge what is happening and decide to use this to their own advantage. Much of this approach is about maintaining an optimistic attitude in the face of adversity (Zinsser et al., 1998). Hanton and Jones (1999b) provided some support for this approach in teaching non-elite swimmers to reframe their anxiety symptoms as facilitative, rather than debilitative, to performance, which resulted in improved performance.

The identification of irrational and distorted thinking and ultimate restructuring of those thoughts forms the core of cognitive behaviour therapies. Gauron (1984) listed a range of beliefs that are commonly held by athletes that are generally unhelpful, and would benefit from restructuring. These include the belief that perfection is essential, catastrophising, the idea that worth depends on achievement, personalisation, the fallacy of fairness, blaming, polarised thinking / labelling and one-trial generalisations. Zinsser

et al. (1998) discussed each of these distorted thoughts based on the fact that they do not fit with reality, they are not logical, and they are generally unhelpful to performance. In terms of perfectionism, Zinsser et al. noted that there is nothing wrong with striving for perfection, but demanding it leads to problems. Clearly, the problem here does not lie with perfectionism per se, but with the demand to have it. Many of the approaches offered by Zinsser have been previously outlined by Ellis's (1962, 1994) in rational emotive behaviour therapy. Zinsser et al. discussed catastrophising in terms of needing to please others. Again, the emphasis is not on a desire to please others, but a need to do so. Ellis (1962) first coined the term catastrophising to mean seeing something as more than 100% bad. The idea that worth depends on achievement is also a core belief of rational emotive behaviour therapy. Ellis (1962, 1994) described this as conditional self-acceptance. Many athletes hold the belief that they are no good, if they are not winning. This belief may not be harmful as long as the athlete continues to win all events, an outcome that is highly unlikely in most sports. This belief is closely associated with what Zinsser et al. termed personalisation, but Ellis described as self-downing. Personalisation or self-downing is a thinking pattern whereby people define themselves (and often others) as entirely bad. Zinsser et al. also cited the fallacy of fairness and ideal conditions as a thinking pattern that can have an adverse impact on performances. Ellis (1962, 1994) described this as a demand for fairness. Again, the desire to be treated fairly is not the problem, but the expectation the individual holds to be treated that way on all occasions. Closely associated to this is the competitors' tendency to blame others (externally attribute the cause of things to others). Zinsser et al. suggested a balanced appraisal of attribution to others and to the self is probably the most rational approach to success. Zinsser et al. defined polarised thinking is the tendency to view people and things in absolute terms. It appears that Zinsser et al. confused polarised thinking with what Ellis (1962, 1994) described as always-and-never thinking and global self-downing, which are both further examples of Ellis would term absolutist thinking. Zinsser et al. went on to discuss one-trial generalisations, which are again a reflection of a thinking style Ellis termed as all or nothing thinking (Ellis, 1962, 1994).

Zinsser et al. (1998) suggested five criteria for deciding whether self-talk or underlying beliefs are rational or irrational. These include determining whether the beliefs are based on objective reality, whether they are helpful, whether they are useful in reducing conflicts with other people, whether they help in attaining goals, and whether they help in reducing affect. Basically, Zinsser et al. utilised two of Ellis's

(1962, 1994) three key criteria for determining the utility of a belief. Ellis's criteria include a determination of whether the belief makes logical sense, whether it fits with reality, and whether it serves some pragmatic good. The first criterion cited by Zinsser et al. is a measure of evidence, and the final four are all what Ellis would describe as pragmatic disputes in that they relate to whether thinking in that way will facilitate the achievement of specific goals (Ellis, 1962, 1994).

Zinsser et al. (1998) also described affirmation statements as a means of enhancing self-efficacy and managing affect. They defined affirmations as statements that reflect positive attitudes or thoughts about oneself. Gauron (1984) suggested that competitors gain confidence by repetition of the affirmation, eventually leading to it being believed by them.

Finally, Zinsser et al. (1998) suggested mastery self-talk tapes and videos. These basically entail video or auditory modelling that is directed by the content of the tapes. The tapes form a guide to help competitors rehearse key criteria associated with past successful performances and key criteria for achieving success in future events.

As discussed earlier, Conroy and Metzler (2004) explored the association between self-talk patterns and anxiety. They observed distinct patterns of self-talk associated with competitive anxieties in sport; the strongest effects being associated with fear of failure and sport anxiety. Fear of success was more weakly associated with systematic patterns of self-talk. There is a distinct lack of research exploring the utility of self-talk approaches to the management of anxiety. These results provide support for the application of cognitive theories of anxiety, and certainly encourage more work in this area.

Research by Ntoumanis and Biddle (2000) directly related self-talk strategies and directional interpretations of anxiety. They explored the relationship of intensity and direction of competitive anxiety with coping strategies employed by sports competitors. In a retrospective design, British university athletes were asked to recall a recent stressful situation in their sport, the coping strategies they used, and the intensity and direction of their anxiety symptoms. The results of Ntoumanis and Biddle indicated that high cognitive anxiety intensity was associated with behavioural disengagement and venting, whereas low cognitive anxiety intensity was associated with distancing. Ntoumanis and Biddle summarised by stating that athletes with a positive interpretation of their anxiety level were able to use more effective coping strategies.

In a two stage research protocol, Thomas, Maynard and Hanton (2007a, 2007b) explored anxiety responses and psychological skill use during the time leading up to competition, and then went on to assess the efficacy of the psychological skills training program based on these observations. Based on the findings of their first study, they proposed that different skills are applicable to different stages in the competition cycle. In their second study, they went on to assess the efficacy of an intervention that included imagery, rationalization and restructuring, goal-setting, and self-talk skills (as identified previously) with three elite field hockey players. Dependent variables for the second study included the frequency, intensity and directional dimensions of anxiety, and performance. Thomas et al. observed that their intervention induced a more facilitative interpretation of the symptoms associated with cognitive and somatic anxiety in all three players. Specifically, perceptions of associated cognitive and somatic anxiety symptoms were restructured from a consistent debilitative interpretation to a consistent facilitative interpretation following the treatment phase. Further, their results indicated the intervention successfully restructured players' interpretations of confidence symptoms, increased the intensity and frequency of experienced self-confidence symptoms, decreased the frequency of experienced cognitive anxiety symptoms, and decreased the frequency of experienced somatic anxiety symptoms for two of the players. Thomas et al. also observed performance improvements for the hockey players. Unfortunately, being a multimodal intervention, it was impossible to tease out the relative contribution of each of these strategies to the outcomes observed, however this study does highlight the potential for modifying debilitative interpretations of anxiety symptoms, and did include a self-talk component as part of the intervention.

Summary of Applied Anxiety Management in Sport

In summary, the current applied sport psychology literature indicates that strategies including imagery, attention control, relaxation, goal setting, and self-talk are effective in producing various desired affective states associated with competitive sport participation. At present, these approaches are regularly incorporated into psychological interventions on an ad hoc basis, and lack a clear theoretical framework overriding their usage. In particular, there is a distinct lack of research supporting the link between strategies and directional interpretations of anxiety symptoms, so more research is needed to explore such connections.

The Present Thesis

Not surprisingly, given the importance of anxiety to competitive sport, the construct has continued to attract research attention. As a result of this attention, what was once seen as a unidimensional construct with quite simple associations with performance, is now conceptualised in multidimensional terms and has been found to have very specific contextually influenced associations with performance. Certain dimensions of anxiety have received considerable research attention whereas others have been overly eagerly adopted into textbook descriptions. As a result there are numerous holes in theory and research findings, and few findings have been consistently generalisable across a range of circumstances. Despite these limitations, research has added to the understanding of this construct. Specifically, there is good support for the distinction between states and traits as originally identified by Cattell and Scheier (1961), and then Spielberger (1966), and research continues to highlight the association between these. Further, it has become apparent that traits are in fact modifiable (e.g. Jorm, 1989). As a result of the work of Leibert and Morris (1967), and then Martens et al. (1990), anxiety is now generally analysed in both cognitive and somatic dimensions. More recently, the directional dimension, as first discussed by Alpert and Haber (1960) and then refined for sport by Jones (1991), has been accommodated as a core theoretical dimension.

Despite these gains, there remain many limitations associated with the theory and management of anxiety in sport. Given the observation that research has highlighted that cognitions play a core role in the experience of anxiety, it seems logical to further explore cognitive theories as a means of framing, and ultimately managing, anxiety in sport. One particular theory that has gained a significant following in the clinical setting, but that lacks clear empirical research in the sports domain is the theory associated with REBT. This particular theory offers a specific framework for the restructuring of harmful interpretations. In addition, the theory targets trait-based change and meta-analyses have shown that it is particularly effective for changing trait anxiety in clinical settings. Based on these considerations, the REBT approach appears to be well suited to the modification of debilitative trait-anxiety interpretations in sport.

The general aim of this thesis was to further investigate the dimension of debilitative trait anxiety in sport. Specifically, I wanted to explore how this variable is measured, what is being measured, what constructs underlie directional anxiety, and how trait anxiety interpretations might be restructured in competitive sport. There were

three linked areas of investigation. The first of these involved an examination of the current conceptualisation and measurement of anxiety, and the relationship between anxiety dimensions and performance. In particular, in Study 1, I set out to explore how state and trait anxiety dimensions are interrelated, and how they are associated with performance. In response to the findings from Study 1, I went on to explore cognitions underlying trait anxiety in Study 2, using the theory of REBT. Finally, in the third study in this thesis, I went on to assess the efficacy of an REBT style intervention as a means of moderating debilitative trait anxiety in sport.

CHAPTER 3: STUDY 1: EXPLORING MEASURES OF ANXIETY

Introduction

Jones (1991) introduced the distinction between the intensity of anxiety, or how much anxiety is experienced, and its direction, that is, whether performers interpret the anxiety as facilitative or debilitative to their performance. They also demonstrated that the directional interpretation applies to trait, as well as state, anxiety (Jones & Swain, 1995). Since its inclusion in the Martens et al. (1990) CSAI-2 in the early 1990's, the directional dimension of anxiety has been widely accepted as an important concept in anxiety measurement, and has been used in the study of the competitive orientation of athletes (Jones & Swain, 1992), skill level (Jones, Hanton, & Swain, 1994; Jones & Swain, 1995), performance and performance variance (Cunningham & Ashley, 2002; Jones, Swain, & Hardy, 1993; Swain & Jones, 1996), the nature of the sport and competitive experience (Mellalieu, Hanton, & O'Brien, 2004), goal-attainment expectancy (Jones & Hanton, 1996), temporal patterning (Hanton, Thomas, & Maynard, 2004), and hardiness (Hanton, Evans, & Neil, 2003). These studies have continued to provide support for the directional distinction. Research has also established that directional anxiety may have a stronger association with performance (Jerome & Williams, 2000; Jones, Swain, & Hardy, 1993; Swain & Jones, 1996), and skill level (Hanton & Connaughton, 2002; Hanton & Jones, 1997; Hanton, O'Brien, & Mellalieu, 2003; Jones & Hanton, 2001; Jones, Hanton, & Swain, 1994; Jones & Swain, 1992, 1995) than anxiety intensity.

The concept of directional anxiety has important implications for research exploring the relationship between anxiety and performance in sport, and consequently, for the effective management of anxiety. Despite this, there has been little investigation of the psychometric properties of the directional scales, other than the early work of Jones, Swain, and Hardy (1993). Further, information is lacking concerning inter-scale relationships between state and trait measures, and confirmation of the relationships between the trait version of the CSAI-2 and other measures of trait anxiety. Such research is a necessary pre-requisite to the development of anxiety-based interventions.

My aim in this study was to further explore the psychometric properties of current anxiety measures, to examine the relationships between trait and state measures of anxiety in sport, and to test propositions regarding the associations between intensity and direction dimensions of anxiety and the variables of skill level, and self-rated performance. I explored these variables with the ultimate goal of assessing the potential

efficacy of developing an anxiety intervention that targets trait anxiety direction as an efficient and effective means of managing state anxiety directional responses in competitive sport.

Predicted Internal Consistency of Anxiety Questionnaires

Martens et al. (1990) reported Cronbach's alpha coefficients for the cognitive, $\alpha = 0.81$, and somatic intensity, $\alpha = 0.82$, subscales of the CSAI-2. More recently, similar statistics have been reported by Davis and Cox (2002), who observed alphas of 0.84 for cognitive intensity, and 0.81 for somatic intensity. Davis and Cox went further to determine the internal consistency of the directional subscales of the CSAI-2-D, reporting a Cronbach's alpha coefficient of, $\alpha = 0.77$, for the cognitive direction scale, and $\alpha = 0.87$, for the somatic direction scale. Given these findings, I predicted that adequate levels of internal consistency would be observed for the subscales of the CSAI-2-D in the current study.

Cunningham and Ashley (2002) reported Cronbach's alpha coefficients for the subscales of the CTAI-2-D. The internal consistency of cognitive anxiety intensity was found to be sufficient, $\alpha = 0.81$, as was somatic anxiety intensity, $\alpha = 0.85$, cognitive direction, $\alpha = 0.78$, and somatic direction, $\alpha = 0.81$. Given these reported observations, I predicted that a high level of internal consistency would be observed for the cognitive and somatic intensity and direction subscales of the CTAI-2-D in the current study.

When developing the SAS, Smith et al. (1990) reported strong Cronbach's alpha levels for each of the three factors that emerged from their model. Cronbach's alpha for the 7-item worry subscale was 0.86, the 5-item concentration disruption factor attained an alpha of 0.93, and the 9-item somatic anxiety scale had an alpha coefficient of 0.92. Given these findings, I predicted that the subscales of the SAS would display high levels of internal consistency in the present study.

Predicted Between-Scale Correlations within Anxiety Questionnaires

Researchers have reported moderate associations between the subscales of the CSAI-2. For example, Edwards and Hardy (1996) observed a correlation of 0.47 between cognitive and somatic anxiety intensity, and Davis and Cox (2002) observed a correlation coefficient of 0.35 between the same subscales. Given such observations, a moderate positive linear relationship was predicted between the cognitive and somatic intensity subscales of the CSAI-2. Edwards and Hardy (1996) reported the strength and direction of inter-scale correlations for the directional subscales of the CSAI-2-D. They observed a correlation of 0.20 between the cognitive and somatic anxiety direction

subscales, a correlation coefficient of -0.20 between cognitive intensity and cognitive direction subscales, and a correlation coefficient of -0.48 between somatic intensity and somatic direction subscales. Given these observations, I predicted only small positive linear relationships between the two directional scales, and small to moderate negative linear relationships between the intensity and direction subscales of the CSAI-2-D.

Associations between subscales of the CTAI-2-D have not been reported in the literature. Despite the differences in general applications between the state and trait measures, as noted in the instructions to participants ("right now" versus "in general"), the CSAI-2-D items have exactly the same wording as the items in the trait measure. As a result, it was predicted that the relationships between the subscales of the CTAI-2-D would closely approximate those observed by Edwards and Hardy (1996) for the CSAI-2-D. In other words, I predicted a moderate positive linear relationship between the cognitive and somatic intensity subscales, a small positive linear relationship between the cognitive and somatic directional subscales, and small to moderate negative linear relationships between the intensity and directional subscales on each of the cognitive and somatic dimensions.

Smith et al. (1990) reported moderate to strong correlations between the subscales of the SAS. They observed a correlation coefficient of, $r = 0.63$, between the worry and concentration disruption subscales, a correlation of, $r = 0.50$, between the somatic and concentration disruption subscales, and a correlation of, $r = 0.62$, between the somatic and worry subscales. Notably Dunn, Causgrove-Dunn, Wilson, and Syrotuik (2000) expressed some concerns about the factor structure of the SAS, and suggested further research. As a result of these reported inter-scale associations, I predicted moderate to strong positive linear correlations between the subscales of the SAS in the current study.

Predicted Relationships Between Subscales of Trait Anxiety Questionnaires

Both the SAS and the CTAI-2 measure cognitive and somatic elements of multidimensional anxiety. Unlike the CTAI-2, the SAS differentiates between two classes of cognitive anxiety, worry and concentration disruption (Smith et al., 1990). Notably, six of the seven items in the SAS worry subscale are exactly the same as those items found in the CTAI-2 cognitive subscale. Items that differ between the two measures on this scale include item 1 of the CTAI-2 "I am concerned about this competition", item 7 of the CTAI-2 "I am concerned about losing", and item 17 of the CTAI-2, "I'm concerned because I won't be able to concentrate". The SAS includes one

item on the worry subscale not found in the cognitive anxiety subscale of the CTAI-2, that being item 16, which states "I'm worried about reaching my goal." (See Appendices F & G). Given the overlap between the SAS worry scale and the CTAI-2 cognitive anxiety scale, a strong positive linear relationship was predicted between these two subscales.

Smith et al. (1990) previously highlighted that the concentration disruption subscale of the SAS is one of two measures of cognitive anxiety that emerged in exploratory factor analysis. On close inspection, this subscale of the SAS appears to differ quite substantially from the CTAI-2. Only one of the 18 items on the CTAI-2 is also found in the SAS, that being item 17, which states "I get concerned because I won't be able to concentrate." Further, as previously mentioned, correlations of, $r = 0.63$, have been observed between the worry and concentration disruption subscales of the SAS. Given these observations, I predicted that there would be a small to moderate association between the concentration disruption subscale of the SAS and the cognitive subscale of the CTAI-2.

Six of the nine items found in the somatic subscale of the SAS are also used in the CTAI-2 somatic subscale. Items that differ between the measures on this scale include item 4 of the CTAI-2, "I feel jittery", item 10 of the CTAI-2, "My body feels relaxed", and item 16 of the CTAI-2, "My hands are clammy". The SAS includes three items not found in the CTAI-2, including item 15, which states, "I sometimes find myself trembling before or during a competitive event", item 19, which states, "My stomach gets upset before or during a competitive event", and item 21, which states, "My heart pounds before competition" (See Appendices F & G). Given the general observed overlap between the somatic scale of the SAS and the somatic scale of the CTAI-2, I predicted a moderate to strong relationship between these scales in the current study.

Predicted Relationships Between Trait and State Anxiety Measures

Compared with individuals low in trait anxiety, trait-state anxiety theory predicts that individuals high in trait anxiety are likely to respond to situations of perceived threat with more intense state anxiety responses (Martens, 1977; Smith, Smoll, & Wiechman, 1998). This prediction has been consistently supported by a number of researchers (Crocker, Alderman, & Smith, 1988; Gould, Horn, & Spreeman, 1983a, 1983b; Gould, Petlichkoff, & Weinberg, 1984; Halvari & Gjesme, 1995; Hanton, Mellalieu, & Hall, 2002; Hassmén, Koivula, & Hansson, 1998; Maynard & Howe,

1987; Passer, 1983; Powell & Verner, 1982; Ryska, 1993; Sonstroem & Bernardo, 1982; Wandzilak, Potter, & Lorentzen, 1982). As an example, Ryska (1993) assessed relationships between the SCAT, a unidimensional measure of sport competition anxiety, and each of the subscales of the CSAI-2. Ryska observed a correlation coefficient of, $r = 0.37$, between generalised trait anxiety and cognitive state anxiety intensity, whilst a correlation of, $r = 0.47$, was observed between generalised trait anxiety and somatic state anxiety intensity.

More recently, Hanton et al. (2002) computed correlations between the SAS and the CSAI-2. They observed a correlation of, $r = 0.74$, between state and trait anxiety intensity for trait worry and cognitive state anxiety intensity, and, $r = 0.78$, between somatic trait anxiety and somatic state anxiety intensity. Hanton et al. went on to calculate correlations between trait anxiety intensity and state anxiety directional scores. They found that low trait anxiety athletes (as indicated by a low score on the concentration disruption scale of the SAS) presented with more facilitating interpretations of cognitive and somatic state anxiety symptoms than their high trait anxiety counterparts. They did not to observe significant differences as a function of state anxiety interpretation for trait worry and trait somatic anxiety groups. Hanton et al. reported correlations between state and trait anxiety intensity of $r = 0.74$ ($p < 0.05$) for trait worry and cognitive state anxiety intensity and, $r = 0.78$ ($p < 0.05$) between somatic trait anxiety and somatic state anxiety intensity. The relationship between concentration and cognitive anxiety intensity revealed only a moderate correlation of, $r = 0.28$ ($p < 0.05$).

I found no data that illustrates the association between directional scales of trait and state measures. Given the similarities between the CTAI-2-D and the CSAI-2-D, I predicted moderate to strong positive relationships between these measures across all sub-scales. As a result of considerable item overlap, I predicted moderate to strong correlation coefficients between the SAS somatic and worry subscales, and their CSAI-2-D counterparts, those being the cognitive and somatic intensity subscales. I predicted a small to moderate strength relationship between the concentration disruption subscale of the SAS and the cognitive intensity subscale of the CSAI-2-D. I predicted moderate to strong positive linear associations between all directional scales across state and trait measures. Finally, given the observed relationships between the anxiety intensity and direction subscales of the CTAI-2-D, and the similarity between the intensity subscales of the SAS and CTAI-2-D, I predicted small to moderate negative linear relationships

between trait and state intensity and direction subscales. Notably, I was unable to find research that has previously explored these relationships.

Predicted Relationships Between Dimensions of Anxiety and Performance Outcome Measures

In their meta-analysis, Woodman and Hardy (2003) observed a weak negative mean effect size for the relationship between cognitive state anxiety intensity (assessed using the CSAI-2) and performance. At around the same time, Craft et al. (2003) also completed a meta-analysis and reported a very weak positive relationship between these variables. Combined these findings do not lend support for a strong relationship between cognitive state anxiety intensity and performance. Craft et al. also investigated the relationship between state somatic anxiety intensity and performance, and reported that it was close to zero. This latter finding may be indicative of the proposed inverted-U relationship between somatic anxiety and performance. Most of the studies included in the meta-analysis used linear statistics to test the relationship between somatic intensity and performance. As a result, Craft et al. could only examine the linear relationship between these variables, which would most likely give close to zero Pearson's correlation coefficient values, if the relationship is a non-linear one. Given the findings of these two meta-analyses, linear associations approaching zero were predicted between state anxiety intensity and performance in the present study.

Jones, Swain, and Hardy (1993) investigated the relative efficacy of various dimensions of state anxiety as predictors of performance in a sample of gymnasts. They divided their sample of 48 gymnasts into poor and good performance groups using the median split technique, and found that cognitive state anxiety direction was the only independent variable that effectively predicted performance, with their good performance group reporting cognitive anxiety as more facilitating and less debilitating than the poor performance group reported.

Jerome and Williams (2000) explored the relationships between intensity and direction of state anxiety and performance with a sample of semi-professional and recreational tenpin bowlers. Their findings indicated that only somatic anxiety direction was significantly correlated with performance, and that only 3% of the performance variance was accounted for by this dimension of the anxiety response. More recently, Cunningham and Ashley (2002) investigated the relationship between trait anxiety intensity and direction, and performance with a sample of 94 entry-level college golfers. They did not observe any difference in subsequent golf performance for any of the

anxiety dimensions. Research exploring the association between performance and anxiety direction remains sparse and is unclear in its findings. Although early research suggested that there is a relationship between skill level and anxiety direction, further research exploring the relationship between these variables is warranted. Given that there has only been limited research conducted in this area, I intend to further explore the associations between anxiety direction and performance at both the state and trait levels.

When considering the utility of using directional interpretations of anxiety as a means of predicting the skill level of competitors, research findings have been somewhat more favourable. For example, in their research on swimmers, Jones et al. (1994) noted that both cognitive and somatic state anxiety direction differentiated skilled from non-skilled competitors, whereas measures of intensity offered no such benefits. Jones and Swain (1995) replicated these findings in the context of trait anxiety responses amongst cricketers.

Jones and Hanton (2001) explored pre-competition feeling states and anxiety directional interpretation in a sample of 190 swimmers. Notably, they did not observe any clear differences between skill and anxiety direction in their study, with more than half of their sample interpreting both cognitive and somatic anxiety intensity as facilitative to performance, and only 27% reporting both anxiety dimensions as being debilitative. They explained such uncharacteristic observations by noting that the majority of their participants were elite swimmers.

Hanton and Connaghton (2002) conducted interviews to determine how the presence of anxiety symptoms and accompanying directional interpretations affected the performance in six elite and six sub-elite swimmers. They found that perceived control mediated the directional interpretation of anxiety symptoms. In other words, symptoms perceived to be under control were interpreted to have facilitative consequences for performance; however, symptoms that were not perceived to be under control were viewed as debilitative to performance outcomes.

Examining a sample of 233 elite and non-elite competitors from a range of open skilled sports, Hanton et al. (2003) explored debilitative and facilitative trait anxiety levels as a function of skill level. Although only low to moderate effect sizes were observed, they did observe main effects between direction variables as a function of skill level. Hanton et al. highlighted the difficulty in operationalising and standardising skill level across a range of sports. Notably, they also observed significant differences

on intensity measures, with elite competitors reporting lower intensities of anxiety. Hanton et al. suggested that the primary variable associated with these observations may be perceived control over outcome goals. Similar observations were made by Hanton and Conaughton (2002). Although early research suggested that there is a relationship between skill level and anxiety direction, further research exploring the relationship between these variables is warranted. Given these findings, I predicted that both cognitive and somatic anxiety direction would be associated with skill level at both the state and trait levels, but that there would be only small and non-significant associations between anxiety intensity measures and skill, at either the state or trait level.

Overall, researchers have accumulated a considerable amount of information pertaining to the psychometric properties of the CSAI-2 and SAS. Less is known about the trait version of the CSAI-2 (the CTAI-2), and the inter-relationships between state and trait measures of the anxiety construct. Despite the general acceptance of the use of directional versions of the CSAI in the research setting, little has been reported in relation to the psychometric properties of these additional scales. Appropriate measurement tools are a necessary component of any research aiming to investigate the utility of interventions designed to change certain aspects of the anxiety response. In addition, proposed interventions should be supported by current observations of the links between anxiety dimensions and performance measures. Given preliminary findings indicating that measures of anxiety direction more accurately predict skill level and performance than intensity alone measures, further research needs to be conducted to explore these relationships. If additional support is forthcoming, future research should investigate what drives directional anxiety, and ultimately how to change it in a way that will help competitors to interpret their symptoms more facilitatively. In this study, I examined state-trait and intensity-direction dimensions of anxiety, and their relationship to subjectively-rated performance and skill level.

Method

Participants

A total of 189 competitors from the sports of freestyle skiing (n = 54), athletics (n = 40), and ten-pin bowling (n= 95) participated in this study. This sample included 17 female and 37 male freestyle skiers, who ranged in age from 12 to 35 years (M = 19.76, SD = 4.76). The competitive level of skiers included recreational (n = 5; 9.3%), club (n = 25; 46.3%), state (n = 17; 31.5%), and national (n = 7; 13%). There were 29 female and 11 male track and field athletes, with an age range of 10 to 51 years (M = 20.53, SD

= 9 .09). Their competitive levels were club (*n* = 14; 35%), state (*n* = 11; 27.5%), and national (*n* = 15; 37.5%). Finally, there were 45 female and 50 male bowlers, with an age range of 16 to 31 years (*M* = 21.43, *SD* = 3.69). The competitive levels of bowlers were recreational (*n* = 19; 20%), club (*n* = 20; 21.1%), state (*n* = 34; 35.8%), and national (*n* = 22; 23.2%).

Measures

Following is a description of the measures that were used in this study. Apart from the first measure, the general demographic questionnaire, all measures used in this study have previously been used in sport psychology research, and have shown adequate psychometric properties. These properties will be discussed under each measure.

Demographic Questionnaire

I obtained demographic and background information using a short questionnaire (See Appendix A). I acquired information relating to general contact details, age, gender, primary and secondary competitive sport involvement (if applicable), skill level (based on the competitors' current competitive level), years of competing, current involvement in other serious competitive sports, and presence of injuries. All responses were assessed with open and closed-response formats.

Competitive State Anxiety Inventory - Mark 2 (CSAI-2; Martens, Burton, Vealey, Bump, & Smith, 1990)

The CSAI-2 is a sport-specific, self-report inventory that assesses athletes' tendency to be anxious in a competitive setting. The scale comprises 27 items, however, in the present study, the self-confidence subscale was omitted, resulting in a total of 18 items. This adjustment has been performed by previous researchers (e.g., see Perry & Williams, 1998). The self-confidence subscale was omitted primarily because it adds considerable time to questionnaire completion. In addition, its inclusion considerably complicates the emphasis of the measure beyond a basic cognitive/somatic symptom intensity distinction into cognitive typologies. The use of this subscale by other researchers was not enough to justify its use in this study. For each item, participants are asked to rate the intensity with which each symptom is experienced "right now" on a scale from 1 (*not at all*) to 4 (*very much*), giving each subscale a range from 9 to 36. As previously reported, the cognitive and somatic subscales of the CSAI-2 have been found to be internally consistent (Martens et al., 1990), with Cronbach's alpha coefficients ranging from, $\alpha = 0.79$, to, $\alpha = 0.90$, across the three intensity scales.

Competitive State Anxiety Inventory - Mark 2 - Directional Scale (CSAI-2-D; Jones, & Swain, 1992)

This scale acts as a supplement to the original CSAI-2, based on the inclusion of an additional scale in which participants rate the degree to which the intensity of each symptom they are experiencing right now is perceived to be either facilitative, neutral, or debilitative to their subsequent performance. This additional measure is assessed on a scale from -3 (*very debilitative*) through 0 (*neutral*), to +3 (*very facilitative*), so, based on the 18 questions retained in this study, the possible direction scores on each 9-item subscale ranged from -27 to +27. As previously reported, Jones and Swain's (1992) direction scale has been reported to possess high internal consistency (Jones & Hanton, 2001; Wiggins, 1998). Split-half reliability coefficients have been reported by Swain and Jones (1996) for the three directional subscales, with values of, $r = 0.83$, for cognitive anxiety, and, $r = 0.72$, for somatic anxiety direction (See Appendix B).

Competitive Trait Anxiety Inventory - Mark 2 (CTAI-2; Martens, Burton, Vealey, Bump, & Smith, 1990)

Although the CSAI-2 is primarily a measure of state anxiety, previous researchers (e.g., Albrecht & Feltz, 1987; Jones & Swain, 1995) successfully modified the test instructions, so that each item is answered in terms of how individuals generally feel, to create a general or trait measure. Similar procedures have been effectively employed by a number of other developers of state-trait measures (e.g., McNair, Lorr, & Dropleman, 1971; Vealey, 1986). This trait scale generally comprises 27 items, however, in the present study the self-confidence subscale was omitted, resulting in 18 items, nine measuring somatic trait anxiety and nine measuring cognitive trait anxiety. For each item, respondents are asked to rate the intensity with which each symptom is usually experienced on a scale from 1 (*not at all*) to 4 (*very much*), giving each subscale a range from 9 to 36 (See Appendix C). Sufficient internal consistency has been reported for the revised scale (Perry & Williams, 1998). Cunningham and Ashley (2002) reported acceptable reliability estimates (Cronbach alpha) for the subscales of the CTAI-2, including cognitive intensity, $\alpha = 0.81$, and somatic intensity, $\alpha = 0.85$.

Competitive Trait Anxiety Inventory - Mark 2 - Directional Scale (CTAI-2-D; Jones & Swain, 1992)

This scale acts as a supplement to the CTAI-2, by including an additional scale in which respondents rate the degree to which the intensity of each symptom they generally experience is perceived to be either facilitative, neutral, or debilitative to their

performance. This additional measure is assessed on a scale from -3 (*very debilitative*) through 0 (*neutral*), to +3 (*very facilitative*), so the possible direction scores on each 9-item subscale range from -27 to +27 (Also See Appendix C). As previously reported, internal consistency for the direction scale has been adequate in previous research (Jones & Hanton, 2001; Perry & Williams, 1998). Cunningham and Ashley (2002) reported acceptable reliability estimates for the directional scale; cognitive direction, $\alpha = 0.78$, and somatic direction of, $\alpha = 0.81$.

Sport Anxiety Scale (SAS; Smith, Smoll, & Schutz, 1990)

The SAS is a 21-item self-report, sport-specific measure of the intensity of cognitive and somatic trait anxiety (See Appendix D). More specifically, the SAS measures individual differences in somatic anxiety (9 items) and in two classes of cognitive anxiety, worry (7 items) and concentration disruption (5 items). Individuals rate each item on a 4-point scale in terms of how they usually feel from 1 (*not at all*) to 4 (*very much*). Total somatic subscale scores range from 9 to 36, the worry sub-scale scores range from 7 to 28, and the concentration-disruption subscale scores range from 5 to 20. High internal consistency values for these SAS subscales have been reported in a number of studies with Cronbach alpha coefficients ranging from, $\alpha = 0.71$, to 0.92 for somatic anxiety, and from $\alpha = 0.70$ to 0.86 for worry (Smith et al., 1990). Smith et al. also found the SAS to obtain appropriate levels of convergent and discriminant validity. More recently Hanton, Evans, and Neil (2002) modified the SAS to include a directional scale. Since its development, the SAS has been used in a variety of sporting contexts and as a measure of cognitive and somatic sport performance anxiety (e.g., Giacobbi & Weinberg, 2000; Johnson, Ekengren, & Andersen, 2005; Smith, Ptacek, & Patterson, 2000).

Subjective Performance Measure

A general subjective measure of performance was utilised in this study. In this single-item measure, participants were asked to rate their performance on a numbered scale from 1 (*very poor*) to 10 (*excellent*) immediately after the game/event they engaged in that was associated with the completion of the CSAI-2-D. I decided on this approach because I was comparing competitors from a range of sports and needed a standardised performance measure. The performance measure was kept very brief because I wanted to ensure that competitors would complete it immediately following the event, and I did not want to further interfere with their competition routines. This

subjective measure of performance was incorporated into the CSAI-2-D form (See Appendix B).

Procedure

I accessed participants through their sport organisation (Appendix E). They completed standard informed consent procedures. These included a description of the procedures to be used in the study, an opportunity to ask any questions relating to the research, the opportunity to withdraw from the research at any time, and issues pertaining to the maintenance of confidentiality (See Appendix F and G). In those instances where the participant was under the age of 18, I sought a legal guardian to provide consent for further participation. Participants completed trait anxiety measures away from competition, in accordance with the administration instructions. They completed state anxiety measures just prior to competing on one occasion, in accordance with the administration instructions. I asked competitors to rate and record their performance on the same occasion immediately after the competition. When instructing competitors, I emphasised the confidentiality of responses at an individual level, honesty in responding to the inventory, and the assurance that answers could not be "wrong", as recommended by Martens et al. (1990).

Analysis

Analyses performed in this study included an assessment of internal consistency, based on Cronbach's alpha coefficient, calculation of Pearson's *r* between all subscales to examine the predicted relationships, and linear regression analyses with all of the subscales of anxiety measures as predictor variables, and the competitors' performance or skill level as criterion variables in separate regressions.

Results

I present the findings from this study sequentially, first focussing on the internal consistency of the measures employed, followed by the description of the observed correlations between subscales within each of the primary measures employed in this study. Following this, I report the relationships between each of the subscales of different measures, at both the trait and then trait-state level. Finally, I present the relationships between various dimensions of anxiety and both performance and skill level of competitors, and I report the results of linear regression analyses with both performance and skill level as dependent variables. Today, it is common practice to discuss the effect sizes of statistics. According to Cohen (1988), the correlation coefficient itself is a measure of effect size. Cohen's conventions for the correlation

coefficient are 0.10 for a small effect size, 0.30 for a medium effect size, and 0.50 for a large effect size. In the literature on anxiety measures in sport, researchers have typically used somewhat more stringent levels when interpreting *r* values, where a coefficient of 0.2 to 0.3 reflects a small correlation, a coefficient of approximately 0.5 is considered moderate, and a coefficient of 0.7 and above is considered large (Martens et al., 1990). To facilitate comparison with previous research on relationships between anxiety measures, and between anxiety measures and performance measures, I employed the more stringent ranges used previously by sport psychologists. I considered the inter-correlations between anxiety measures from a psychometric perspective, and as a result did not include detailed analysis of *p* values. In terms of interpreting correlations between anxiety and performance measures, I did cite *p* values, in order to be able to effectively relate my findings to previous research.

Observed Internal Consistency of Anxiety Questionnaires

I calculated means and standard deviations, and the overall internal consistency of the subscales for each test. I assessed the internal consistency of subscales using Cronbach's alpha. The results of these analyses are presented in Table 3.1.

Table 3.1

Means, SD's, and Internal Consistency of the CSAI-2-D and SAS

Scale	*M*	*SD*	Cronbach's α
CSAI-2 Cognitive	19.21	5.16	0.83
CSAI-2 Somatic	17.78	4.67	0.80
CSAI-2 Cognitive Direction	-8.02	9.51	0.84
CSAI-2 Somatic Direction	2.54	8.47	0.88
CTAI-2 Cognitive	19.24	4.35	0.75
CTAI-2 Somatic	18.08	4.20	0.77
CTAI-2 Cognitive Direction	0.28	8.27	0.77
CTAI-2 Somatic Direction	4.20	7.76	0.83
SAS Worry	14.22	3.75	0.80
SAS Concentration Disruption	8.12	2.89	0.82
SAS Somatic	17.32	5.25	0.89

Table 3.1 shows that all the subscales of the anxiety measures used in this study demonstrated adequate internal consistency, ranging from 0.75 to 0.89 as per the instructions of Nunally (1978). The means and standard deviations were similar to those

reported in previous research for the CSAI-2-D (Davis & Cox, 2002; Martens et al., 1990), the CTAI-2-D (Cunningham & Ashley, 2002), and the SAS (Smith et al., 1990). As a result, I went on to compute associations between measures of anxiety, and between anxiety and performance measures.

Correlational Analyses

I constructed a correlation matrix to illustrate the relationships between the subscales of each of the anxiety measures, and the performance measures used in this study (See Table 3.2). I now report relevant relationships associated with each of the major areas of investigation of this study based on this table.

Table 3.2

Intercorrelations Between Subscales of Anxiety Measure, and Performance Outcomes

Measures	1	2	3	4	5	6	7	8	9	10	11	12
1. CSAI-2 Cognitive Intensity	---											
2. CSAI-2 Somatic Intensity	0.41**	---										
3. CSAI-2 Cognitive Direction	-0.51**	-0.24**	---									
4. CSAI-2 Somatic Direction	-0.39**	-0.25**	0.59**	---								
5. CTAI-2 Cognitive Intensity	0.68**	0.17*	-0.27**	-0.24**	---							
6. CTAI-2 Somatic Intensity	0.30**	0.73**	-0.23**	-0.26**	0.31**	---						
7. CTAI-2 Cognitive Direction	-0.39**	-0.13	0.74**	0.52**	-0.40**	-0.21**	---					
8. CTAI-2 Somatic Direction	-0.26**	-0.18*	0.50**	0.82**	-0.27**	-0.31**	0.54**	---				
9. SAS Worry	0.70**	0.13	-0.34**	-0.28**	0.69**	0.17*	-0.37**	-0.23**	---			
10. SAS Concentration Dis.	0.30**	0.04	-0.24**	-0.17*	0.37**	0.19**	-0.26**	-0.18*	0.40**	---		
11. SAS Somatic	0.25**	0.73**	-0.24**	-0.28**	0.16*	0.77**	-0.11	-0.27**	0.23**	0.18*	---	
12. Performance	-0.25**	-0.10	0.54**	0.29**	-0.14	-0.10	0.39**	0.24**	-0.20**	-0.20**	-0.14*	---
13. Skill Level	-0.16*	-0.11	0.48**	0.34**	-0.02	-0.09	0.33**	0.30**	-0.13	-0.17*	-0.09	0.22**

*$p < .05$, ** $p < .01$, $N = 189$ (two-tailed tests).

Table 3.2 shows all correlation coefficients between the major measures employed in this study, including all subscales of the CTAI-2-D, the CSAI-2-D, and the SAS, and both performance and skill level. This table highlights that correlations between directional and corresponding intensity sub-scales were generally significant and higher than those for sub-scales that bore little or no relation to each other. Such an observation lends support to the proposition that the predicted correlations assessed in the following section would not have occurred simply as a result of chance.

Observed Between-Scale Correlations within Anxiety Questionnaires

In relation to the CSAI-2-D, I predicted a moderate, positive linear relationship between the cognitive and somatic intensity subscales. As Table 3.2 indicates, the correlation coefficient I observed between these subscales was slightly lower than expected, $r = 0.41$, however close enough to provide support for this prediction. In relation to the cognitive and somatic directional subscales, I predicted a small, positive linear relationship. The actual correlation coefficient of, $r = 0.59$ ($p < 0.01$), was somewhat lower than I predicted. Finally, I predicted small to moderate negative linear correlations between the corresponding intensity and direction subscales of the CSAI-2-D. I observed a correlation coefficient of, $r = -0.51$, between cognitive intensity and direction subscales, and an observed correlation coefficient of, $r = -0.25$, between the somatic intensity and direction scales. Overall, the observed inter-scale correlations for the CSAI-2-D fit predictions.

Given that there has been little statistical information reported on general associations between the subscales of the CTAI-2-D, I made predictions with reference to past observed associations in the CSAI-2-D. Specifically, I predicted a moderate, positive linear relationship between the cognitive and somatic intensity subscales. I observed a correlation coefficient of, $r = 0\ .31$, which, although in the small to moderate range, provided partial support for that prediction. My prediction of a small, positive linear relationship between the cognitive and somatic directional subscales was supported, however, as with the CSAI-2-D, this association was larger than predicted, $r = 0.54$. Finally, as for the CSAI-2-D, I predicted small to moderate, negative linear relationships between the intensity and directional subscales on each of the cognitive and somatic dimensions. My predictions were supported with an observed correlation coefficient of, $r = -0.40$ between cognitive intensity and direction subscales, and an observed correlation coefficient of, $r = -0.31$ between somatic intensity and direction

subscales. Overall, the inter-scale associations for the CTAI-2-D supported the predictions.

Based on the reported inter-scale correlations of the SAS, I predicted moderate to strong positive linear correlation coefficients between these subscales. I found the SAS worry and concentration disruption subscales were moderately associated, $r = 0.40$. I observed only small correlation coefficients between the SAS somatic subscale and the two SAS cognitive subscales, $r = 0.23$ for worry, and $r = 0.18$ for concentration disruption. These between-scale correlation coefficients on the SAS were generally lower than those reported by Smith et al. (1990).

Observed Relationships Between Subscales of Trait Anxiety Questionnaires

Given the similarities between the two measures of trait anxiety, I predicted that there would be a large, positive linear relationship between the cognitive subscale of the CTAI-2-D and the worry subscale of the SAS. The correlation I observed between these variables was, $r = 0.69$, providing support for that prediction. I predicted a moderate, positive linear relationship between the cognitive subscale of the CTAI-2-D and the concentration disruption subscale of the SAS. Reasonable support for my prediction was forthcoming, with an observed correlation between these variables of, $r = 0.37$. Finally, I predicted that there would be a large, positive linear relationship between the somatic subscale of the CTAI-2-D and the somatic subscale of the SAS. The observed correlation between these variables was, $r = 0.77$, thus, supporting the prediction.

Observed Relationships Between Trait and State Anxiety Measures

Trait-state anxiety theory predicts that state and trait anxiety measures should be associated, at least to a moderate degree. Relationships between these dimensions of the anxiety constructs observed in this study are illustrated in Table 3.2. Correlation coefficients generally supported the prediction of moderate to strong relationships between subscales of the CSAI-2-D and the CTAI-2-D. Specifically, I observed moderate to strong relationships between cognitive, $r = 0.68$, and somatic intensity subscales, $r = 0.73$, of the CTAI-2-D and CSAI-2-D. The strength of these associations was mirrored in directional subscales across the state-trait divide, with an observed correlation coefficient of, $r = 0.74$, for cognitive direction, and a correlation coefficient of, $r = 0.82$, for somatic anxiety direction.

I also observed moderate to strong correlations between the SAS somatic scale, and the CSAI-2 somatic intensity subscale, $r = 0.73$, and the SAS worry subscale and CSAI-2 cognitive intensity subscale, $r = 0.70$. I found a somewhat weaker correlation

between the SAS concentration disruption subscale and the CSAI-2 cognitive subscale, $r = 0.30$. Overall, these observations generally fit the predictions I made in relation to the associations between the intensity of trait and state measures of anxiety.

Correlational analyses between intensity and direction subscales across the state-trait divide resulted in coefficients ranging from -0.24 to -0.39 on the cognitive intensity-direction dimensions, and -0.26 to -0.28 on the somatic anxiety intensity-direction dimensions (See Table 3.2). Again these results fit with my predictions.

Observed Relationships Between Dimensions of Anxiety and Performance Outcome Measures

In the following section, I explore associations between performance and skill and measures of state and trait anxiety. Correlations between subscales of the SAS, CTAI-2-D, CSAI-2-D, and performance and skill level are shown in Table 3.2.

I observed a small negative linear correlation for the relationship between the cognitive anxiety intensity subscale of the CSAI-2-D and performance, $r = -0.25$ ($p < 0.05$). When correlated with performance, the somatic intensity subscale of the CSAI-2-D, and either somatic or cognitive intensity subscales of the CTAI-2-D failed to attain significance.

I observed small to moderate, significant, negative linear correlations between the three subscales of the SAS and performance. I observed a weak negative linear relationship between performance and the concentration disruption subscale of the SAS. This association was found to be significant, $r = -0.19$, $p < 0.01$. I observed a weak negative relationship between performance and the worry subscale of the SAS. Further statistical analyses revealed that this association was significant, $r = -0.19$, $p < 0.01$. I observed a weak negative linear association between performance and somatic anxiety as measured by the SAS. Statistical analyses revealed that this association was significant, $r = -0.14$, $p < 0.05$.

For the relationship between directional dimensions of anxiety and performance, a somewhat different picture emerged. I observed a moderate positive linear association between the variables of performance and cognitive state anxiety direction. Statistical analyses revealed that this association was significant, $r = 0.54$ ($p < 0.01$). For the association between performance and somatic state anxiety direction, I observed a weak to moderate positive linear relationship between the variables of performance and somatic state anxiety direction. Statistical analyses supported this observation, $r = 0.29$ ($p < .01$).

I replicated those analyses conducted using the state directional anxiety subscales and performance with trait directional anxiety dimensions and performance. In relation to the variables of performance and cognitive trait anxiety direction, I observed a weak to moderate correlation between performance and cognitive trait anxiety direction. Statistical analysis revealed that this association was significant, $r = 0.39$ ($p < 0.01$).

For the association between performance and somatic trait anxiety direction I observed a moderate association between performance and somatic trait anxiety direction. When I calculated Pearson's *r*, I found that this association was statistically significant, $r = 0.24$ ($p < 0.01$).

I computed a linear regression analysis using the ENTER method to determine which dimensions of anxiety best predicted competitors' performance. My analysis of variance showed that the results were not merely due to chance, $F(11, 177) = 6.95$, $p < 0.001$. The adjusted coefficient of multiple correlation (R^2) I calculated for this model was 0.26, indicating that 26% of the variance in performance was explained by the model. I conducted significance testing of correlation coefficients included in the model. The results of these analyses indicated that the only independent variable that achieved statistical significance was cognitive state direction, $t = 5.03$ ($p < 0.001$).

In relation to the competitors' skill levels, I split competitors into two skill groups based on their responses to the demographic questionnaire. Those competitors that indicated they were actively competing at the recreational or local club level were allocated to the low skill group. Those who indicated that they were actively competing at the state or national/international level were allocated to the high skill group. These criteria were somewhat less stringent than those used by Hanton et al. (2003), who classified elite participants as those who had previously competed internationally at major championships, such as the Olympic Games, European Championships, and World Championships. Their non-elite criteria included competitors who did not exceed National standards. Such a split with my sample would not have left enough participants in the elite group to conduct statistical analyses.

Participants were differentiated by their skill level, then their responses to the CSAI-2-D and CTAI-2-D were averaged. Figure 3.1 illustrates difference in responses to the cognitive and somatic state anxiety intensity subscales of the CSAI-2-D across skill groups.

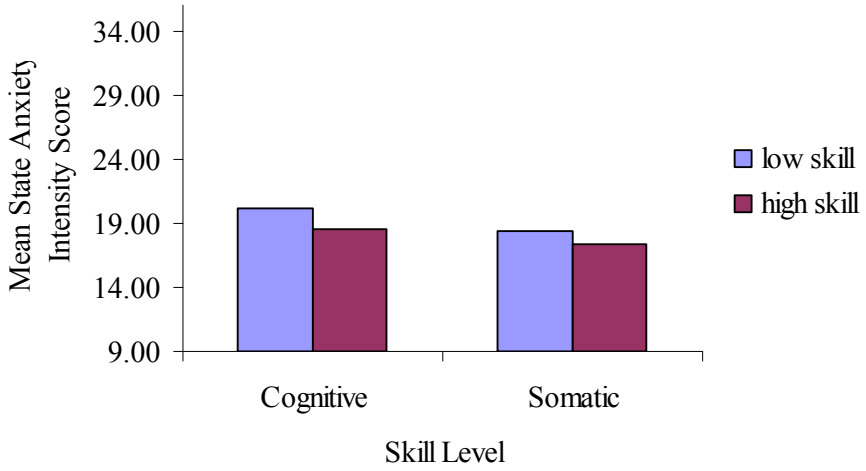

Figure 3.1. Mean CSAI-2-D Cognitive and Somatic State Anxiety Intensity Scores Across Skill Groups.

Figure 3.1 shows only a marginal difference between competitors in the high skill group, and competitors in the low skill group, when analysing mean state anxiety intensity score. The mean cognitive state anxiety intensity score for the low skill group was, $M = 20.16$, compared to a mean of, $M = 18.47$ for the high skill group. The mean somatic state anxiety intensity score for the low skill group was, $M = 18.35$, compared to a mean of, $M = 17.34$ for the high skill group.

Figure 3.2 illustrates difference in responses to the CSAI-2-D on the subscale of state direction for each skill group.

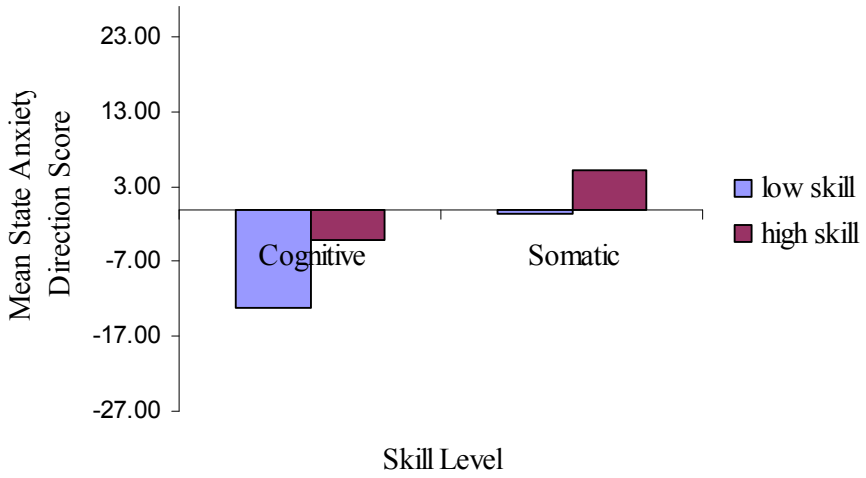

Figure 3.2. Mean CSAI-2-D Cognitive and Somatic State Anxiety Direction Scores Across Skill Groups.

Figure 3.2 shows clear differences between competitors in the high skill group when compared to competitors in the low skill group on the variable of mean state anxiety direction scores. The mean cognitive state anxiety directional score for the low skill group was, $M = 13.12$, compared to a mean of, $M = -0.70$ for the high skill group. The mean somatic state anxiety directional score for the low skill group was, $M = -4.02$, compared to a mean of, $M = 5.08$ for the high skill group.

Figure 3.3 illustrates difference in responses to the CTAI-2-D on the trait anxiety intensity subscales for each skill group.

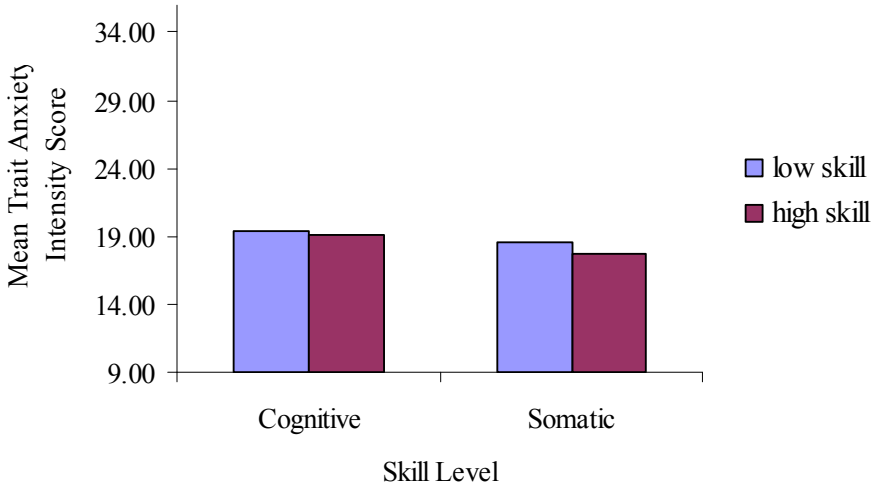

Figure 3.3. Mean CTAI-2-D Cognitive and Somatic State Anxiety Intensity Scores Across Skill Groups.

Figure 3.3 shows only a marginal difference between competitors in the high skill group when compared to competitors in the low skill group on the mean intensity of their cognitive and somatic trait anxiety. The mean cognitive trait anxiety intensity score for the low skill group was, $M = 19.35$, compared to a mean of, $M = 19.16$ for the high skill group. The mean somatic trait anxiety intensity score for the low skill group was, $M = 18.52$, compared to a mean of, $M = 17.74$ for the high skill group.

Figure 3.4 illustrates differences in responses to the CTAI-2-D on the trait anxiety direction subscales for each skill group.

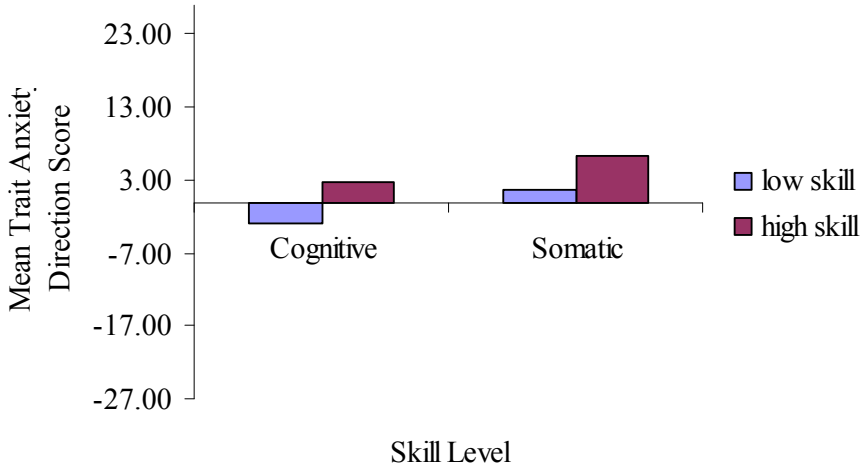

Figure 3.4. Mean CTAI-2-D Cognitive and Somatic State Anxiety Direction Scores Across Skill Groups.

Figure 3.4 shows small differences between competitors in the high skill group when compared to competitors in the low skill group on the variable of mean trait anxiety direction scores. The mean cognitive trait anxiety directional score for the low skill group was, M = -2.84, compared to a mean of, M = 2.72 for the high skill group. The mean somatic trait anxiety directional score for the low skill group was, M = 1.58, compared to a mean of, M = 6.25 for the high skill group.

Figure 3.5 shows differences between low- and high-skill groups across the three subscales of the SAS.

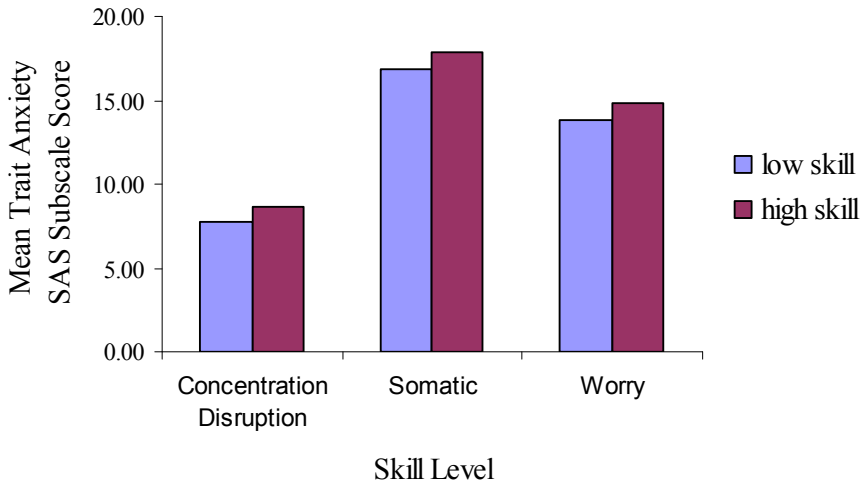

Figure 3.5. Mean SAS Concentration Disruption, Somatic, and Worry Across Skill Groups.

Figure 3.5 shows very small differences on each of the subscales of the SAS across the variable of skill level. The mean concentration disruption score for the low skill group was, $M = 7.70$, compared to a mean of, $M = 8.66$ for the high skill group. The mean somatic score for the low skill group was, $M = 16.88$, compared to a mean of, $M = 17.88$ for the high skill group. The mean worry score for the low skill group was, $M = 13.77$, compared to a mean of, $M = 14.78$ for the high skill group.

Overall, the preliminary analysis indicated that, when comparing high-skilled with low-skilled competitors, more highly skilled competitors experienced slightly less intense anxiety symptoms, and were less likely to interpret these symptoms in a debilitative way. In order to further clarify the nature of these associations, I conducted additional analyses between skill level of competitors and their anxiety dimensions.

In subsequent explorations I observed small, but significant, correlations for skill level, with the cognitive intensity subscale of the CSAI-2-D, $r = -0.16$ ($p < 0.05$) and the concentration disruption subscale of the SAS, $r = -0.17$ ($p < 0.05$). The analyses indicated that no other anxiety intensity scales correlated significantly with the skill level of competitors. I found that the directional subscales of both the CTAI-2-D, and CSAI-2-D significantly correlated with competitors' skill level, with moderate r values ranging from, $r = 0.30$ to 0.48 (all $p < 0.01$). I observed somewhat stronger correlation coefficients for state anxiety directional scores, when compared to trait anxiety directional scores. In addition, the analyses indicated that stronger correlations were

apparent between cognitive directional scales and skill level, compared to somatic directional scales and skill level.

I conducted a linear regression analysis using the ENTER method to determine which dimensions of anxiety best predicted the skill level of the competitor. The analysis of variance showed that the results of this analysis were not merely due to chance, F (11, 177) = 6.18, $p < 0.001$. I calculated the adjusted coefficient of multiple correlation (R^2) for this model to be 0.23, indicating that 23% of the variance in skill level was explained by the model. When I conducted significance tests of correlation coefficients included in the model, I found that cognitive state direction, $t = 4.27$ ($p < 0.001$), and concentration disruption, $t = -2.02$ ($p < 0.05$), were the only variables that achieved statistical significance.

Discussion

In the following section, I provide some general comments that help place the sample in perspective with previous research, and I go on to discuss the internal consistency of questionnaires. Following this, I explore between-scale correlations, both within and between measures, trait-state relationships, and relationships between anxiety and performance measures. The primary purpose of this discussion is to relate my findings to previous research, and, based on this, to further explore the potential for an intervention targeting debilitative trait anxiety.

General Results of Anxiety Questionnaires

In comparing the findings of this study to the findings of previously cited research, it is important to understand that a number of variables have the potential to influence the degree of association. For example the timing of questionnaire administration (Cerin, et al., 2000; Martens et al., 1990), skill level of participants (Mahoney & Meyers, 1989), type of sport (Craft et al., 2003; Martin & Hall, 1997; Simon & Martens, 1979), and even gender characteristics of the sample (Jones, Swain, & Cale, 1991), are variables that have been found to influence characteristics of the anxiety response.

At the state level, the cognitive and somatic intensity subscales of the CSAI-2-D have a possible range from 9 to 36, where 9 represents a situation in which competitors report experiencing no anxiety intensity, and 36 represents a situation in which competitors report an extremely strong anxiety reaction in the form of worrying thoughts or bodily reactions. The mean score I observed for cognitive state anxiety intensity was, $M = 19.21$ ($SD = 5.16$), whereas the mean score I observed for somatic

state anxiety intensity was, *M* = 17.78 (*SD* = 4.67). These scores are comparable to those cited in the original work by Martens et al. (1990); for example, they cited a mean cognitive anxiety intensity score of, *M* = 20.05 (*SD* = 5.77).

The directional cognitive and somatic subscales of the CSAI-2-D have a possible range from -27 to +27, where -27 represents a very detrimental interpretation of anxiety symptom intensity, and +27 represents a very facilitative interpretation of anxiety symptom intensity. I observed more extreme mean negative directional interpretations on the cognitive intensity scale, *M* = -8.02 (*SD* = 9.51), when compared to the somatic intensity scale, *M* = 2.54 (*SD* = 8.47). These findings suggest that, on average, the sample of competitors generally interpreted the intensity of their cognitive anxiety as debilitative to performance, whereas their experience of somatic anxiety was, on average, interpreted as slightly helpful to their ensuing performance. I observed higher standard deviations on the directional subscales, when compared to the intensity subscales. I assume these are more likely to be a reflection of the possible range of the scales, not the variability in the data. The directional scores I observed were somewhat different from those reported by Hanton et al. (2000), who cited a mean cognitive state anxiety direction score of, *M* = 3.09 (*SD* = 4.65), a mean somatic state anxiety direction score of, *M* = 4.50 (*SD* = 3.37) for rugby players, and a mean cognitive state anxiety direction of, *M* = 0.58 (*SD* = 5.12), and mean somatic state anxiety directional score of, *M* = -5.58 (*SD* = 5.64), for rifle shooters. Notably, the standard deviations I observed were higher, most likely resulting from variance between various sports included in my sample. It remains unclear why my observations would have differed to those cited by Hanton et al. (2000). Clearly there is a difference the sports from which participants were recruited. The less extreme results report by Hanton et al. for rugby players may be partially explained by research that has indicated that competitors from team sports may experience less cognitive and somatic state anxiety than their individual sport counterparts (Zeng, 2003). All of the competitors recruited in this study were from individual sports and the results are generally more extreme than those for the rugby players cited by Hanton et al. Such an observation does not explain the differences observed between the rifle shooters (an individual sport) and the findings from this study. One possible explanation might be that that the fine motor control required for rifle shooting leaves competitors in this sport more likely to interpret increases in somatic symptom intensity as being debilitative to their performance when compared to competitors engaging in gross motor skill sports such as freestyle skiing, track-and-field

athletics, and ten-pin bowling. Other variables that were not controlled in this study, but that may have been associated with such observed differences relate to the context in which the state anxiety response was assessed (Cerin, et al., 2000). In particular, temporal patterning research has indicated that somatic state anxiety tends to increase rapidly close to the start of the competitive event and dissipate once the competition is over (Burton, 1988; Cerin et al. 2000; Karteroliotis & Gill, 1987; Marten et al., 1990; Slaughter et al., 1994). Competitors in this study were asked to complete the CSAI-2-D as close to the start of their competition as possible, without interfering with their performance. If the rugby players in the Hanton et al. study completed questionnaires somewhat earlier in the lead up to the competition then lower intensity results would be predicted. Other antecedents may also be associated with such differences including the importance of the competition, the place in the overall competitive calendar, timing of state data collection, associated training etc.

At the trait level, I found that the cognitive and somatic anxiety intensity scores, as measured by the CTAI-2 D, generally mimicked those of the CSAI-2-D. Specifically, I observed a mean cognitive trait anxiety intensity score of, $M = 19.24$ ($SD = 4.35$), as compared to a mean somatic trait anxiety score of, $M = 18.08$ ($SD = 4.20$). My observations are in accordance with Ntoumanis and Jones (1998), who reported a mean cognitive trait anxiety intensity score of, $M = 21.19$ ($SD = 3.99$), as compared to a mean somatic trait anxiety score of, $M = 17.70$ ($SD = 4.63$), with a sample of university and county sports competitors from the sports of swimming, hockey, rugby, cricket, and athletics.

In relation to the directional subscales of the CTAI-2-D, I observed a mean cognitive direction score of, $M = 0.28$ ($SD = 8.27$). For the somatic directional subscale of the CTAI-2-D, I observed a mean of, $M = 4.2$ ($SD = 7.76$). These are comparable to findings by Ntoumanis and Jones (1998), who cited a mean cognitive trait anxiety directional score of, $M = 0.57$ ($SD = 7.52$), and a mean somatic trait anxiety directional score of, $M = 2.16$ ($SD = 6.26$).

Possible subscale ranges for the SAS are 7 to 28 for the worry scale, 5 to 20 for the concentration disruption scale, and 9 to 36 for the somatic scale. Higher scores on these scales represent a higher perceived intensity of anxiety symptoms. I observed a mean score of, $M = 14.22$ ($SD = 3.75$) for the worry subscale, $M = 8.12$ ($SD = 2.89$) for the concentration disruption subscale, and, $M = 17.32$ ($SD = 5.25$) for the somatic subscale. My observations are comparable to those cited by Smith et al. (1990) who

observed average scores of, $M = 15.27$ ($SD = 4.53$) for the worry subscale, $M = 8.15$ ($SD = 2.63$) for the concentration disruption subscale, and, $M = 19.9$ ($SD = 5.95$) for the somatic anxiety subscale.

Internal Consistency of Anxiety Questionnaires

Based on previous research, I predicted I would observe adequate levels of internal consistency for the subscales of the CSAI-2-D (Davis & Cox, 2002; Martens et al., 1990), the CTAI-2-D (Cunningham & Ashley, 2002), and the SAS (Smith et al., 1990). Given the sparsity of psychometric research using the CSAI-2-D and CTAI-2-D, these findings provide much needed additional support for the utility of these measures as a means of assessing the intensity and directional dimensions of anxiety in sport. Woodman and Hardy (2001) questioned the construct validity of the CSAI-2 based on the observation that various performers can interpret a statement from the CSAI-2 quite differently. They cited a study by Barnes, Sime, Dienstbier, and Plake (1986) where the researchers chose to remove the first item from the CSAI-2 as it was being reported in very different ways by different competitive swimmers in their study. On one hand, some swimmers interpreted the statement, "I am concerned about this competition", as a means of assessing the importance of the event, whereas other swimmers interpreted this statement as a means of measuring perceived worry about the event.

Although not a direct measure of construct validity, the strong levels of internal consistency I observed would tend to partially refute this claim, as greater variability would be predicted within subscales if items were associated with different emotions. In observing acceptable levels of internal consistency for all the subscales, I consider that the results lend further support to the utility of each of these measures.

Related to this, researchers have expressed reservations over the use of the word "concern" as opposed to "worried" in both the state and trait versions of the CSAI-2 (Burton, 1998; Lane et al., 1999). These authors suggested that competitors might be more apt to interpret the word "concern" in a challenging manner compared to the word "worry", and, thus, rate the perceived intensity of such symptoms as facilitative on the directional cognitive state anxiety scale. The high internal consistency scores observed for this subscale in the present study would appear to refute this claim. To further address this objection, I performed *t*-tests comparing the average score of the two non-concern items of the cognitive directional scale ("I have self doubts", and "I'm worried about reaching my goal"), with the average of the seven items that contain the word "concern" (for both the CSAI-2-D and the CTAI2-D). Findings from this analysis

revealed that, at the state level, the mean cognitive state anxiety directional score for items that did not contain the word "concern" was, $M = 0.16$ ($SD = 1.09$), compared to a mean cognitive state anxiety directional score of, $M = -0.06$ ($SD = 1.19$), for items that did contain this word. These means were not found to differ significantly; $t(376) = 1.81$, $p > 0.05$. The mean cognitive trait anxiety directional score for items that did not contain the word "concern" was, $M = 0.09$ ($SD = 0.94$), compared to a mean cognitive trait anxiety directional score of, $M = -0.18$ ($SD = 1.16$), for items that did contain this word. These means were found to differ significantly; $t(376) = 2.49$, $p < 0.01$). Notably, the differences observed on the CTAI-2-D were actually in the opposite direction as those predicted by Burton (1998) and Lane et al. (1999). These findings suggest that competitors in this study were more likely to associate questionnaire items containing the word "concern" with a more debilitative interpretation, providing evidence against the conjecture made by Burton (1998) and Lane et al. (1999).

Overall, despite concerns raised by some researchers, the present analysis of the internal consistency of the subscales of the CSAI-2-D, CTAI-2-D, and SAS, using Cronbach's alpha, revealed alphas that were high enough to be considered statistically useful (Nunally, 1978). Such results closely approximate the observations of previous researchers (e.g., Jones & Hanton, 2001; Martens et al., 1990; Perry & Willliams, 1998; Smith et al., 1990; White & Zellner, 1996; Wiggins, 1998). In particular, the findings lend support to the utility of the CTAI-2-D, which to date has undergone only limited psychometric analysis. These findings enabled me to go on to examine more specific questions associated with inter-measure correlations and associations with performance and skill.

Observed Between-scale Correlations Within Anxiety Questionnaires

Observed relationships between cognitive and somatic intensity and directional subscales of the CSAI-2-D closely reflected predictions, and were in line with previous research (Davis & Cox, 2002; Edwards & Hardy, 1996). These relationships were generally moderate, which I predicted from the literature given that cognitive and somatic anxiety are separate, but related, factors. Negative relationships were predicted between intensity and directional subscales, highlighting that a high level of anxiety intensity (high positive score) is generally associated with more unhelpful interpretations (more negative score). The correlation coefficients I observed closely approximated those of Edwards and Hardy.

I observed similar patterns of relationships for the trait version of the CSAI-2-D, the CTAI-2-D. Such observations are a critical addition to the anxiety knowledge base because I was unable to find any previously published inter-scale correlations based on this measure. As proposed in the literature review, these findings provide preliminary support for the notion that these subscales are measuring the same dimensions, differentiated only by the state/trait divide. These findings further highlight the utility of measuring anxiety at the trait level. Clearly, more research is required before any definitive conclusions can be drawn with regard to this proposition.

The relationships between the intensity sub-scales of the SAS generally approximated those reported by Smith et al. (1990), although they were slightly lower in strength. These differences may have been a reflection of sample characteristics. Smith et al. (1990) conducted their research with 489 male and 348 female high school varsity athletes competing in football, basketball, soccer, cross country running, gymnastics and wrestling. It may be that the relative importance of somatic anxiety, worry and concentration disruption could vary across different sports depending on the unique demands of the sport. Future research should explore between scale associations for different sports to further address this issue.

Relationships Between Subscales of Trait Anxiety Questionnaires

The observed relationships between subscales of the two trait anxiety questionnaires employed in this study reflected predictions. Factor analysis conducted by Smith et al. (1990) supported the dichotomisation of cognitive anxiety into two separate, but related, factors, and, as previously mentioned, there is more overlap of content between the SAS Worry scale and the CTAI-2 cognitive intensity scale than there is between the SAS concentration disruption subscale and the CTAI-2 cognitive intensity subscale. As predicted, given the item overlap between the somatic scales of the CTAI-2 and SAS, I observed a strong association.

The Relationships Between Trait and State Anxiety Measures

Hanton, Mellalieu, and Hall (2002) noted that current evidence suggests that predispositions to experience high or low competitive anxiety symptoms are likely to influence the interpretation of state anxiety responses as either facilitating or debilitating to performance. My findings lend further support to this notion, with observed relationships between the CSAI-2-D and both trait anxiety measures (the CTAI-2-D and the SAS) being generally moderate to high. These observations highlight the link between trait and state anxiety constructs.

In addition, to examine trait-state relationships, correlation coefficients were calculated within and between SAS and CSAI-2 subscales. These findings were comparable to those reported by Hanton et al. (2002), with moderate to high correlations between cognitive state anxiety and worry, moderate to high correlations between trait and state somatic anxiety, and a weak to moderate correlation between cognitive state anxiety and concentration disruption. Such findings are pertinent to anxiety treatment because they imply that interventions that target elevated trait anxiety intensity or direction may have a generalised effect on the intensity and direction of state anxiety responses. Such an approach would be highly efficient and pervasive in its impact on competitors.

Relationships Between Dimensions of Anxiety and Performance Outcome Measures

Correlational research does not allow us to directly infer causality. When variables are measured in temporal sequence, however, and those variables are discrete or based on results from one competition, and, that competition took place immediately following the measurement of anxiety, then it is possible to claim that anxiety affected performance. Having said this, it is possible that there are other mediating variables associated with this observed relationship, for example, the skill level of competitors. Measures of anxiety intensity found to be significantly associated with performance included the cognitive intensity subscale of the CSAI-2-D, and the three subscales of the SAS. These associations were only small to moderate. Importantly, strong, positive, linear associations were observed between both the cognitive and somatic directional scales of the CSAI-2-D and performance. Although slightly weaker, the strength of these associations with performance was reflected in the CTAI-2-D. The results of the regression analyses indicated that the only independent variable that achieved statistical significance was cognitive state direction. These findings directly mimic those of Jones et al. (1993), and highlight the important association between state directional interpretations of anxiety and performance.

With reference to competitors' skill level, a somewhat different picture emerged. In terms of intensity, analysis of the associations between competitors' skill and anxiety measures revealed significant associations between the cognitive intensity subscale of the CSAI-2-D and skill level, and the concentration disruption subscale of the SAS and skill level. The directional subscales of the CSAI-2-D and the CTAI-2-D were also both significantly correlated with competitors' skill level, with higher associations apparent for the state scales. These observations are in accordance with the reports by other

researchers, investigating the association between state anxiety direction (Jones & Swain, 1992, 1995; Jones et al., 1994), or trait anxiety direction (Hanton & Conaughton, 2002; Hanton et al., 2003) and skill level. Regression analysis highlighted that cognitive state direction and concentration disruption were the only variables that significantly predicted skill level.

My findings highlight the association between performance, skill, and directional state anxiety. In addition, trait and state directional scales were found to be strongly associated. These findings imply that modification of interpretations of cognitive and somatic state anxiety has the potential to positively influence performance. Given the link between trait and state anxiety dimensions, it would be possible to administer a trait-based intervention with the goal of influencing state-based interpretations across a range of competition contexts. Such an intervention would be likely to be more appealing to competitors who could complete it away from the event, thereby minimising interference with pre-competition routines. Combined, these observations highlight the potential for a directionally-focussed, trait-based intervention as a means of influencing state anxiety direction, and ultimately performance.

Methodological Issues

Despite adding considerably to what is known about measures of anxiety and performance outcomes, there existed some methodological limitations associated with this research. In studies investigating the directional response, the relevance of sport type has been highlighted (Hanton et al., 2000; Mellalieu et al., 2004). For example, Mellalieu et al. examined symptoms associated with competitive trait anxiety as a function of sport type and competitive experience. A total of 162 participants from gross explosive and fine motor-skill sports completed a trait version of the CTAI-2-D. Mellalieu et al. observed main effects for experience and sport type, with participants in gross explosive sports indicating symptoms associated with competitive anxiety as more facilitative to performance than participants in fine motor skill sports. Experienced performers also reported more facilitating interpretations of symptoms than their less experienced counterparts. In terms of the nature of the sport, competitors in the present study were drawn from the sports of freestyle skiing, ten-pin bowling, and track-and-field athletics. Admittedly, all three sports entail gross motor activity engagement, however, bowling is far less physically demanding when compared to track-and-field athletics or freestyle skiing. Less variance might be obtained with a more coherent group of participants, potentially resulting in even stronger associations.

Another limitation of this study relates to the association between anxiety measures and performance. Given the nature of correlational research, it is impossible to determine exactly to what extent dimensions of anxiety play a causal role in performance outcomes. Having said this, anxiety measures were taken prior to performance, and, as a result of this temporal sequencing, it is reasonable to suggest that competitors' performances could not have caused this anxiety response. As a result, the findings of this research point towards the mediating role of anxiety in performance, especially cognitive state anxiety direction. When combined with the observed associations between anxiety direction and skill, these observations warrant further investigation. Future researchers should apply a true experimental paradigm to these variables, with the goal of controlling for other potentially mediating variables.

A secondary limitation associated with the measurement of performance relates to the way this variable was operationalised in this study. Immediately following competition, participants were asked to rate their performance on a numbered scale. This approach was chosen because I needed a standardised measure, and I wished to reduce any potential interference competitors might experience in subsequent competitions as a result of completing a more complex assessment. Such an approach is highly subjective, and has the potential to miss nuances in competition performances that are potentially associated with anxiety. For example, one competitor may have rated their performance in a competition highly in comparison to a poor result in the previous competition, or another may have had a predisposition to rate their performances poorly, despite objective outcomes. Ideally, performances would have been compared to the competitors' average (assessed over a range of competitions of the same importance), however, I was not in a position to collect such information, and would still be faced with difficulties associated with standardising such results across very different sports.

Despite these methodological weaknesses, the information I obtained in this study provides valuable insight into the associations between measures of anxiety. Similarities in the general patterns of association between subscales of measures that I observed, that have already been cited in the research, lend further support to the generalisablity of the measures employed. Further, agreement between the means and standard deviations across different studies would appear to suggest moderate consistency in terms of the prevalence of various anxiety dimensions across sports. The data I obtained for the CTAI-2-D, and the observed associations between this and the

SAS and CSAI-2-D, add considerable information to a very limited body of research investigating the psychometric properties of the trait anxiety measure, especially for the directional scales. In particular, close associations observed between measures of state and trait anxiety direction highlight the potential for development of trait-based interventions. Finally, this study has contributed by addressing criticisms pertaining to item consistency in the CSAI-2-D, particularly in relation to the use of the word "concern" in the item content of the CSAI-2, in all but two of the cognitive anxiety items. The data I obtained did not indicate any significant differences between items at the state level, and differences that were at odds with the predictions made by Burton (1998) and Lane et al. (1999) were observed at the trait level.

Future Research

The findings of the present study highlight several areas for future investigation. In particular, opportunities for future research lie in the development of more reliable and valid measures of the anxiety construct. In relation to this goal, findings from the current study lend additional support to the importance of directional interpretations of anxiety symptoms. Additional research is required to help determine the association between intensity and directional components of current measures. One line of investigation may entail an exploration of the necessity (or otherwise) of the intensity scale in future measurement. It might be predicted that when the intensity of responses are very high, one would observe less variability in directional scales. An alternate approach may entail citing commonly reported symptoms associated with anxiety and asking competitors to rate the degree to which they interpret each symptom as being facilitative or debilitative to their ensuing performance. Such an approach may have the potential to reduce pre-game interference associated with the completion of long and time-consuming questionnaires.

Another line of investigation relates to the item content of the trait and state versions of the CSAI-2. Issues pertaining to the use of certain words within specific items have been raised by researchers (e.g., Burton, 1998; Lane et al., 1999). The differences I observed in mean directional interpretations of specific items at the level of trait anxiety allude to the utility of re-visiting the item content and makeup of this scale. Related to this, it remains unclear why results of such an analysis would differ across the state-trait divide.

As Swain and Jones (1993) indicated, the frequency of competitors' thoughts about potential threats may be associated with performance outcomes. Intensity alone

measures only assess for the presence of such thoughts, and would not be expected to be influenced by the frequency of thoughts. On the other hand, directional interpretations of specific thoughts could quite easily be mediated by the frequency of thoughts. For example, a competitor who repeatedly reflects on perceived tension in their body over the course of a short period of time, may report that this thought is more debilitative to performance than a competitor who has had this thought only once in the same time period. Future research should explore the relative contribution of the frequency of thoughts as a mediating variable underling the directional dimension of anxiety. Having competitors verbalise their thoughts just prior to competing, and then comparing these with directional measures of anxiety such as the CSAI-2-D may provide some preliminary insight into such associations.

In relation to the temporal patterning of the anxiety response, more research is needed to address differences between cognitive and somatic interpretations in the lead up to, and during performance. If one considers the interpretive style of the competitor to be a unidimensional construct (for example running along an optimistic/pessimistic continuum), and cognitive and somatic measures of anxiety are both measures of interpretations, then only minimal differences would be predicted between these variables. Alternately, it might be that increases in physiological reactivity in the lead up to a major event (possibly associated with a warm-up routine) may result in greater increases in awareness of somatic anxiety symptoms, and thereby differentially mediate interpretations of the cognitive/somatic dimensions of the anxiety response.

Findings from the current study provide support for the predictive validity of the CSAI-2-D in relation to skill level and performance. Future research should further address specific aspects of performance, and investigate the causal factors in these associations. Given the nature of the current study, it was difficult to infer that anxiety was the mediating variable in performance outcomes, or self-reported level of skill.

The close association between state and trait measures of anxiety that I observed in this study begs for further research attention. In particular, researchers should further investigate the utility of the CTAI-2-D as a measure of trait anxiety with the goal of developing trait-based interventions. Such interventions have the capacity to be highly efficient, and carry benefits associated with the ability to administer them well away from the competitive environment.

Conclusions

The results of this study supported the conceptions of trait and state anxiety direction proposed by Jones and Swain (1995; Jones, Swain, & Hardy, 1993). The trait directional scales correlated highly with the state directional scales and the directional scales correlated to a higher level with each other than with the intensity scales. More importantly, the study demonstrated the importance of the trait and state anxiety direction concepts for research on anxiety and performance, as well as for the treatment of anxiety in sport. Whereas the intensity measures showed little relationship to self-rating of performance, strong relationships were shown between the directional measures and self-rating of performance. This was especially the case for the state measures of direction, which suggests that treatments that can change performers' general debilitative interpretation of the anxiety they experience to a more facilitative interpretation would be highly effective for the long-term management of anxiety. Although no causal relationships can be inferred, the results of this study are encouraging for the application of the trait and state directional anxiety conceptions in relation to anxiety control as a performance enhancement strategy. Research on these issues from a direction of anxiety perspective is certainly warranted.

Combined, the performance and skill-level findings observed in this study highlight the importance of cognitive state direction as a predictor variable. These findings imply that directional interpretations of cognitive state anxiety should be targeted if performance or skill outcomes are pertinent. Observed associations between state and trait measures further highlight the possibility of targeting trait predispositions as an efficient means of improving performance across a range of settings. In the future, researchers should investigate the causal role of anxiety interpretations related to performance and skill level.

CHAPTER 4: IDENTIFYING A THEORETICAL FRAMEWORK

Introduction

In Study 1, I found further support for the directional distinction made by Jones and Swain (1995), and the benefits of using such an assessment over and above intensity alone measures. Specifically, I observed that directional measures of anxiety have a stronger relationship to skill level and perceived performance than intensity alone measures. Findings from study provide additional support for the association between these variables (e.g. Jones, Swain, & Hardy, 1993; Swain & Jones, 1995), and highlight the need for more research exploring the concept of directional anxiety.

I also observed moderate correlations between trait and state anxiety direction, mimicking relationships already reported in the literature between trait and state anxiety intensity (Martens et al., 1990). Hanton, Mellalieu, and Hall (2002) came close to exploring such relationships, observing moderate associations between trait anxiety intensity and state anxiety direction scores, however their study was limited by the use of the SAS, which, at the time, only measured the intensity of trait anxiety. Findings from Study 1, taken in conjunction with the observations made by Jorm (1989), suggest that the management of trait anxiety directional interpretations may prove an efficient means of moderating debilitative state anxiety. In the past, such a focus has been neglected in favour of state specific interventions, largely based on the assumption that traits were, by nature, relatively fixed positions.

Researchers have begun to explore some of the underlying variables thought to be associated with directional anxiety interpretations. Studies have explored the role of positive and negative expectancy (Jones & Hanton, 1996), coping styles (Ntoumanis & Biddle, 2000; Raffety, Smith, & Otacek, 1997; Wang, Morris, & Marchant, 2004), positive and negative affect (Jones & Hanton, 2001; Jones, Swain, & Harwood, 1996), confidence (Hanton & Connaughton (2002), and the acquisition and management of cognitive skills (Hanton & Jones, 1999a, 1999b). Apart from the last, these studies have targeted quite specific concepts thought to mediate directional anxiety interpretations. As a collection, the foci of these studies remain somewhat disparate, and they lack the unification provided by a general theory. A refined awareness developed entirely out of a strict theoretical position enables researchers and practitioners to recognise and make choices that are consistent with the position of the theory, and thereby provide direction to the research endeavour. Based on these observations, I established a clear need to adopt a theoretical framework for conducting research, and developing treatments. This

framework would ideally suit the conceptualisation of anxiety that has emerged, namely that directional interpretations of anxiety at the trait level appear to be related to performance. Given the focus on interpretations, and trait-based change, cognitively focussed frameworks seemed particularly applicable.

My purpose for the following chapter was to provide background to, and a detailed description of one specific form of cognitive-behavioural therapy, that being REBT. In this chapter, I initially explore general theories of emotion leading to a specific focus on theories of anxiety. This initial exploration provides a context to explore the theory and practice of REBT, which I do next. I conclude with a brief overview of applied research employing REBT, with an emphasis on the performance and sports domains, I relate the findings of Study 1 to this theory, and provide the detail necessary to go on to conduct Study 2.

General Theories of Emotion

The James-Lange Theory

The relationship between physiological activity and emotional experience has been explained in a number of ways. One of the earliest theories of emotion was independently conceptualised by both William James (1890) and Carl Lange (1887) and has come to be called the James-Lange theory of emotion. James and Lange proposed that subjective emotional experiences are the result of physiological changes. Thus, the perceived importance of a major competition may trigger autonomous reactions (increased heart rate, dry mouth, and other forms of physiological arousal), which will be interpreted by the competitor as an emotional response. In other words, people experience emotions because of their awareness of physiological reactions to various stimuli or situations. The basic structure of the James-Lange theory is presented in Figure 4.1.

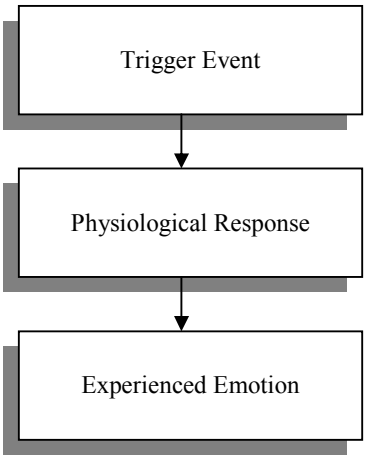

Figure 4.1. The James-Lange Theory of Emotion.

Some support for this theory has been forthcoming, although there is only a limited pool of research that has addressed its basic constructs. Support for the theory arose from studies involving soldiers, who had suffered injuries to their spinal cords (Hohmann, 1966). This research indicated that soldiers, who had their spinal cord severed in the lower part of the spine, reported little change in their subjective experience of emotions, whereas soldiers with injuries at the neck level reported a considerable decrease in their emotional responsiveness. Subsequent research employing highly sophisticated and sensitive physiological measures has indicated that different emotions are associated with different patterns of physiological activity (Ekman, Davidson, & Friesen, 1990; Izard, 1992; Levenson, 1992). Further, facial feedback studies seem to indicate that people feel happier when they smile and sadder when they frown (e.g., Ekman et al., 1990). As Eysenck (1997) has noted, however, the existence of differential physiological patterning among emotions does not necessarily demonstrate that distinctive emotional feelings depend on such physiological differences.

It appears that the James-Lange theory of emotion has failed to attract considerable support because people intuitively report experiencing emotional states prior to any awareness of bodily changes. This belief may partially explain why only limited research has been performed in this area. The theory has received additional criticism because, until recently, emotional states were largely undifferentiated in terms of physiological changes, and it fails to provide detail relating to the actual processes underlying emotions (Eysenck, 1997).

The Cannon-Bard Theory

An alternative theory that is more consistent with people's commonsense beliefs about emotions was independently developed by Cannon (1927) and Bard (1928) and has since become known as the Cannon-Bard theory of emotion. This theory largely arose from a series of experiments that indicated that central factors (especially the thalamus) are of primary importance in generating emotional experience (e.g., Cannon, Lewis, & Britton, 1927). Essentially, it was predicted that bodily arousal and experienced emotion occur simultaneously. Cannon (1927) hypothesised that a perceived emotional stimulus would arouse the thalamus, which would in turn simultaneously trigger impulses to internal organs and skeletal muscles, and to the cerebral cortex. Figure 4.2 schematically illustrates this relationship.

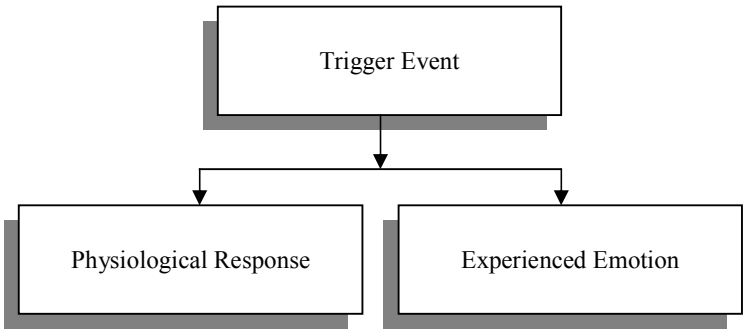

Figure 4.2. The Cannon-Bard Theory of Emotion.

Applying the Cannon-Bard theory to a sporting situation, a trigger for an emotion may be a particularly important sporting event, which would be predicted to directly arouse the thalamus, simultaneously triggering both physiological arousal and cognitions via the cerebral cortex, resulting in the experience of an emotional episode. The Cannon-Bard theory of emotion held popularity, primarily because primitive measurement devices were unable to find physiological support for the James–Lange theory, and there were few alternatives offered. It was not until Schachter (1964) developed his two-factor theory of emotion that some bridging was achieved between the two approaches.

Schachter's Two-Factor Theory

Schachter (1964) proposed that both arousal and cognition were necessary for the experience of emotion. Specifically, emotion was seen as the result of cognitive interpretation and subsequent labelling of arousal. Using this approach, a competitor may be physiologically aroused, but until an explanation for the high level of arousal is found, it will not be interpreted as an emotion. If, for example, a competitor perceives

that the event in which they are competing is important to their future success, they may associate their physiological arousal with the perceived importance of the event, and consequently experience the emotion of anxiety. Figure 4.3 illustrates the interrelationships hypothesised by Schachter in the theory.

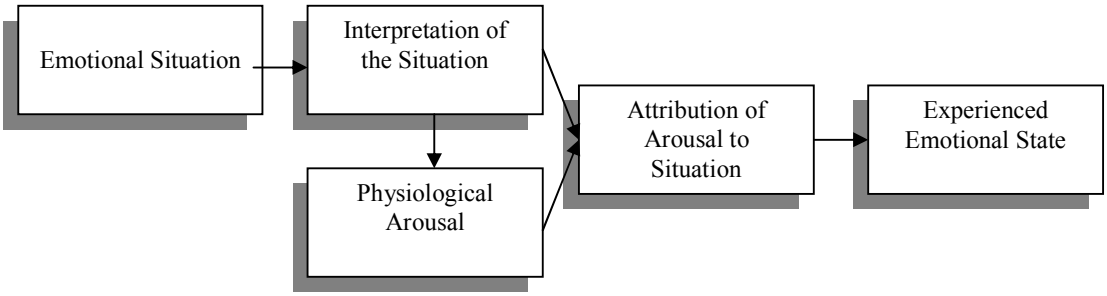

Figure 4.3. Schachter's (1964) Two-Factor Theory of Emotion.

Parkinson (1995) noted that Schachter's two-factor model is valuable in that it proposes that emotion is more flexible than straightforward physiological theories imply.

One of the crucial issues relating to this theory is whether physiological arousal can make an independent contribution to experienced emotion. Research indicates that negative emotions, such as anxiety, can be amplified when the level of physiological arousal is increased independently of the situation (Borkovec, 1974). Such findings are particularly relevant to the sporting environment where arousal levels are often increased as a result of the physical skills involved in participating in sports. Critics of Schachter's theory have argued that it is unclear how arousal and cognition combine to create the experienced emotion (Leventhal, 1974).

Lazarus's Cognitive Appraisal Theory of Emotion

Appraisal theorists have suggested that emotions are rarely direct reactions to stimulus qualities, rather, what gives an object emotional impact is its relevance to the individual (Parkinson, 1995). One prominent appraisal theorist, Lazarus (1966, 1982) claimed that cognitive appraisal of situations can be subdivided into three specific forms. Primary appraisal involves a process whereby the situation is interpreted as being positive, stressful, or irrelevant. Secondary appraisal involves taking into account the resources the individual has available to cope with the situation. The third form is actually a reappraisal process whereby the primary and secondary appraisals are modified where necessary, such as when circumstances change, or when the individual perceives that they have changed. This emotional theory can be represented schematically as in Figure 4.4.

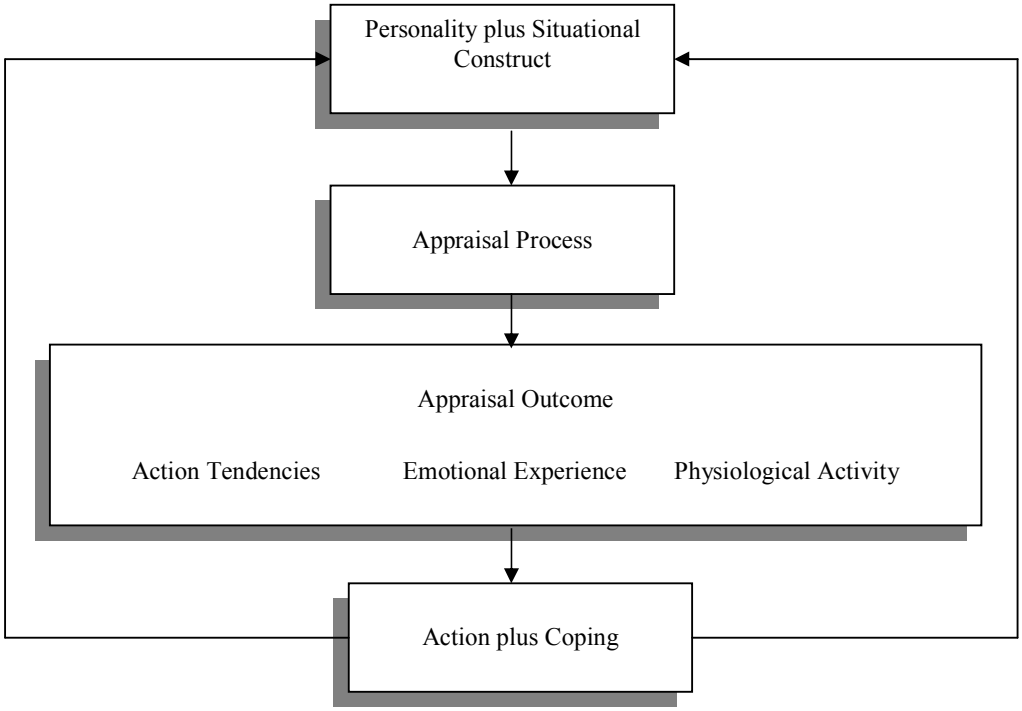

Figure 4.4. Lazarus's (1991) Cognitive Appraisal Theory of Emotion.

Unlike Schachter's (1964) two-factor theory of emotion, in the cognitive appraisal theory, Lazarus (1982) hypothesised that appraisal of a stimulus actually produces physiological changes (arousal), and that a combination of physiological arousal and action tendencies jointly lead to an emotional experience. Such an approach highlights why two competitors who appraise the same situation quite differently, may experience disparate emotional responses. Empirical support for the theory has been generated using experimental methodologies, in which participants' cognitive appraisals are systematically manipulated and their subsequent emotional self-reports and behaviour are observed (e.g., Speisman, Lazarus, Mordkoff, & Davidson, 1964).

A weakness of this theory is that there is a general lack of concordance typically found across self-report, physiological, and behavioural measures of anxiety, yet the theory would predict that each of these is determined by cognitive appraisal of the situation, and they should therefore be strongly associated. An additional limitation of this approach, as suggested by Lazarus himself, was that the theory may be difficult to test, because individuals' appraisals may not be accessible to consciousness.

Major conceptualisations of emotion, such as the James-Lange theory, the Cannon-Bard theory, Schachter's two-factor theory, and Lazarus's cognitive appraisal theory focussed on the processes involved in emotional experiences. Emphasis has varied from the role of the environment, to feedback from bodily and other sensations.

Eysenck (1997) has suggested that each of these approaches has been limited by its specificity.

General Theories of Anxiety

Trait Anxiety Theories

Anxiety is cited as being one of the major emotional response styles in almost all general theories of emotion (Eysenck, 1992). One of the principal Big Five factors is often referred to as trait anxiety, neuroticism, or negative affectivity (Meyers, 1986). Watson and Clark (1984) suggested that these three terms actually refer to essentially the same personality factor. There have been numerous attempts to account for differences in trait anxiety. Some theories have emphasised the role of heredity and individual differences in physiological activity (Gray, 1982), whilst others have focussed on the role of cognition (Eysenck, 1992).

In his theory of trait anxiety, Gray (1982) assumed that individual differences in trait anxiety are dependent on genetic factors, and that these factors influence the level of anxiety via individuals' physiology. Some research from twin studies indicates that approximately 30% of the variance in self-reported trait anxiety may be explained by genetic factors (Eysenck, 1997). However, psychophysiological research employing a wide range of indirect physiological measures has failed to find consistent differences between those high and low in trait anxiety (Fahrenberg, 1992).

Weinberg, Schwartz, and Davidson (1979) suggested that individual differences in coping styles may be masking differences in trait anxiety responses. This assumption was tested by collecting both trait anxiety and social desirability scores from a group of participants. Individuals, who obtained low scores on social desirability, as well as trait anxiety, were classified as truly low anxious, whereas those who scored high on social desirability, but low on trait anxiety were classified as repressors. When exposed to a moderately anxiety-provoking situation, the physiological responses observed in the repressors were significantly stronger than those shown by the truly low anxious group and. In addition, the repressors were more physiologically responsive than the truly high-anxious participants on most measures. This finding has been replicated by other researchers (e.g., Brown, Tomarken, Orth, Loosen, Kalin, & Davidson, 1996), indicating that the failure to find consistent relationships between physiological responses and trait anxiety may be due to the high level of physiological responsiveness, associated with low self-reported anxiety shown by repressors.

Gray's (1982) theory of trait anxiety is somewhat limited in that genetic factors determine only some of the individual differences in trait anxiety, and these differences are difficult to demonstrate (Eysenck, 1997). More importantly, such an approach neglects environmental influences on trait anxiety and the role of learning (the cognitive system). Gray's theory also predicts that individuals with highly responsive psychological systems will be anxious across virtually all stressful situations, but Eysenck (1993) has highlighted the absence of evidence in support of such a hypothesis.

Alternative cognitive approaches to trait anxiety have been proposed by Williams, Watts, MacLeod and Mathews (1997) and Eysenck (1992). Researchers examining these approaches have succeeded in establishing consistent differences in a range of cognitive biases between individuals high and low in trait anxiety. Eysenck (1992) has discussed some of these, including selective attentional bias, interpretative bias, negative memory bias, and implicit memory bias.

Available evidence suggests that a satisfactory theory of trait anxiety must include a detailed consideration of the functioning of the cognitive system. Previous theories have had only limited success in this direction. Eysenck's unified theory of anxiety and cognition incorporates such a perspective.

Eysenck's Unified Theory of Anxiety and Cognition

Eysenck (1997) proposed a theory of emotion (specifically tailored to anxiety) that synthesises the appraisal and feedback approaches. The theory is based on the understanding that the experience of anxiety is influenced by four sources of information; cognitive appraisal of the situation, perceived level of behavioural anxiety, perceived level of physiological anxiety, and negative cognitions from long term memory. The effects of these four sources of information on experienced anxiety depend on attentional and interpretive biases normally operating below the level of conscious awareness (including the effects of schemas), and they become more intense as state anxiety increases. Eysenck's four-factor theory of emotion is illustrated in Figure 4.5.

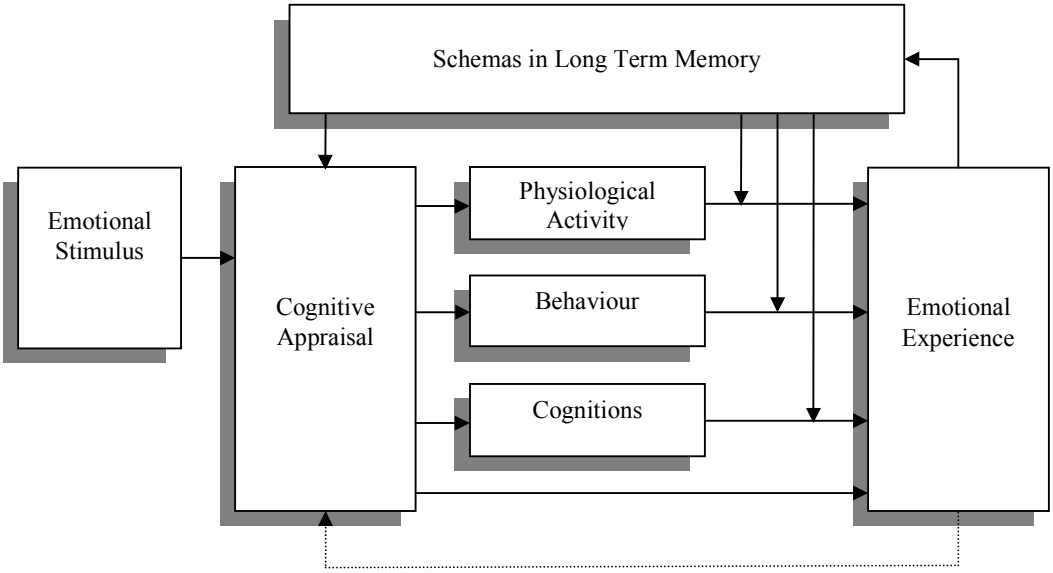

Figure 4.5. Eysenck's (1997) Four-Factor Theory of Trait Anxiety

Of the four sources of information highlighted in the model, cognitive appraisal of the situation is considered the most important determinant of the emotional experience. The level of physiological activity is influenced by cognitive appraisal of the situation, however physiological activity's impact on anxiety is dependent on (1) the degree to which selective attention is directed towards or away from physiological activity, and (2) the interpretation of perceived physiological activity as threatening or non-threatening. Cognitions based on information stored in long-term memory form another source of information for the experience of anxiety (for example, worries). Eysenck (1997) suggested that it is not the number of worries present in long-term memory, but the tendency to attend selectively to such information in conjunction with its interpretation.

The final source of information influencing the experience of anxiety is based on the individual's action tendencies and behaviour. Eysenck defined behaviour as all of the observable overt evidence that can be used to infer a person's level of anxiety. Although behaviour can have some influence on the experience of anxiety, what is more important is the extent of the individuals' selective attention to their behaviour, combined with how that behaviour is interpreted.

The broken line running from the emotional experience back to cognitive appraisal of the situation relates to the possibility that the emotional experience itself may affect further cognitive appraisal. The line is broken because it remains unclear whether cognitive appraisal is affected by emotional experience.

There are two other important issues relating to Eysenck's theory. The first of these is the prediction that attentional and interpretive biases are hypothesised to be influenced by schemas operating below the level of conscious awareness. The second assumption is that prevailing state anxiety will increase cognitive biases. Eysenck (1997) highlighted the proposal that this situation may result in a positive feedback mechanism, whereby cognitive biases influence state anxiety, which in turn leads to more cognitive biases.

In summary, Eysenck's four-factor theory of trait anxiety offers a comprehensive framework that aids in understanding the anxiety response, and developing interventions targeting specific elements of this response. This framework closely fits the theory of REBT as proposed by Ellis (1962, 1994).

Ellis's Theory of Emotional Disturbance

Background

Incorporating a somewhat similar structure in many respects to Eysenck (1997), Ellis (1962, 1994) developed his own theory of personality and emotional disturbance, Rational Emotive Behaviour Therapy (REBT). David, Szentagotai, Eva, & Macavei (2005) noted that REBT is the first form of cognitive behaviour therapy (CBT), created by Ellis in 1955. Descriptions of REBT range in breadth from a structured approach to emotional problem-solving (Dryden & DiGuiseppe, 1990) to a profound philosophy of personality (Weinrach, 1996). Irrespective of the relative prominence attached to this psychological theory, most REBT practitioners agree with its founder Albert Ellis, who highlights the fact that it is an efficient and effective form of therapy (Ellis, 1962, 1994).

In its most fundamental form, the theory of REBT emphasises the influence of people's cognitions, emotions, and behaviours on their psychological well-being. Ellis (1962, 1994) proposed that humans are both rational (self and socially helping), and irrational (self and socially defeating). Although Ellis highlighted the interrelationships between, and relative importance of, each of these three processes, he primarily emphasised the role of cognitions in emotional dysfunction. More specifically, Ellis predicted that most emotional disturbance is largely the result of dysfunctional thought processes, and by changing these thought processes, emotional disturbance can be minimised. In the following section, I discuss those aspects of the theory of REBT that have particular relevance to this thesis.

The Theory of REBT

Weinrach (1996) noted six principles of REBT. These include the primacy of cognition in emotion, the premise that dysfunctional thinking is a major determinant of emotional disturbance, the proposal that disturbance is largely caused by holding irrational beliefs, the premise that both environmental and genetic influences lead to irrational thinking, the proposition that efficient therapy focuses on present, rather than historical, influences on emotion and behaviour, and, finally the premise that beliefs can be changed.

Basic Biological Tendencies

Based on his personal experience in thousands of counselling sessions, Ellis (1994) hypothesised that all humans have two opposing innate tendencies. The first of these is an irrational thinking tendency, or a propensity to escalate strong desires and preferences into absolute musts. This tendency is critical to the practice of REBT, and holds a primary position in the process of emotional dysfunction. Ellis also proposed that humans have a self-actualising tendency, or an urge to be strongly proactive, to be motivated and compelled to change things for the better. It is this second tendency that gives humans the ability to strive to overcome the first, and thereby rise above emotional disturbance. In addition, this tendency highlights the positive self-enhancing qualities of the theory, which are often lost in its psychotherapeutic emphasis (Bernard, 1995).

REBT and Emotions

Before discussing the specific details relating to the theory of REBT it is worth noting how emotions are conceptualised. Reid (1950) defined emotion as:

> (1) an introspectively given affect state, usually mediated by acts of interpretation; (2) the whole set of internal psychological changes, which help (ideally) the return to normal equilibrium between the organism and its environment, and (3) the various patterns of overt behaviour, stimulated by the environment and implying constant interactions with it, which are expressive of the stirred up physiological state (2) and also more or less agitated psychological state (1) (Reid, 1950, p. 55).

This definition highlights the symbiotic relationship between cognitions, physiology, and behaviour (Ellis, 1994). Ellis went further to claim that emotion can have any one or more of the following origins and pathways; (a) through sensorimotor processes, (b) through biophysical stimulation, and (c) through cognitive and thinking

processes. Based on this, Ellis (1994) postulated that emotions can be controlled in four ways; (a) by electrical or biochemical means, (b) by using one's sensorimotor system, (c) by using one's existing emotional states as motives to change, and (d) by using one's cerebral processes. Although all of these processes are interrelated, the theory of REBT tends to emphasise cognitions as primary mediators of change.

The ABC Framework of REBT

David et al. (2005) noted that the "ABCDE" model is the cornerstone of REBT and in various forms can be found in all cognitive-behavioural psychotherapies. In the original and somewhat overly simplistic structure of the ABC's of REBT, Ellis (1994) suggested that, when individuals' experience an activating event (A) they interpret as aiding or confirming their goals and values (G), they usually react cognitively with a preferential belief system (B), and experience pleasurable consequences (C's). Alternatively, when individual's goals and values are blocked by negative activating events, they have a conscious or unconscious choice to respond with either healthy negative emotional consequences or unhealthy negative emotional consequences at point C, based on their cognitions (more specifically beliefs) at point B. Ellis proposed that healthy negative emotional consequences about negative activating events that have the potential to block individuals' goals, are created by believing in functional or rational beliefs at point B. Alternatively, unhealthy, self-defeating, negative emotional consequences at point C are usually created by believing in dysfunctional and irrational beliefs at point B. Ellis hypothesised that a new effective philosophy (E) could be attained by engaging in cognitive, emotional, or behavioural disputation at point D (see Figure 4.6).

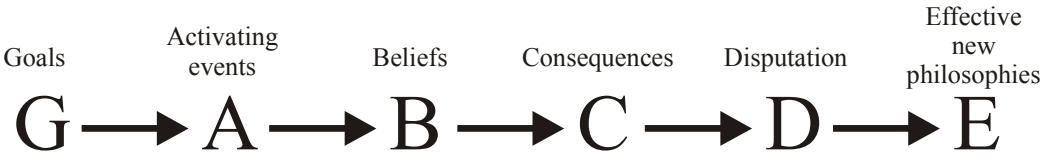

Figure 4.6. The Expanded ABC's of REBT.

This simplified conceptualisation is useful in that it provides an instructional account of emotional experiences, and helps clients see that they have some control over their experiences (Wessler & Wessler, 1980). The subtle nuances of the theory, however, may be gained best from a detailed breakdown and analysis of the expanded ABC framework.

Goals

Ellis (1994) hypothesised that all people enter situations with goals that consist of purposes, values, standards, and hopes. Goals can be learned or biological propensities, and are often practised or made habitual. Ellis (1994) proposed that they include cognitive, emotive, behavioural, and physiological elements, that they can be healthy or unhealthy, and that they can exist at the conscious or subconscious level. Goals provide a context that affects how people perceive their activating events and evaluate their world (Ellis, 1994). Ellis clearly defined the role of goals in the ABC framework when he stated,

> Almost all humans seem to be born and reared with strong tendencies to see their world and their life as benign rather than malevolent; to see their environment and other people as meaningful (including predictable, controllable, and just); to view others as a source of support and happiness rather than a source of insecurity and unhappiness; and to see their traits as capable, good, and lovable rather than incapable, bad, and unlovable. (Ellis, 1994, p. 77).

Activating Events

Ellis (1994) used the category of activating events to describe a sequence of events that occur in the early stages of sensation and perception. Using the basic example of an external event, Ellis suggested that a stimulus is transmitted by an external happening, the sensory system responds, sensation is experienced, and that sensation is interpreted (Ellis, 1994). Ellis has sometimes referred to these initial interpretations as cool or descriptive cognitions, for example, “This is a paragraph,” or warm or evaluative cognitions, e.g., “I like this paragraph.”

Activating events are not necessarily external stimuli. Ellis suggested that A’s can be anything individuals are capable of contemplating. A’s can include content from past memories that is realistically or distortedly stored in individuals’ memory system. A’s can be anything from individuals’ current experience. A’s can be anything from individuals’ fantasised future.

Initially, the simple forward moving ABC sequence occurs. When the A extends well into the higher levels of the brain, then B and C (emotions and behaviours) can affect the A. An activating event that begins with a current external stimulus situation extends all the way up the sensory association areas before it can activate B level processes. Such B level processes can feedback to the association areas and direct

subsequent perception. Ellis produced Figure 4.7 to further clarify where and how the interactions among the A's, B's, and C's are possible.

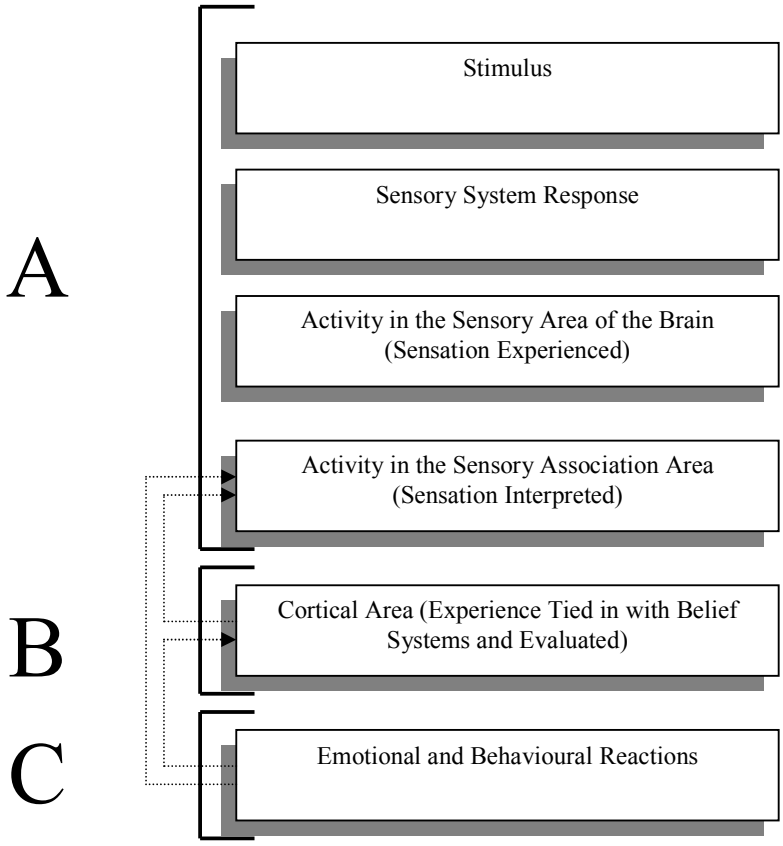

Figure 4.7. Possible Interactions among A's, B's, and C's (Ellis, 1994).

Wessler and Wessler (1980) noted that this model is somewhat confusing, because of the cognitive content of activating events and the potential confusion between this content and beliefs. In an attempt to clarify further the definitional characteristics of Ellis's original model, Wessler and Wessler (1980) provided a somewhat expanded definition of an activating event (see Figure 4.8).

	Step	Event
A	1. Reality	Stimulus (S)
	2. Input and Selection	S competed with other stimuli: Awareness of S
	3. Definition and description	What S is: $S=S^1$: Covert and overt verbal description of S
	4. Interpretation	Non-observable aspects of S^1 or of observer

Figure 4.8. Processes Associated with the A Component of REBT (Adapted from, Wessler & Wessler, 1980).

According to Wessler and Wessler (1980), an emotional episode is initiated by an overt or covert stimulus, such as a change in circumstances or a reflection (Step 1). Step 2 refers to the process of input and selection, and is characterised by the physiological processes involved in generating an awareness of the stimuli over other thoughts, and/or other physiological arousal, and/or other external noise. Step 3 is a distinctly cognitive step, which consists of the definition and description of perceptions. In this step, the incoming information is organised and categorised. Step 4, interpretation, refers to the making of inferences or interpretations about non-observable aspects of the perceived stimulus (S′) or about oneself. These interpretations can be relatively enduring or relatively specific. Combined, these four steps comprise the activating event in Ellis's ABC model.

An alternative conceptualisation was offered by Dryden (1994), who defined an activating event as, "a situation, or an aspect of a situation, which can potentially serve to trigger a person's belief" (p. 9). These situations may have occurred in the past, may be currently occurring, or may involve hypothetical future events. In addition, A's can refer to internal events, such as bodily sensations, thoughts, intentions, images, dreams, and fantasies (Dryden, 1994). More specifically, Dryden (1994) hypothesised that activating events include the actual event itself, the individual's interpretation of that event, and inferences made by the individual. By definition, actual activating events do not add to what can already be observed. Interpretations go beyond the data, in that they are hypotheses about reality. Inferences differ from interpretations in that they are personally significant to the individual and are associated with emotional experiences (Dryden, 1994).

Structurally, actual activating events, interpretations, and inferences are linked together in a chain. This is an important concept because inference-chaining procedures are often used to determine core philosophies (Moore, 1983, Neenan & Dryden, 1996). Of particular relevance to REBT is what is termed the critical activating event, or that event in the chain that triggers the person's belief. Dryden (1994) noted that inferences often serve as critical activating events, because individuals generally respond to views they take of events, rather than the events themselves. In addition, from a therapeutic perspective, Dryden (1994) proposed the discovery of the critical activating event often triggers awareness and verbalisation of the underlying belief held.

Beliefs

Bernard and Joyce (1984) highlighted the importance of beliefs to the theory of REBT by noting that, if one could map out the beliefs individuals hold, the degree of endorsement of these beliefs, and the degree to which the beliefs are taken literally, it would be possible to understand people's personality. Ellis (1997) noted that people can have almost innumerable beliefs that serve as mediators between A's and C's. Walen, DiGuiseppe, and Dryden (1992) defined an irrational belief as "a thought that is logically incorrect, inconsistent with empirical reality, or inconsistent with one's long-term goals" (p. 358).

Ellis (1994) differentiated between activating events and beliefs by assigning an evaluative component to the belief. Ellis (1994) suggested that evaluations are one of the key ingredients of emotion. Weinrach (1996) noted that this emphasis is one of the main differentiations between REBT and other forms of Cognitive Behaviour Therapy, in that REBT clearly specifies a specific set of beliefs underlying disturbance. Based on this, Ellis has termed beliefs as "strongly evaluative" cognitions (Ellis, 1994). Wessler and Wessler (1980) suggested that beliefs include appraisal, where a positive, negative, or neutral value is assigned to the activating event. Dryden (1994) expanded on this understanding, noting that beliefs differ from inferences in that they involve the individual making a judgement about something. Ellis (1994) defined evaluation as the process of perceiving something as "good" or "bad", "pleasant" or "unpleasant", "beneficial" or "harmful" and responding positively or negatively. He noted that evaluating seems to operate in a feedback loop whereby perception biases responses, and responses bias perception. For example, individuals emote when they evaluate something strongly and respond to it strongly. Emoting also usually involves some kind of bodily sensation, which, when perceived, may exacerbate the original emotion. Ellis went on to suggest that most emotion is a kind of appraisal or thinking that (a) is strongly slanted or biased by previous perceptions or experiences, that (b) is highly personalised, that (c) is often accompanied by gross bodily reactions, and that (d) is likely to induce the emoting individual to take some kind of positive or negative actions. In addition, thinking and emotion act in a circular cause-and-effect relationship. Ellis highlighted the importance of emotions by noting that both brief and sustained emotions are useful in helping the individual to evaluate and move towards favourable events and appraise and move away from obnoxious ones. Ellis further highlighted that, if thinking almost always accompanies feeling, and most thinking is done in the form of words,

phrases, and sentences, it would appear that much of our emoting takes the form of self-talk or internalised sentences. Ellis stressed, however, that human thinking is complex, consists of more than internalised sentences, and may include images, symbols, thought feelings, and thought reactions.

Ellis (1994) described cognitions as being cool, warm, or hot. Cool cognitions are descriptive, warm cognitions are evaluative, and hot cognitions are strongly evaluative. REBT theory postulates that warm cognitions or evaluations almost always accompany, or partially cause, feelings or emotions, whereas hot cognitions or strong evaluations almost always accompany and partially cause strong and sustained feelings. When hot cognitions are absolutistic and imperative, they tend to go with, significantly contribute to, and partially cause self-defeating feelings, or what are termed emotional disturbances. Ellis generally used the terms healthy negative feelings and unhealthy negative feelings when differentiating between the two, and postulated that there is an optimal balance of positive and negative emotional states.

Walen, DiGiuseppe and Dryden (1992) stated that the core irrational beliefs of REBT are demands, awfulising, low-frustration tolerance, and global evaluations of human worth. Ellis (1994) provided definitions of these core irrational beliefs, including demandingness, or the idea that "One absolutely must be competent, adequate, and achieving in all important respects or else one is an inadequate, worthless person" (p. 109); awfulising, or the idea that "it is awful and terrible when things are not the way one would very much like them to be" (p. 114); low-frustration tolerance, or the idea that "you must be quite dependent on others and need them and cannot mainly run your own life" (p. 124); and global evaluations of human worth, based on the idea that "People absolutely must act considerately and fairly and they are damnable villains if they do not. They are their bad acts" (p. 111). The theory is based on the belief that active-directive disputation of these basic core philosophies (absolute demands and musts and related evaluations) can result in profound philosophical change.

Differentiation between beliefs and inferences is of paramount concern in the practice of REBT. Based on this, Dryden and DiGuiseppe (1990) noted that the most frequent error made by new REBT therapists is disputing the inference instead of the irrational beliefs. Inferential disputation may result in the modification of inferences, however, according to the theory of REBT, the underlying irrational beliefs will remain (Bernard, 1991). Inelegant REBT often involves disputing inferences, whereas elegant REBT involves deeper philosophical disputation (Ellis, 1994). Dryden (1991) predicted

that the identification and restructuring of irrational beliefs an individual holds with rational ones will often result in a spontaneous reduction in the number of negative inferences. In addition, such an approach is hypothesised to empower the person to handle a range of specific and general situations in the future (Dawson, 1991).

Eschenroeder (1982) noted that images may also form part of the belief. More abstract beliefs are not necessarily verbalised and constitute the enduring "assumptive framework" by which people evaluate, appraise, and form conclusions about what happens around them. Such beliefs may be inferred from the types of thought-statements people are able to articulate, as well as the patterns of behaviour exhibited by them (Bernard & Joyce, 1984). Related to this, Vygotsky (1962) noted that thoughts and language are not synonymous. Children think before they develop linguistic abilities, therefore people's early thoughts appear not to be encoded in the words of spoken language. Even when language is developed, thoughts can still be generated without spoken language (Vygotsky, 1962). Using this differentiation between thought and language as a basis, effective REBT may involve extracting thoughts and converting them into a recognisable form of language. Related to this, Bernard and Joyce (1984) used an illustration to highlight the fact that thoughts differ in terms of how accessible they are (See Figure 4.9).

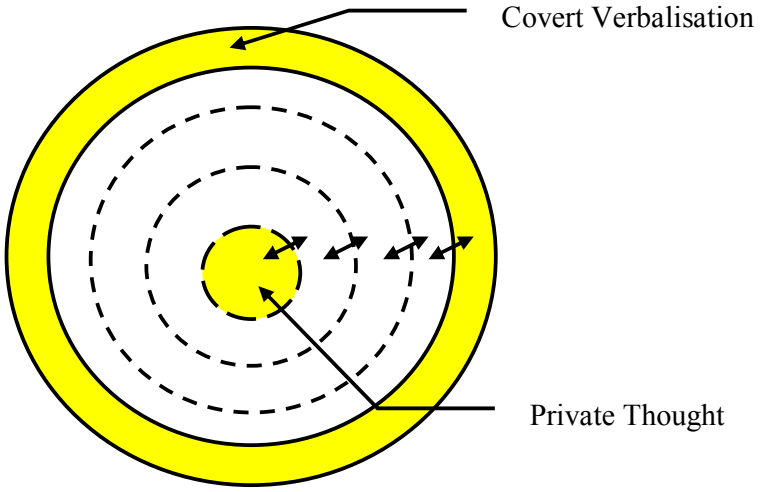

Figure 4.9. A Model of Private Thought (Bernard & Joyce, 1984, p. 57).

In the model in Figure 4.9, the outermost ring represents thoughts of which the individual is immediately aware. These thoughts are hypothesised to closely correspond to covert verbalisations and external speech (Bernard & Joyce, 1984). The smaller inner circles represent abbreviated and elliptical forms of thought. These inner circles are

further from the conscious awareness of the individual, and are the source of most core thoughts. When relating the predictions of this model to REBT theory, Bernard and Joyce hypothesised that the core beliefs held by individuals will fall in the small inner circles, and inferences tacitly derived from these beliefs will be present in the outermost rings. The model also highlights the point that it takes hard work to get at core beliefs, and this process necessarily entails the transformation of covert verbalisations into semantically definable and generalisable concepts. Bernard and Joyce (1984) used the metaphor of peeling away at an onion to represent the process of exposing people's underlying beliefs.

Grieger (1985) described this conceptualisation in a different manner. He suggested that human cognition can be differentiated by a number of categories arranged from the more general and philosophical to the more specific. The more general the cognition, the more likely the cognition is to be beyond awareness, the more pervasively the cognition is likely to influence the person's life, and the more the cognition directs how the person will respond in any given situation. Grieger termed these pervasive cognitions "life positions", relabelling what Ellis (1962, 1994) termed beliefs.

Aside from these details, cognitive-behavioural therapies have a common assumption that certain types of beliefs lead to functional emotions and inferences, and that other types of beliefs lead to dysfunctional emotions and inferences (Beck, 1976; Ellis, 1962; Lazarus, 1991). In REBT, Ellis (1994) maintained that those beliefs that lead to functional inferences, emotions, and behaviours are called rational beliefs, and those that lead to dysfunctional inferences, emotions, and behaviours are called irrational beliefs. It its simplest form, this distinction has been delineated by Ellis and Dryden (1987) who stated that "rational" in REBT theory "means that which helps people to achieve their basic goals and purposes, whereas irrational means that which prevents them from achieving these goals and purposes" (p. 4).

Dryden (1994) noted that rational beliefs are flexible, logical, consistent with reality, and promote the achievement of goals. Alternatively, irrational beliefs are rigid and absolutistic, illogical, inconsistent with reality, and hinder goal achievement (Dryden, 1994). According to REBT theory, irrational beliefs take the form of musts, absolute should's, have to's, got to's, and so forth, whereas rational beliefs generally involve preferences (Ellis, 1994). Bond and Dryden (1997) went further to hypothesise that irrational beliefs lead to dysfunctional inferences, and that the content of the

irrational belief determines the theme of the inferences. Alternatively, rational beliefs typically lead to functional inferences. People who have an irrational belief with threatening content may form a dysfunctional inference, such as "I cannot cope with this situation"; whereas, people who have a rational belief with threatening content may form a functional inference, such as "I will do my best to cope with this threatening situation, if and when it occurs" (Bond & Dryden, 1997). Therefore the content of the rational or irrational belief affects aspects of inferences and emotions.

When commenting on the nature of rational and irrational beliefs, Walen et al. (1992) furthered this conceptualisation by stating,

> The distinction between the consequences of rational and irrational thinking is reflected in the frequency, intensity, and duration of the negative affect, rather than its presence or absence. If emotional turmoil blocks constructive action, it is consequently self-defeating and non-adaptive for the individual. (p. 21).

This comment highlights the interplay between irrational beliefs, affect, and behavioural outcomes.

Ellis (1994) hypothesised that there are three major irrational beliefs or absolutistic musts people tend to hold that very frequently cause maladaptive emotional and behavioural consequences. These include self-demandingness, other-demandingness, and world-demandingness. All irrational beliefs that accompany neurotic disturbance can be categorised under these three superseding mustabatory headings (Ellis, 1994). Walen, DiGuiseppe and Dryden (1992) proposed that demands reflect "unrealistic and absolute expectations of events or individuals" (p. 17). They are often recognisable by cue words, such as 'must', 'ought', 'should', 'have to', and 'need'. Ellis (1994) argued that there are three sub-categories of demands held by clients. These include demands about the self, frequently revealed in statements, such as "I must do well to be approved of by significant others", demands about others, expressed in statements, such as "You must treat me fairly", and demands about the world, that often take the form of "Things must be the way I want them to be". Ellis further postulated four forms of thinking that are logical derivatives of these basic musts, including awfulising, Low-frustration Tolerance (LFT), damnation, and always-and-never thinking. Awfulising has been defined as the situation whereby people perceive a situation as being more than 100% bad, or worse than it absolutely should be (Dryden & DiGuiseppe, 1990). The alternative to this is moderate evaluations of badness. Low-frustration Tolerance or LFT refers to the evaluation that people will be

unable to endure certain situations, if what they demand must not exist actually exists (Dryden & DiGuiseppe, 1990). The alternative to this is high frustration tolerance, evidenced by statements of toleration. Damnation refers to a set of evaluations that are exceptionally critical of self, others, and life situations (Dryden and DiGuiseppe, 1990). The alternative to this is an acceptance of fallibility in self, others, and of life conditions. Always and never thinking involves an insistence on absolute evaluations (Dryden and DiGuiseppe, 1990). The alternative to this is flexible thinking with respect to the occurrence of events.

Alternatively, Ellis (1994) hypothesised that rational beliefs take the form of desires, wishes, wants, and preferences. When people adhere to flexible premises, they also tend to draw rational conclusions, which may include moderate evaluations of badness or the belief that things are bad, but not terrible, when faced with a negative activating event; statements of toleration or the expression of tolerant views, such as I don't like it, but I can bear it; acceptance of fallibility or an acceptance of the self and others as fallible human beings who cannot be legitimately given a single global rating, and an acceptance of the world and life conditions as being composed of good, bad, and neutral elements; and flexible thinking with respect to the occurrence of events, or an understanding that most events can be placed on a continuum from occurring very rarely to occurring very frequently (Dryden & DiGuiseppe, 1990).

Consequences

In the A-B-C framework, C stands for the consequences of one's beliefs about activating events. Ellis (1994) proposed that C's usually consist of cognitive, physiological, and behavioural components (Ellis, 1994). C's often form the primary target for change in the eyes of most clients.

Ellis (1994) conceded that, occasionally, emotions may occur in the absence of thought, but hypothesised that sustained emotion is normally associated with, and is the direct result of, sustained thinking. C's that follow from A's and B's are rarely monolithic, more often partially including and interacting with A's and B's (Ellis, 1997). The consequences that follow from irrational beliefs are called inappropriate negative consequences, and the consequences that follow from rational beliefs are termed appropriate negative consequences (Ellis, 1994). Other writers have noted that rational beliefs may occasionally result in extreme levels of emotion, but that these levels are not perceived to be upsetting to the individual (Bernard & Joyce, 1984; Walen, DiGuiseppe, & Wessler, 1980).

According to Ellis's (1994) conceptualisations of REBT, a unitary model of distress is not viable (e.g., in stressful situations, high distress levels produce high levels of negative affect; low distress levels produce low levels of negative affect). Instead, Ellis (1994) postulated a binary model of distress, whereby people can concurrently experience both functional and dysfunctional negative emotions, the functionality of these emotions being based on the subjective experiences, associated cognitions, and behavioural consequences of these feelings (Ellis & DiGiuseppe, 1993). According to the binary model of emotions, functional negative experiences would include negative subjective experiences, rational beliefs, and adaptive behavioural consequences, whilst dysfunctional negative feelings are defined by negative subjective experiences, irrational beliefs, and maladaptive behavioural consequences (Ellis & DiGiuseppe, 1993). David, Montgomery, Macavei, and Bovbjerg (2005) noted that dysfunctional negative feelings correspond to clinically significant problems, such as anxiety, anger, and depression, whereas functional negative feelings, such as concern, annoyance, and sadness, correspond to normal negative reactions by people facing stressful events. Further, Ellis (1994) indicated that functional and dysfunctional negative feelings can independently be of low, medium, or high intensities. In the sport setting, it might be functional to be concerned about an upcoming event (with associated rational beliefs and adaptive behaviour), but dysfunctional to experience anxiety in response to the same event (with associated irrational beliefs and maladaptive behaviour). Preliminary research is providing support for this distinction proposed by Ellis (e.g., David et al., 2005; David et al., 2002; David et al., 2004).

Dryden (1994) summarised this proposition by noting that rational emotive behavioural theory proposes that people can hold rational and irrational beliefs at the same time. As a result of this distinction, people can also concurrently hold healthy (constructive) and unhealthy (unconstructive) negative emotions, unconstructive negative emotions tending to be experienced as more aversive than constructive negative emotions. Dryden used the emotions of anxiety and concern to describe this distinction. Anxiety is seen to be an unconstructive negative emotion, because it is characterised by task-irrelevant thoughts, decreasing concentration, and resulting poor task performance. Alternatively, concern is characterised by more task-relevant thoughts coupled with increased concentration and good task performance. Dryden highlighted the qualitative difference between constructive and unconstructive negative

emotional outcomes diagrammatically. The commonly held error of combining two different forms of emotion is illustrated in Figure 4.10.

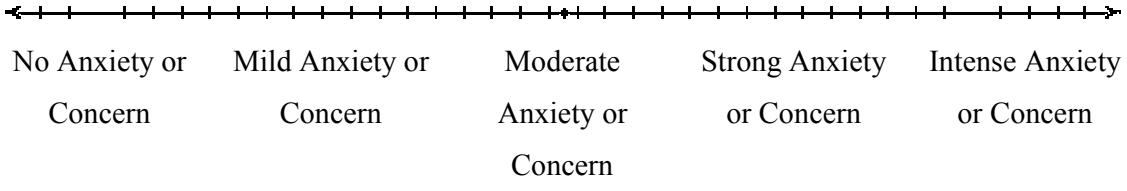

Figure 4.10. Single Continuum Showing no Differentiation between Anxiety and Concern (Dryden, 1994, p. 55).

In a binary model, as shown in Figure 4.11, anxiety and concern are placed on separate continua. With this understanding, it is possible for an individual to experience no anxiety and intense concern at the same time. These continua are completely interdependent, and therefore need not run in parallel.

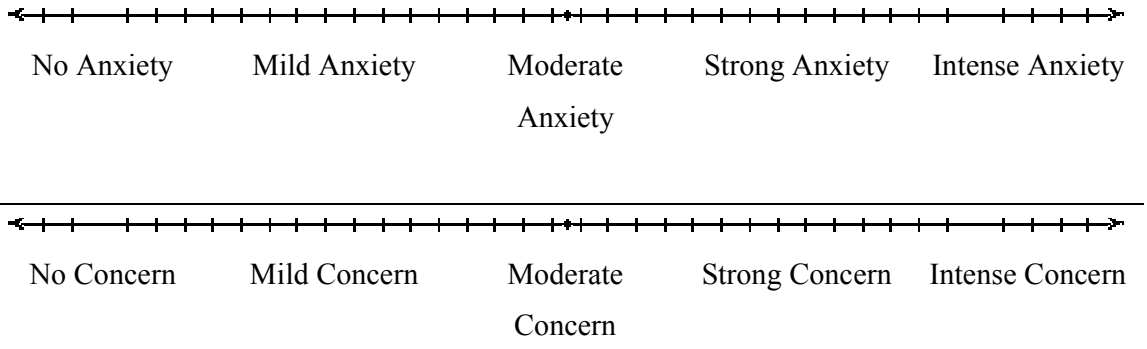

Figure 4.11. Two Continua Showing Differentiation between Anxiety and Concern (Dryden, 1994, p. 55).

In this manner, attempts have been made to distinguish between a range of helpful and harmful emotions in the literature. One example of this was provided by Dryden and DiGuiseppe, (1990; See Table 4.1).

Table 4.1

Inappropriate and Appropriate Negative Emotions and their Cognitive Correlates (Dryden & DiGuiseppe, 1990)

Inference Related to Personal Domain	Type of Belief	Emotion	Appropriateness of Emotion
Threat or danger	Irrational	Anxiety	Inappropriate
	Rational	Concern	Appropriate
Loss (with implications for future); failure	Irrational	Depression	Inappropriate
	Rational	Sadness	Appropriate
Breaking of personal rule (other or self); other threatens self; frustration	Irrational	Anger	Inappropriate
	Rational	Annoyance	Appropriate
Breaking of own moral code	Irrational	Guilt	Inappropriate
	Rational	Remorse	Appropriate
Other betrays self (self non-deserving)	Irrational	Hurt	Inappropriate
	Rational	Disappointment	Appropriate
Threat to desired exclusive relationship	Irrational	Morbid jealousy	Inappropriate
	Rational	Non-morbid jealousy	Appropriate
Personal weakness revealed publicly	Irrational	Shame	Inappropriate
	Rational	Regret	Appropriate

Rational-emotive behavioural therapists do not generally target healthy negative emotions for change because they are deemed to be consequences of rational thinking (Ellis, 1994). Dryden (1994) suggested that most individuals hold both rational and irrational beliefs in varying degrees of conviction. The purpose of therapy is to remove any conviction people may hold towards irrational beliefs, and strengthen their conviction towards rational beliefs. The goal of therapy, thus, is to cause a shift from unconstructive negative emotions to constructive negative emotions that will result in a reduction in the intensity of anxiety, and the generation of constructive emotional responses, such as concern.

In a study exploring the associations between appraisal and beliefs, David et al. (2002) explored the attributions, appraisal, irrational beliefs, and emotions of 120

undergraduates when the students reported on past encounters associated with various negative events. David et al. distinguished between functional and dysfunctional negative emotions (concern vs. anxiety; sadness vs. depression; remorse vs. guilt; annoyance vs. anger). Without going into detail regarding the association between appraisals and beliefs, this study uncovered considerable information relating to the types of beliefs underlying various emotions. In particular, the authors observed that anxiety significantly correlated with demands ($r = 0.80$), awfulising ($r = 0.77$), low-frustration tolerance ($r = 0.65$), and self-downing ($r = 0.31$). Anger significantly correlated with low-frustration tolerance ($r = 0.57$), demands ($r = 0.55$), awfulising ($r = 0.47$), and self-downing ($r = 0.26$). Depression significantly correlated with demands ($r = 0.77$), awfulising ($r = 0.62$), and low-frustration tolerance ($r = 0.62$).Finally, guilt significantly correlated with demands ($r = 0.78$), awfulising ($r = 0.64$), low-frustration tolerance ($r = 0.58$), and self-downing ($r = 0.27$).

There were smaller but significant correlations between annoyance and the irrational beliefs of demands, awfulising, low-frustration tolerance and self-downing, whereas no significant correlations were observed with all other negative helpful emotions assessed including concern, sadness, and remorse. These findings would appear to imply that, in general, harmful negative emotions are associated with the major types of irrational beliefs whereas helpful negative emotions are not characterised by such beliefs.

Disputation

Ellis (1994) suggested that one of the best methods to help reduce or remove emotional disturbances is to actively challenge or Dispute (D) irrational beliefs, and help replace them with Effective (E) rational beliefs. Disputation refers to any method that demonstrates the irrationality of individuals' thinking, and subsequently helps them to acquire a more rational, non-absolute view of self, others, and the world (Ellis, 1994). Johnston (2001) noted that disputation of irrational beliefs is the most commonly utilised therapeutic strategy among therapists practicing REBT. Johnston described disputation as a debate (or challenge) usually logical or empirical, to the patients irrational belief system. In a more detailed account, Walen, DiGiuseppe and Dryden (1992) described the intent of disputation as to:

> Help the patient internalize a new philosophy . . . this basic goal in RET is known as the elegant solution. [Disputation], therefore, consists of two basic

> stages. The patient is helped to: 1. Examine and challenge his or her present mode of thinking. 2. Develop new more functional modes of thinking (p. 154).

In nearly all cases, disputing is first performed at the cognitive level, however, more active forms of disputation are also often applied, especially in the form of emotive and behavioural disputation homework tasks. Emotive disputation methods may include rational emotive imagery, shame attacking exercises, role-playing, forceful coping statements, forceful disputing, and humour, whilst behavioural methods may include exposure, in-vivo desensitisation, reinforcement, penalties, skill training, and assertiveness training.

Ellis (1994) also suggested that people's self-talk and internalised sentences stem from their basic implicit or tacit meanings and attitudes. People perceive an activating event and quickly refer it to their implicit core philosophy. They then immediately feel (emotion) and sometimes voice their core philosophy into words and sentences (behaviour). Ellis surmised that it is possible to sometimes feel an emotion without internal dialogue, but that people rarely feel emotion without an underlying belief or philosophy, which can usually be expressed in words. It takes more than changing self-talk sentences to change emotions. People need to believe in the changes made (Ellis, 1994). For more long lasting change, there needs to be a change in the meaning, which can be achieved by modified self-talk and a strong belief in the new sentences, but change can also be achieved in other ways, such as risk taking.

Walen et al. (1992) adopted Kuhn's (1970) philosophy of science as a model of cognitive functioning and change. Walen et al. (1992) suggested that there are a number of prerequisites for cognitive change, which include; a requirement for considerable empirical data to suggest that the inferences deduced from the belief are false; considerable logical inconsistency within the belief; a lack of heuristic value; and the availability of an alternative belief. In other words, individuals require evidence against their irrational belief and in support of an alternative rational perspective, they benefit from exposure to the illogical nature of their irrational beliefs, they are more likely to change their position when they see that their beliefs are blocking their goals, and they see that endorsing a more rational alternative will provide them with benefits in terms of goal attainment.

Secondary Emotional Problems

Ellis (1994) proposed that, for effective philosophical change, practitioners must often go beyond the primary emotional disturbance symptoms. Ellis distinguished

humans from other creatures by our unique ability to think about our thinking (Ellis, 1994). Ellis also highlighted the capacity people possess to engage in tertiary thinking, whereby they think about their thinking about thinking, for example, when people are considering their secondary neuroses in terms of psychotherapeutic change.

Following this reasoning, and the understanding that activating events can be thoughts, inferences, images, sensations, or behaviours, as well as an event that can be confirmed by neutral observers, people's emotional response may serve as activating events for secondary emotional disturbances (Ellis, 1994). For example, sports competitors may experience anxiety due to irrational beliefs held about particular activating events, such as the belief that "I absolutely must play all of my shots well", in an event. The symptoms of this anxiety may serve as a second activating event (A_2) for those players. For example, the competitors may start to notice their elevated heart rate, and draw on irrational beliefs about these symptoms, such as the belief that "I must not get overly aroused in competition". These beliefs would be predicted by the theory to further magnify the competitors' anxiety at C_2. In essence, these people are experiencing a secondary emotional disturbance (anxiety about arousal or somatic anxiety) about a primary emotional consequence (anxiety about performance), as illustrated in Figure 4.12.

Primary Emotional Sequence Secondary Emotional Sequence

$$A_1 \longrightarrow B_1 \longrightarrow (C_1 - A_2) \longrightarrow B_2 \longrightarrow C_2$$

Figure 4.12. Primary and Secondary Emotional Disturbances.

REBT distinguishes between two types of disturbance; ego disturbance and discomfort disturbance (Dryden, 1994). Discomfort disturbance (or anxiety) stems from irrational beliefs centrally concerned with comfort, whereas ego disturbance (or anxiety) is driven by irrational beliefs concerned with approval (Ellis & Dryden, 1997). The concept of secondary emotional disturbance is important to this thesis because sport anxiety measures are actually measuring inferences related to secondary emotional responses. For example, the items in the directional scale of the CSAI-2 ask participants to determine how debilitative/facilitative the thoughts and feelings they have relating to their emotional experience of anxiety will be to their subsequent performance. Given that these are inferences and not demands, they would be located at A_2 in figure 4.12.

Summarising the ABC's of REBT

In summary, Ellis (1994) described his theory in the following terms. When people's goals are thwarted or blocked by activating events inimical to these goals, they have a conscious and unconscious choice of responding with healthy or unhealthy negative consequences. If individuals hold a rational, self-helping belief system, the result will mainly be healthy emotional consequences, such as feelings of disappointment, sorrow, regret, and frustration, and healthy behavioural consequences, such as trying to change, improve, or stay away from such activating events. If individuals hold an irrational belief system, the results will mainly be unhealthy emotional consequences, such as anxiety and anger, and unhealthy behavioural consequences, such as procrastination. In REBT, Ellis proposed a range of methods designed to dispute irrational beliefs and replace them with rational beliefs, with a primary emphasis on cognitive processes. In the theory, Ellis also distinguished between primary and secondary emotional disturbance, primary disturbance being associated with A's that are not direct manifestations of the emotional experience, whereas secondary disturbance is associated with inferences related to cognitions, physiological reactions, and behaviours that are associated with this emotional experience.

REBT Research and Measurement

Ellis (2003) noted that, despite being a pioneering cognitive behaviour therapy, REBT has been relatively neglected in the professional and scientific literature. He proposed a number of reasons for this, including the Albert Ellis Institute for Rational Emotive Behaviour Therapy's independence from academic institutions, limited funding, and emphasis on applied training. In addition, Ellis highlighted that REBT literature is liberally applied to broad-ranging disturbance as opposed to being tailored to specific conditions, and the theory includes a range of therapeutic strategies that can make it difficult to test specific hypotheses. Finally, Ellis suggested that people often associated his personality style with REBT, which is not exactly consonant with the scientifically respectable cognitive-behavioural therapy movement.

Not all reviews of cognitive behaviour therapy have been supportive. Eisner (2000) specifically criticized REBT with regards to its ambiguous definitions. He noted that research has not been able to shed light on the active ingredients of this therapy as there have been too few clinical trials whereby REBT has been compared to a control group or other psychotherapy. Further, Eisner highlighted that researchers have failed to include specific details pertaining to the type of intervention applied, leaving the 'active

ingredients' of therapy unclear. Eisner proposed that REBT may only be useful for verbal, high functioning clients who are capable of philosophical debate.

In response to the lack of research, and consequent lack of research support, Ellis (2003) suggested that considerably more outcome research is needed. He proposed that the core tenets of the theory of REBT be tested, that more research be conducted to compare the efficacy of REBT against other therapeutic systems, and that specific cognitive, emotive, and behavioural techniques be assessed for their relative contribution to change. It may be that Ellis's concerns are more a reflection of his predisposition to healthy scepticism and his drive for theoretical development, than a true indication of the current state of affairs. In a synopsis of REBT research, David, Szentagotai, Eva, and Macavei (2005) stated that "A balanced approach, analyzing both the strengths and weakness, suggest that REBT has hundreds of research articles and that high-quality studies tend to support REBT's basic theory and efficacy" (p. 175).

Measurement of Beliefs in REBT

In a review of early REBT research, Ellis and Whiteley (1979) cited support for a number of hypotheses critical to the formulation of REBT theory. Findings include the observation that cognition, feelings, and behaviour significantly overlap, and that changes targeting any one of these modalities can be effective at mediating harmful emotions; the finding that beliefs have a particularly central role in emotional disturbance by mediating the content of awareness, both semantically and in the form of images, fantasies, and dreams; and the important role secondary emotional disturbances (disturbances about disturbances) play in emotional dysfunction (Ellis, 1994, 1998; Ellis & Dryden, 1996; Ellis & MacLaren, 1998). Unfortunately, much of this research was contaminated by poor measurement devices. Haaga and Davison (1993) noted that early measures of irrational beliefs, such as the Rational Beliefs Inventory (RBI; Shorkey & Whiteman, 1977) and the Irrational Beliefs Test (IBT; Jones, 1968) have become outdated, as a result of contamination by affective items, and/or they reflected Ellis's earlier theories of irrational thinking.

Ellis's earlier conceptualisation of irrational thinking suggested a specific typology of beliefs, whereas current conceptualisations differentiate the process of thought from the content of thought, contain pure cognitive items, and often include separate scales for rational and irrational thinking (Lindner, Kirkby, Wertheim, & Birch, 1999). These new measures have enabled researchers to obtain evidence that supports the notion that rational and irrational thinking are not bi-polar constructs, in other words

high scores on an irrational belief scale do not necessarily correlate with low scores on rational belief scales (Bernard, 1998).

Four measures that assess such core beliefs include the Survey of Personal Beliefs (SPB: Kassinove, 1986), the Malouff and Schutte Belief Scale (MSBS; Malouff & Schutte, 1986), the Irrational Belief Scale (IBS; Malouff & Schutte, 1986), and the General Attitude and Belief Scale (GABS; Bernard, 1990). Lindner et al., (1999) noted that these questionnaires improve on their predecessors in that they contain cognitive items that are not contaminated by affective items, they differentiate the thought process from the content of the thought, and they include subscales that independently assess rational and irrational thinking.

The SPB is a 50-item scale that assesses five, 10-item subscales; Awfulising (e.g., "some situations in life are truly terrible"), low-frustration tolerance (e.g., "there are some things I just can't stand"), self-worth (e.g., "being ignored, or being socially awkward at a party would reduce my sense of self worth"), self-directed shoulds (e.g., "in some areas, I absolutely should be more competent"), and other-directed shoulds (e.g., "absolutely people must obey the law"). Respondents score each item on a 4-point scale ranging from 3 (*strongly agree), to 0, (strongly disagree*). The SPB has been found to exhibit sound psychometric properties (Kassinove, 1986).

The MSBS is a 20-item global assessment of irrational beliefs. Items are scored on a 5-point Likert scale ranging from 4, (*strongly agree), to 0, (strongly disagree).* Previous research has established the MSBS as a valid measure (Malouff, Schutte, & McClelland, 1992; Malouff, Valdenegro, & Schutte, 1987).

The IBS is a self-report measure of irrational beliefs intended to assess the major types of demandingness described by Ellis (Ellis, 1994). Malouff and colleagues demonstrated strong internal consistency (Malouff & Schutte, 1986) and high test-retest reliability and discriminant validity (Malouff, Valdenegro, & Schutte, 1987).

Burgess (1986) developed a 96-item measure of irrationality called the General Attitude and Belief Scale (GABS). This scale was criticised by Bernard (1990) on the grounds it failed to distinguish between the thought process and the content of the thought. DiGiuseppe, Leaf, Exner, and Robin (1988) modified the GABS, reducing it to 76 items, and then Bernard (1990) established a 55-item version of the test. Further work was carried out by on the 76 items to establish the 55-item version of the test. Results of a factor analysis by Bernard revealed one rationality subscale, and six dimensions of irrationality, including need for achievement, need for approval, need for

comfort, demand for fairness, self-downing, and other-downing. A total irrationality score could be obtained by summing scores from the six subscales that measured dimensions of irrationality.

Different versions of the GABS have been broadly used in investigations of anxiety, bulimia, agoraphobia, depression, premenstrual discomfort, and rehabilitation processes (Bernard, 1990; DiGuiseppe et al., 1988; Poulakis & Wertheim, 1993). In response to complaints about the considerable amount of time it took to complete the GABS, Lindner et al. (1999) developed a 26-item shortened version, which retained the original structure of the GABS, and was called the SGABS. WHEN completing this measure, participants are asked to respond to each item on a 5-point Likert response scale ranging from 1 (*strongly disagree*), to 5 (*strongly disagree*). An example of an item that forms part of the rationality scale of the SGABS is "I have worth as a person even if I do not perform well at tasks that are important to me." An example if an item from the need for achievement subscale is "It's unbearable to fail at important things, and I can't stand not succeeding at them." The SGABS has substantial test-retest reliability and construct validity (Lindner et al., 1999; MacInnes, 2003).

Meta-analyses of REBT

Researchers conducted two major meta-analyses exploring the efficacy of REBT in the early 1990's. Lyons and Woods (1991) analysed the results of 70 REBT outcome studies, yielding a total of 236 comparisons. Specifically, they addressed the efficacy of REBT in comparison to no treatment controls, attention control placebos, and cognitive behaviour modification. An effect size of 0.95 was obtained for REBT, and it was found to be more efficacious than all alternate therapies. With somewhat stricter inclusion criteria, Engles, Garnefski, and Diekstra (1993) conducted a meta-analysis of 28 controlled studies yielding 31 comparisons and reported that REBT yielded the highest overall effect size (1.62) when compared to systematic desensitization, combination treatments, and placebo conditions. In reviewing these meta-analyses, Daniel and Avellino (2002) came to the following conclusions: REBT is useful for a large range of clinical diagnoses and clinical outcomes; it is equally efficient for clinical and non-clinical populations, for a large age range (9-70), and for males and females; in general, there is no difference in efficacy between individual and group REBT format; the higher the level of training of the therapist, the more substantial the results of REBT intervention; and, finally, that increased numbers of REBT sessions correlate with greater therapeutic efficacy (a dose-response effect). More recent research has

continued to provide support for these findings (e.g., Bond & Dryden, 1997). Daniel and Avellino (2002) also noted that much REBT outcome research has been conducted with participants from sub-clinical populations. Daniel and Avellino described this as an asset, highlighting that the theory can be used for clinical, non-clinical, and sub-clinical populations.

Researchers exploring the relationship between beliefs and emotions in REBT have distinguished dysfunctional feelings from functional feelings in two major ways. Firstly, Ellis (1962) proposed that functional emotions differ from dysfunctional emotions in terms of intensity, with very intense feelings seen as being dysfunctional. There has been some research support for this proposal (e.g., Cramer & Buckland, 1996). Consistent with Ellis's (1994) revised conceptualisations, functional and dysfunctional feelings have also been found to differ qualitatively (e.g., David et al., 2002). Based on the very limited data available, it appears that irrational and rational beliefs are involved in the mediation of emotion, however, whether their impact is quantitative, accommodating a unitary model of distress, or qualitative, accommodating a binary model of distress, remains unclear.

As with the association between beliefs and emotions, there is a distinct lack of research relating to the association between beliefs and physiological indicators. Early research by Goldfried and Sobocinsky (1975) for example, observed a positive association between the endorsement of irrational beliefs and the intensity of physiological/emotional arousal. More recently, evidence has been obtained that shows a positive association between the endorsement of irrational beliefs and the intensity of anger and arousal (Eckhardt, Barbour, & Davidson, 1998).

Ellis (1962, 1994) predicted that irrational beliefs would be accompanied by dysfunctional behaviour, whereas rational beliefs would be associated with functional behaviour. Some research exploring the impact of irrational beliefs on procrastination has suggested that such beliefs may play a mediating role in this form of behaviour (Beswick, Rothblum, & Mann, 1988). As with research conducted on emotions and physiology, significantly more research is required before any definitive claims regarding such associations can be made.

Researchers have noted that like adults, children's interpretations of their world play a strong role in their behaviour and emotional well-being (Gonzalez, Nelson, Gutkin, Saunders, Galloway, & Shwery, 2004; Rosenbaum, McMurray, & Campbell, 1991). Gonzalez et al. (2004) systematically reviewed the available research on REBT

with children and adolescents. They applied meta-analytic procedures to 19 studies that met inclusion criteria, and found that the overall mean weighted effect of REBT was positive and significant. In particular, effect sizes were computed for five outcome categories including anxiety, disruptive behaviours, irrationality, self-concept, and grade point average. Among other observations, Gonzalez et al. observed an average mean weighted effect size of 0.48 for anxiety disorders. In addition, REBT appeared equally effective, regardless of whether the client did or did not have a presenting clinical problem. Gonzalez et al. observed effects of greater magnitude when REBT was delivered by non-mental health professionals than when it was delivered by mental health professionals, and more sessions resulted in better outcomes. These findings are particularly promising because Gonzalez et al. (2004) noted that unlike adults, younger people seldom perceive themselves as being in need of therapeutic treatment, and that most child and adolescent treatment referrals are made by parents, teachers, or carers. Further, carers are more likely to determine the desired goal of the therapy. As a result, one would expect lower effect sizes for this population. Combined, REBT research conducted with children, adolescents, and adults indicates that this form of therapy is a useful skill for the management of emotional and behavioural disturbance.

REBT is a comprehensive theory of emotion and personality change that incorporates cognitive, emotive, and behavioural therapy interventions. Ellis (1962, 1994) presented a range of treatment options that relate well to the underlying theory. REBT is generally delivered in an active-directive, and didactic manner, empirically oriented, and rational. It employs the logico-empirical method of science to encourage people to efficiently surrender illogical, anti-empirical, and pragmatically debilitative cognitions, and the behaviours and emotions they drive (Ellis, 1962, 1994; Ellis & Dryden, 1997; Ellis & MacLaren, 1998). In addition, Ellis has highlighted that REBT is humanistic, existentialist, and hedonistic. Research exploring the efficacy of REBT has indicated that it is an effective form of therapy for managing mood disturbance in adults (Engles et al., 1993; Lyons & Woods, 1991), and younger populations (Gonzalez et al., 2004). As part of this research process, a range of measures of irrational beliefs have been developed and used in various research settings.

REBT in Sport

Despite research and anecdotal support in clinical and non-clinical general psychology settings, there has been a distinct lack of research interest in the application of REBT to sport. Such a situation is surprising given the simplicity and efficacy of this

therapy. This may in part be explained by the observation that concepts specific to REBT are often reported in the sporting literature without specific reference to the theory from which they emerged. In one of the few studies available in the literature, Bernard (1985) implemented a 5-week rational-emotive mental training program with a team of 40 Australian Rules football players. The program emphasised cognitive (positive attitude training, disputation, positive thinking), emotive (relaxation, rational-emotive imagery), and behavioural (goal setting) components, and was delivered at both the group and individual level. In the early sessions, players were asked to complete open-ended and multiple-choice questions concerning stressful events. This information was used to stimulate discussion about the interrelationships between activating events, thinking, and emotions, with specific focus on the importance of thinking and self-talk. Players were then taught disputational strategies to modify harmful thinking styles. Although no follow-up, formal, empirical analyses were conducted, Bernard (1985) noted that many of the players came to the realisation that they could exercise some control over aspects of their mind that directly influenced the quality of their play. In addition, between 50 and 75 percent of players reported that, during the following weeks, they continued to use the rational-emotive ideas and skills they had learned.

Although Bernard (1985) provided some preliminary information pertaining to the applicability of REBT in competitive sport, there were some limitations associated with his study. Firstly, the intervention was quite broad, and included skills, such as goal setting and concentration training. As a result the unique contribution of core REBT skills, such as cognitive restructuring, could not be determined. Even if only specific skills were implemented, Bernard did not include outcome measures. Bernard did indicate that players were employing rational-emotive ideas and skills to improve their consistency, commitment, confidence, concentration, and self-control, however, the effectiveness of these skills was not assessed. Ideally, future research would assess core REBT skills against a control condition. Given the lack of formal analyses, and the fact that there was no control condition, it is difficult to determine the extent to which REBT acted as a mediating variable in this study.

Elko and Ostrow (1991) examined the effect of six sessions (spread over three weeks) of rational-emotive education for female collegiate gymnasts with heightened anxiety levels. Prior to the intervention, 12 gymnasts completed the CSAI-2 and the SCAT. Six gymnasts who presented with the highest state and trait anxiety scores based on these measures were selected for inclusion in the intervention phase of the study. The

study followed a single-case design with a psycho-educational emphasis, focussing on the following sequence of modules; a) identifying trigger thoughts, b) examining the role of irrational beliefs and developing substitution statements, c) exploring the role of cognitive mediation, d) defining and recognising low-frustration tolerance, and disputing through utilisation of the ABC model, e) rational emotive imagery, and f) integrated coping responses. The results of this study indicated that the rational-emotive education program significantly decreased levels of cognitive anxiety in five of the six gymnasts. Elko and Ostrow concluded that the changes in dysfunctional thought processes brought about through disputation mediated changes in cognitive anxiety. The effects of the program on somatic anxiety, performance, and thought listening were not significant. Only three of the six gymnasts showed significant performance improvements. Elko and Ostrow suggested that, for somatic anxiety, the baseline levels were probably not high enough to have a debilitating effect on performance. Although the findings of Elko and Ostrow imply that REBT may be useful in the management of anxiety in sport, as with Bernard's (1985) study, there were also some limitations associated with their study. In particular, they only recruited six participants which would greatly reduce the generalisablity of their findings. Further, the lack of change in reported self-talk measures may have been attributable to the fact that their definition of negative self-talk did not necessarily constitute irrational statements. REBT does not attempt to eliminate negative self-talk, it just moderates extreme and rigid forms of such internal dialogue. Despite these limitations, Elko and Ostrow's findings suggest that REBT may provide an efficacious means of moderating anxiety in sport.

A more recent study by Yamauchi & Murakoshi (2001) explored the efficacy of REBT as a means of managing trait anxiety (as assessed by the SCAT) for 11 high school female soft-tennis players. The training consisted of lectures that introduced the principles of REBT and five training sessions. In these sessions, the researchers encouraged participants to recognise their irrational beliefs and alter them to rational ones. Findings indicated that the participants' self-reported levels of anxiety decreased significantly from pre- to post-intervention. Yamauchi & Murakoshi did not compare REBT with an alternat therapy (as suggested by Ellis, 2003), and there was no control condition employed in this study. In addition, it was unclear whether a manipulation check was performed to ensure that the REBT actually changed irrational beliefs as opposed to anxiety simply being reduced by an expectancy effect. Unfortunately, only the abstract for this study was made available, and I was unable to obtain any additional

details from the Japanese authors. As a result I was unable to provide any further critique of the methods employed.

Despite limited research, some therapists have hypothesised specific beliefs and strategies for change in the sport and performance literature. For example, Walen, DiGuiseppe, and Dryden (1992) noted that anxiety is the result of future-oriented cognitions. They highlighted three distinct steps to anxiety. These steps include; 1) something bad might happen, 2) it must not happen, and 3) it would be awful if it did happen. They went on to highlight that the bad event may be something external, or individuals' own self-condemnation resulting in anticipation of a potential failure. Using the REBT framework, it is evident that anxiety is the result of demands (self, other, and the world), and often includes the evaluation of awfulising. These propositions are of particular interest given the focus of this thesis, however, clearly research support is necessary to explore their efficacy.

Dryden and Hill (1993) discussed a range of irrational beliefs that they predicted would be associated with performance. In relation to demands, they predicted that performers might engage in any one or more of the following; (1) "I must perform perfectly", (2) "I must be perfectly prepared. I'm not ready yet and I must not perform until I am", (3) "I must be seen (heard, etc.) as I perceive myself to be, i.e., perfectly prepared and competent. I must not be seen/heard as the observer (casting director, critic, audience) prefers to see/hear me", (4) "I must not reveal too much of myself to others via my act, performance, speech, art work, etc.", (5) "I must not experience any discomfort in performance", (6) "I must not experience any discomfort in preparation for performance", (7) "I must not experience any discomfort while thinking about preparing or performing", (8) "I must be acclaimed after my performance, audition, etc. All my hard work in preparation, audition, performance, etc. entitles me to the effortless recognition and acclaim that I must have. Any delay in acclaim is intolerable", (9) "I must achieve stardom, films, etc., quicker than at my current rate of progress", and (10) "my life must not change in any undesirable way as a consequence of my performance" (Dryden & Hill, 1993, p.170-171). Dryden and Hill went on to cite examples of beliefs associated with the evaluation of low-frustration tolerance including; (1) "I can't stand the hassle of, a) Preparing, b) Practicing, c) Auditioning, d) Waiting for a reply, e) Possibly being rejected, f) Possibly being accepted, g) Performing, h) Having to develop a track record/reputation, i) Having to live up to my reputation, and j), Having to meet the public", and (2) "I can't stand the physical discomfort I experience when I, a) Meet

the public, b) Have to deal with unpleasant people, c) Think about performing, d) Prepare, e) Practice, f) Audition, g) Get rejected, h) Get accepted, or, i) Perform" (pp.170-171). They suggested a range of typical beliefs associated with the evaluation of catastrophising, including; (1) "It's the end of the world if I don't do well (perfectly)", (2) "I am seen as less than perfectly competent and prepared, get a bad rating, get negative comments, get a bad review, reveal my secret self", (3) "I experience any discomfort" (pp.170-171). Finally, Dryden and Hill outlined beliefs associated with the evaluation of global rating, including; (1) "The World is utterly shitty because a) Its requirements are too hard, b) Its requirements are too inconvenient c) It has rules at all", (2) "I am totally worthless when a) I believe I have done poorly or not achieved my personal best, b) I feel any discomfort, and c), Others rate me as performing poorly", and (3) "Others are completely rotten/stupid when a) They rate me negatively and I don't deserve it, b) They rate me positively and I don't deserve it, and c), They don't understand/ give me credit for my hard work, preparation, and anxiety" (pp. 170-171). These examples cover a range of possibilities pertaining to differential belief categories as suggested by Ellis (1994). The various specific types of beliefs proposed by Dryden and Hill highlight just some of the range of possibilities underlying each of the core beliefs identified by Ellis (1962, 1994).

Somewhat more specifically related to the competitive sports domain, Goldman (2003), in a pamphlet written for dissemination at the Albert Ellis Institute, outlined a proposed approach for incorporating REBT in a psychological skills training package as a means to improving athletic potential. In particular, Goldman suggested the use of REBT as a means to modifying arousal via competitors' self-talk. Specifically, he discussed the applicability of REBT to both primary and secondary disturbances, providing examples of thoughts and consequences that might be associated with each (See Table 4.2).

Table 4.2

Productive and Unproductive Arousal Chains (Goldman, 2003).

Productive Arousal Chain		
Healthy Cognition		
Rational Self-Talk	Desired Emotional Arousal	Proper Skill Execution
"I can handle this. I'm in control."	Concern; 60 (moderate arousal)	Accurate pass to teammate

Unproductive Arousal Chain		
Distorted Cognition		
Defeating Self-Talk	Crippling Emotional Arousal	Ineffective Skill Execution
"I can't handle this. It's too hard."	Anxiety; 80 (high arousal)	Inaccurate pass to teammate

Secondary Distorted Cognition		
Defeating Self-Talk	Crippling Emotional Arousal	Ineffective Skill Execution
"I knew I couldn't do this. I'm a terrible player."	Panic; 95 (extreme arousal)	Inaccurate pass to opponent

According to this proposal, rational self-talk is associated with healthier levels of arousal and more effective skill execution. In this respect, Goldman was attempting to link REBT with Hanin's (2000) Individual Zones of Optimal Functioning (IZOF) model. Goldman went on to provide specific examples of self-talk associated with competition and training experiences, and associated outcomes (See Table 4.3).

Table 4.3

Common Examples of Activating Events, Defeating Self-Talk, and Unproductive Outcomes (Goldman, 2003).

Activating Events	Defeating Self-Talk	Outcomes
Dropping an easy pass	I must be perfect and never make mistakes	Emotion: Anger Arousal: 95 (extremely high) Behavior: I commit a stupid foul
Fans booing me	It is awful when fans, coaches, teammates criticize me	Emotion: Embarrassed Arousal: 20 (low) Behavior: I don't put forth any effort next game
Extra wind sprints after practice	I can't stand wind sprints	Emotion: Rage Arousal: 100 (maximum) Behavior: I fight with a teammate
I lost the match	Losing means I am a terrible athlete and therefore a terrible person	Emotion: Depression Arousal: 5 (extremely low) Behavior: I no longer desire to play

These examples include self-directed demands, awfulising, low-frustration tolerance, and self-downing, resulting in anger, embarrassment, rage, and depression. Notably, although emotional responses were cited by Goldman, he primarily focussed on arousal as a target for change via thinking. Goldman went on to explore disputation strategies as utilised in REBT as a means of moderating outcomes (See Table 4.4).

Table 4.4

Common Examples of Disputation (Goldman, 2003).

Defeating Self-Talk	Disputation	Disputation Questions
I must be perfect and never make mistakes	1) Logical	Just because I want to be perfect and not make mistakes, does it follow logically that it must happen?
It is awful when fans, coaches, teammates criticize me	2) Empirical	Where is the proof that it is awful (110% terrible) when fans, coaches, teammates criticize me? Is there evidence to support my ability to dislike but tolerate their criticism?
I can't stand wind sprints	3) Pragmatic	How does thinking "I can't stand wind sprints" help me? How does it hurt me? Is thinking "I can't stand wind sprints" helping me to achieve my goals?

Disputational strategies outlined by Goldman included those targeting the logic of the belief, those testing evidence pertaining to the belief, and those exploring the utility of the belief in relation to competitors' goals. Finally, Goldman explored likely outcomes associated with self-talk of a rational nature in response to negative activating events (See Table 4.5).

Table 4.5

Common Examples of Activating Events, Rational Self-Talk, and Productive Outcomes After Disputing (Goldman, 2003).

Activating Events	Rational Self-Talk	Outcomes
Dropping an easy pass	Though I would prefer to not make mistakes, they are part of the game. Even Michael Jordan missed 11,497 shots and Babe Ruth struck out 1,330 times.	Emotion: Frustration Arousal: 60 (motivated) Behavior: I execute my next play
Fans booing me	It is unpleasant when fans, coaches, teammates criticize me but it is not the end of the world.	Emotion: Regret Arousal: 70 (engaged) Behavior: I try harder next game
Extra wind sprints after practice	I don't like wind sprints but I can certainly tolerate them. In fact, they help me become a better athlete.	Emotion: Ambivalence Arousal: 50 (moderate) Behavior: I run the sprints
I lost the match	Losing means I had a bad match but that does not make me a terrible athlete or a terrible person. It is impossible to define me by any one set of behaviors. There is more to me than my actions. I can accept myself as a fallible human being.	Emotion: Sadness Arousal: 30 (low) Behavior: I prepare for the next match

Goldman suggested that these techniques can be taught through a program of Rational Emotive Imagery, a form of imaginal exposure that incorporates REBT. Although this approach was primarily designed to target arousal, given the theory of REBT, it would appear to make more sense if specific harmful emotions were targeted. Goldman has presented one particular approach, largely based on the theory of REBT, that could be used with competitors to help them manage strong emotions in sport. Clearly more

research is needed to explore whether the examples outlined by Goldman actually fit the applied setting, and whether the traditional disputational strategies of REBT are applicable to the competitive setting.

In summary, REBT has been shown to provide a comprehensive theory of emotional disturbance. Anecdotal support for the theory has emerged in the clinical domain, yet despite predictions associated with the efficacy of REBT as a skill that is relevant and applicable to competitive environments, little research has been conducted in these areas. In the next section of this thesis, I utilise the theory of REBT as a framework to explore cognitions characteristically associated with strong emotions in the sporting domain, with a primary goal of investigating cognition, using the framework of REBT, and a secondary goal of determining the core components of a proposed REBT-style intervention for the management of anxiety in sport.

CHAPTER 5: STUDY 2: EXPLORING ANXIETY-CAUSING COGNITIONS

Introduction

In Study 1, I observed that cognitive and somatic trait anxiety directional scores were closely associated with state anxiety directional scores. I also observed strong, positive, linear associations between cognitive and somatic state anxiety direction and performance, and to a lesser extent between cognitive and somatic trait anxiety direction and performance. In particular, the results of the regression analysis revealed that cognitive state anxiety direction was the only variable that attained statistical significance in terms of predicting performance outcomes, mimicking the findings of Jones et al. (1993). In terms of competitors' skill level, analysis of the associations between competitors' skill and anxiety measures revealed significant associations between the cognitive intensity subscale of the CSAI-2-D, the concentration disruption subscale of the SAS, and the directional subscales of the CSAI-2-D and the CTAI-2-D, again largely replicating the findings of other researchers (Hanton & Conaughton, 2002; Hanton et al. 2003; Jones & Swain, 1992, 1995; Jones et al., 1994). Results from the regression analysis highlighted that cognitive state direction and concentration disruption were the only variables that significantly predicted skill level.

When considered in combination, these findings highlight the potential for an unobtrusive intervention specifically targeting directional interpretations of trait anxiety, with the ultimate aim of fostering performance improvement. In order to effectively implement such an intervention, a greater understanding of the range and typology of cognitions that underlie the directional interpretations assessed by measures, such as the CTAI-2-D, is needed. Such measures only assess the frequency of a small range of interpretations, associated with the intensity of specific cognitive and somatic symptoms that have been generally associated with anxiety. Fundamentally, they are a measure of competitors' tendency to interpret the intensity of certain cognitive and somatic symptoms as being facilitative or debilitative to their ensuing performance. In this respect, directional measures of anxiety provide some information pertaining to the competitors' interpretive style. As outlined in the previous chapter, REBT is a therapeutic strategy that is primarily concerned with the role of interpretations in the experience of emotions, and, therefore, lends itself to such an analysis.

REBT is a theoretical framework that, among other things, makes specific predictions about the types of interpretations, or more specifically beliefs associated with, and largely causative of, emotions. According to this theory, the primary

determinant of whether people's emotions are considered to be functional or dysfunctional relates to the impact they have on behaviour (Ellis & DiGiuseppe, 1993). In REBT, Ellis (1962, 1994) further postulated that beliefs about perceived threats to performance are seen to be central to the causation of negative feelings and maladaptive behaviours. These beliefs are categorised into what are termed rational or irrational beliefs primarily by their pragmatic value to the holder. Irrational beliefs are defined as beliefs that fail to make logical sense, lack objective empirical support, and are not pragmatic (Ellis, 1994). They generally include demands relating to the self, others, and life conditions, expressed in form of musts, shoulds, and oughts. Rational beliefs are defined as beliefs that are likely to have objective empirical support, make logical sense, and hold pragmatic value. According to the theory of REBT, these beliefs are expressed as preferences, rather than demands. Functional negative emotions and adaptive behaviour result when a negative subjective experience is interpreted rationally, whereas dysfunctional negative emotions and maladaptive behaviour result when a negative subjective experience is interpreted irrationally (Ellis & DiGiuseppe, 1993). In other words, in the theory of REBT, specific predictions are made about the nature of interpretations that underlie functional and dysfunctional negative emotions. These predictions can be used as a means of providing structure to an exploration of the interpretive styles endorsed by individuals in response to negative subjective experience. REBT provides an ideal means for finding out more about what drives the directional interpretations being identified by sport specific anxiety measures.

In this study, I aimed to use in-depth interviews, guided by the theory of REBT, to explore typical cognitions associated with sport-specific emotions in competitive bowling, focussing on the emotion of anxiety. Other emotions were included in this analysis with the goal of generally examining emotional experiences in competitive sport in comparison to anxiety (where research remains limited. If this additional information had not been collected, it would have been impossible to identify typical thoughts had by competitors who are anxiety free (or experiencing other emotional states). Given an interest in potential interactions between various emotional states and the and the fact that I was The study was not limited Given that there has been only limited research that has directly explored underlying cognitions associated with emotions in sport, the theory of REBT appears to be well suited to such an exploration, and there is evidence supporting the utility of REBT in the management of trait anxiety in the clinical context (Jorm, 1990), I decided to use this theoretical framework to

provide structure to the interviews and to guide the analyses I conducted. Specifically, I explored patterns of association between a range of cognitions and emotions using the ABC framework. I subdivided activating events (A) into external events perceived by bowlers as a primary trigger of a noticeable change in their emotional state, and individually mediated events, that is, perceived changes in somatic states, cognitive states, and behavioural states that were perceived by the bowler to be a trigger of increased affect. I categorised beliefs (B) into those predicted by the theory of REBT, and including self- other- and world-directed demands, awfulising, low-frustration-tolerance, self- other- and world-downing, and always-and-never thinking (Ellis, 1962, 1994). Consequences (C) were explored in term of their somatic and behavioural expression. Further, I also assessed interpretations of somatic, cognitive, and behavioural states mediated in response to a clear primary trigger (secondary emotional disturbances).

The secondary aim for this study was to explore the relationship between trait anxiety directionality, as measured by the CTAI-2-D, and the interpretive style of bowlers framed in the theory of REBT. I decided to use the CTAI-2-D, and not the SAS as some recent research has called into question the factor structure of the SAS (Dunn, Causgrove, Dunn, Wilson, & Syrotuik, 2000). Here, I compared typical cognitions endorsed by bowlers with a debilitative trait anxiety predisposition when experiencing strong emotions in sport in response to externally- and internally-mediated activating events, with those cognitions endorsed by bowlers who I identified as having a facilitative trait anxiety predisposition, based on CTAI-2-D scores.

Based on the findings of Bernard (1985), I predicted that there would be a good fit between the predictions made by the theory of REBT and cognitive experiences reported by competitive bowlers. I expected a primary mediating factor in this relationship to be the rigidity and inflexibility of the bowlers' interpretations of externally- and internally-mediated activating events. I further envisaged that the information gleaned from this study would prove critical to the subsequent development of a REBT-style intervention targeting debilitative trait anxiety. Specifically, I intended that the information gleaned from this study would be used to target types of beliefs held by bowlers that have been found to be associated with dysfunctional emotional consequences.

Method

Participants

Participants in this study included six bowlers (4 males, 2 females) who obtained negative directional trait anxiety scores on both of the cognitive and somatic subscales of the CTAI-2-D (*M* cognitive = -8.83, *SD* = 4.22; *M* somatic = -6.0, *SD* = 2.19), and six bowlers (4 males, 2 females) who obtained positive directional trait anxiety scores on both of the cognitive and somatic subscales of the CTAI-2-D (*M* cognitive = 10.83, *SD* = 4.71; *M* somatic = 12.50, *SD* = 5.99). The age range for the entire sample was from 14 to 24 years (*M* = 18.92; *SD* = 2.75). Participants were injury free and actively competing at the time of the research. I obtained informed consent from all participants before their participation in this study (Appendix H). As a means of controlling for expectancy effects, the participants remained blind to the CTAI-2-D results until after the completion of the study.

Measures

I conducted semi-structured interviews with all participants (See Appendix I for the interview guide). Prior to use with this sample, I independently pilot tested the interview guide, first with colleagues, and then with a small number of bowlers who did not subsequently participate in the study. I used a standardised format for this guide, where each participant was taken through the same series of questions. I pre-determined general procedures for probing, clarification, elaboration, and general inference chaining prior to conducting the interviews (See Appendix I).

I designed much of the interview guide with the goal of assessing the presence, and typology of, cognitions associated with emotional responses based on the ABC framework adopted in the theory and practice of REBT. When they were not directly apparent by the bowlers' commentary, I probed for core beliefs through the process of inference chaining (Moore, 1983; Neenan & Dryden, 1996). This process involves asking "Let's assume . . . then what." style questions until the respondent is unable to further generate responses.

I divided the interview into a number of major sections, which included the following; 1). General rapport building and introduction. In this section, I provided each bowler with some general information about the context of the study and the nature of the information we would explore in the interview. At this point, I also encouraged bowlers to be as honest and open in their responses as possible. 2). Goal identification. In this section, I initially encouraged bowlers to identify their goals from broad life

goals to sport specific short- and long-term goals. Specifically, I attempted to elicit technical, mental, physical, and performance goals from each competitor. The identification of goals was pertinent to the interview procedure and the study in general in that individuals' goals served as a yardstick by which they could then determine whether their cognitions about internal or external events at a particular time were facilitating or acting as barriers to their goal attainment. 3). Identification of emotional consequences. In this section, I asked bowlers to identify recent occasions during competition where they had an intense and clearly identifiable emotional experience they perceived to be either facilitative or debilitative to their goal attainment. In order to reduce experimenter influence, I did not encourage competitors to focus on a pre-determined list of emotions, but did encourage them to focus on one emotional response at a time. As a result, I obtained data on a range of emotions experienced by bowlers during and around competitive sporting experiences. For each emotional experience identified by each bowler, I encouraged them to describe the somatic, cognitive, and behavioural characteristics of the emotion, and, where apparent, the interpretation of these characteristics in relation to goal attainment (facilitative, neutral, & debilitative). 4). Identification of activating events. I asked bowlers to identify whether there were any specific triggers associated with the emotional response they identified in the previous step. 5). Identification of inferences and beliefs relating to activating events. Where a specific trigger was identified by the bowler, I then asked them to recount their self-talk in response to that trigger. Where possible, at this stage in the interview, I applied inference-chaining procedures to elicit underlying beliefs. 6) Identification of inferences and beliefs relating to consequences during competition. Where competitors reported harmful emotional consequences, I further probed and employed inference-chaining procedures in an attempt to elicit beliefs mediating secondary emotional responses. I repeated stages 3 to 6 across a range of prominent recent emotional experiences cited by bowlers. 7). Closing. All previous steps were completed before closing the full interview schedule. I re-interviewed each bowler on a second occasion to obtain more detail and check for the reliability of their responses. At this point in time, I also asked bowlers to add any information they felt was relevant to the nature of the research.

Procedure

Prior to conducting this research I obtained ethics approval from Victoria University. Consistent with qualitative research methods, I used purposive sampling to

select participants (Lincoln & Guba, 1985). I drew the sample for this study from a large pool of ten-pin bowlers who participated in Study 1. Prior to inclusion, I obtained informed consent from the participants or their legal guardians, if they were minors. Each participant completed two in-depth interviews in order to increase the reliability of participant responses. I conducted the second interview approximately two weeks after the first. The primary focus of the second interview was to reassess information gathered in the first interview and further probe relevant information.

I conducted all the interviews, providing a constant across the study. I have a strong competitive sport history, had undergone familiarisation with the sport of bowling over a number of months prior to the interviews, and am familiar with sport-specific terminology and experiences. I conducted the interviews away from the competitive arena, usually at the home of the participant, with the goal of minimising the effects of possible situational influences, such as the competition atmosphere. I encouraged each participant to take their time, and if they still could not elicit a response, to inform me, rather than guess. The initial interviews lasted approximately 45 minutes. The follow-up interviews ran for 15 – 30 minutes. I tape-recorded all interviews in their entirety, and then transcribed them verbatim, yielding over 400 typed pages.

Analysis

I then drew the data from the transcripts using deductive content analysis procedures based on a fixed hierarchical index tree of codes that I established prior to data collection. I based the definitions for each code on concepts defined in the theory of REBT. I left goals free-floating, and used them throughout the interview as a prompt to help bowlers determine the facilitative or debilitative nature of their emotional responses. Figure 5.1 is an illustration of a free-floating hierarchical index tree for the bowlers' goals.

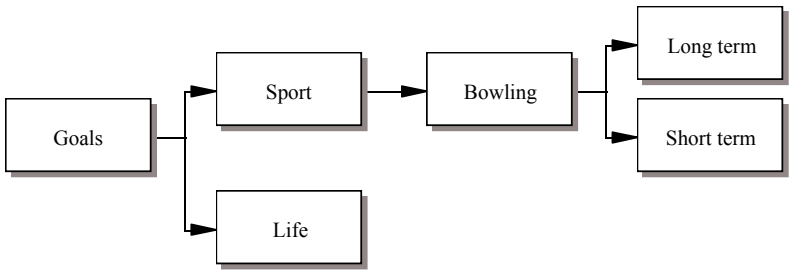

Figure 5.1. Goal Setting Hierarchical Index Tree.

This hierarchy differentiates between sport and life goals and includes more specific categorisations for those goals deemed relevant to the bowlers' performance.

Aside from goals, I analysed all other information elicited by the interviews for general response themes, and for trends in terms of specific cognitions across the sample. In terms of the content analysis procedure, both myself and a colleague with extensive training in REBT independently coded the interview content based on definitions provided by REBT theory. The range of harmful beliefs and evaluations assessed in this process included self-, other-, and world-directed demands, awfulising, low-frustration tolerance, self-, other-, and world-directed damnation, and always and never thinking. Helpful beliefs assessed in the process included moderate evaluations of badness, statements of toleration, acceptance of fallibility, and flexible thinking with respect to the occurrence of events. These core beliefs (or constructed views of the world) are typically reported as being central to the theory and practice of REBT (e.g., Dryden & DiGuiseppe, 1990; for more details see Chapter 4). Where both my colleague and I agreed upon the coding assigned to a section of text, it was used in further analyses. Where we disagreed on the assignment of a coding, following detailed discussion that portion of text was not used in subsequent analyses. In this way, I was able to control researcher bias using a form of consensus validation. I initially analysed the data by counting the frequencies of coded responses for each variable (See Appendix J to M). I also explored the way various variables were related by following cognitive pathways for each sequence for each competitor, and then overlaid the results of these observations to explore general trends endorsed by bowlers. I used responses to illustrate the most frequently occurring relationships between extracted themes. These were then displayed as flow charts, largely based on the ABC framework utilised in REBT.

Results

In first section of the results, I present findings derived from the content analysis in terms of the frequency and type of bowlers' goals, activating events, beliefs, and consequences. I then explore differences between debilitative and facilitative trait anxiety groups in terms of the beliefs they hold about activating events, and the nature, and interpretation of the consequences they report to experience. In the second section of the results I explore typical cognitive pathways exhibited by bowlers associated with a range of emotional consequences.

ABC Frequency Counts

I elicited both general and sport-specific goals as part of the interview. In Table 5.1, I present the number of citations for major themes of bowling goals as identified for all competitors in order of frequency of report.

Table 5.1

Major Bowling Goals

Dimension / Higher order Theme	Number of Citations
Improve average score	11
Competition – professional circuit	8
Competition - international	6
Competition - state	6
Competition - adult	4
Attain specific score	4

Table 5.1 highlights that the majority of bowlers reported performance goals, which included improving their average, performing well in various levels of competition, and specific score targets. I also elicited goals from the interviews that were not sport related. These were associated with study, careers, other sports, and accumulation of possessions.

Following exploration of goals reported by competitors, I went on to investigate typical activating events reported by competitors that were associated with an intensification of their emotional states. Table 5.2 illustrates the major activating events reported by the sample.

Table 5.2

Activating Events - Frequency of Reporting

Activating Event	Number of Citations
Performing poorly	26
A major competition	19
Characteristics of the venue	17
Poor professional etiquette of competitors	16
The presence of spectators	10
Playing against skilled competitors	9
Performing well	8
Experiencing unusual emotions	7
Experiencing unusual thinking states	6
Reflecting on the scoreboard	5
Competing against older and more experienced competitors	2
Competitors playing above average	2
Experiencing unusual physiological states	2

Responses indicated that triggers included those that were unique to the individual (e.g., good & poor performance, emotional, mental, physical states), those that were situational (e.g., the venue, relative importance of the competition, presence of spectators), and those that were related to competitors (e.g., etiquette, skill level, age, performance). Table 5.2 shows that the bowlers in this sample reported performing poorly as the most frequently cited activating event.

As part of the interview, I explored beliefs associated with the activating events previously identified by bowlers. Table 5.3 highlights the frequency of responses with regard to higher-level demands and preferences exhibited by bowlers.

Table 5.3

Number of Demands/Preferential Citations Falling into Major Themes

Dimension / Higher order Theme	Number of Citations
Self-directed demands	67
Other-directed demands	13
Self-directed preferences	6
Life-directed demands	2
Other-directed preferences	2

Most evident in Table 5.3 is that the bowlers overwhelmingly reported self-directed demands as the most common component of their internal dialogue in response to triggers linked with emotional reactivity. For example, one bowler reported the following self-talk in response to reflecting on his score, “I have got to move, got to get this strike”. Another bowler recalled his thoughts having just bowled a series of strikes, “If I can't get this spare, it will stuff up my whole routine. I just have to get it.”

The second most commonly cited type of belief by bowlers was that of other-directed demands, as illustrated by the following comments; “They should just shut up. I know what I am doing.” and “You should wait until I have finished my bowl. Why don't you know the rules?” An example of a self-directed preference vocalised by one of the bowlers is apparent in the following comment: “I was thinking that I really want to do my best, but know I sometimes make mistakes.” The only theme predicted by REBT that did not emerge from the interviews was life-directed preferences.

When I analysed the beliefs reported by bowlers identified as having a predisposition to experience anxiety as debilitative or facilitative (by the CTAI-2-D), I obtained the breakdown of demands versus preferences shown in Table 5.4.

Table 5.4

Number of Demands/Preferential Citations Falling into Major Themes for Debilitative and Facilitative Bowlers

Dimension/ Higher-order Theme	Number of Citations for Debilitative Bowlers	Number of Citations for Facilitative Bowlers
Self-directed demands	46	21
Other-directed demands	6	7
Self-directed preferences	3	3
Life-directed demands	0	2
Other-directed preferences	1	1

Table 5.4 reveals that the directional trait anxiety style of the bowler did not predispose them to differential thinking styles across all higher order dimensions they engage in when interpreting potential threats to their goals. Notably, the frequency count does illustrate that bowlers with a debilitative trait anxiety predisposition reported more than twice the number of self-directed demands than their facilitative counterparts. This observation highlights the importance of self-directed demands when considering causal factors associated with directional measures of anxiety. Apart from this observation, I did not observe any other notable differences between bowlers distinguished by their anxiety predisposition.

I also categorised the evaluative component of participants' beliefs in order to gain further details pertaining to the types of cognitions competitors held about potentially goal-blocking activating events. Table 5.5 indicates the number of citations I obtained for each of the major forms of evaluations, as defined by REBT theory, for both debilitative and facilitative bowlers.

Table 5.5

Number of Evaluative Citations Falling into Major Themes for Debilitative and Facilitative Bowlers

Dimension/ Higher-order Theme	Number of Citations for Debilitative Bowlers	Number of Citations for Facilitative Bowlers
Awfulising	26	7
Other-directed downing	13	9
Always & never thinking	1	2
Low-frustration tolerance	2	1
Self-downing	2	0
Moderating	1	0
Fallibility of self	1	1
Flexible thinking	0	1

I found that both awfulising and other-directed downing emerged as the most frequently-occurring evaluations across the sample, and I observed that for both of these evaluations, bowlers with a debilitative anxiety predisposition reported a higher frequency of citations (nearly four times the frequency of awfulising) than their facilitative counterparts. A typical example of an inference pertaining to awfulising that was provided by one of the bowlers was, “I hate this lane. I always fall off.” An example of other-directed downing made by one of the bowers was, “And again it's, it's partly thinking about someone else, he shouldn't be doing this, he shouldn't be doing that. You are so stupid, why are you doing this?” And finally, a bowler who engaged in a combination of awfulising and other-directed demands reflected on his self-talk, “I just think, get out of here you little shits. It’s the worst when they do that.” I did not observe any occurrences of evaluations of life-damnation, high-frustration tolerance, fallibility of others, and fallibility of life, despite these being predicted by the theory of REBT.

Having observed typical interpretations in response to adversities, I went on to examine the frequency of notable self-reported emotional consequences reported by the sample and this is presented in Table 5.6.

Table 5.6

Number of Emotional Consequence Citations Falling into Major Themes

Dimension/ Higher-order Theme	Number of Citations for Debilitative Bowlers	Number of Citations for Facilitative Bowlers
Anxiety	29	7
Anger	12	12
Annoyance	2	9
Focussed	5	2
Happiness	1	4
Concern	2	2
Depression	2	1
Shame	0	1
Sadness	1	0
Calm	1	0

Table 5.6 highlights the frequency of citations of emotional consequences for bowlers previously identified as holding differential directional trait anxiety predispositions. I found anxiety and anger to be the most often cited emotional consequences by bowlers. I also found that bowlers with a debilitative anxiety predisposition reported anxiety as an emotional consequence more than four times more often than bowlers with a facilitative anxiety predisposition. The results of this analysis also indicate that among bowlers with a debilitative anxiety predisposition, a greater proportion reported anxiety, when compared to bowlers who endorsed a facilitative anxiety predisposition, where the greatest proportion reported anger/annoyance. The only other emotional consequence I observed that distinguished between the two groups was annoyance, which was more frequently cited by bowlers with a facilitative predisposition. In total, I found that bowlers identified as having a debilitative anxiety predisposition provided 55 citations coded as emotions, when compared to 38 coded emotions identified by bowlers with a facilitative anxiety predisposition. In accordance with the predictions made by the theory of REBT, I also observed that a total of 43 citations for the debilitative trait anxiety group could be considered goal blocking, whilst only 20 citations reported by the facilitative trait anxiety group could categorised in the same way.

I asked participants to identify whether the emotional consequence they experienced was most apparent in changes in their thoughts, physiological state, or behaviour, and whether they interpreted these changes as being facilitative or debilitative to their performance goals. I assessed this with the goal of directly relating participant self-talk to current directional measures of trait anxiety. Notably, not all participants were able to determine whether these dimensions were helpful or harmful, so I allocated a neutral coding to those examples of self-talk. I then generated Table 4.7 to illustrate frequency counts of responses to these questions.

Table 5.7

Frequency of Citations for Each Response Dimension and Directional Interpretations for Debilitative and Facilitative Trait Anxiety Competitors

	Debilitative Bowlers			Facilitative Bowlers			
	Harmful	Neutral	Helpful	Harmful	Neutral	Helpful	Total
Cognitive	2	1	0	4	0	1	8
Somatic	9	4	1	4	4	3	25
Behavioural	14	5	9	4	3	5	40
Total	25	10	10	12	7	9	

Table 5.7 reveals that participants most frequently reported changes in their behaviour as the primary indicator that they were aware they were responding emotionally to potentially goal-blocking activating events, followed by somatic reactions, and then cognitive changes. One bowler expressed his behavioural awareness in the following way: “I first notice my head’s down. And I don’t sort of talk as much. You sort of, um, don’t talk to people as much.” A bowler noting a somatic response recalled the following self-talk: “This is stupid, why are you shaking?” One of the few cognitive examples was:

> I wish I could get those thoughts out of my head and look at the game. Say somebody bowls at the same time as you. And you think about that when you should be thinking about bowling. And you are saying in your head “I have got to think about that. Why can't I think about bowling?” I would be feeling “oh I hope I get in, I want to get in, I really want to, yeah.” All those thoughts really throw me.

The pattern of responses I observed also reveals that bowlers identified as having a debilitative trait anxiety predisposition, and those identified as having a facilitative trait anxiety predisposition, generally interpreted the dimensions of their self-reported emotions as being unhelpful to the achievement of their goals, although there was a higher frequency of citations for the bowlers classified as debilitative. It appears, from these results, that bowlers with a facilitative anxiety predisposition were less selective in their interpretation. For example, one of the female bowlers made the following comment when indicating that she could interpret her behavioural response as being facilitative to her performance:

> Maybe it's just because I'm a woman, but, um, for me, um, I, if I am getting that bad then, like if I am getting that angry with myself and that upset then I will cry and it's strange. It's a release. I feel better and get back to the job at hand.

ABC Pathway Analyses

In order to gain specific information about the relationships between various interpretive aspects of the competitors' emotional experience, I mapped typical components based on the ABC structure offered by REBT. I used this information in the construction of flow charts, which I employed as a means of illustrating typical cognitive pathways engaged in by bowlers when faced with potential threats. I created each flow chart by assessing the frequency of responses and links between variables in a backwards sequence from the interpretation of the consequences to the activating event. Such an approach has been adopted in qualitative sport psychology literature (e.g., Hanton & Jones, 1999a). In the figures that display these flow charts, thicker connector lines identify the most frequently occurring pathways of responses. I constructed these interpretive pathways for the negative harmful emotions of anxiety and anger, for the negative helpful emotions of annoyance and concern, and, finally, for the positive helpful emotions of being focussed and experiencing happiness. Given that anxiety is the focus of this study, I made comparative analyses between the two directional trait anxiety groups on this emotion only. Figure 5.2 illustrates the interpretive pathways for the whole sample for the emotional experience of anxiety.

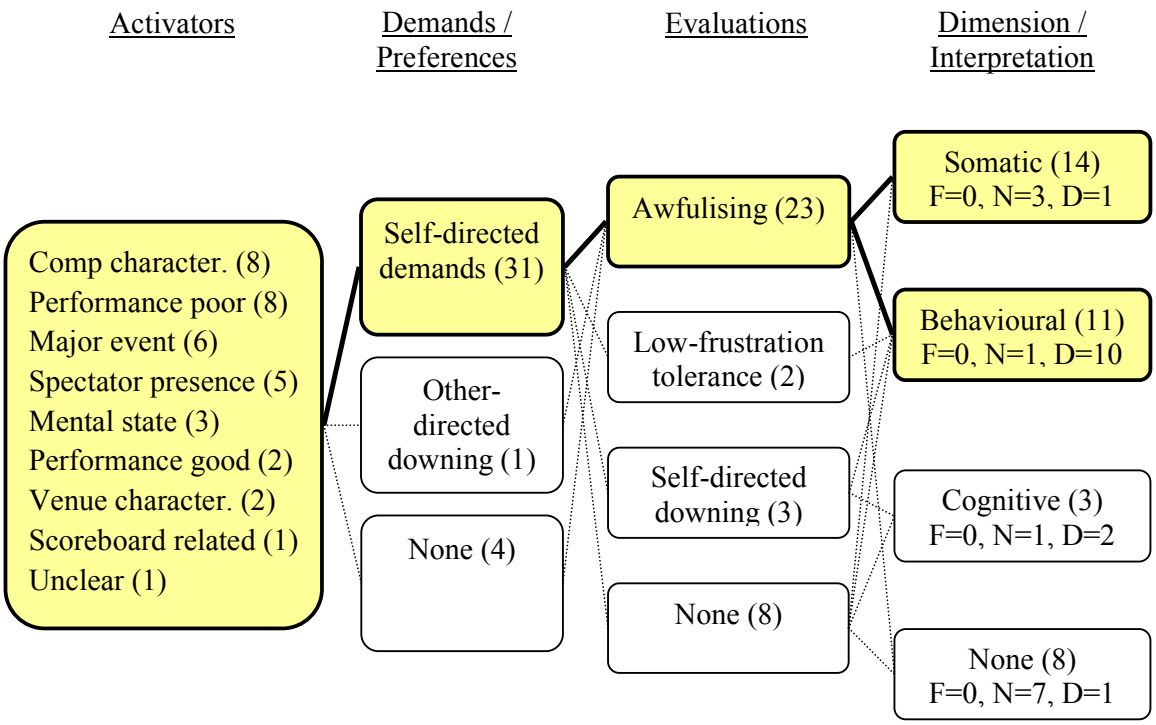

Figure 5.2. Anxiety Pathway Map for the Entire Sample.

This flow chart highlights that the majority of competitors who experienced anxiety interpreted their activating events with self-directed demands and awfulising. These competitors primarily reported their experience of anxiety in the form of somatic and behavioural components, both of which they interpreted as being largely debilitative to their ensuing performance. In the following comment, a bowler identified a self-directed demand, awfulising, and awareness of a somatic response that was interpreted to be debilitative,

> I was thinking "if I don't bowl well, I will be pushed out. I must be number one. Jane is watching me. It would be terrible if I were to stuff up in front of her." And I just, I sort of felt myself evaporating inside. It was horrible. Yeah, well just like um, everything was being eaten up inside of me. I don't know, like acid just eating away at me. I don't know it sounds really bad, but I just felt horrible inside, and I knew it was hurting my scores.

A second bowler reported a similar sequence in response to having bowled badly,

> If I start with some bad bowls I think, "man, I should have closed that frame, or whatever". Because I think to myself, "gees, there are only three games and I have already wrecked one of them." It's the worst when this happens, and I usually follow up with a really crappy game.

A third bowler made the following comments highlighting a range of absolute thinking styles, including self-directed demands, self-directed downing, and awfulising:

> I start thinking that "I am not good enough. Um, everyone else can beat me. Basically I am a loser. And I really must . . . I must do better than this." It's awful when I do this. I can do better than this. Basically you're thinking "I'm so stupid, why are you doing this, um, you can do better, um," You concentrate so hard on just one shot that you stuff up anyhow, and you are just continuously saying to yourself "oh, you're stupid, you know." It's like you become very down on yourself, so you are bringing all these negative things like "you are stupid," and "you can't do it," and "no, you're not better than everyone, everyone can beat you." And all this affects everything. I get so stressed.

Figure 5.3 illustrates the interpretive pathways for bowlers previously identified as holding a predisposition to experience anxiety symptoms as being debilitative to performance.

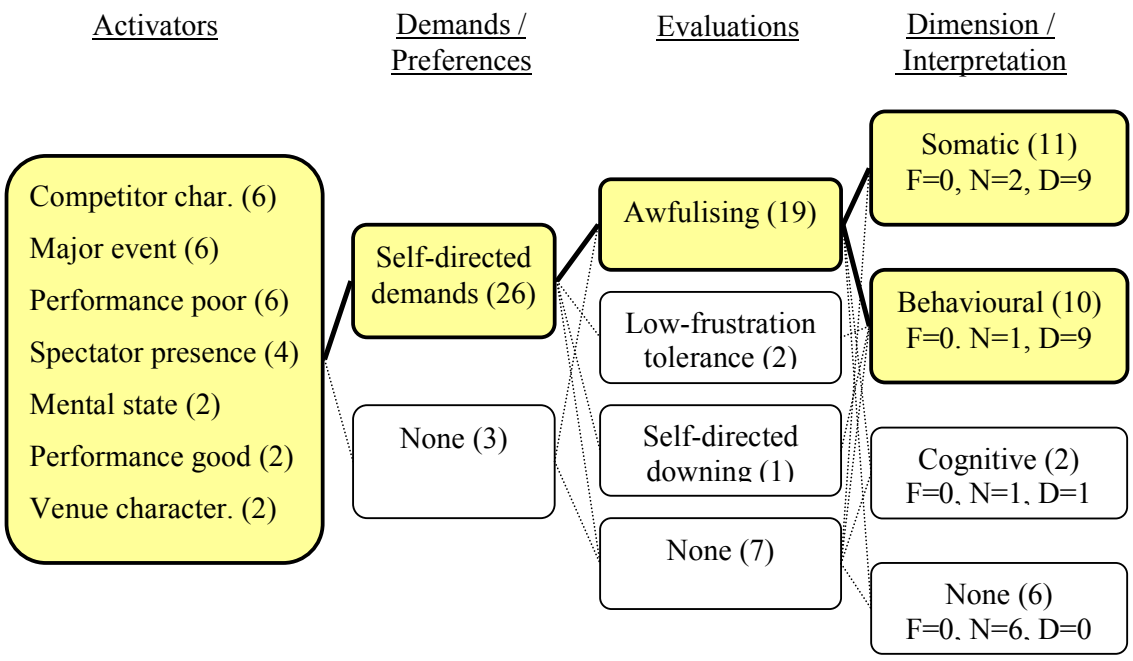

Figure 5.3. Anxiety Pathway Map for the Debilitative Trait Anxiety Group.

The interpretations of this subset of bowlers closely mimicked the observations for the whole sample, with a strong presence of self-directed demands and awfulising. In response to poor performance, one bowler commented, "Why can't I get my release right? I know how to do this. I should be able to do it now! It sucks when this happens." A second bowler made the following comments about playing badly in a major event,

> During a major comp, I would be just thinking, "oh like I'll just say oh no, this is not working. It's terrible. I have got to change it." And then I change it and I get it wrong, and it gets worse.

Finally, in response to the behaviour of competitors, one bowler stated, "They are cheating. It is shocking when they get away with that."

Bowlers with a debilitative trait anxiety predisposition also reported a greater awareness of both somatic and behavioural dimensions of anxiety that were interpreted as primarily debilitative to performance. One bowler reported noticing the following behavioural response associated with their experience of anxiety,

> Yeah I tend to loose my target, or I tend to step so many boards over. Then I have a bad game or things like that. I tend to rush. People would see me rushing things. Take my steps too quick or things like that or let go of the ball too much or just drop it.

Other bowlers indicated an enhanced awareness of somatic changes illustrated by comments such as: "You shouldn't be shaking like this." and "I get really tense and my muscles tighten up."

Figure 5.4 illustrates the interpretive pathways for bowlers previously identified as holding a predisposition to experience anxiety symptoms as being facilitative to performance.

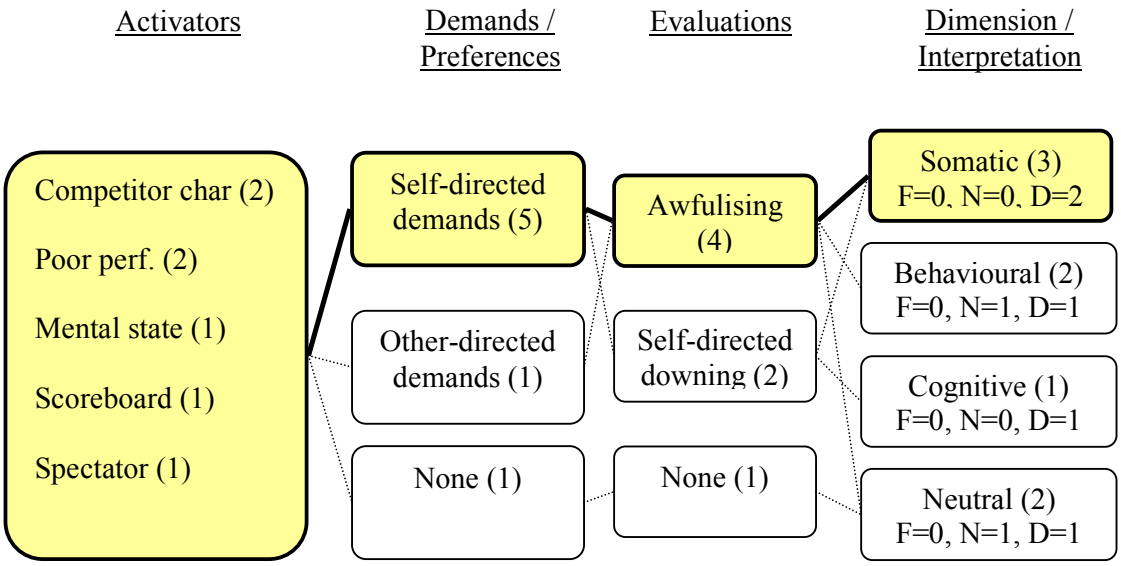

Figure 5.4. Anxiety Pathway Map for the Facilitative Trait Anxiety Group.

The interpretations of this subset of bowlers also closely mimicked the observations for the whole sample, but, notably, there were lower frequencies of all variables present and the patterns of responses were less evident.

Figure 5.5 illustrates the interpretive pathways for bowlers reporting the emotional experience of anger.

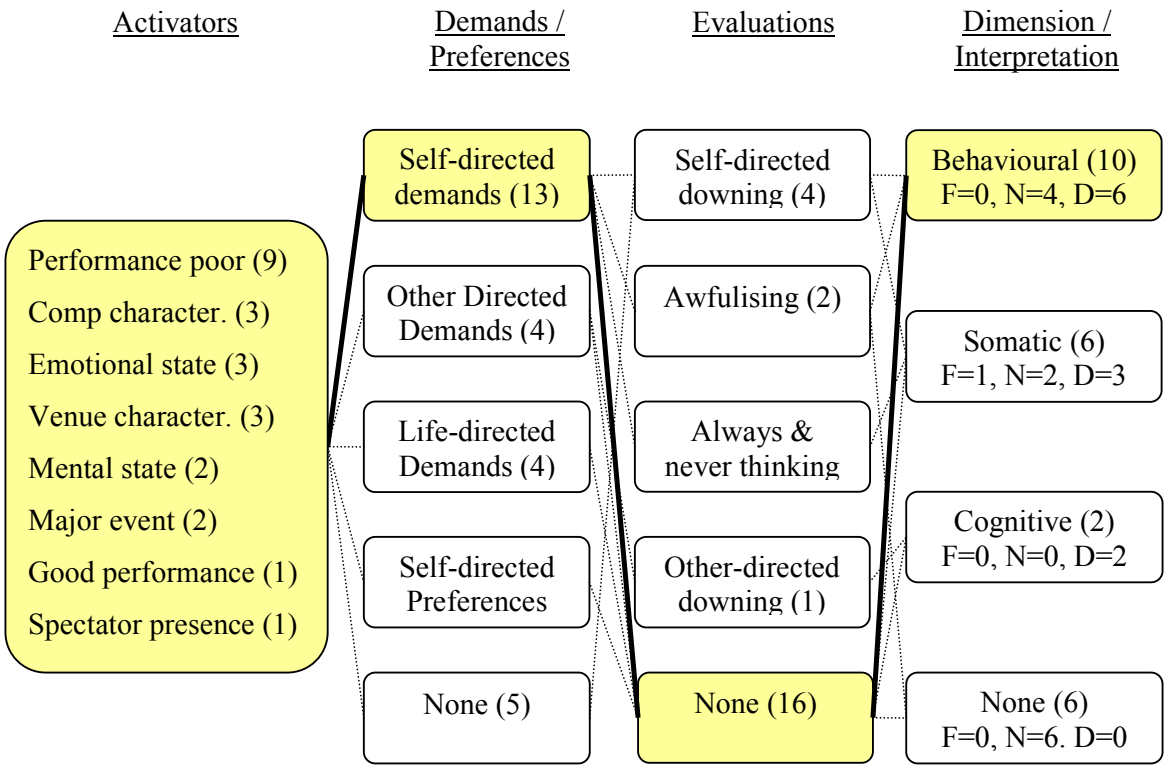

Figure 5.5. Anger Pathway Map for the Entire Sample.

The flow-chart in Figure 5.5 indicates that angry bowlers generally engaged in self-directed demands without evaluations that were observed in changes in their behaviour. One of the bowlers presented self-directed demands, self-downing, and primarily behavioural consequences in response to performing poorly, as illustrated by the following comments,

> And it makes me look bad kind of thing. I'd be saying "idiot" (laughs). "You manage to put three good balls in and then you bowl a gutter." It's like "you are pretty stupid." It's myself. It's like "silly me," it is very sort of self-focussed. Yeah "stupid me I shouldn't have done that." I was hot, I was getting flustered because I wasn't bowling good, and I couldn't turn; my arms weren't straight.

> That was when I was bowling straight with a normal ball. And I just couldn't, nothing went right. I was pretty angry with myself.

A second bowler illustrated clear self-directed demands after missing a critical bowl,

> And like if I look up and I see like strike, strike, spare, spare and then I get a seven, I get annoyed if I don't close that one. I say to myself "well fuck me, I should have closed that, bloody wrecked a good game." It is very annoying. Yeah I get really pissed off yeah. Yeah you just want to smash a wall or something.

Other-directed demands were also apparent for a small number of bowlers who responded with anger towards their opponents, as can be seen by the following comment: "They should just shut up. I know what I am doing. They kind of place pressure on me when they are here."

Figure 5.6 illustrates the interpretive pathways for bowlers experiencing the emotion of annoyance.

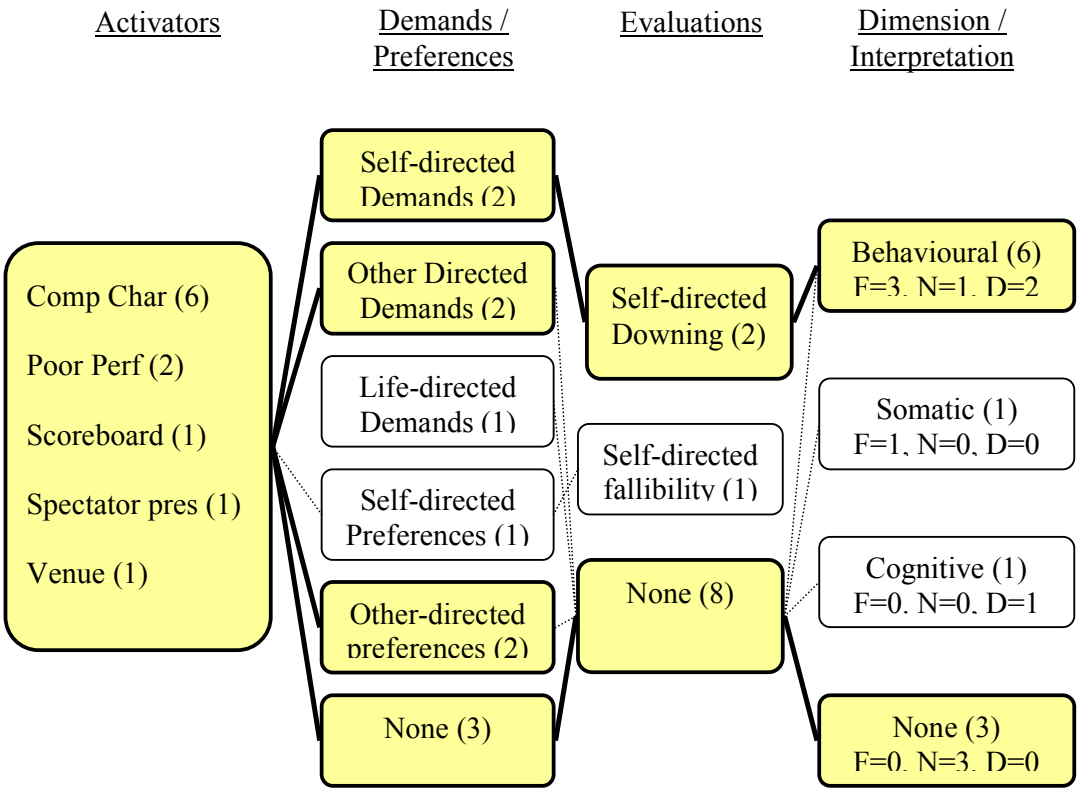

Figure 5.6. Annoyance Pathway Map for the Entire Sample.

The interpretations of this subset of bowlers showed a range of responses, primarily including self-directed demands, leading to self-directed downing, other-directed demands, and other-directed preferences. Emotional consequences were primarily noted

in the behavioural domain, and were most often interpreted as being facilitative to performance. In the following commentary, the bowler indicates the presence of an other-directed preference in response to competitors making noise on nearby lanes,

> Um, I was pretty frustrated because I knew they were disrupting play, but I was able to use this to focus in on my game. So it was annoying, and I wanted them to be quiet, but I couldn't stop them and it all helped me to actually bowl better.

Figure 5.7 illustrates the interpretive pathways for bowlers experiencing the emotion of concern.

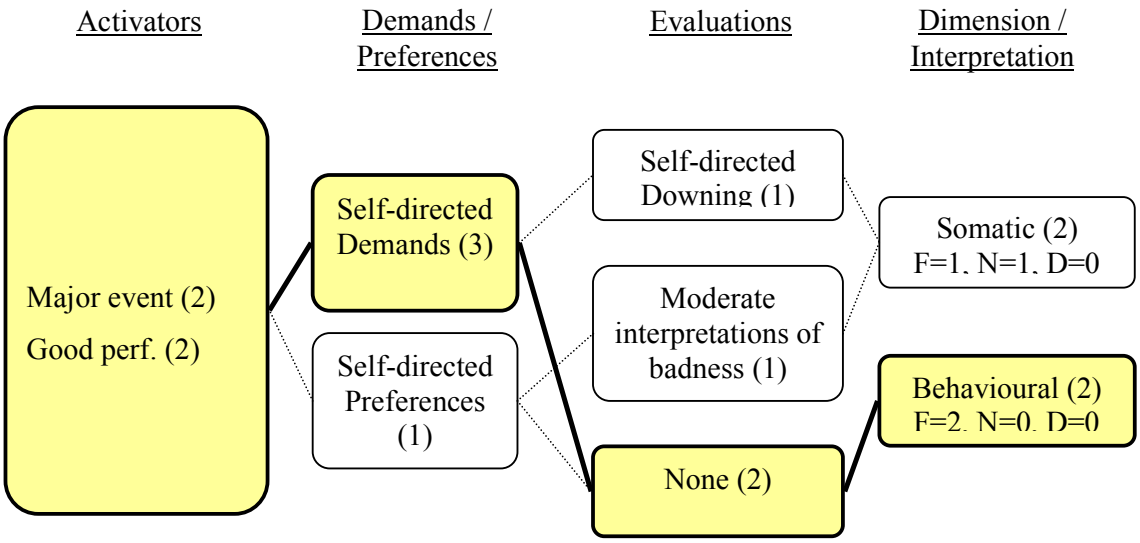

Figure 5.7. Concern Pathway Map for the Entire Sample

The interpretations of this subset of bowlers indicated a predominance of self-directed demands without evaluations. This emotion was primarily experienced in the behavioural domain, and was seen as being facilitative to performance. One bowler provided an example of a self-directed demand and a primarily somatic awareness in the following comments,

> Well I am thinking "I really have to do well now", and, I get um, I get nervous and I can feel like my heart in my chest, and my hands shake as well. But, um, I can still bowl off my nerves. Like the first game of a tournament, of a really important tournament. I'll be nervous, but it kinda feels good to be that way.

A second bowler made the following comment, further highlighting the differential through patterns underlying concern as opposed to anxiety,

I get a bit nervous in competitions, but I think there has to be some sort of tension because, um, you have got, sort of, that's the difference between a competition feeling and a league feeling. It makes you perform.

Figure 5.8 illustrates the interpretive pathways for bowlers experiencing the emotion of being focussed.

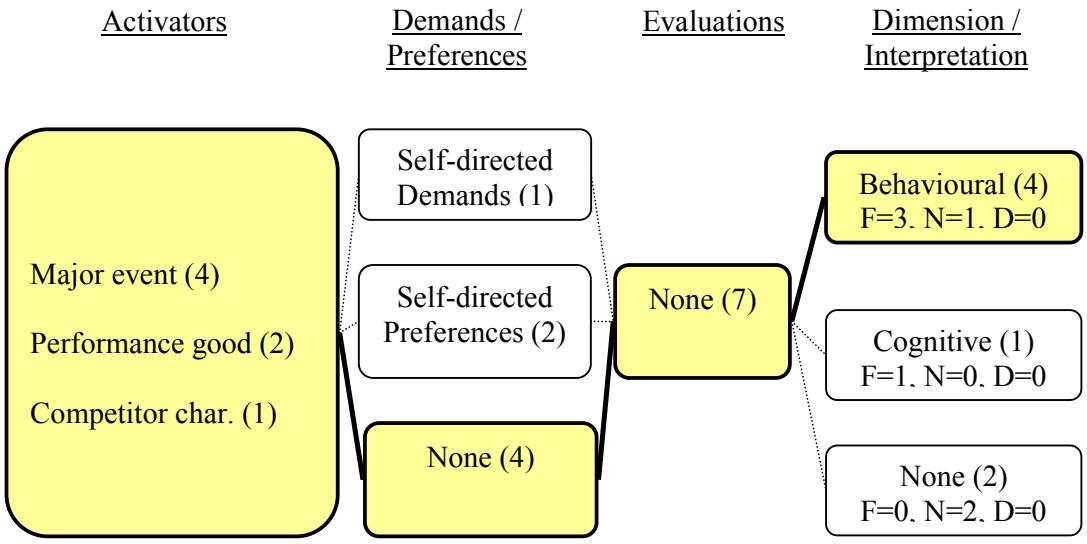

Figure 5.8. Focussed Pathway Map for the Entire Sample.

The interpretations of this subset of bowlers were characterised by a lack of clearly definable cognitions associated with this emotion. For example, one of the bowlers stated, “There is no pressure on me. I am just sort of there. I just know where I'm going to stand and I just go up there and execute it.” Another commented, “Everything just works, it’s hard to describe. You are just there, you know. Just really focused.” A final indicative comment made by another bowler was,

You get so focussed before you go up to bowl. And you are just going though the shot the whole time you are up there, and once you get a few strides into your bowl you are completely focussed on what's going on in your head.

These comments appear quite different to characteristic thoughts associated with emotional disturbance, as the following comment highlights,

It's really strange because in my mind when I am bowling well, it's totally clear. There is nothing in my mind. But when I am not doing so well, I can sort of like hear a voice in my head saying you mustn’t pull the ball to the left or you cannot throw your elbow out, like I'm giving myself instructions. And if I don’t I’ll lose and be humiliated.

Being focussed was primarily experienced in the behavioural domain by bowlers, and was interpreted as being facilitative to performance.

Figure 5.9 illustrates the interpretive pathways for bowlers experiencing the emotion of happiness.

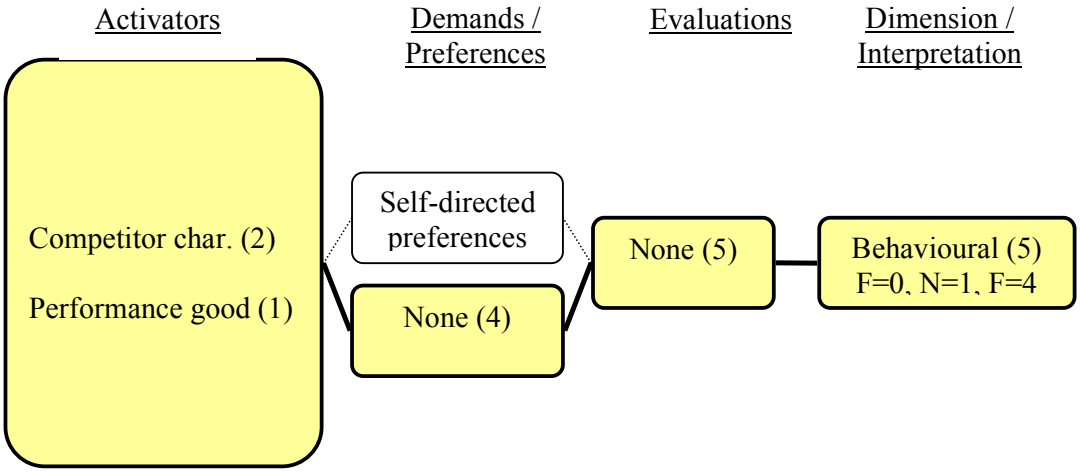

Figure 5.9. Happiness Pathway Map for the Entire Sample.

In most instances, I found that it was not possible to categorise the interpretations of bowlers experiencing this emotion. Happiness was primarily experienced in the behavioural domain and was interpreted as being facilitative to performance. One bowler made the following comment in response to having to perform at a major competition, "I'm happy. There is a bit of extra pressure and I like that. Well it doesn't really matter. Well I think I am more determined to bowl better, but it won't really matter if I don't." A second bowler made the following comments in response to the presence of her parents,

> I get sort of, like my mum and dad come down every now and again and my cousin and that. And I get sort of really like, I know I perk up because they are there, and it is just the hype of them being there. It helps.

Finally, when describing the experience of feeling happy on the lanes, a bowler made the following comments,

> It's so different. Nothing's going in your head. It's . . . when I'm bowling good, I am really happy and I, see, to be a good bowler you have got to bowl off your subconscious mind. So you have got to not concentrate on what you are doing. There is a level of concentration, but it is not as far as "alright so I have got to take that first step." It's all done automatically. So when you are bowling well you are working off your subconscious mind. So you are not thinking much.

In summary, when considering cognitive pathways underlying various emotions, I specifically focussed on the emotion of anxiety across the whole sample, and went on to compare and contrast competitors independently assessed as holding debilitative versus facilitative trait anxiety dispositions (as assessed using the CTAI-2-D). I also explored typical cognitive pathways associated with the emotions of anger, annoyance, concern, being focussed, and happiness across the whole sample.

Discussion

The primary aim for this study was to explore characteristic cognitive interpretations underlying different sport specific emotions in competitive bowling. These interpretations were in response to both activating events and consequences experienced by the competitor. I also explored characteristic patterns of association between these interpretations, specific activating events, and emotional consequences. I employed the theory of REBT as a framework for these analyses. As a secondary aim of this study, I explored the relationship between trait anxiety directionality and interpretive style. In relation to this second aim, I distinguished between the types of cognitions displayed by bowlers with a debilitative trait anxiety predisposition and the cognitions of those bowlers who were identified as having a facilitative trait anxiety predisposition (as identified by the CTAI-2-D). Based on the findings of this investigation, I gained considerable insight into the potential efficacy of using REBT as a means of managing anxiety in sport.

Results from analyses of the interview transcripts revealed that performing poorly, major events, venue characteristics, and competitor characteristics were often identified as threats to performance. It is important to highlight that poor performance may, in fact, be a consequence of a reaction to another trigger, or may instead be completely unrelated to the emotional state of the bowler. Beliefs characteristically associated with these triggers included self-directed and other-directed demands. Such findings are consistent with recent re-conceptualisations that indicate demands as the primary irrational appraisal mechanism (e.g., David et al. (2002). REBT also highlights the importance of life-directed demands; however, only two instances of these emerged from the data. Despite the theory of REBT predicting that a preferential philosophy is the alternate state to a demanding philosophy, and is most commonly associated with helpful negative and positive emotions, very few preferences were observed in participant responses in association with these emotions. In terms of maladaptive secondary appraisal mechanisms, respondents most commonly cited the evaluations of

awfulising and other-directed downing across all major emotions. Notably, when I separated participant responses according to their trait anxiety directional predisposition, facilitative trait anxiety respondents reported approximately half the number of clearly identifiable belief typologies compared to debilitative trait anxiety respondents. This observation may indicate that directional trait anxiety measures indirectly tapped into the interpretive style of bowlers (for both external activating events and individually mediated activating events), and that this style may generalise across a range of emotions in response to a range of activating events.

The results I obtained from this analysis also revealed that the emotions of anger and anxiety accounted for more than 60% of all affect reported by respondents. In relation to this observation, it is important to note that I selected participants based on their responses to the CTAI-2-D. As a result, I would predict that the information obtained in this study would not necessarily reflect a random sample of competitors. Despite this, my findings imply that the experience of anger may be just as relevant to bowling performance as that of anxiety, or may be in some way associated with the experience of anxiety. Finally, the majority of respondents (55%) reported primarily experiencing their emotions in the behavioural modality. Combined, these general findings suggest that interventions designed to moderate levels of anxiety or anger should ideally focus on restructuring self- and other-directed demands, awfulising, and self-downing. These findings also suggest that working towards a cognitive state that involves a greater task-focus, and less judgemental thought (rigid or preferential) may be associated with positive performance outcomes. In addition, the findings of this research suggest that measures of emotional states may be more effective, if they include a behavioural component.

I also analysed data to determine associations between interpretations made by bowlers that lead to emotional consequences. Across the full sample, the findings indicated that differing emotional responses were associated with different typical cognitive response pathways. Having said this, there did not appear to be any clear links between specific activating events and emotional responses. In other words, a major event may trigger the experience of anxiety for some bowlers, yet trigger anger in other bowlers, or even a focussed response in yet other bowlers. Such findings clearly emphasise the important role of cognitions in the experience of emotions in sport. In relation to this finding, self-directed demands and awfulising were found to be the primary beliefs underlying the experience of anxiety across the sample. Respondents

reported experiencing their anxiety in both somatic and behavioural modalities, and this experience was generally interpreted as being harmful to performance. Interestingly, the cognitive dimension of anxiety was not identified as a primary means by which the anxiety response was experienced, yet this modality is a core factor in the majority of anxiety measures. Data from this study suggests that the competitors' interpretation of behavioural dimensions may be a more appropriate indicator of anxiety than somatic or cognitive dimensions, particularly for competitive bowlers.

Research conducted by Jones and Hanton (2001), and more recently by Mellalieu, Hanton, and Jones (2003), has indicated that competitors' interpretations of their cognitions and somatic responses can vary significantly depending on the context. Specifically, Jones and Hanton and Mellalieu et al. observed that symptoms that may be interpreted as being facilitative in training before competition may then be seen to be debilitative if experienced during competition. Associated with these observations, when my sample was split according to competitors' directional trait anxiety predisposition, I found that bowlers who had a facilitative anxiety predisposition reported significantly fewer clearly definable thoughts underlying their experience of anxiety than did bowlers who had a debilitative anxiety predisposition. These observations may suggest that when competitors identified as having a debilitative anxiety predisposition are exposed to an activating event they perceive to be threatening, the pace of their thinking may increase, the range of their thoughts may broaden, or they may become fixated on quite specific and identifiable thoughts. At this stage, it remains unclear whether it is the pace of thinking, range of thoughts, or focus of self-talk (or combination thereof) that is most strongly associated with a debilitative trait anxiety style.

This study further supports the conjecture by Bernard (1998) that rational and irrational beliefs are not bipolar constructs, but may be independent. Individuals may hold rational beliefs relating to one specific trigger, whilst concurrently holding irrational beliefs relating to another. Further, competitors may hold a combination of rational and irrational beliefs pertaining to the same trigger. Although I did not directly assess the interrelationships between various types of thinking (demands and preferences) and emotions (functional and dysfunctional), bowlers reported overlaps in these domains.

The findings from this study also provide preliminary evidence that adaptive behaviour may be associated with a lack of interpretive thinking (rational or irrational).

If this is the case, then intervention strategies such as REBT could initially be used to weaken strong irrational beliefs, and then alternate strategies could be employed to help distance competitors from their thought processes altogether (where appropriate). Techniques focussing on facilitating flow states (Csikzentmihalyi, 1990), or strategies based on creating healthy distance from thoughts, such as Mindfulness Acceptance Commitment (MAC; Gardner & Moore, 2004), or Acceptance and Commitment Therapy (Hayes, Strosahl, & Kelly, 2003) may prove fruitful in this task. Clearly, more research is required to further explore this possibility.

Cognitions underlying the experience of anger mainly included self-directed demands and self-downing. Participants reported experiencing the emotion of anger in the behavioural modality, and indicated that this experience was goal-blocking. The number of participants experiencing anger in this sample highlights the relevance of this emotion in competitive bowling. Typically, anger has not been considered as a major target of sport psychology measures or interventions (Robazza & Bortoli, 2006).

Two negative, but helpful, emotions emerged from the data as relevant to the experience of competitive bowling, annoyance and concern. There were few clearly discernable underlying beliefs associated with the experience of annoyance, apart from a small number of demands and preferences without any evaluations. This emotion was generally experienced in the behavioural modality, and was interpreted as being facilitative to performance. Concern was also associated with a lack of identifiable cognitions, was primarily experienced in the behavioural modality, and was generally interpreted as being facilitative to goal attainment. These findings may suggest that negative, helpful emotions are characterised by an absence of clearly definable thought. The positive helpful emotions of being focussed and happiness also emerged from the data as having unclear underlying thought patterns. These findings fit with suggestions made by Gallway (1974) and Rotella (1996) who have stressed that peak performances usually occur in the absence of conscious thought. In such circumstances, concentration is turned in on automatic functions, which are largely free from the interference of thought. This concept is supported by Eastern philosophical approaches (Deshimaru, 1982; Leonard, 1992). Despite this, Zinsser et al. (1998) noted that athletes do generally think during competitions. Hardy, Hall, and Hardy (2001) provided evidence to suggest that more self-talk occurs in competition settings than in practice settings, and the greatest amount of self-talk occurs during competition when compared to before and after competition. Given that there is no current yardstick against which we can clarify

what an average amount of self-talk is, it is impossible to know whether there is more or less self-talk associated with sporting performances when compared to other life domains. Given that this self-talk can mediate emotions (and ultimately behaviour), it is imperative that sport psychologists continue to teach competitors to recognise, and either restructure or relate differently to, harmful thoughts around competitions.

Methodological Issues

This study generated a considerable amount of information associated with the experience of emotions in sport, explored some innovative means for gaining access to such information, highlighted the relevance of REBT as a framework for the analysis of cognition in sport, and provided additional insight into directional measures of trait anxiety. In so doing a number of methodological issues became apparent.

One methodological issue encountered in this study relates to the subjective nature of the coding process. Despite the precision of the definitions of various types of beliefs offered in REBT, it can be quite difficult to determine whether the implied meaning an individual holds is the same as that defined by the theory. I encountered some instances where text was not incorporated in further analyses as a result of disagreement between coders on whether that text fit with definitions provided by REBT. Further to this, as the cognitions of participants could not be directly matched against performance outcomes, there was no direct performance assessment. It is not possible to determine whether the beliefs held by individuals were resulting in performance detriments, and I had to rely on the bowlers' retrospective self-reports.

A second methodological issue associated with coding process relates to the difficulty in untangling aspects of the potential range of emotional experiences that bowlers reported. The procedures I employed in this study did not allow for any investigation of the interrelationships between various emotions. In his binary model of emotion, Ellis (1994) highlighted that different emotions can occur simultaneously. It is also clear that different emotions can share similar symptoms and cultivate similar behaviours. Given such a situation, when competitors are experiencing more than one emotion at a time, it is very difficult to tease out the relative contribution of specific triggers, beliefs, and consequences. In this study, I encouraged participants to focus on one identifiable emotion at a time, yet I could not guarantee that bowlers were experiencing unidimensional and emotionally-uncontaminated ABC sequences. To complicate matters further, although emphasising the primacy of beliefs, Ellis (1962, 1994) highlighted the reciprocal relationships between thoughts, emotions, and

behaviours. According to Ellis, emotions are defined by their cognitive, physiological, and behavioural components (See Chapter 4). Given such a definition, the interdependence of the basic elements of the ABC sequence, and sequential arrangement of these elements remains blurry at best. As a result, one can never know whether the emotional sequence under investigation is partly being influenced by other emotional sequences. For example, it may be that a consequence of competitors' experience of concern is that they become more vigilant to threats. As a result, they may be more likely to observe the behaviour of significant others in their competitive context, fostering irrational beliefs about this behaviour and ultimately driving a dysfunctional emotional consequence. In this case, the primary trigger pertains to the sequence leading to concern, however, the level of awareness of the consequences of focussing on threat, stimulated by that concern, may not be available to the competitor. As can be seen by this illustration, it may not be possible to determine the sequence of emotional disturbance, throwing into question the likelihood of clearly delineating Ellis's (1962, 1994) concept of secondary emotional disturbance.

A theoretical issue that emerged out of this study relates to the hierarchical order of beliefs proposed by the theory of REBT. In this study, I assumed that demands form the core in terms of a belief hierarchy (the start of the chain following an activating event). David et al. (2005) highlighted that demands may not necessarily be the core irrational beliefs, and that in some cases what we generally consider to be derivatives of demands (e.g., awfulising, low-frustration tolerance) may be more central to individuals' dysfunction than demands (or may even exist independent of core beliefs of a demanding nature). Preliminary research supports the proposition that demands are the primary maladaptive appraisal mechanism, and further suggests that the effects of this mechanism on various outcomes (e.g., cognitive, emotional, behavioural), are mediated by evaluations (e.g. awfulising) (David et al., 2003). These results appear to be consistent with the findings of this study, although they may be partially influenced by the biases associated with the theory of REBT, and researchers trained in this form of therapy. David et al. (2005) suggested that future research should attempt to further develop our understanding of the associations between, and relative importance of, rational and irrational beliefs.

The nature of a retrospective assessment of beliefs is inherently problematic, particularly when there is a significant time between the event in question (and emotional response to interpretations associated with it) and assessment. In this study,

competitive bowlers were simply asked to recall potentially threatening situations they had encountered in the competitive arena, to which they responded with strong emotions. No attempt was made to assess how long ago these experiences occurred, and, as a result, the findings are highly dependent on the memory of the participants. Ideally, future research would take into consideration the time elapsed between the actual experience and recollection associated with the interview procedure, with the goal of assessing for the effects of memory decay. In addition, researchers might employ behavioural observations, unstructured thought listings, thinking aloud procedures, and videotape prompted recollection to help triangulate the data.

On a positive note, the methodology employed in this study provided considerable structure to a considerable amount of complex, and otherwise unrelated information. REBT's ABC structure provided a framework from which various components of bowlers emotional experiences could be identified, and numerous associations could be observed. In addition, the ABC structure has the potential to simplify the process of selecting treatment options for the applied management of goal blocking emotions in sport.

Future Research

The findings of this study provided additional information pertaining to specific beliefs underlying the emotional experiences of ten-pin bowlers. In addition, I obtained information that sheds some light on typical beliefs held by competitors with a debilitative directional trait anxiety predisposition, as compared to those who endorse a facilitative directional trait anxiety predisposition. Future research is needed to determine whether an intervention aimed at restructuring underlying beliefs (particularly self-directed demands and awfulising) will result in reduced dysfunctional affect, and improved performance, as predicted by the associations between the CTAI-2-D and performance/skill observed in Study 1.

In this study, there were only two instances of life-directed demands verbalised by bowlers. It may be that because most sport participation is actively chosen by the participant, a greater sense of personal responsibility is taken for occurrences within that environment. Alternately, experiences outside of the sporting environment are often not directly chosen, but are experienced as a matter of survival. Future research should explore whether sporting competitors are less likely to endorse life-directed demands as a general rule, or just in relation to the competitive sporting environment. In addition, it would be fruitful to explore the relative frequency of self- other- and life-directed

demands with the goal of determining the relative likelihood of observing these in the population at large. Practical experience would suggest that self- and other-directed demands are more likely to form a part of the primary irrational appraisal mechanism than those directed at the world and life at large.

In relation to this finding, although the results of this study indicated that a larger number of specific and identifiable beliefs and evaluations were associated with harmful negative emotions when compared to helpful negative and positive emotions, it remains unclear whether it is the pace of thinking, range of thoughts, or focus of self-talk (or combination thereof) that is associated with these emotional outcomes. Future research using more direct measures (such as thinking aloud procedures), should explore these variables to help determine the relative contribution of each to emotional disturbance.

Data from this study suggests that the competitors' interpretation of behavioural dimensions may be a more appropriate indicator of anxiety than somatic or cognitive dimensions, particularly for competitive bowlers. It may be that observable behaviours such as withdrawal, impulsivity, or aggression, and the competitor's interpretation of these, may add significantly to our understanding of the emotional response system, and may improve the specificity of measures of emotion. More research is needed to determine whether the findings of this study translate to other sporting populations, and, perhaps more importantly, whether behavioural attributes can be measured.

Although beyond the scope of this thesis, further research is also needed to determine the relative efficacy of therapeutic strategies that target the content of thoughts versus those that target the way an individual relates to their thoughts. Findings from this study highlight that competitors responding to potential threats with functional emotional outcomes reported an absence of identifiable thought. Such a finding might imply that these individuals are less focussed on, or aware of, their thoughts, and more immersed in the activity. More comparative research is needed to determine the relative contribution of each of these philosophically-independent approaches.

Finally, given the simplicity of this approach, future researchers should attempt to utilise the ABC model of emotional disturbance as a means of exploring the relationships between triggers and various dimensions of emotion. The framework is relatively uncomplicated to apply as a structure, and offers some degree of delineation between what are otherwise confusingly interrelated dimensions. In particular, more research is required to test some of the propositions of the theory of REBT that suggest

that specific beliefs are characteristically associated with specific emotions, as highlighted by David et al. (2002).

Conclusions

In summary, this study has highlighted that the theory of REBT has a lot to offer as a means of analysing and potentially managing emotions in sport. The findings revealed tangible differences between the types of thoughts associated with functional versus dysfunctional emotional responses. These findings highlight the potential of an intervention aimed at helping competitors to learn how to restructure dysfunctional beliefs they experience in performance situations. Given the observed relevance of REBT to the analysis of thoughts underlying emotions, and the level of research support for REBT in the clinical and non-clinical literature, it would appear that REBT would lend itself to such a task. In Study 3, I go on to explore the relative efficacy of REBT as a means of managing trait anxiety and improving performance in sport.

CHAPTER 6: STUDY 3: MANAGING ANXIETY IN SPORT WITH REBT

Introduction

Despite the observation that measures of anxiety based on intensity only continue to be developed (e.g., the SAS–2; Smith, Smoll, Cumming, & Grossbard, 2006), the notion of "direction" of anxiety (Jones, 1991), and subsequent modification of the CSAI-2 by Jones and Swain (1992) has had a profound impact on the measurement of anxiety in sport. In Study 1, I observed strong associations between both the cognitive and somatic directional scales of the CSAI-2-D and measures of performance. These observations corroborated the findings of previous research (e.g., Jones, Swain, & Hardy, 1993; Swain & Jones, 1995, 1996). In addition, I observed an association between anxiety direction and skill level, which has also been noted in previous research (e.g., Jones, Hanton, & Swain, 1994; Jones & Swain, 1992, 1995; Mahoney & Avener, 1977; Perry & Williams, 1998). Further, the findings from Study 1 add support to observations by Swain and Jones (1996) and Jones and Hanton (2001) that the direction dimension may be a more accurate predictor of performance than the traditional intensity component. In Study 1, I also observed moderate associations between state and trait anxiety direction, and noted significant correlations between trait anxiety direction and performance. When combined with the findings of the meta-analysis by Jorm (1989), which have indicated the modifiability of trait components of anxiety in clinical research, particularly using REBT, it was a rational extension to further explore athletes' interpretations associated with their anxiety experience in Study 2, and to adopt a REBT perspective in that study.

Then in Study 2, I employed a qualitative methodology to gain a clearer perspective of the experience of cognitions underlying directional measures of cognitive and somatic trait anxiety. I classified these cognitions, or, more specifically, beliefs and evaluations, using an REBT framework. The major triggers that ten-pin bowlers reported as having the potential to lead to debilitative anxiety included competing against highly skilled competitors, competing in major events, competing in the presence of significant others, high pressure performances, and poor performances. I found that beliefs bowlers' interpreted as driving their subsequent debilitative interpretations of anxiety symptoms (cognitive, somatic, & behavioural) primarily included self-directed demands, and evaluations of awfulising. I found that facilitative symptom interpretation was associated with a much lower frequency of these self-directed demands and awfulising, and more often than not was associated with an

absence of classifiable self-talk. I identified other beliefs predicted by the theory of REBT, however, they were not typically endorsed by bowlers when faced with challenging activating events. Based on the findings from Study 2, I was able to provide preliminary evidence for the utility of REBT as a means of exploring and categorising beliefs associated with directional interpretations of anxiety. I was also able to determine specific beliefs that are likely to be mediating directional trait anxiety responses.

Study 3 logically progressed from the findings of the previous two studies in that it assessed the efficacy of modifying harmful interpretations that emerged from the content analysis performed in Study 2, that were indirectly identified by directional measures observed in Study 1. In Study 3, I compared the efficacy of two forms of anxiety management. These included REBT, and a combined relaxation and mental imagery training programme. The focus of the relaxation and mental imagery training intervention was primarily on rehearsing alternate physiological and mental states, whereas the focus of REBT was to change the way participants interpret circumstances, cognitions, behaviours, and feelings experienced before and during competition. Relaxation and imagery were combined to mimic the way in which this approach is typically delivered in the applied setting. I predicted that REBT would mediate significantly greater shifts in directional trait anxiety, underlying beliefs, and performance. I also predicted that this change would be more likely to be sustained, as REBT aims to change the way a person thinks in general, which would be predicted to mediate the content of thoughts across a range of specific situations well into the future. The efficacy of both of these interventions was assessed against a matched control group that received a placebo intervention called befriending which entails general attention and reflective counselling.

As outlined in Chapter 4, to date there have only been a handful of studies that have directly explored the efficacy of REBT in the competitive sporting arena. Bernard (1985) observed that as a result of a 5-week intervention program of REBT, Australian rules footballers reported that they could exercise some control over aspects of their mind that directly influenced the quality of their play. When working with gymnasts, Elko and Ostrow (1991) found that a program of REBT significantly decreased the intensity of cognitive anxiety. More recently, Yamauchi & Murakoshi (2002) found that an REBT intervention significantly reduced trait anxiety intensity in a team of 11 high-school soft-tennis players.

Aim. The aim of the current study was to examine the relative efficacy of REBT as a means of moderating debilitative interpretations of anxiety symptoms at the trait level, compared to a standard anxiety intervention involving relaxation and mental imagery.

I explored four main research predictions in this study. The first related to the efficacy of REBT as a means of moderating debilitative trait anxiety interpretations. Specifically, I predicted that competitive ten-pin bowlers who underwent an REBT intervention would report significantly more facilitative interpretations of their trait anxiety symptoms than bowlers allocated to either a relaxation and mental imagery training, or a control condition. Related to this, I predicted that competitive ten-pin bowlers who participated in the REBT intervention would report significantly more facilitative interpretations of their state anxiety symptoms than bowlers allocated to either a relaxation and mental imagery training, or a control condition. That is, I expected that the results I predicted for trait anxiety would be carried over to state anxiety interpretations. In the third research prediction, I investigated changes at the belief level, as measured by the SGABS. Specifically, I predicted that bowlers who underwent an REBT intervention would be significantly less likely to endorse irrational attitudes, and significantly more likely to endorse rational ones, than those bowlers allocated to a relaxation and mental imagery training or a control condition. The final research prediction related to expected performance outcomes resulting from the various interventions. Specifically, I predicted that participants who underwent the REBT intervention would experience significantly greater performance gains across the intervention period than those in a relaxation and mental imagery training condition or a control condition.

Method

Participants

The participants were 60 competitive ten-pin bowlers (44 male; 16 female) with a mean age of 18 years (SD = 1.59), who expressed an interest in being in a study focussing on the management of competitive anxiety, and who were assessed as experiencing debilitative competitive trait anxiety. This assessment was based on their responses to the CTAI-2-D, where they had to obtain a total negative score on either the cognitive and/or somatic directional subscales to be eligible for inclusion. A total of 16 bowlers were excluded from the total pool of 76 potential participants as a result of this selection criterion.

The sample reported their current competitive level in the following manner; Recreational (10), local club (47), state (3), and national/ international (0). Their competitive experience ranged from 1 to 5 years (M = 3.05, SD = 0.98). The self-reported average game score of the sample was 178 (SD = 15.01). A total of 15 of the 60 participants reported competing in other sports at a serious level.

General Measures

Demographical information. This measure, which I devised for the study, comprised a series of general demographic and performance-based questions that covered the age and gender of participants, how many years they had been bowling competitively, the bowlers' self-reported average game score, whether there were any injuries present, the bowlers' competitive level, and whether the bowlers' were currently participating in other competitive sports. I used their responses to these items as a means of identifying characteristics of the sample, and to monitor equivalence between conditions (See Appendix N).

Social Desirability. The Marlowe-Crowne Social Desirability Scale (MC SDS; Crowne & Marlowe, 1960) is a measure that is designed to identify individuals who have a tendency to respond in a socially desirable manner (Crowne & Marlowe, 1960). This personality trait can be an important source of bias in psychological investigations, indicating high levels of defensiveness, a high need for social approval, and a reluctance to report negative emotional states. The scale contains 33 true-false items that describe acceptable, but improbable, behaviours, as well as those deemed probable, but unacceptable. Socially desirable responses are summed, yielding a possible range of scores from 0 to 33, with high scores indicating greater social desirability. Mogg et al. (2000) used a cut-off of 15 to discriminate between high and low social desirability scores. The MC SDS has been found to maintain adequate internal consistency (K-R 21 = 0.75) and construct validity (Crowne & Marlowe, 1960). This measure was used in this study as a means of determining whether participants were responding in a socially desirable manner, which would be predicted to bias responses to other measures. See Appendix O for a copy of the SDS.

Trait anxiety. The Competitive Trait Anxiety Inventory - Mark 2 (CTAI-2; Albrecht & Feltz, 1987) is a measure of pre-competition trait anxiety (See Study 1). I modified it as per the instructions of Jones and Swain (1995) to include the direction response scale, and I omitted the self-confidence subscale, resulting in the CTAI-2-D.

Beliefs. The Shortened General Attitude and Beliefs Scale (SGABS; Lindner, Kirkby, Wertheim, & Birch, 1999) is a brief 26-item version of the 55-item General Attitude and Belief Scale (GABS; Bernard 1990). It is designed to assess multidimensional aspects of irrational thinking. There are seven subscales in the SGABS, one assessing rationality, and a further six representing dimensions of irrational thought (self-downing, need for achievement, need for approval, need for comfort, demand for fairness, and other-downing). A total irrationality score can be calculated by summing these six subscales. For each item, participants are asked to respond using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores represent more strongly held beliefs. The SGABS has been found to have good reliability and validity (Lindner et al., 1999; MacInnes, 2003). Prior to this study, the SGABS has not been used in the sport setting. See Appendix P for a copy of the SGABS.

Specific and State Measures

State anxiety. The Mental Readiness Form Version 3 (MRF-3; Murphy, Greenspan, Jowdy, & Tammen, 1989) is a brief pre-competition state anxiety measure. I modified the MRF-3 by including the directional interpretation scale devised by Jones and Swain (1995) after the intensity scale for each item. As with the CTAI-2, I omitted the self-confidence subscale. The adapted MRF-L (Krane, 1994) used in this study was composed of two brief statements associated with an 11-point Likert scale. These statements included; “my thoughts are”, and “my body feels”. The anchors for the “my thoughts are” cognitive anxiety statement were calm and worried. The anchors for the “my body feels” somatic anxiety statement were relaxed and tense. Krane (1994) reported a correlation of, $r = 0.76$, between the MRF-L cognitive anxiety intensity subscale and the corresponding CSAI-2 cognitive subscale and a correlation of, $r = 0.69$, between the MRF-L somatic anxiety intensity subscale and the corresponding CSAI-2 somatic subscale. Cox, Russell and Robb (1999) assessed the concurrent validity of the MRF-L and found it to be a valid instrument for use with basketball and volleyball players. The directional scale was appended to the MRF-L as per the CTAI-2-D (see Appendix Q).

Performance. Game scores for each bowler during competitive matches associated with anxiety questionnaire completion (i.e., the first game of each weekly competition) were collected prior to, throughout, and following the intervention period.

Treatments

REBT. Participants allocated to the REBT condition underwent a treatment designed to teach them skills appropriate to the modification of anxiety mediating unhealthy thoughts. Sessions involved psychoeducation and group interaction. I conducted all the sessions. Prior to the study, I had undergone advanced training in applied REBT. All participants were given instructions to practice aspects of the intervention regularly on their own. The intervention covered a total of six 90 minutes sessions. Each of these sessions focussed on core rational emotive-behavioural therapy skills. Based on the findings of Study 2 which indicated that bowlers identified as having a debilitative anxiety predisposition present with a specific typology of beliefs when anxious, I placed greater emphasis on identifying and restructuring self-directed demands, awfulising and secondary emotional disturbance associated with somatic and behavioural interpretations. However, in order to retain the therapeutic core of REBT, I did not deviate significantly from the typical intervention framework. In session one, emphasis was placed on providing a general background to the ABC model of emotional disturbance. Competitors were shown how to identify activating events, self-talk, and emotional and behavioural consequences. Bowlers were asked to keep an ABC diary as a homework exercise. In session two, emphasis was placed on reviewing homework and highlighting specific thinking patterns identified by bowlers as being unhelpful to their performance. In addition, a brief introduction to secondary emotional disturbance was provided. In session three, emphasis was placed on the range of possible beliefs that can interfere with performance, including demands and evaluations. In session four, the process of disputation was explored, using empirical, logical and pragmatic approaches. In addition, bowlers were taught how to generate rational alternatives. In session five the emphasis was on practical application using a combination of rational-emotive imagery and personal examples from the group. In session six further strategies to help bowlers move to a more rational perspective were explored including cost-benefit analyses, shame attacking, and psychoeducation associated with the concept of self-worth (See Appendix R for an outline).

Relaxation and Mental Imagery. Participants allocated to the relaxation and mental imagery condition underwent a treatment designed to teach them these skills as deemed appropriate to the management of anxiety. I conducted all the sessions. At the time, I already had an extensive background in research and practice associated with relaxation and mental imagery. Specifically, relaxation sessions included skills training in relaxation, using Jacobson's (1938) progressive relaxation technique. In relation to

mental imagery, emphasis was placed on internal and external perspectives (Morris, Spittle, & Perry, 2004), vividness and controllability (Watt, Morris, & Andersen, 2004), and successful execution of skills and mastery experiences (Paivio, 1985). The imagery training program used in this study largely followed the components and procedural sequence suggested by Morris, Spittle and Watt (2005). In particular, the program stimulated the development and control of imagery, progressed gradually from simple to complex situations, involved all of the senses, used imagery that emphasised kinaesthetic sensations, encouraged images that were as realistic and dynamic as possible, used both internal and external perspectives, was performed in real time, focussed on positive performances and outcomes, involved memory for re-creation and creation, included both the complete skill and outcome of performance, and included stimulus, response, and meaning elements (Morris et al., 2005). In term of rehearsal, practice was systematic, and where possible individual preferences and skills were considered in determining rehearsal routines. Further, bowlers were encouraged to complete homework task pertaining to practice (Morris et al., 2005). This imagery training program included the incorporation of triggers to facilitate the imagery process. Finally, ongoing verbal evaluation procedures were employed to enhance monitoring of the acquisition of imagery skills. See Appendix S for an outline. All sessions involved psychoeducation and group interaction. All participants were given instructions to practice aspects of the intervention regularly on their own (see Appendix S).

Control condition. The bowlers in the control condition received so-called "befriending therapy" (Turkington & Kingdon, 2000), which involved empathy and non-directed support. This form of control condition has been used in the clinical setting as a means of controlling for experimenter effects (Turkington & Kingdon). I conducted all befriending sessions, and had previously administered such an intervention in clinical research. I spent an equal amount of time with bowlers in the control condition as compared to each of the two experimental conditions. Interaction mostly consisted of non-directive discussion around neutral topics, such as the bowlers' interests and general day-to-day news. When questioned about issues relating to the management of anxiety, participants were informed that a thorough assessment in the form of general ongoing observation would be necessary before specific interventions could be implemented. The participants in the control condition informed me that they welcomed and appreciated this time. Further, I offered participants in this condition, psychological skills training for the management of anxiety following the completion of final data

collection, and approximately 20% of bowlers took up this offer. Much of the content of this training was developed out of the findings of this study, and feedback that arose from the debriefing of participants in the two experimental conditions.

Procedure

I obtained approval from the Victoria University Human Research Ethics Committee. Then, I invited participants from independent bowling centres in metropolitan Melbourne to complete an initial anxiety screening assessment. Prior to the screening, I provided them with information about the nature of the research (See Appendix T) and I obtained consent for their involvement (See Appendix U). As part of this screening, I assessed the bowlers for intensity and direction of cognitive and somatic trait anxiety using the CTAI-2-D, and the presence of social desirability responses using the SDS. Participants completed these measures away from the competitive environment, in order to minimise any contextual influences (e.g., audience effects).

Prior to completion, I presented each participant with standardised instructions based upon the recommendations of Smith et al. (1990) and Martens et al. (1990), respectively. These instructions emphasised the confidentiality of responses, thus, attempting to minimise social desirability, accentuate honesty, and indicate that there were no right or wrong answers. Individuals' responses to the somatic and cognitive subscales of the CTAI-2-D were used to reflect debilitative trait anxiety direction, and I considered those who achieved a sum negative result on either subscale of the CTAI-2-D, then invited them to participate further in the study. Then I asked them to complete the SGABS and the brief demographic data questionnaire.

None of the 76 bowlers who completed the MC SDS were omitted from further involvement, as their responses indicated that they were answering questions honestly. A total of 16 participants failed to achieve a total negative score on either of the debilitative subscales of the CTAI-2-D, and I omitted them from further involvement in the research. I gave details of the research to the remaining 60 participants (Appendix Q), I obtained consent for full participation in the study, including permission from relevant coaches and organisers (where appropriate), and parental consent where participants were under the age of 18 (a total of 21 of the participants were under 18), and I randomly allocated them to one of three conditions. To avoid the exchange of treatment information between bowlers, I drew participants allocated to either of the two experimental conditions from geographically separate locations. They were

competing in different, but equivalent, club level competitions. Participants allocated to the control condition originated from both of these general areas. As a result, I assigned a total of 25 participants to the REBT condition, 20 participants to the relaxation and mental imagery condition, and 15 participants (6 from one general municipality, and 9 from the other) to the control condition.

Over the following 10 weeks of competition, I asked participants to complete the MRF-L-D no more than 20 minutes prior to their first bowling game of each weekly competition. In addition, I asked participants to record their actual results for each of these games. I ran the intervention from Week 3 to Week 9 of this period. Each week, I conducted two separate 90-minute group sessions for participants from each of the two experimental conditions. I allocated the same amount of face-to-face access time to participants in the control condition. After the tenth week of state data collection, I asked all participants to complete a second copy of the CTAI-2-D, and SGABS, debriefed them, and thanked them for their participation in the study. I then offered the psychological skills training option to participants in the control condition.

Data Analysis

I divided data analysis into five stages. Firstly, I checked the data for missing or incorrect values. Secondly, I calculated the internal reliabilities and correlations between subscales and measures for the sample. Thirdly, because the sample comprised performers with varying possible covariate influences (e.g., gender, skill level), I calculated a one-way Multivariate Analysis Of Variance (MANOVA) to determine the existence of covariate influences as highlighted in previous anxiety-direction studies (e.g., Hanton et al., 2000; Perry & Williams, 1998). Fourthly, I used MANOVA and Analysis of Variance (ANOVA) to examine between group differences in trait anxiety intensity and direction, state anxiety intensity and direction, beliefs, and performance across conditions. Finally, I calculated repeated measures ANOVA's to assess changes between-groups across time for performance and state anxiety data. I found that assumptions underlying all statistical tests were met at each stage of the analysis.

Results

Preliminary Data Analysis

Prior to the main data analyses of the study, I examined participants' scores on all measures for accuracy of data entry, missing values, and fit between sample distribution and the assumptions of analysis of variance procedures. In addition, I

assessed the influence of potential covariates, and I observed relationships between demographic data and pre-intervention trait anxiety intensity and direction scores.

I performed additional analyses to measure the influence of potential covariates. I conducted separate one-way ANOVAs to determine the presence of significant differences between the three conditions on the variables of average score, gender, age, level of competition, engagement in other sports, presence of injuries, and years competing. I did not observe any significant differences between conditions on any of these variables. In accordance with recommendations of Tabachnick and Fidell (1996), I also observed that the assumptions of normality, homogeneity of variance-covariance matrices, linearity, and multicollinearity were satisfactory.

Further, there were no significant relationships between preliminary cognitive or somatic trait anxiety intensity or direction scores on any of the following demographic variables; gender, age, number of years competing, presence of injuries, other sports (r = 0.00 to 0.23; all $p > 0.05$). This eliminated the need to account for these demographic variables in any of the subsequent analyses. Significant correlations were observed between level of competition and cognitive and somatic direction (CTAI-2-D-cognitive; $r = 0.44$, $p < 0.01$; CTAI-2-D-somatic; $r = 0.40$, $p < .0.01$). These observations further reinforce the findings of Study 1, in which I found that higher skilled performers tend to have more facilitative interpretations of their anxiety symptoms than their less skilled counterparts.

Before examining the interrelationships among the subscales of each measure, I examined internal reliabilities. I assessed the internal consistencies of the measurement scales used in this study by calculating Cronbach's Alpha Coefficients (α) for each subscale of each instrument. These are displayed alongside means and standard deviations in Table 6.1.

Table 6.1

Internal Reliabilities of Scales

Scale	Scale *M*	Scale *SD*	Scale α
MC SDS	3.08	2.27	0.49
CTAI-2 (cognitive anxiety intensity)	27.08	5.16	0.89
CTAI-2 (somatic anxiety intensity)	21.98	5.60	0.87
CTAI-2-D (cognitive direction)	-15.67	6.03	0.87
CTAI-2-D (somatic direction)	-11.23	6.64	0.89
SGABS (rationality)	8.12	1.75	0.75
SGABS (self-downing)	13.15	1.70	0.75
SGABS (need for achievement)	15.32	2.19	0.69
SGABS (need for approval)	11.72	1.70	0.64
SGABS (need for comfort)	14.18	2.80	0.73
SGABS (demand for fairness)	13.88	2.94	0.80
SGABS (other downing)	9.52	1.88	0.64
SGABS (total irrationality)	77.77	10.15	0.90

The internal reliabilities, examined for all scales, showed that most of the subscales assessed obtained alphas greater than 0.70, a value which is generally considered to be acceptable (Nunally, 1978).

Notably the need for approval and other downing subscales from the SGABS obtained alphas of 0.64. These compare to alphas of 0.71 and 0.61 by MacInnes (2003), who has suggested that there needs to be further examination of items in relation to the other-downing subscale of the SGABS. Nunally (1978) has suggested that scores above 0.60 may be considered appropriate in an exploratory study. As such, I utilised each of the measures in further calculations, however, I exercise some caution in drawing interpretations. Of note, the mean scores on the SGABS closely reflect those obtained by MacInnes (2003), using a high anxious population as identified by the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983). These results further support the validity of employing this measure in the sports setting.

The only notably low result for the internal reliabilities analysis related to the alpha level for the MC SDS, which I found to be only 0.49. Ray (1984) has suggested that variable alphas may be obtained from the MC SDS, depending on the population under investigation. For example, O'Gorman (1974) obtained an alpha of only 0.46

from a sample of Australian Army conscripts. Ray suggested that these differences may be due, in part, to differences in the educational and socioeconomic characteristics of the sample that differentiate them from the "usual" sample of college students. It may be that the population of bowlers used in this study were characteristically different from commonly used samples.

In addition to a relatively low internal reliability, the average score of respondents on the MC SDS was comparatively low with a mean score of, $M = 3.08$, and a maximum score of 6. This is well below the cut-off score of 15 suggested by Mogg et al. (2000) to be indicative of an individual attempting to respond is a socially desirable manner. These findings may indicate that respondents were not attempting to respond in a socially desirable manner, which may reflect that the procedural emphasis on eliciting honest responses from participants was effective. An alternative explanation may result from the fact that I advertised the study as an exploration of the management of anxiety in sport. Eysenck (1997) has found evidence to suggest an association between the variables of anxiety and repression, with repressors less likely to admit to experiencing anxiety symptoms. As a result it may be that the way in which the study was promoted inadvertently discouraged repressors from participating, reducing the number of competitors who would be expected to score higher on the MC SDS. Irrespective, the use of the MC SDS in this study was largely exploratory, and the low scores of respondents would seem to imply that they were responding honestly.

The observed internal consistencies for the CTAI-2-D subscales reflect previously reported observations by Perry and Williams, (1998), Hanton, O'Brien, and Mellalieu, (2003), and Jones and Hanton (2001). They appear to be acceptable for further analyses. In order to explore the relationships between trait and state dimensions of anxiety I constructed a correlation matrix using participant responses to both the CTAI-2-D (pre-intervention) and MRF-2-D at game 1 (See Table 6.2).

Table 6.2

Correlations among Trait Anxiety Subscales (CTAI-2-D) and State Anxiety Subscales (MRF-L-D) at Game 1.

Scale	1	2	3	4	5	6	7
1. CTAI-2-D (cog. intensity)	---						
2. CTAI-2-D (som. intensity)	0.53**	---					
3. CTAI-2-D (cog. direction)	-0.30*	-0.13	---				
4. CTAI-2-D (som. direction)	-0.10	-0.24	0.69**	---			
5. MRF-L-D (cog. intensity)	0.78**	0.30*	-0.34**	-0.12	---		
6. MRF-L-D (som. intensity)	0.36**	0.66**	-0.15	-0.18	0.26*	---	
7. MRF-L-D (cog. direction)	-0.22	-0.02	0.71**	0.42**	-0.34**	-0.10	---
8. MRF-L-D (som. direction)	-0.16	-0.21	0.48**	0.69**	-0.08	-0.07	0.21

*$p < 0.05$, ** $p < 0.01$, $N = 60$ (two-tailed tests).

Table 6.2 highlights that the CTAI-2-D and the MRF-L-D correlated highly at Game 1, with correlation coefficients ranging from, $r = 0.69$ to 0.78, between associated subscales. These findings closely correspond to those I observed in Study 1 between the CTAI-2-D and the CSAI-2- D (See Table 3.2), which ranged from, $r = 0.68$ to 0.82, and provide further support for the utility of using the MRF-2-D as an unobtrusive measure in the bowling context.

In order to determine relationships between the subscales of the CTAI-2-D and the subscales of the SGABS, I constructed a correlation matrix (See Table 6.3).

Table 6.3

Correlations among subscales of the CTAI-2-D and the SGABS

Measures	1	2	3	4	5	6	7	8	9	10	11
1. Cognitive Intensity	--										
2. Somatic Intensity	.53**	--									
3. Cognitive Direction	-.30*	-.13	--								
4. Somatic Direction	-.10	-.24	.69	--							
5. Rationality	-.40**	-.33**	.47**	.27**	--						
6. Self Downing	.21	.13	-.44**	-.71**	-.04	--					
7. Need for Achievement	.16	.43**	-.38**	-.42**	-.57**	.21	--				
8. Need for Approval	.38**	.34**	-.44**	-.21	-.63**	.03	.53**	--			
9. Need for Comfort	.33*	.28*	-.37**	-.63**	-.30*	.66**	.51**	.12	--		
10. Demand for Fairness	.60**	.49**	-.46**	-.57**	-.37**	.64**	.51**	.41**	.76**	--	
11. Other Downing	.46**	.49**	-.41**	-.28*	-.61**	.22	.73**	.66**	.45**	.66**	--
12. Irrationality	.48**	.48**	-.54**	-.63**	-.54**	.62**	.76**	.56**	.82**	.91**	.80**

*$p < 0.05$, ** $p < 0.01$, $N = 60$ (two-tailed tests).

Examination of the inter-scale correlations of the CTAI-2-D revealed coefficients that approximated the findings of Study 1. Specifically, a correlation coefficient of 0.53 ($p < 0.01$) was observed between scores for cognitive and somatic trait anxiety intensity, whereas in Study 1 the observed coefficient was 0.31. A correlation coefficient of -0.30 ($p < 0.05$) was observed between cognitive anxiety intensity and direction, compared to -0.40 in Study 1. A correlation coefficient of -0.24 ($p > 0.05$) was observed between the variables of somatic anxiety intensity and direction, compared to -0.31 in Study 1. A correlation coefficient of 0.69 was observed between cognitive and somatic direction which may be predicted if we consider that they are both based on an underlying cognitive process. These values also closely approximate those previously reported (Perry & Williams, 1998; Hanton, O'Brien, & Mellalieu, 2003). Such findings further support the multidimensional nature of cognitive and somatic anxiety components, and the separate measurement of intensity and direction dimensions of anxiety (Jones & Hanton, 2001).

The inter-scale correlations of the irrational attitude sub-scales of SGABS ranged from 0.03 to 0.91, with an average inter-scale correlation coefficient of 0.55. Correlations between the irrational attitude sub-scales and the rational subscale ranged from -0.04 to -0.63, with an average correlation of -0.44. Ellis (1994) noted that individuals can concurrently hold rational and irrational beliefs, which may partially explain some of the lower observed correlations between rational and irrational beliefs. The observed correlations between different subscales of the SGABS approximated those observed by MacInnes (2003), further reinforcing the validity of this measure.

Correlations between the CTAI-2-D and the SGABS showed positive relationships between trait anxiety intensity scores and irrational beliefs, ranging from 0.13 to 0.60 ($M = 0.38$), and negative relationships between intensity scores and the rationality scale of the SGABS with an average correlation coefficient of -0.36. Negative relationships were observed between trait anxiety direction scores and irrational beliefs ranging from -0.71 to -0.21 ($M = -0.46$), and a positive relationship was found between the direction scale of the CTAI-2-D and the rationality scale of the SGABS of 0.37.

One of the primary predictions I made in this study was that bowlers who took part in a REBT intervention would be significantly more likely to endorse rational attitudes than bowlers who either engaged in relaxation and mental imagery training or who were in the control condition. Table 6.4 was constructed to provide an overview of

changes in scores on the subscales of the SGABS from pre- to post-intervention for the two intervention conditions and the control condition.

Table 6.4

Means and Standard Deviations for Each SGABS Subscale for Each Condition Pre and Post-intervention

SGABS Subscale	Pre		Post		Pre		Post		Pre		Post	
	REBT Group				Imagery Group				Control Group			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Rationality	8.32	1.89	14.16	1.55	8.05	1.90	8.10	1.37	7.87	1.41	7.67	1.59
Self-Downing	13.28	1.65	7.80	1.50	12.80	1.70	13.25	1.92	13.40	1.88	13.27	1.75
Need for Achievement	15.20	2.35	10.20	2.53	15.95	2.24	15.55	2.19	14.67	1.80	14.80	2.88
Need for Approval	11.40	1.58	8.28	1.86	12.15	1.66	11.70	1.45	11.67	1.99	11.53	1.13
Need for Comfort	14.32	3.02	10.16	2.59	13.85	2.87	13.65	2.94	14.40	2.53	14.53	2.56
Demand for Fairness	13.80	2.96	11.76	2.24	14.15	3.03	13.85	2.89	13.67	3.06	14.33	2.74
Other-Downing	9.32	1.82	8.52	2.04	9.85	2.01	9.70	2.05	9.40	1.92	9.00	1.56
Total Irrationality	77.32	10.17	56.72	10.01	78.75	10.83	77.70	10.52	77.20	10.14	77.47	9.57

One-way ANOVA of gain scores showed a significant difference between the three conditions on all subscales of the SGABS (Rationality: $F(2, 57) = 110.36$, $p < 0.01$; Self-downing: $F(2, 57) = 110.88$, $p < 0.01$; Need for achievement: $F(2, 57) = 56.88$, $p < 0.01$; Need for approval: $F(2, 57) = 31.98$, $p < 0.01$; Need for comfort: $F(2, 57) = 33.43$, $p < 0.01$; Demand for fairness: $F(2, 57) = 13.46$, $p < 0.01$; Other-downing: $F(2, 57) = 3.65$, $p < 0.05$; Irrationality: $F(2, 57) = 108.87$, $p < 0.01$). Bonferroni post hoc analyses revealed that these significant differences entirely existed between the REBT and relaxation and mental imagery, and REBT and control conditions, and all were reported to have attained a 0.05 level of significance. Specifically, participants in the REBT condition showed a significantly greater shift away from endorsing irrational beliefs, and a significantly greater shift towards the endorsement of rational attitudes, than the relaxation and mental imagery or control conditions, thereby providing support for the first research prediction.

The second purpose of this study was to examine the efficacy of REBT as a means of moderating debilitative trait anxiety interpretations. I predicted that competitive ten-pin bowlers, who took part in the REBT intervention, would interpret their trait anxiety symptoms significantly more facilitatively than bowlers who completed, either the relaxation and mental imagery training, or who underwent the befriending intervention.

Table 6.5 was constructed to provide an overview of changes in trait anxiety intensity and direction scores from pre- to post-intervention for the two intervention conditions and the control condition.

Table 6.5

Means and Standard Deviations for Each Composite CTAI-2 Subscale for Each Condition Pre and Post-intervention

Composite CTAI-2 Subscale	Pre		Post		Pre		Post		Pre		Post	
	REBT Group				Imagery Group				Control Group			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Cognitive Intensity	27.40	5.42	25.48	4.82	27.15	5.33	26.00	2.66	26.47	4.94	26.53	1.46
Somatic Intensity	27.40	5.42	21.96	5.44	27.15	5.33	22.80	2.33	26.47	4.94	22.20	2.68
Cognitive Direction	-15.64	6.62	0.64	6.51	-16.30	5.81	-14.65	3.28	-14.87	5.79	-14.93	2.89
Somatic Direction	-12.52	6.54	-3.24	6.04	-10.45	6.67	-11.05	3.49	-10.13	7.09	-10.13	3.48

Examination of the pre-intervention means and standard deviations suggested little difference between the three groups. Examination of mean gain scores from pre- to post-intervention indicated that the greatest changes were apparent for participants who took part in the REBT condition on all trait anxiety sub-scales. In order to determine whether these observed differences attained statistical significance, I conducted a MANOVA first. From this analysis, I found that there were significant differences between the three conditions on cognitive trait anxiety directional interpretations, $F(2, 57) = 62.07$, $eta^2 = 0.69$, $p < 0.01$, and on somatic trait anxiety directional interpretations, $F(2, 57) = 18.21$, $eta^2 = 0.39$, $p < 0.01$, but not on cognitive trait intensity scores, $F(2, 57) = 0.80$, $eta^2 = 0.27$, $p > 0.05$, or somatic trait intensity scores, $F(2, 57) = 0.11$, $eta^2 = 0.004$, $p > 0.05$. I conducted post-hoc tests, which revealed that the REBT condition had a significant moderating effect on debilitative cognitive anxiety interpretations resulting in a large effect size ($eta^2 = 0.76$), and somatic anxiety interpretations resulting in a medium effect size ($eta^2 = 0.35$). These findings provided direct support for the second research prediction of this study.

Table 6.6 was constructed to provide an overview of changes in state anxiety intensity and direction scores from pre- to post-intervention for the two intervention conditions and the control condition.

Table 6.6
Means and Standard Deviations for Each Composite MRF-2-D Subscale for Each Condition Pre and Post-intervention

Composite MRF-2-D Subscale	Pre		Post		Pre		Post		Pre		Post	
	REBT Group				Imagery Group				Control Group			
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Cognitive Intensity	8.78	1.45	7.62	1.51	9.10	1.14	7.98	1.22	8.97	1.26	9.33	1.35
Somatic Intensity	7.44	1.40	6.62	1.28	7.85	1.49	7.38	1.24	7.83	1.35	8.10	1.26
Cognitive Direction	-1.52	0.93	1.46	0.99	-1.88	0.86	-1.60	0.95	-1.60	0.97	-1.43	0.86
Somatic Direction	-1.18	0.91	0.96	0.97	-1.08	1.12	-0.28	0.91	-1.03	0.69	-0.37	0.93

Table 6.6 illustrates changes in mean state anxiety scores across the intervention period. This table highlights that differences in reductions in intensity were greatest for the REBT and imagery groups, whereas the intensity of anxiety actually slightly increased for the control condition. In terms of directional interpretations, results indicate that bowlers made the greatest shifts from debilitative to facilitative interpretations in the REBT condition.

As part of my exploration of the relationship between state and trait anxiety dimensions, I predicted that the observed changes in trait anxiety directional scores across the three conditions would be mirrored in directional state anxiety interpretations. Figure 6.1 illustrates changes in somatic state anxiety intensity scores for each of the three conditions in relation to each game across the intervention period as assessed by the MRF-2-D.

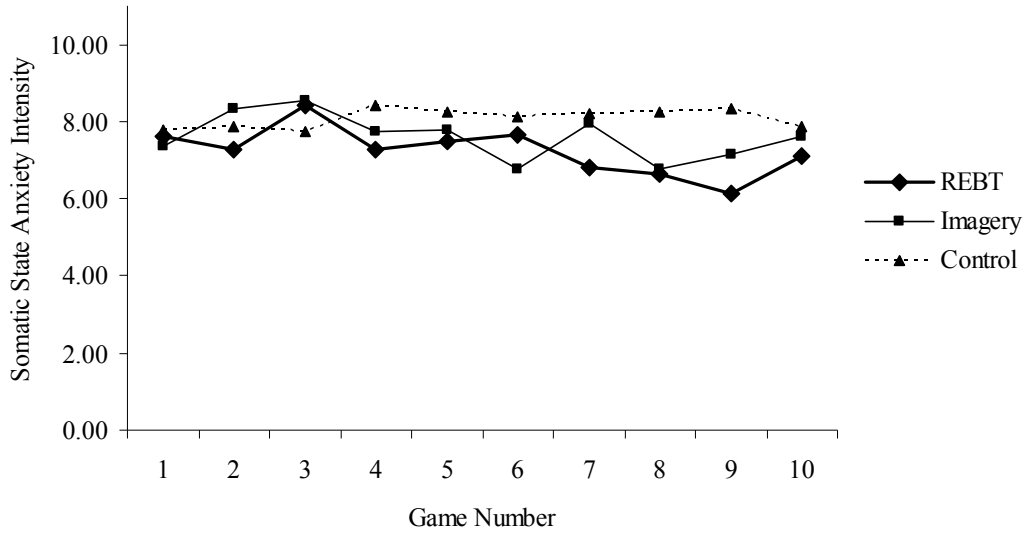

Figure 6.1. Somatic State Anxiety Intensity Across Games

Figure 6.1 does not reveal clear changes in somatic state anxiety intensity scores across the ten games assessed. In order to further investigate these changes from pre-to post-intervention, Figure 6.2 was constructed. Figures 6.2 compares the average of the first two somatic state anxiety intensity scores that were obtained prior to the first intervention session, with the average of the final two cognitive state anxiety intensity scores that were obtained following the final intervention session..

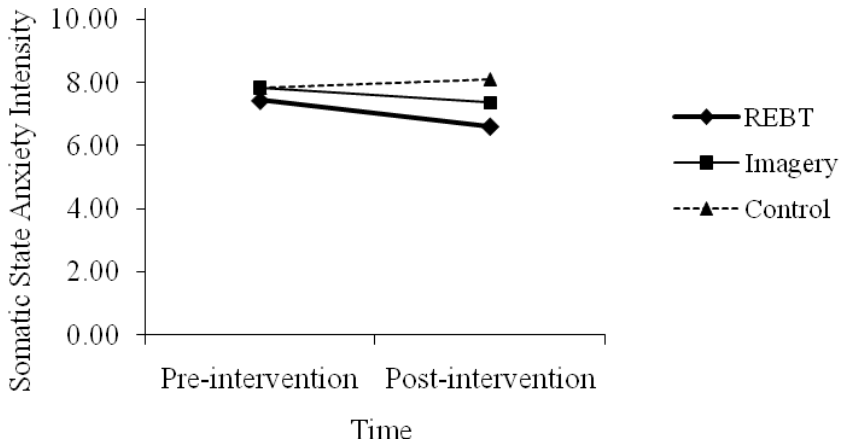

Figure 6.2. Average Pre- and Post-Intervention Somatic State Anxiety Intensity Scores.

Figure 6.2 provides weak evidence implying that the REBT and then relaxation and mental imagery conditions were more effective at reducing somatic state anxiety intensity than the control condition. The average somatic state anxiety intensity score for the REBT condition prior to the intervention was $M = 7.44$ ($SD = 1.40$), as compared to a mean of, $M = 6.62$ ($SD = 1.28$), at post-intervention. The average somatic state anxiety intensity score for the relaxation and mental imagery condition prior to the intervention was, $M = 7.85$ ($SD = 1.49$), as compared to a mean of, $M = 7.38$ ($SD = 1.24$), at post-intervention. The average somatic state anxiety intensity score for the control condition prior to the intervention was, $M = 7.83$ ($SD = 1.35$), as compared to a mean of, $M = 8.10$ ($SD = 1.26$), at post-intervention.

I subsequently used gain scores in the calculation of a one-way ANOVA in order to test for differences in somatic state anxiety intensity between the three conditions across the intervention. This approach was used because the first two scores were associated with baseline data collection (the actual intervention did not start until after the second game), and the intervention was completed before the ninth game. The ANOVA revealed the presence of a significant difference between at least two of the conditions; $F(2, 57) = 7.12$, $p < 0.01$. Post hoc tests revealed that the REBT and relaxation and mental imagery conditions and had significantly greater mean gain scores from pre- to post-test, when compared to the control condition (REBT, $M = -0.82$; relaxation and mental imagery, $M = -0.48$; control, $M = 0.27$. In relation to these figures, negative scores represent a reduction in the intensity of somatic state anxiety intensity.

These results were found to be significant at the 5% alpha level, and demonstrated a small effect size ($eta^2 = 0.21$, $p < 0.05$).

Figure 6.3 illustrates changes in cognitive state anxiety intensity scores for each of the three conditions across the 10-game intervention period as assessed by the MRF-2-D.

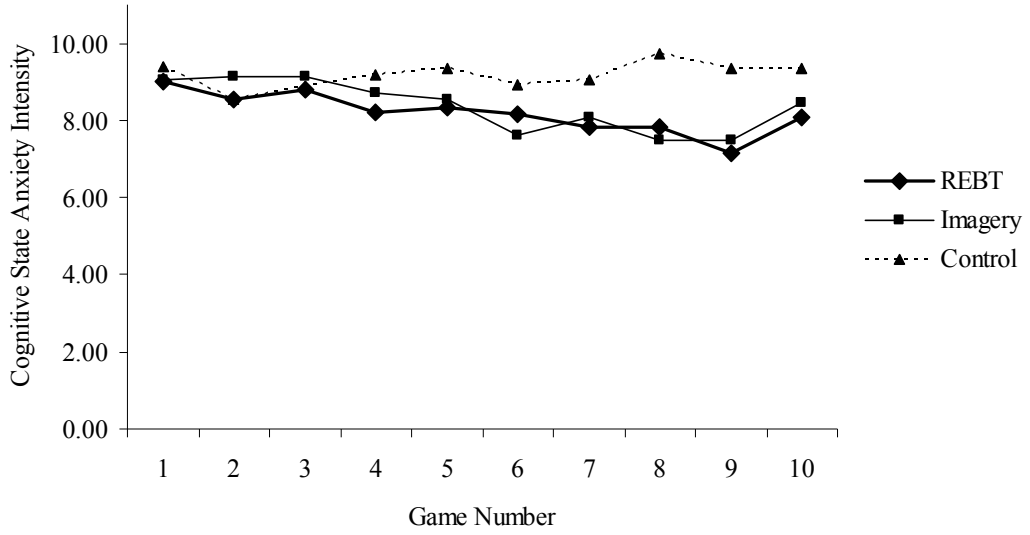

Figure 6.3. Cognitive State Anxiety Intensity Across Games

Figure 6.3 indicates a small reduction in state cognitive anxiety intensity scores across the intervention period for the REBT and relaxation and mental imagery conditions, but not the control condition. This figure indicates an increase in the intensity of cognitive state anxiety for the REBT and relaxation and mental imagery condition in the final week. It remains unclear why this increase may have occurred as there were no external events reported by competitors around this period that might be associated with such an observation. Figure 6.4 was constructed to compare the average of the first two cognitive state anxiety intensity scores with the average if the final two cognitive state anxiety intensity scores.

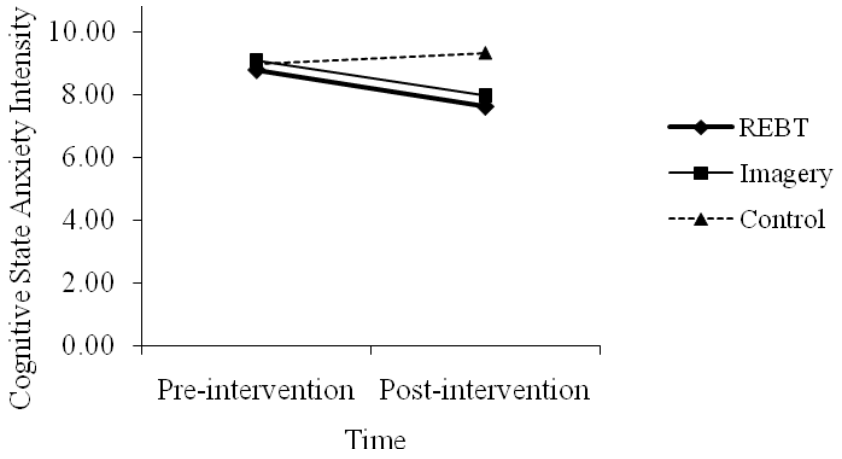

Figure 6.4. Average Pre- and Post-Intervention Cognitive State Anxiety Intensity Scores

Figure 6.4 shows small reductions in cognitive intensity for both the REBT and relaxation and mental imagery conditions, whereas a slight increase in cognitive state anxiety intensity seems apparent for the control condition. The average cognitive state anxiety intensity score for the REBT condition prior to the intervention was, $M = 8.78$ ($SD = 1.45$), as compared to a mean of, $M = 7.62$ ($SD = 1.51$), at post-intervention. The average cognitive state anxiety intensity score for the relaxation and mental imagery condition prior to the intervention was, $M = 9.10$ ($SD = 1.14$), as compared to a mean gain score of, $M = 7.98$ ($SD = 1.22$), at post-intervention. The average cognitive state anxiety intensity score for the control condition prior to the intervention was, $M = 8.97$ ($SD = 1.26$), as compared to a mean gain score of, $M = 9.33$ ($SD = 1.35$), at post-intervention. I performed a one-way ANOVA using difference scores calculated from the average of the first two, and the average of the last two cognitive anxiety intensity scores in order to assess for differences between the three conditions from pre- to post-intervention. The ANOVA indicated the presence of a significant difference between at least two of the conditions. Post hoc tests revealed that both the REBT, and relaxation and mental imagery conditions, differed significantly from the control condition, with the mean gain for REBT, $M = -1.16$, and the mean gain score for the relaxation and mental imagery condition $M = -1.13$, both being significantly greater than that observed for the control condition ($M = 0.37$). These results were found to be significant at the 5% alpha level, and produced a large effect size ($eta^2 = 0.57$, $p < 0.05$).

I constructed Figure 6.5 to illustrate changes in state somatic anxiety direction scores for each of the three conditions across the 10 games as assessed by the MRF-2-D.

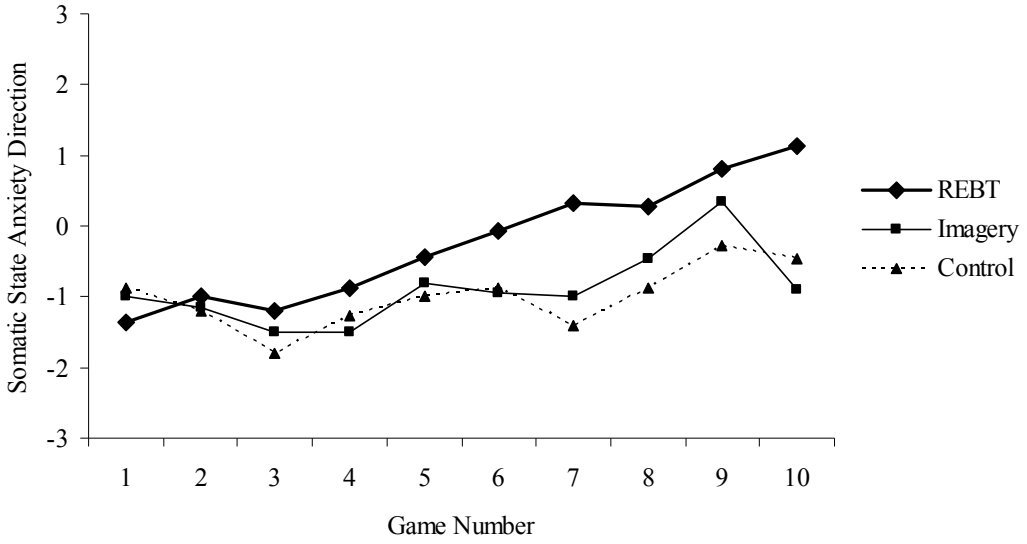

Figure 6.5. Somatic State Anxiety Direction Scores Across Games

Figure 6.5 shows a shift from debilitative to more facilitative somatic state anxiety responses for all conditions, with the most pronounced change evidenced by the REBT condition. Figure 6.6 was constructed to compare the average of the first two somatic state anxiety direction scores with the average if the final two somatic state anxiety direction scores.

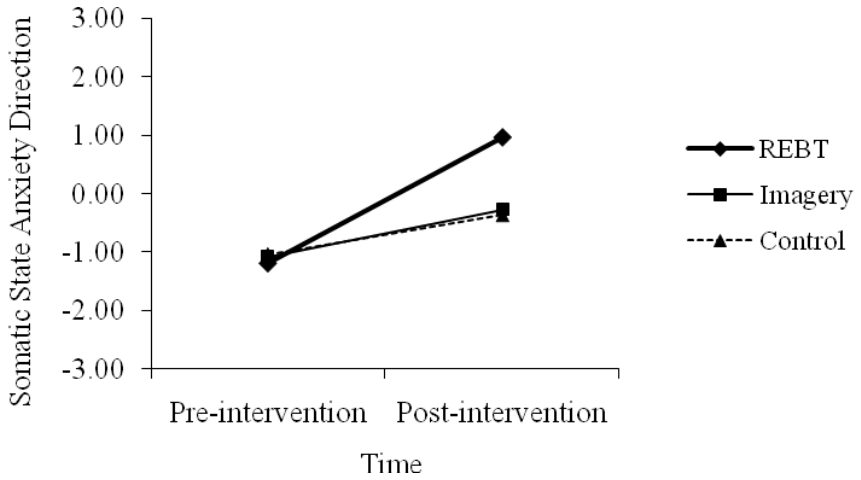

Figure 6.6. Average Pre- and Post-Intervention State Somatic Anxiety Direction Scores

Figure 6.6 highlights that for all conditions there was a reduction in state somatic anxiety direction scores, the greatest gains being made in the experimental condition. The average somatic state anxiety direction score for the REBT condition prior to the intervention was, M = -1.18 (SD = 0.91), as compared to a mean gain score of, M = 0.96 (SD = 0.97), at post-intervention. The average somatic state anxiety direction score for the relaxation and mental imagery condition prior to the intervention was, M = -1.08 (SD = 1.12), as compared to, M = -0.28 (SD = 0.91), at post-intervention. The average somatic state anxiety direction score for the control condition prior to the intervention was, M = -1.03 (SD = 0.69), as compared to a mean gain score of, M = -0.37 (SD = 0.93), at post-intervention. I calculated a one-way ANOVA using difference scores calculated from the average of the first two, and average of the last two somatic anxiety direction scores in order to assess differences between the three conditions from pre- to post-intervention. The ANOVA revealed the presence of a significant difference between at least two of the conditions. Post hoc tests revealed that the REBT condition differed significantly from both the relaxation and mental imagery condition, and the control condition, with the mean difference score for REBT being, M = 2.14, whereas the observed mean difference score for the relaxation and mental imagery group was, M = 0.80, and for the control group I observed, M = 0.67. These results were found to be significant at the 5% alpha level, and, according to Cohen's conventions, resulted in a large effect size (eta^2 = 0.46, $p < 0.05$).

I constructed Figure 6.7 to illustrate changes in cognitive state anxiety direction scores for each of the three conditions across the 10 games as assessed by the MRF-2-D.

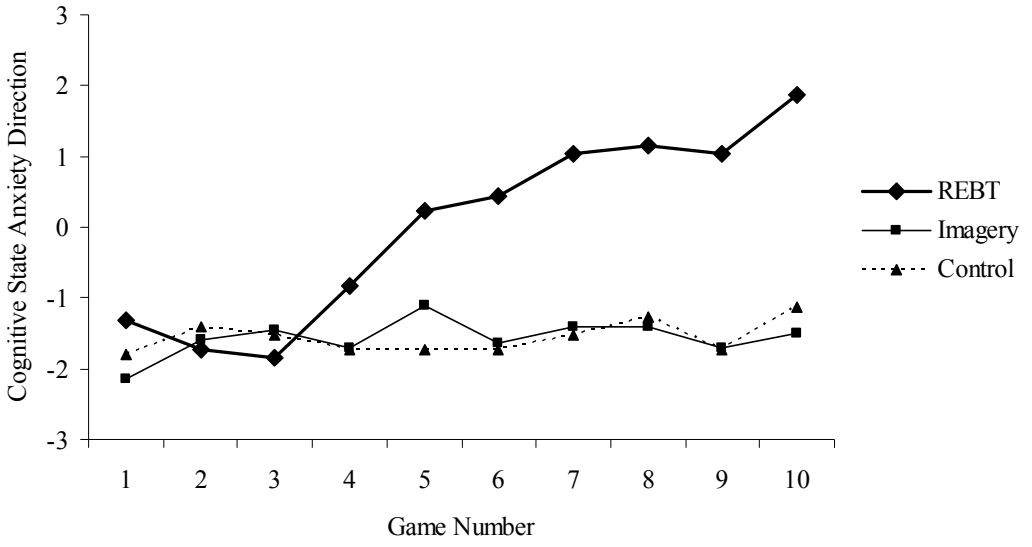

Figure 6.7. State Cognitive Anxiety Direction Scores Across Games

Figure 6.7 shows a considerable shift from debilitative to facilitative interpretations of cognitive state anxiety for the REBT condition that was not reflected in either the relaxation and mental imagery or control conditions across the course of the 10 games. Figure 6.8 was constructed to compare the average of the first two cognitive state anxiety direction scores with the average if the final two cognitive state anxiety direction scores.

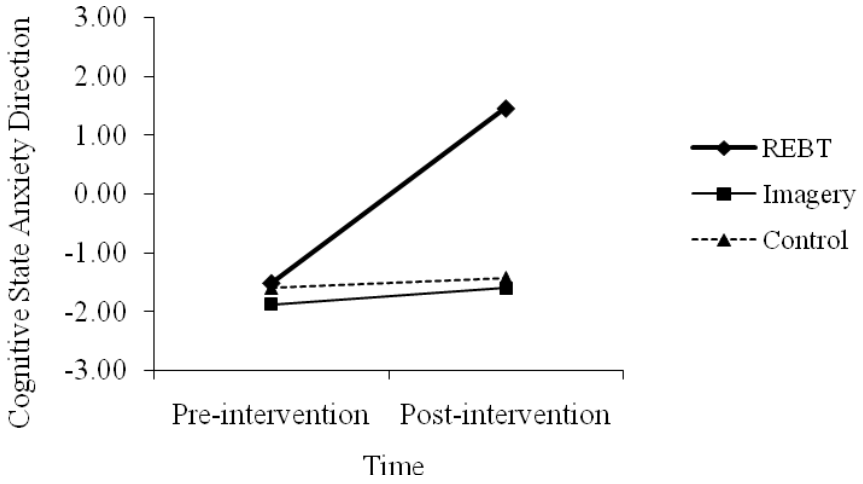

Figure 6.8. Average Pre- and Post-Intervention Cognitive State Anxiety Direction Scores

Figure 6.8 highlights only small changes occurred in cognitive state anxiety direction scores in the relaxation and mental imagery, and control conditions, whereas for the experimental condition this gain was considerable. The average cognitive state anxiety direction score for the REBT condition prior to the intervention was, M = -1.52 (SD = 0.93), as compared to a mean gain score of, M = 1.46 (SD =0.99), at post-intervention. The average cognitive state anxiety direction score for the relaxation and mental imagery condition prior to the intervention was, M = -1.88 (SD = 0.86), as compared to a mean gain score of, M = -1.60 (SD = 0.95), at post-intervention. The average cognitive state anxiety direction score for the control condition prior to the intervention was M = -1.60 (SD = 0.97), as compared to a mean gains core of, M = -1.43 (SD = 0.86), at post-intervention. I performed a one-way ANOVA using difference scores calculated from the average of the first two, and average of the last two cognitive anxiety direction scores in order to assess differences between the three conditions from pre- to post-intervention. The ANOVA revealed the presence of a significant difference between at least two of the conditions. Post hoc tests revealed that the REBT condition obtained significantly higher mean gain scores than both the relaxation and mental imagery condition, and the control condition. The mean gain score for the REBT condition was, M = 2.98, as compared to a mean gain score for relaxation and mental imagery of, M = 0.28, and a mean gain score for the control condition of, M = 0.17. These differences were significant at the 0.05 alpha level, and according to Cohen's conventions, the effect sizes was large (eta^2 = 0.84).

As part of my continued exploration of the impact of the experimental conditions, I predicted that participants who took part in the REBT intervention would experience significantly greater performance gains across the intervention period than either those participants who engaged in the relaxation and mental imagery training, or those in the control condition. I calculated average game scores for participants in each condition for each game across the course of the intervention. I used the resulting data to construct Figure 6.9

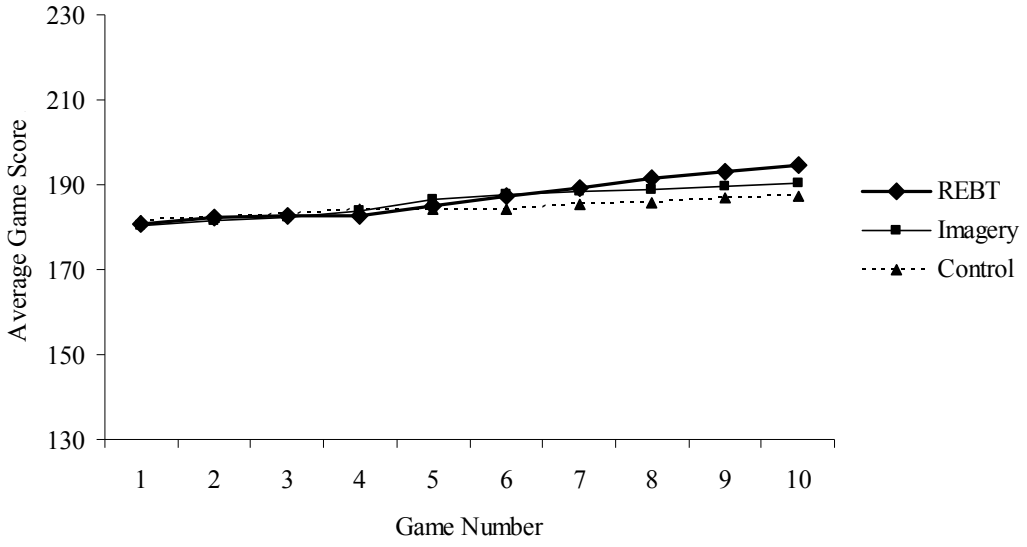

Figure 6.9. Average Game Scores for all Participants Across the Study.

Figure 6.9 shows a general pattern of improvement in average game scores for each condition across the ten games. This trend is greatest for the REBT condition, followed by the relaxation and mental imagery condition, and finally the control condition.

Figure 6.10 was constructed to compare the average of the first two game scores with the average of the final two game scores.

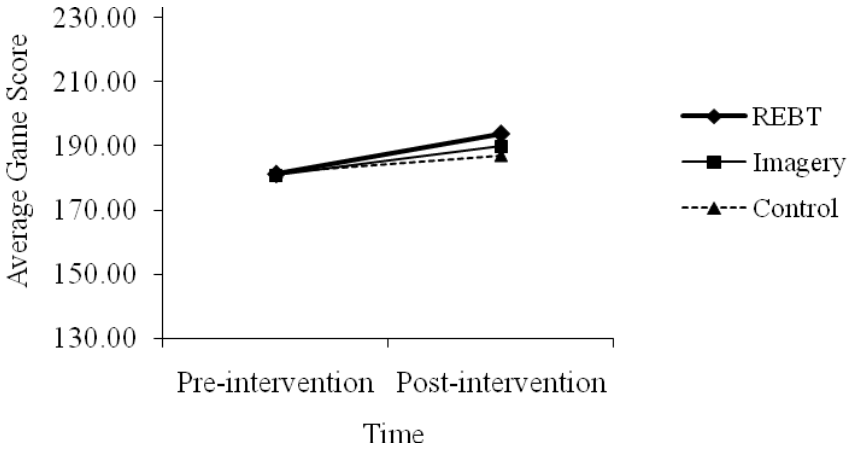

Figure 6.10. Average Pre- and Post-Intervention Game Scores

Figure 6.10 shows general improvement in average game scores from pre- to post-intervention across all conditions, with the highest improvement noted for the

REBT condition, followed by the relaxation and mental imagery condition, and finally the control condition. The average game score for the REBT condition prior to the intervention was $M = 181.38$ ($SD = 17.73$), as compared to $M = 193.80$ ($SD = 20.54$) post-intervention, resulting in a mean gain of, $M = 12.42$. The average game score for the relaxation and mental imagery condition prior to the intervention was $M = 180.98$ ($SD = 20.25$), as compared to $M = 189.93$ ($SD = 17.08$) post-intervention, resulting in a mean gain of, $M = 8.95$. The average game score for the control condition prior to the intervention was $M = 181.93$ ($SD = 20.46$), as compared to $M = 187.17$ ($SD = 25.71$) post-intervention, resulting in a mean gain of, $M = 5.23$. I performed a one-way ANOVA with gain scores obtained from the average of the first two game scores minus the average of the last two game scores. This ANOVA revealed that there was no significant difference between any of the three conditions in relation to performance scores from pre- to post-intervention ($p > 0.05$, $eta^2 = 0.03$).

Discussion

The purpose of the present study was to explore the efficacy of employing REBT as a means of moderating directional interpretations of trait, and ultimately state, anxiety. I also explored the effects of the REBT intervention on performance. I focussed on comparing REBT with a more traditional form of anxiety management, specifically relaxation and mental imagery training. In order to gain additional information relating to underlying mechanisms of change and as a manipulation check, I collected information that enabled me to determine changes in competitors' beliefs associated with the various intervention strategies.

The findings I obtained from this study revealed that REBT was the only intervention that resulted in significant positive shifts in beliefs as measured by the SGABS. These differences were observed on all subscales of the SGABS. Such observations suggest that the REBT intervention had an overall effect of moderating bowlers' irrational beliefs and enhancing their rational beliefs. In particular, I observed large effect sizes for the variables of rationality, self-downing, need for achievement, need for approval, need for comfort, and demand for fairness. Thus, as a manipulation check, the SGABS confirmed changes in beliefs that would be expected as a result of the REBT intervention occurring only for participants in that condition. In Study 2, I observed that bowlers who were experiencing emotions they deemed to be unhelpful endorsed beliefs that included a need for achievement and need for approval, demands for fairness, and self- and other-downing. The association between the observed

changes in beliefs in this study and those beliefs identified in Study 2 as driving unhelpful thoughts, feelings, and behaviours, further highlights the specificity of the REBT intervention.

When comparing the results of this study to the findings of Lindner et al's (1999), which surveyed 36 participants form the general population, elevated scores on the variables of need for achievement, need for approval, and other-downing were apparent for the bowlers. Although the specific themes used in the SGABS were not assessed in Study 2, the results of the content analysis revealed that bowlers with a predisposition for debilitative anxiety exhibited greater numbers of self-directed demands, awfulising, and other-directed downing when compared to those bowlers with a facilitative anxiety predisposition. When the specific items of the SGABS are scrutinised, it becomes apparent that for the need for achievement subscale, depending on the responses of the individual, all four items may be indicative of self-directed demands (depending on the level of endorsement of the respondent), and all four items contain references to awfulising. For the need for approval subscale all three items may indicate the presence of self-directed demands, and one of the three items includes references to awfulising. Finally, as would be expected, in relation to the other-downing subscale, all three items include examples of other-downing statements. When the results of Study 2 are combined with the results of this study, and compared to normative data provided by Lindner et al, (1999), it becomes apparent that bowlers present with self-directed demands, and the evaluations of awfulising and other downing that combine in forms that are indicative of a high need for achievement, need for approval, and other-downing. It may be postulated that these core beliefs drive the experience of anxiety in sport.

An additional finding associated with responses to the SGABS indicated that, despite scoring significantly higher on the total irrationality scale of this measure (when compared to Linder et al's 1999 sample), the bowlers also scored significantly higher on the rationality subscale of this measure. Such a finding would appear to provide further support for Ellis's (1962, 1994) binary model of emotions, highlighting that the bowlers can concurrently hold rational and irrational attitudes.

Findings also highlighted that REBT was significantly more effective in moderating directional interpretations of trait anxiety symptoms than relaxation and mental imagery. These findings support the observations of Jorm (1989) that traits are modifiable, and that REBT is particularly efficacious in bringing about such change.

Notably, I did not observe any significant changes in bowlers' trait anxiety intensity scores across the intervention period. It should be noted that intensity scores at pre-intervention were quite low. This may indicate that the competition was not particularly stressful, and may partially explain why significant results were not observed on intensity measures. These observations suggest that REBT specifically targets competitors' interpretations of their cognitive and somatic anxiety, but these changes are not necessarily reflected in changes in intensity. Meyers, et al. (1996) noted that cognitive restructuring techniques were more efficacious than goal setting, mental rehearsal, and relaxation strategies as a means of moderating moods. Given that the studies assessed by Myers et al. all used measures of intensity, it may be that the efficacy of cognitive restructuring has been underemphasised in the research given the nature of the measurement tools. Such an observation can be generalised to the few studies that exist in the sport psychology literature connecting REBT with anxiety management. In particular, results observed by Elko and Ostrow (1991), and more recently Yamauchi and Murakoshi (2001), indicated that REBT can be used to moderate the intensity of trait anxiety. Findings from this study additionally highlight that REBT can also be used to moderate debilitative directional interpretations.

The findings I obtained from trait measures in this study were mirrored in observations of state anxiety direction. This observation suggests that it is possible to utilise a brief trait-focussed REBT intervention to mediate changes at the state level, enabling sport psychologists to provide interventions away from the competitive environment that elicit lasting changes across future competitions. Although no long-term follow up was conducted, these changes were maintained across two competitions following the completion of the intervention period. Given the changes are occurring at the trait level, I predict that they would be maintained. This is an important question for future research.

The final major area investigated in this study involved analysing whether the changes in underlying beliefs and symptom interpretation actually resulted in changes in performance outcomes. Specifically, I predicted that participants who took part in the REBT intervention would experience significantly greater performance gains across the intervention period than either those participants who engaged in the relaxation and mental imagery training, or those in the control condition. Although the trend was for greater improvements in performance for the REBT group, followed by the relaxation and mental imagery group, and finally, the control condition, these results did not attain

statistical significance. Jones (1995) noted that equivocal findings have been reported when assessing the efficacy of a range of interventions aimed at moderating anxiety. Given that performance is under the influence of a range of potential variables, it may be unreasonable to expect to see changes as a result of only manipulating anxiety. Despite these findings, the observed results certainly warrant further investigation into the relationship between belief modification techniques such as REBT and performance.

Methodological Issues

The findings from this study strongly support the efficacy of using REBT as a means of moderating debilitative trait and state anxiety. In addition, the results highlight that a relatively brief programme of REBT can result in significant shifts in beliefs predicted to mediate harmful emotional consequences, and there is some preliminary evidence to indicate that REBT can enhance performance in ten-pin bowling. Although the findings of the present study are interesting and thought-provoking, I acknowledge that there were limitations that could be rectified by methodological refinements in future research.

Given the fact that this was the first time the SGABS has been used in the sport setting, it may be that this measure required adaptation for this unique sample. Having said this, the results I obtained closely mimicked those of MacInnes (2003), who obtained data from a sample of individuals identified as experiencing heightened levels of anxiety, using the Hospital Anxiety and Depression Scale (HADS). Further, the beliefs identified by the SGABS closely corresponded to those identified in Study 2.

A second methodological issue relates to item content in the CTAI-2-D. Relatively late in the development of the CSAI-2 a social desirability problem was identified in the scale which led the developers to use the word “concerned” instead of “worried” in seven of the nine items in the cognitive scale (Burton, 1998). Issues associated with the choice of concerned have subsequently been criticised by researchers (Burton, 1998; Lane et al., 1999), who have suggested that competitors might be more apt to interpret the word “concern” in a challenging manner compared to the word “worry”. If this were the case, such competitors might also be predicted to rate the perceived intensity of such symptoms as facilitative on the directional scale. A further complication related to this issue arises when the theory of REBT is taken into consideration. REBT defines concern as a constructive negative emotion, whereas anxiety is seen as an unconstructive negative emotion (Dryden, 1994). Given that competitors allocated to the REBT condition were exposed to the basic theory of REBT

in this study, they were taught this semantic differentiation. Based on this observation, it might be predicted that these competitors would be more likely to report facilitative interpretations of cognitive items following the REBT intervention simply as a result of being exposed to specific meanings adopted by the theory. If this were the case, I would expect average shifts towards facilitative interpretations to be greater for those items containing the word "concern" when compared to the remaining two cognitive items. Although on average, bowlers in the REBT condition attributed items containing the word "concern" with a more facilitative interpretation on the CTAI-2-D at pre-intervention (M = -0.25, SD = 0.10), compared to items without this word (M = -0.88, SD = 0.39), the differences were not found to be significant. Further, when the average changes in directional responses for items containing the word "concern" were compared to average changes in directional scores for items that did not contain the word "concern", no significant difference were found from pre- to post-intervention. These findings imply that the shifts in directional cognitive trait anxiety interpretations were not simply the result of changes in semantics.

A final methodological issue relates to the fact that I did not obtain any long-term follow-up measures. Without follow up measures, it is not possible to determine whether lasting changes resulted from the intervention assessed. Having said this, given that notable changes occurred at the trait level, and by definition traits are general predispositions, I predict that the changes would be maintained for some time.

Despite some methodological issues, this study has provided considerable insight into beliefs underlying debilitative trait anxiety interpretations, and has revealed that REBT can be used as a means of directly restructuring these beliefs. For the first time, REBT was found to moderate debilitative trait anxiety to a greater extent than a more traditional intervention combining relaxation and mental imagery training. Given the close associations observed between directional interpretations and performance/skill variables in Study 1, and similar observations reported in the sport psychology literature (e.g., Hanton & Conaughton, 2002; Hanton et al., 2003; Jones et al., 1994; Jones & Swain, 1992, 1995; Jones et al., 1993), such a finding highlights the utility of REBT in the management of anxiety in sport.

Future Research

Future research should further explore types of beliefs associated with various emotional experiences in sport. Findings from this study point towards the relevance of the need for achievement, need for approval, and self-downing, as being at the core of

the experience of debilitative trait anxiety in sport, and provide the first glimpse of what may be driving this emotion. These beliefs appear to be constructed with self-directed demands, awfulising and other-downing. Goldman (2003) predicted the presence of self-directed demands, awfulising, low-frustration tolerance, and self-downing when postulating the potential for REBT as a means of managing moods in sport, although these were not specifically associated with competitive anxiety. At this point in time, no other research has explored beliefs that underlie emotional experiences in sport using an REBT framework. Given that research conducted in the sport setting indicates that it is the competitors' interpretation that is the best predictor of emotional disturbance and ultimately performance (Jones, 1995), then measures of interpretation at either the inferential or belief level should be investigated and used to identify beliefs mediating the anxiety response.

Clearly, more research is also needed to explore the associations between measures of beliefs, such as the SGABS with measures of emotion used in the sport psychology setting. This study has revealed that belief based measures can provide significantly more detail than direction alone measures, helping further tailor psychological skills training packages. Although in establishing the discriminant validity of the SGABS, Lindner et al. (1999) compared this measure to a range of clinical measures of affect, these differ from sport specific measures. Future research should explore whether patterns of beliefs are associated with specific emotional responses using a combination of sport specific and belief based measures.

The efficacy of trait-based psychological skills training observed in this study raises the possibility of a range of interventions that could be conducted well away from the competitive arena. These interventions would be less likely to intrude on the competitors pre-performance routines, and, given the results of the current study, may lead to long-lasting changes that would be predicted to mediate responses across a range of specific situations. In future, researchers should assess whether the changes brought about by trait-based interventions are sustained. In relation to this, researchers might explore the association between the duration of the intervention and outcomes. In this study, competitive bowlers in the REBT condition were continuing to experience gains right up until the final session. It may be that the impact of REBT could have been even greater if the intervention exceeded six sessions.

Overall, this study raises many more questions than it answers about the use of REBT, the manipulation of beliefs, the impact of REBT and changing beliefs on trait

anxiety direction, the effect this has on state anxiety direction, and ultimately the impact of this on performance immediately and in the longer term. As a result, numerous avenues for future research have become apparent, all of which have the potential to add considerably to the understanding and management of emotions in sport.

Implications for Practice

Cognitive-behavioural techniques, such as REBT, have a great deal to offer as a means of helping competitors manage harmful emotions and optimise performance. In particular, researchers have found REBT to be very effective in clinical and non-clinical settings (David et al., 2005) and this study provides preliminary support for the use of REBT in sport. The theory can be relatively easily taught, using the ABC framework, and researchers have reported the approach to be applicable to a range of emotional disturbances (Ellis, 1994). Although it can take some time to gain a conceptual understanding of the theory of REBT and its application, the benefits of having a clear theoretical and applied framework from which to practice psychological skills training are well worth the investment. This study also highlights a range of benefits associated with conducting interventions that target traits. Trait-focussed therapy can be conducted well away from the competitive arena, thereby reducing interference with competitors' pre-competition routines. Further, this study has shown that trait-based interventions can mediate changes that will generalise across a range of specific situations. Although I did not conduct a long-term follow up in this study, the fact that trait based measures showed significant changes across the course of the intervention also implies that these changes are likely to be maintained. When compared to other commonly used strategies, such as relaxation training, which need to be performed repeatedly in preparation for or in response to each anxiety experience, REBT offers a technique that can result in lasting change once competitors' core beliefs have been changed.

Conclusions

In this study, I sought to explore the relative efficacy of REBT as a means of changing underlying beliefs that were found to be associated with anxiety in Study 2, and to moderate debilitative anxiety interpretations at the state and trait level. I also aimed to determine the presence of a link between these modifications and changes in ten-pin bowling performance. My results strongly support the utility of REBT as a means of managing anxiety interpretations. The findings I obtained further highlighted the benefits of targeting trait interpretations as a means of bringing about change at the state level. Further, performance trends seemed to suggest that REBT interventions that

alter directional trait anxiety may result in performance gains. These findings provide support for using REBT as a means of managing anxiety interpretations and highlight the need for further research exploring this form of therapy in the sporting domain.

CHAPTER 7: DISCUSSION

My overall aim for this thesis was to further investigate the theory, measurement, and applied management of anxiety in sport. I set out to achieve this aim by conducting a comprehensive literature review out of which emerged a sequentially-linked research programme. In this research, I attempted to connect observations that I extracted from the literature to a clinically-derived theory of emotional disturbance, namely REBT, which could then be applied to the sporting context. In the final phase of this thesis, I tested the efficacy of an REBT-based intervention as a means of moderating debilitative anxiety and improving performance.

Specifically, in Study 1, I employed a quantitative methodology to explore the psychometric properties of, and interrelationships between, common measures of anxiety. Given the sparsity of research in this area, especially trait anxiety directional research, I focussed in on the relationships between intensity and directional interpretations of cognitive and somatic anxiety dimensions at both the trait and state level. Further, I explored relationships between these dimensions of anxiety and competitors' self-reported performance and skill level. In order to gain a good cross-section of responses, I administered questionnaires to competitors from a range of sports.

The findings from this initial study provided further support for the internal consistency of all subscales of the CSAI-2-D (Davis & Cox, 2002), the CTAI-2-D (Cunningham & Ashley, 2002), and the SAS (Smith et al., 1990; Smith et al., 2006). In addition, the means and standard deviations I observed for the sample of competitors I recruited were similar to those cited in previous studies (Cunningham & Ashley, 2002; Davis & Cox, 2002; Martens et al., 1990; Smith et al., 1990).

In terms of between scale correlations, the observations closely resembled findings from previous research, revealing moderate relationships between the cognitive and somatic anxiety intensity sub-scales of the CSAI-2 (Davis & Cox, 2002; Edwards & Hardy, 1996). The present results were also in concordance with previously published research when considering the moderate relationships between cognitive and somatic anxiety directional sub-scales of the CSAI-2-D, and negative correlations between intensity and directional subscales (Edwards & Hardy, 1996).

Few researchers have reported the inter-scale associations both within and between trait measures of anxiety. The outcomes I obtained from the SAS fit well with predictions I made and observations reported in the literature (Smith et al., 1990). Using

the CTAI-2-D enabled me to add to the very limited body of knowledge that has been published in relation to this scale. In particular, I observed associations that closely mirrored those that I found using the state version. Further, I noted moderate to strong associations between the intensity subscales of the CTAI-2-D and the SAS, in accordance with those previously reported by Hanton, Mellalieu, and Hall (2002).

When comparing state and trait anxiety, I observed moderate associations between states and traits on intensity measures, as has been reported by a range of researchers (Crocker, Alderman, & Smith, 1988; Gould, Horn, & Spreeman, 1983a, 1983b; Gould, Petlichkoff, & Weinberg, 1984; Halvari & Gjesme, 1995; Hanton, Mellalieu, & Hall, 2002; Hassmén, Koivula, & Hansson, 1998; Maynard & Howe, 1987; Passer, 1983; Powell & Verner, 1982; Ryska, 1993; Sonstroem & Bernardo, 1982; Wandzilak, Potter, & Lorentzen, 1982). Although I was unable to find any reported correlations between states and traits on directional measures in previous research, I predicted that I would observe similar associations to those reported in the intensity literature. I based this prediction on the reported associations between intensity and direction, and state and trait scales. I obtained support for this prediction and my findings highlighted the close associations between the various dimensions of trait and state anxiety, providing further motivation to explore management strategies aimed directly at trait anxiety.

I also explored the association between anxiety dimensions, self-reported performance, and skill level. I observed that cognitive state direction was the only variable that predicted self-reported performance to a degree that attained statistical significance, replicating the findings of Jones, Swain, and Hardy (1993). Cognitive state direction emerged as a statistically significant predictor variable of skill level, closely replicating the findings of Jones and Swain (1992).

Generally speaking, the findings from this first study in this thesis highlighted the close relationship between state and trait dimensions of anxiety, and the importance of directional interpretations in the prediction of both performance and skill outcomes. These findings hinted at the potential efficacy of using an intervention that would target directional trait anxiety interpretations as a means of moderating directional state anxiety responses, and would ultimately foster performance outcomes across a range of settings. In order to improve the power of such an intervention, in Study 2, I went on to conduct a detailed exploration of the cognitive styles of competitors identified as having a predisposition to interpret their anxiety symptoms as debilitative to performance, and

compared these styles with those held by competitors who generally interpreted their symptoms as facilitative to performance.

Because my focus for the second study was largely exploratory, and I was unable to find pre-existing research that had already explored specific cognitions underlying directional interpretations in the sport psychology literature, I decided to employ a qualitative methodology. I provided some structure to this process by using the framework of REBT. This approach was particularly applicable given Jorm's (1989) comments on the modifiability of trait anxiety with REBT.

Specifically, I conducted semi-structured interviews with ten-pin bowlers to examine the frequency of occurrence of various types of cognitions occurring in response to certain triggers, and resulting in strong emotional consequences. I utilised the ABC model of emotional disturbance and the theory of REBT (Ellis, 1962, 1994) to distinguish between various elements of bowlers' emotional experience, and employed inference chaining procedures (Neenan & Dryden, 1996) to tease out specific cognitive pathways to various emotional consequences. In particular, I was interested in patterns of association between activating events, beliefs, and emotional and behavioural consequences. I was also interested in exploring how these interpretive styles related to traditional directional measures of trait anxiety. Thus, I used a selective sampling technique to ensure that I interviewed a range of competitors with both debilitative and facilitative interpretive styles (as pre-determined by their responses to the CTAI-2-D).

The information I obtained from this study provided considerable detail about the types of thinking patterns underlying strong emotions in sport. In addition, the REBT framework enabled me to make sense of this detail in terms of identifying and classifying thinking patterns. Bowlers reported that the most commonly occurring activating event that had the potential to result in a strong emotional response was performing poorly, closely followed by participation in a major competition, characteristics of the venue, and the professional etiquette of competitors. Beliefs characteristically associated with these triggers included self-directed demands, with associated evaluations of awfulising and other-directed downing. More specifically, I observed that competitors with a predisposition to interpret anxiety symptoms as debilitative to performance (as assessed by the CTAI-2-D) expressed higher frequency counts of these irrational beliefs than their facilitative counterparts. I interpreted these findings as an indication that the CTAI-2-D indirectly taps into the internally focussed

(or cognitive and somatic symptom interpretation) dimensions of these interpretive styles, or what Ellis terms "secondary emotional disturbance" (Ellis, 1994).

Of considerable interest was the observation that competitors unanimously noted changes in their behaviour as the most obvious indication that they were experiencing anxiety, over and above awareness of changes in perceived psychological symptoms and cognitive states. Current measures of anxiety have largely ignored behavioural change and the interpretation of this change, despite some discussion in the literature (see Bernstein, Borkovec, & Coles, 1986).

Other important findings that emerged from this study included the observation that competitors often link specific types of beliefs and evaluations in an interpretive chain, and that the content of this chain is different for different types of emotions. For example, my findings indicated that angry competitors could be quite accurately predicted to be engaging in self-directed demands, whereas anxious competitors would be most likely engaging in self-directed demands in combination with awfulising. These observations closely fit with the general predictions of REBT theory (Dryden & DiGuiseppe, 1990), and relate to recent research conducted in the clinical setting, which has indicated that specific patterns of thinking are associated with specific emotions (David, Montgomery, Macavei, & Bovbjerg, 2005; David, Schnur, & Belloiu, 2002). These preliminary findings have the potential to provide practitioners with insight into the most likely patterns of beliefs that mediate harmful emotional responses experienced by competitors, adding efficiency to treatment regimens.

Related to this, yet not predicted by the theory of REBT, I observed that competitors who respond to potential threats in a way that is facilitative to their performance actually express fewer definable interpretations. The theory of REBT predicts that such individuals would respond with a flexible thinking style primarily illustrated with preferential attitudes. The findings of Study 2 imply that goal-blocking emotions are the result of rigid interpretations, whereas facilitative emotional responses are more strongly associated with a lack of clearly identifiable evaluative or judgemental thought.

Overall, the second study highlighted the relevance of the competitors' interpretive style in their anxiety experience, and provided considerable support for the use of an REBT-style intervention for the management of directional trait anxiety interpretations. In particular, the findings of Study 2 implied that an intervention designed to mediate self-directed demands and awfulising would be predicted to have

the greatest moderating effect on directional trait anxiety, and ultimately facilitate positive performance outcomes. Further, my results highlight the importance of helping competitors to differentially interpret expressed behavioural consequences of anxiety, not just their interpretations of cognitions and somatisations. Findings also alluded to an absence of measurable thought in association with peak performances. This finding may imply that facilitative outcomes on measures of anxiety may not be as useful a predictor of performance as those that are neutral. This observation also alludes to the potential efficacy of teaching competitors to focus on non-judgemental awareness of actions when competing, as opposed to attempting to change the content of cognition. Many of these suggestions warrant future research.

Based on the findings from Study 2, I conducted a third and final study with the aim of investigating the efficacy of REBT as a means of moderating directional interpretations of anxiety, and ultimately improving performance outcomes. In this study, I utilised a traditional experimental paradigm, whereby I compared the relative efficacy of REBT as a means of bringing about changes to competitors' anxiety experience and performance outcomes, with a typical anxiety intervention involving relaxation and mental rehearsal, and a control condition involving befriending. In particular, the target of the REBT intervention was self-directed demands and awfulising, and I emphasised interpretations of the behavioural dimensions of anxiety (as previously observed to be strongly associated with competitors' experience of anxiety in Study 2). I explored outcomes in this study by observing both changes in state and trait dimensions of anxiety, changes in the competitors' underlying beliefs, and changes in performance outcomes.

The results of Study 3 indicated that the REBT-style intervention significantly outperformed imagery and relaxation and befriending in terms of moderating bowlers' debilitative trait, and subsequent state anxiety responses. These findings provide further support to the meta-analysis conducted by Jorm (1989), who noted that trait anxiety is in fact modifiable, and highlighted the efficacy of using REBT as a means of mediating change in trait anxiety. In fact, in the present thesis, REBT was found to be the only intervention that resulted in significant changes to directional trait or state anxiety.

In this study, I also found that the directional subscales of the CTAI-2-D correlated highly with the subscales of a measure of beliefs, the SGABS. In particular, I observed strong associations for self-downing, need for comfort, demand for fairness, and irrationality. It may be that these are core beliefs that are prone to mediating

cognitive and somatic responses in athletes. Alternatively, these may simply be beliefs that are indirectly being measured by the CTAI2-D. It is more likely that the findings that bowlers presented with an elevated need for achievement, need for approval, and self-downing (when compared to the findings of Lindner et al., 1999), are a more precise indicator of those beliefs underlying competitive anxiety in sport. Such associations further highlight the utility of employing a specific measure of underlying beliefs, such as the SGABS as opposed to general measures of sport specific interpretations such as the CTAI-2-D.

In terms of change, I observed that participants in the REBT condition showed a significantly greater shift away from endorsing irrational beliefs, and a significantly greater shift towards the endorsement of rational attitudes, than the relaxation and imagery or befriending conditions. These changes occurred across all belief dimensions assessed and provide further evidence for the utility of REBT as a means of changing beliefs (David et al., 2005).

In terms of performance, I observed improvements in game scores in all three conditions across the intervention period, yet graphical observation of results suggested that performance changes were greatest for participants in the REBT treatment condition. Given a longer treatment period, it might be predicted that significant differences would have been observed in performance outcomes across the three conditions. When the findings of this study are combined with the results of Study 1, which indicated that cognitive state anxiety direction predicted self-reported performance and skill level, and similar reported findings in the literature (e.g., Jones & Swain, 1992; Jones, Swain, & Hardy, 1993), it would appear that the association between anxiety REBT, and performance warrants future research attention.

Overall, my findings from Study 3 clearly highlighted the value of REBT as a means of moderating trait anxiety directional interpretations, facilitating the endorsement of a more rational belief structure, and alluded to potential influence of these changes on performance.

Methodological Issues

Despite the wealth of information gleaned from this thesis, there were some methodological concerns, predominantly associated with the measurement of anxiety, particularly using the CSAI-2. As previously discussed, two independent meta-analyses, which both tested the predictions of multidimensional anxiety theory (primarily assessed with the CSAI-2), arrived at somewhat different and inconclusive findings

(Craft et al., 2003; Woodman & Hardy, 2003). Given that the directional scale uses the same items as the intensity measure, questions arise concerning the validity of the directional scale on the same grounds. Despite reservations about the validity of the CSAI-2, Craft et al. (2003) noted that researchers continue to use it to test theoretical perspectives. This is most likely because, at present, there are no promising alternatives in the sport psychology literature.

One concern relating to the CSAI-2 is that it fails to measure the frequency of symptoms. This can be problematic as some competitors might feel very nervous on a few occasions prior to a major event, whereas others might feel very nervous all of the time in the same period. In its current form, the CSAI-2 (and therefore CTAI-2) cannot distinguish between such competitors. These concerns relate directly to the directional scales because one isolated experience of a debilitative symptom in the lead up to a competition may have a far less deleterious impact than a more chronic symptomatic and debilitative response. In response to this situation, a modified version of the CSAI-2 that includes a measure of frequency is starting to be employed in the research literature. For example, Hanton, Thomas, and Maynard (2004) used this modified version of the CSAI-2 to investigate intensity, direction, and frequency dimensions of anxiety in the lead up to a competition. For each item of the questionnaire, participants were asked how frequently they experienced a particular thought or feeling at that point in time. Different pre-competition patterns were observed for each of the three dimensions, providing further evidence for their unique role in the experience of anxiety.

A second limitation of the CSAI-2 relates to the scoring procedure. In order to be identified as suffering from anxiety a competitor must be experiencing a range of symptoms of high intensity. It is quite foreseeable, however, that a pistol shooter, for example, may have a very specific symptomatic response to anxiety, such as clammy hands, which could have a big impact on performance even though other symptoms do not arise for that athlete. When cumulative responses are used and competitors only report a few symptomatic responses, they will not be identified as suffering from a high intensity of anxiety. This would occur despite the degree to which a particular symptom may influence performance outcomes in certain athletes in specific contexts. This effect carries across to the directional scale, which is also cumulative. Future research might explore competitors' ratings of intensity and direction on single items of the CSAI-2-D, and the consistency of these responses across games. By observing specific

symptomatic styles exhibited by competitors, as suggested by Hanin (2000) more precise observations may be made.

In relation to the CSAI-2, researchers have also expressed reservations about use of the word "concern", as opposed to "worried", in both the state and trait versions of the CSAI-2 (Burton, 1998; Lane et al., 1999). Lane et al. suggested that competitors might be more apt to interpret the word "concern" in a challenging manner compared to the word "worry", and, thus, rate the perceived intensity of such symptoms as facilitative on the directional scale. The internal consistency scores for this subscale that were observed in Studies 1 and 3 appear to refute this claim given that, if those items were measuring an alternate emotion (such as concern), then one would not expect the overall association between all items to be so high. The high internal consistency I observed is in accordance with the findings of other researchers (e.g., Cunningham & Ashley, 2002). In addition, in Study 3, when I compared the average differences in gain scores between items that contained the term "concern" and those that did not, I observed no significant differences. These findings provide additional evidence that brings the conjecture about the word "concern" into question.

In a related theme, Jorm (1989) highlighted that it is possible that therapies, such as REBT, may not really modify the underlying personality trait, but only people's responses to trait anxiety questionnaires. In other words, people who have been exposed to such therapies may still get anxious around competitions, but because of their therapeutic training would be less likely to admit it on paper. It is possible that such a situation may have occurred with my sample, however, I had in place a range of strategies to control for such an influence. For example, in selecting participants, I used the SDS, which should identify individuals who are prone to respond in ways that make them look good or meet the needs of the experimenter, to exclude those individuals. In addition to this, I made a point of encouraging all respondents to answer all questionnaires as honestly as possible. As a final precaution, I utilised both a clinical measure of beliefs, and a sport specific measure of anxiety, which, in combination, would be more likely to tap into honest responses simply as a result of the greater numbers and variety of items.

The proposal to include a directional scale in the measurement of state and trait anxiety in sport has generally received support in the literature, yet some researchers have argued that such scales may be inadvertently measuring states other than anxiety (Burton, 1988; Burton & Naylor, 1997). Burton and Naylor highlighted that researchers

must address the question of whether anxiety can actually be facilitative, or whether positive emotions, such as excitement and challenge, are being re-labelled as facilitative anxiety. Jones and Hanton (2001) suggested that only negative scores on the directional scale are indicative of anxiety, and that positive directional scores indicate a conceptually different state. Such a statement implies that it is the directional interpretation endorsed by the competitor that determines the emotional label. Other researchers have argued for the importance of assessing competitors' directional interpretations of specific anxiety symptoms, as opposed to focussing on the general emotion of anxiety (Jones, 1995). Given such an emphasis, it would appear to make more sense to target specific single items of the CSAI-2-D as opposed to total scores.

Findings from Study 2 highlighted that a large proportion of the sample reported the presence of anger around performance situations. Although participants clearly identified anxiety as the most commonly occurring emotion in this particular sample (as would be predicted based on the selective sampling procedure), the majority of participants additionally reported the presence of anger. Further, the experience of anger was overwhelmingly interpreted as being debilitative to performance. In Study 2, I encouraged competitors to label the emotion they experienced, whereas quantitative measures, such as the CSAI-2, do not provide respondents with such an opportunity. Fight or flight responses allude to the association between these emotions, and applied experience suggests that there is significant overlap between symptoms of anger and anxiety. Based on this observation, it is quite possible that some of the responses to the CSAI-2 (especially somatic responses) are, in fact, a measure of symptoms associated with anger. Clearly, more research is needed to tease out the relative impact of each of these emotions on performance. Early progress in this field of investigation is being made. For example, in a study exploring the perceived impact of anger and anxiety on sporting performance with 197 Italian rugby players, Robazza and Bortoli (2006) reported that, regarding the direction of symptoms, cognitive trait anxiety was a significant predictor of trait anger. Such findings highlight that, when attempting to predict athletic performance, and for a better understanding of competitors' experience, looking only at the effects of anxiety is not enough. There is, instead, a need to examine a variety of emotional states evident in the competitive sports environment.

A final methodological limitation of the third study relates to the observation that I did not include any long-term follow up measures to determine whether changes made during the intervention period were sustained. Unfortunately, as a result of

participant relocation following the intervention, it was impossible to conduct a long-term follow-up with bowlers to determine whether the changes incurred through participation in the course of REBT were actually sustained. This is a significant limitation as there would be little benefit from employing a trait-based intervention with the goal of generalising impact, if changes at the belief level are not sustained. Despite this, the research was conducted over a period of 11 weeks, and performance/cognitive changes were sustained for at least two weeks following the final intervention session.

Future Research

Findings from the present thesis have highlighted that positive emotions and peak performances may be characterised by an absence of definable thought. This finding may imply that facilitative outcomes on measures of anxiety may not be a better predictor of performance than those that are neutral. In his description of the characteristics of optimal experiences, Csikszentmihalyi (1999) noted that individuals tend to report a state of consciousness where one becomes totally absorbed in what one is doing, and the mind and body work together effortlessly. These experiences are characterised by an absence of evaluative thoughts and a greater focus on process. In a related theme, other researchers, such as Teasdale, Moore, and Hayhurst (2002), have proposed that the success of CBT is the result of its promotion of "metacognition", or the ability to decentre oneself from one's thoughts, to treat them as mental events, and to focus on action. Teasdale et al. suggested that one of the reasons CBT is effective is that it promotes talk about thoughts as thoughts, thus, indirectly fostering metacognitive awareness. Some of the newer mindfulness based therapies, such as Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999), and Mindfulness Acceptance Commitment (MAC; Gardner & Moore, 2004) help people to focus directly on the relationship they have with their thoughts and sensations, not on the specific content of those thoughts or typology of those sensations. As a result, these therapies are more concerned with the degree to which the individual becomes "fused" with content that would be predicted to hinder goal achievement (Hayes et al., 1999).

Given these theoretical propositions, results of the research conducted in this thesis may be interpreted to indicate that an intervention that either initially employs strategies, such as cognitive restructuring, followed by an approach emphasising "defusing" techniques, or one that focuses on "defusing" techniques alone, may be highly effective as a means of both minimising the deleterious effects of negative, harmful emotions and maximising an optimal state of awareness for peak performance.

It may be that competitors move through a continuum from harmful beliefs to rational alternatives, ultimately leading to an absence of self- and cognitive-awareness closely aligned with what have been termed flow states (Csikszentmihalyi, 1990). Hanton and Jones's (1999) findings that competitive swimmers moved from a state of debilitative interpretations to one that entailed a greater ratio of facilitative interpretations would partially support such a prediction. Hanton and Jones indicated that this change occurred as a result of listening to significant others, and taking advice on the way that they felt prior to a race. REBT may provide a means to fast-track this process. Clearly, more research is required to tease out the relative efficacy of focussing on changing the content of harmful beliefs versus changing the way an individual relates to such beliefs with the goal of promoting goal achievement. Such research was beyond the scope of this thesis, but begs for future attention. Clinical trials comparing cognitive restructuring with mindfulness and acceptance based procedures might be one methodology for exploring the differences between these approaches. One of the difficulties of such an approach lies in the different philosophical positions promoted by such approaches (Hayes, 1999). For example, in ACT, one of the primary goals of therapy is to change the way the individual relates to their private experiences (thoughts, feelings, memories and sensations), not necessarily to change the symptoms themselves (Hayes, 1999). In REBT, more therapeutic time is devoted to restructuring private experiences, in particular beliefs. Given these differing philosophical positions, it is difficult to make direct comparisons between the two strategies. Despite Ellis's (2005) position that ACT and REBT are quite similar, in the following quote, Hayes (2005) highlighted that clear differences between these approaches remain:

> If defusion and direct experiencing replaces disputation and if believing-in-context replaces belief, a hybrid is created that provides a good way for REBT clinicians to begin to experiment in ACT and perhaps other third wave methods. As they do so, it seems likely that some of the REBT methods will be retained. In the long run, however, it is not clear how many of these methods need be retained. That remains a question. Effectiveness, not just logic, will be the ultimate metric (p. 146).

Given that the therapeutic differences highlighted are not only associated with the active ingredients of therapy, but also relate to outcomes, it remains quite difficult to compare the relative efficacy of each of these approaches. One particular line of investigation might be to focus primarily on outcomes in terms of the achievement of practical and

measurable goals. Both ACT and REBT have the ultimate aim of helping individuals live the life that they want, and this commonality could be employed as a means of assessing the relative efficacy of each. An alternative line of research relates to the exploration of whether researchers could use REBT as a means of enhancing flow states in sport. Alternatively, combinations of REBT and ACT may further facilitate flow states, which, according to the results of Study 2, appear to be associated with peak performances.

This study has also highlighted the potential utility of REBT in the management of other emotions in sport. In particular, Study 2 highlighted that bowlers who experience the emotion of anxiety also report frequently experiencing anger, and their anger is often seen as being dysfunctional to performance goals. Given the findings of the current study, it would appear that REBT may also lend itself to the management of anger in sport. Although many of the concepts taught in the intervention could easily be generalised to other emotions, the intervention remained primarily focussed on anxiety in this study. Future research would benefit from exploring beliefs underlying a range of competition specific emotions, and then assessing the relative efficacy of strategies designed to change these beliefs. On a related theme, future researchers should start to explore associations between emotions. Given that the emotions of anger and anxiety often produce similar symptomatic responses, and appear to be commonplace in the competitive experience (Robazza & Bortoli, 2006), it would be interesting to determine to what extent they combine to drive emotional disturbance.

In future, researchers should more specifically explore the utility of the CSAI-2-D as a measure of anxiety in sport. In particular the cumulative nature of the intensity scale of this measure, its inability to assess the frequency of thoughts, and its lack of behavioural component are considerable limitations that warrant further research. The importance of behavioural interpretation cannot be overemphasised given the findings of Study 2. These limitations would also be predicted to carry across to the directional scale, although this scale may already provide an indirect measure of the frequency of cognitions. For example, researchers might explore correlations between frequency based measures (such as thinking aloud procedures), behavioural measures, and single-item assessments of intensity and direction for the CSAI-2-D. Alternately, as Hanin (2000) suggested, researchers might observe the specific symptomatic styles exhibited by competitors, as opposed to attempting to determine these styles using general measures of key symptoms.

Related to the measurement of emotions, findings from Study 2 highlighted the importance of assessing all dimensions of the anxiety construct. General definitions of emotion highlight cognitive, somatic, and behavioural components (Ellis, 1994). Current measures of anxiety, such as the CSAI-2, only assess variants of cognitive anxiety (in other words self-reported cognitive and symptomatic reactions). In the educational setting, Calvo and Miguel-Tobal (1998) explored concordance between cognitive and somatic interpretations of symptoms, behavioural anxiety, physiological arousal, and task performance. Calvo and Miguel-Tobal employed tasks that included motor and speech tests. They reported significant relationships among measures of cognitive aspects, and among those concerned with somatic (or physiological) aspects, but not between the two areas. In particular, Calvo and Miguel-Tobal noted the mediating effects of trait anxiety on all dimensions of the anxiety response. They observed that individuals previously identified as having high trait anxiety showed higher levels of concordance across all dimensions of anxiety measured, when compared to those individuals who presented with low levels of trait anxiety. Unfortunately, Calvo and Miguel-Tobal did not include directional interpretations of dimensions that may add further insight into the relationships they observed. Such findings highlight that anxiety presents across a range of domains (cognitive, somatic, and behavioural), and in order to effectively work with competitors suffering from anxiety, identification and treatment would ideally consider all of these domains. Given the results of the present thesis pertaining to trait anxiety, such a thorough assessment could be conducted away from competition without directly impacting competitors' event preparation, and yet provide very reliable and useful results. Clearly, there is a need for the development of measures of emotion that assess all relevant domains before treatment options may be explored. As a starting point, sport psychology researchers could attempt to replicate the study by Calvo and Miguel-Tobal, with the additional incorporation of a directional measure of trait anxiety.

Considering the relative importance of trait anxiety in mediating all domains of the anxiety response, an alternative approach to measurement may be to specifically target the beliefs of competitors. The SGABS lends itself to this approach and, according to the findings of Study 3, distinguishes between competitors on variables assessed by the CTAI-2-D. In the future, researchers should investigate the application of the SGABS to the sporting context. Belief based assessments, like the one I performed in Study 2 may provide considerable insight into the cognitive styles of

competitors experiencing different emotions in sport. Alternately, approaches that attempt to tap into the self-talk of the competitor as it is happening may also provide additional insight into the mediating role of beliefs in emotional and performance variance in sport.

Given the support provided for REBT in Study 3, and the hypothesised indirect/partial assessment gained from current measures of anxiety, future research should ideally focus on assessment tools that tap into competitors' interpretive style, whilst concurrently measuring secondary responses to changes in thinking, sensing, and behaving. If required, competitors themselves could be asked to name the emotional label they would use to describe their experience. This may be less critical than whether the external and internal (cognitive, somatic, and behavioural) changes experienced by competitors are seen to be harmful to performance. Gaining access to this information would enable practitioners to quickly identify the causes of harmful emotions and, as a result, more efficiently moderate them. Given that the results of this study indicated that REBT can effectively moderate these interpretations, an efficient and well-tested clinical tool is already at the disposal of researchers. It is surprising that REBT has not been used more widely in the sports setting.

Although research exists suggesting the generalisablity of REBT across cultures (e.g., Lega, & Ellis, 2001), with different aged clients (Gonzalez et al., 2004) and with different levels of emotional insight (e.g., Robb, Backx, & Thomas, 1999), it still may be that, as a therapeutic strategy, it is more applicable with some specific cohorts of individuals than others. For example, it has been suggested, in practice, that very concrete or rigid thinkers may not benefit due to their inability to generate alternative ways of seeing things (Robb, Backx, & Thomas, 1999). In a similar vein, Kinney (2000) proposed that certain individuals endorse biased information-processing strategies regarding the development and preservation of self-theories. These biases pose significant challenges for REBT therapists attempting to assist clients in the transition from intellectual- to emotional-insight. Such observations encourage future research with a wide range of athletes. Future research might specifically gather additional details about participants to further explore such potentially mediating variables.

Implications for Practice

The present research has raised a number of implications for practice in sport psychology. In particular, findings from this thesis highlight that directional measures are more accurate predictors of skill and performance, and provide the researcher with

an interpretive focus in relation to the management of anxiety. Despite this observation, the findings of this thesis indicate that current measures of anxiety are quite limited in their present form. Until measures are further developed, where possible, practitioners would be best advised to explore the experience of anxiety from an individual perspective, and use ongoing monitoring procedures to help determine whether that experience is seen to be helpful or harmful to the competitor. The ABC framework of REBT may be particularly useful in this respect. Alternatively, practitioners may use belief-based measures (such as the SGABS) to help them gain additional insight into the competitors' cognitive style, and assess for thinking errors that might be implicitly related to mood and performance variability. In situations where competitors report experiencing harmful emotional consequences, the findings of this thesis have shown that, at least in the case of anxiety, REBT is a useful means of restructuring the debilitating beliefs that drive these emotional responses. There is significant support for the efficacy of REBT in the clinical literature as a means of restructuring beliefs (David et al., 2005). The current study highlights that this particular form of therapy can also be used, quite effectively, as a means of managing emotions in the sport psychology setting. Practitioners are strongly encouraged to take some training in REBT and "see for themselves" the applicability of this approach to much of the work they do.

Based on the findings of Study 2, practitioners are well advised to assess for a range of emotional experiences in the competitive sporting environment. I noted that both anger and anxiety were reported by the majority of participants in the second study. Assessment and interventions that consider the possibility of multiple emotional responses occurring at the same time are likely to be more effective in moderating affect and improving performances. General measures of beliefs, such as the SGABS, are also likely to be useful in the identification of beliefs thought to be mediating a broad range of emotional responses.

This research has also highlighted that peak performances often occur in the absence of judgmental thought. Based on this, applied sport psychologists are encouraged to employ strategies that reduce competitors' endorsement of irrational beliefs (e.g., Ellis, 1962, 1994), facilitate flow states (e.g., Csikszentmihalyi, 1990), and/or foster diffusion from thoughts (Gardner & Moore, 2004; Hayes, 1999). Although further research is required to investigate the relative efficacy of each of these approaches, they share outcomes that have been found to be associated with goal

achievement, and independently have accrued good research support for their application.

Finally, findings from this research also highlight the potential for trait-based interventions that can be taught away from the competitive arena, and that result in the production of state-specific changes in affect. One significant benefit of such approaches is that they minimise the potential for disturbing competitors' pre-competition routine, thereby fostering the therapeutic alliance. In particular, observations reported in Studies 1 and 2 indicate that the framework of REBT lends itself as a therapeutic strategy to such endeavours.

Concluding Remarks

Several practical implications arise as a result of the present thesis. First, the findings confirm the utility of employing interventions that specifically target traits with the goal of mediating state specific responses. The research in this thesis highlighted that such interventions can also influence state directional responses over a number of competitions. More research is required to investigate specific contexts where such interventions are efficacious, and to further explore whether such outcomes are maintained. Trait-based measures are relatively unobtrusive in that competitors can be assessed and treated away from the competitive environment, and trait-based interventions are predicted to generalise across a range of specific contexts, thereby providing increased efficiency.

Secondly, the findings reported in this thesis highlight the benefits of assessing specific beliefs as opposed to general emotional responses. Given that the research I conducted indicates that competitors' thinking style is the primary cause of emotional disturbance, applied interventions should logically target these systems by either changing the content or changing the manner in which competitors relate to the content.

The findings from Studies 2 and 3 highlight the mediating role of underlying beliefs in the experience of anxiety in sports, and the use of REBT as a means of identifying and restructuring such thoughts. Knowledge of competitors' underlying beliefs, grounded in a specific model of emotions, can assist practitioners in the identification of emotional disturbance, and help them in the use of appropriate techniques to manage dysfunctional mood states. In this thesis, I addressed a range of critical issues using innovative approaches, and, in doing so, I uncovered some very interesting findings for the future of sport psychology. I hope that the positive outcomes

of this research will encourage other researchers to examine the role of REBT in the management of anxiety and other emotions in sport.

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APPENDICES

Appendix A

Study 1 Participant Details Form

Your ID number is:

Please print the following details

First name: _____ **Surname:** _____

Address: _____

Suburb: _____ **Postcode:** _____

Telephone: _____

Gender: *Male / Female* **Age:** ___*(years)*

Sport Details:

1. Primary competition event: _____

2. Secondary events: _____
   _____
   _____
   _____

3. At what level do you compete in your primary event *(please tick)*?
   - ☐ Recreational
   - ☐ Local club
   - ☐ State
   - ☐ National / Int.

4. How long have you competed in your primary event ?
   _____ *(years).*

5. Do you currently compete (*this year*) in any other competitions at a serious level ? ☐ Yes / ☐ No.

6. Do you currently have any injuries ? ☐ Yes / ☐ No.

Appendix B

Study 1 Competitive State Anxiety Inventory-2-D

Competition Day

Date __ / __ / __ Time before competition (__ hours)

A number of statements which athletes have used to describe their feelings/thoughts before competitions are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how **you currently feel/think** about your upcoming competitive event. Following this, rate the degree to which you believe that feeling/thought you have is **helpful or harmful to your upcoming performance**. There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer which best describes your current feelings/thoughts.

	How you currently feel/think				**Degree to which that feeling/thought is helpful or harmful to your next performance**						
Statements:	*Not at all*	*Somewhat*	*Moderately*	*Very much*	*Very harmful*						*Very helpful*
1. I am concerned about this competition.	1	2	3	4	-3	-2	-1	0	1	2	3
2. I feel nervous.	**1**	**2**	**3**	**4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**
3. I have self doubts.	1	2	3	4	-3	-2	-1	0	1	2	3
4. I feel jittery.	**1**	**2**	**3**	**4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**
5. I am concerned that I may not do as well in this competition as I could.	1	2	3	4	-3	-2	-1	0	1	2	3
6. My body feels tense.	**1**	**2**	**3**	**4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**
7. I am concerned about losing.	1	2	3	4	-3	-2	-1	0	1	2	3
8. I feel tense in my stomach.	**1**	**2**	**3**	**4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**
9. I am concerned about choking under pressure.	1	2	3	4	-3	-2	-1	0	1	2	3
10. My body feels relaxed.	**1**	**2**	**3**	**4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**
11. I'm concerned about performing poorly.	1	2	3	4	-3	-2	-1	0	1	2	3
12. My heart is racing.	**1**	**2**	**3**	**4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**
13. I'm worried about reaching my goal.	1	2	3	4	-3	-2	-1	0	1	2	3
14. I feel my stomach sinking.	**1**	**2**	**3**	**4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**
15. I'm concerned that others will be disappointed with my performance.	1	2	3	4	-3	-2	-1	0	1	2	3
16. My hands are clammy.	**1**	**2**	**3**	**4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**
17. I'm concerned because I won't be able to concentrate.	1	2	3	4	-3	-2	-1	0	1	2	3
18. My body feels tight.	**1**	**2**	**3**	**4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**

My personal performance rating in this event on this day was: _____ (where 1 = very poor, and 10 = excellent).

Appendix C

Study 1 Competitive Trait Anxiety Inventory-2-D

Date __ / __ / __ ID: _____

Competitive Thoughts and Feelings

A number of statements which athletes have used to describe their usual feelings/thoughts before competitions are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how **you usually feel/think** about your competitive events. Following this, rate the degree to which you believe that feeling/thought you usually have is **helpful or unhelpful to your performance**. There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer which best describes your usual feelings/thoughts.

	How you usually feel/think				Degree to which that feeling/thought is helpful or detrimental to your performances						
Statements:	*Not at all*	*Somewhat*	*Moderately*	*Very much*	*Very detrimental*						*Very helpful*
1. I get concerned about competitions.	1	2	3	4	-3	-2	-1	0	1	2	3
2. I feel nervous.	1	2	3	4	-3	-2	-1	0	1	2	3
3. I have self doubts.	1	2	3	4	-3	-2	-1	0	1	2	3
4. I feel jittery.	1	2	3	4	-3	-2	-1	0	1	2	3
5. I get concerned that I may not do as well in competitions as I could.	1	2	3	4	-3	-2	-1	0	1	2	3
6. My body feels tense.	1	2	3	4	-3	-2	-1	0	1	2	3
7. I get concerned about losing.	1	2	3	4	-3	-2	-1	0	1	2	3
8. I feel tense in my stomach.	1	2	3	4	-3	-2	-1	0	1	2	3
9. I get concerned about choking under pressure.	1	2	3	4	-3	-2	-1	0	1	2	3
10. My body feels relaxed.	1	2	3	4	-3	-2	-1	0	1	2	3
11. I get concerned about performing poorly.	1	2	3	4	-3	-2	-1	0	1	2	3
12. My heart races.	1	2	3	4	-3	-2	-1	0	1	2	3
13. I worry about reaching my goal.	1	2	3	4	-3	-2	-1	0	1	2	3
14. I feel my stomach sinking.	1	2	3	4	-3	-2	-1	0	1	2	3
15. I get concerned that others will be disappointed with my performance.	1	2	3	4	-3	-2	-1	0	1	2	3
16. My hands feel clammy.	1	2	3	4	-3	-2	-1	0	1	2	3
17. I get concerned because I won't be able to concentrate.	1	2	3	4	-3	-2	-1	0	1	2	3
18. My body feels tight.	1	2	3	4	-3	-2	-1	0	1	2	3

Appendix D

Study 1 Sport Anxiety Scale

Date __ / __ / __ ID: _____

Reactions to Competitions

A number of statements which athletes have used to describe their thoughts and feelings before or during competitions are listed below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you **usually feel** prior to or during competition. Some athletes feel they should not admit to feelings of nervousness or worry, but such reactions are actually quite common, even among professional athletes. To help us better understand reactions to competition, we ask you to share your true reactions with us. There are, therefore, no right or wrong answers. Do not spend too much time on any one statement, but circle the answer which best describes how you commonly react.

Statements:	How you usually feel prior to, or during competition			
	Not At All	*Somewhat*	*Moderately*	*Very Much*
1. I feel nervous.	1	2	3	4
2. During competition I find myself thinking about unrelated things.	1	2	3	4
3. I have self-doubts.	1	2	3	4
4. My body feels tense.	1	2	3	4
5. I am concerned that I may not do as well in competition as I could.	1	2	3	4
6. My mind wanders during sport competitions.	1	2	3	4
7. While performing, I often do not pay attention to what's going on.	1	2	3	4
8. I feel tense in my stomach.	1	2	3	4
9. Thoughts of doing poorly interfere with my concentration during competition.	1	2	3	4
10. I am concerned about choking under pressure.	1	2	3	4
11. My heart races.	1	2	3	4
12. I feel my stomach sinking.	1	2	3	4
13. I'm concerned about performing poorly.	1	2	3	4
14. I have lapses in concentration during competition because of nervousness.	1	2	3	4
15. I sometimes find myself trembling before or during a competitive event.	1	2	3	4
16. I'm worried about reaching my goal.	1	2	3	4
17. My body feels tight.	1	2	3	4
18. I'm concerned that others will be disappointed with my performance.	1	2	3	4
19. My stomach gets upset before or during competition.	1	2	3	4
20. I'm concerned I won't be able to concentrate.	1	2	3	4
21. My heart pounds before competition.	**1**	**2**	**3**	**4**

Appendix E
Study 1 Participant Invitation Letter

Dear Competitor,

Thankyou for expressing interest in this study. The following section outlines the nature of the research being conducted, including what is required of you (if you decide to participate), and what you can gain by participating.

The study has two general objectives. The first of these involves investigating mental aspects associated with the experience of competing. The information obtained will then be used to help achieve the second objective of the study, to construct and evaluate a mental skills training package for those competitors who require it.

You can help with the first phase of this research by providing information about your experiences prior to and during competitions. This information will be gathered in the form of a series of questionnaires which are regularly used by competitors in a range of sports. Some of the questionnaires are to be filled out in your own time, others must be completed on competition days. They are all relatively short, and should only take a few minutes of your time to complete. Your responses to the questionnaires will remain entirely confidential (only available to the principal researchers involved in this study).

In addition to the questionnaires, a small number of individuals may be asked to discuss their competitive experiences further with the primary researcher in an informal interview. These individuals will be contacted after a considerable number of the questionnaires have been returned.

The information obtained in this initial phase of the study will help sport psychologists, coaches and competitors better understand the unique experience of competitive sport. In addition, it will be used to help construct a specific mental skills training package. This package will be implemented and evaluated once all questionaries and interviews have been conducted. It will primarily take an educational form, helping competitors identify and control thoughts they have that are contributing to poor performances. Similar approaches have been used in other performance settings with great success. The training will involve from four to six group workshops which will be conducted at times and venues that suit participants.

Your eligibility to receive mental skills training for your sport is dependent upon your early involvement in the first phase of the study. If you do decide to participate you should know that you are free to withdraw at any time.
If you are interested in participating in this initial phase of the study, please read on. If you would like information beyond what is included in this booklet, please call me on (03) 9583 3687.
Thankyou for taking the time to read this, and I look forward to working with you in the near future.

Appendix F

Study 1 Participant Instructions

Find following general details about the nature of the research, instructions to participants, a consent form and a number of questionnaires. If you wish to participate in this study you must complete all the required sections. Once complete, return these in the supplied reply paid envelope. The information you provide will then be analysed and you will be contacted concerning the intervention.

If you decide to participate in the study you must complete the following two sections.

Section 1
Read and sign the consent form (if you are under the age of 18 you will need to have a parent or legal guardian sign this form on your behalf).
Complete the 'Participant Details' section and the first three questionnaires in your own time away from competition.

Section 2
Decide on a challenging competition league that you compete in regularly (at least weekly), and perform the following tasks at each of your next three competitions in that league.

Complete the questionnaire titled 'Competition Day' as close to the start of your chosen event as you feel comfortable. Do not forget to record how many hours prior to the event it was completed.
Complete the section titled 'Just Before Competing' as close to the start of your chosen event as you can without interfering with your preparation. Do not forget to record how many minutes prior to the event it was completed.
Once the event is over, complete the section titled 'Performance Details'.
If you play more than one game in that league each week, focus the questionaries on the first game you play only.

Try to complete all of the questionnaires away from others. Do not print your name on any of the pages except the Participant Details form.

Once all forms have been completed, place them in the reply paid envelope and post it.

Appendix G

Study 1 Informed Consent form

We are interested in investigating the types of feelings competitors have prior to and during competitions. To participate in this study, you will be required to complete a series of questionnaires (see Participant Instructions sheet). The questionnaires are regularly completed by athletes from many sports. You are free to withdraw from the study at any time, and all the information you give us will remain confidential.

_____

STATEMENT

I certify that:

- I have the legal ability to give valid consent,
- I understand the procedures to be used in the study,
- I have had the chance to have my questions answered,
- I am free to withdraw at any time,
- My responses will be totally confidential, and
- I freely give my consent to participation using the procedures.

Signed: _____)
)
Witness or legal guardian other than experimenter:) Date:_____
)
_____)

Any queries or complaints about your participation in this project may be directed to the experimenter, or to the secretary, Human Research Ethics Committee, Victoria University of Technology, PO Box 14428 MCMC, Melbourne 8001. (Tel. 03 9688 4710).

Appendix H

Study 2 Informed Consent form

We are interested in investigating the types of thoughts competitors have prior to and during competitions. To participate in this study, you will be required to sit two interviews approximately two weeks apart. The first interview will last approximately 30 minutes and will focus on your thoughts, feelings and behaviours around competitions. The second interview will last approximately 15 minutes and will briefly review what was covered in the first. This style of interview is regularly completed by athletes from many sports. You are free to withdraw from the study at any time, and all the information you give us will remain confidential.

_____

STATEMENT

I certify that:

- I have the legal ability to give valid consent,
- I understand the procedures to be used in the study,
- I have had the chance to have my questions answered,
- I am free to withdraw at any time,
- My responses will be totally confidential, and
- I freely give my consent to participation using the procedures.

Signed: _____)
)
Witness or legal guardian other than experimenter:) Date:_____
)
_____)

Any queries or complaints about your participation in this project may be directed to the experimenter, or to the secretary, Human Research Ethics Committee, Victoria University of Technology, PO Box 14428 MCMC, Melbourne 8001. (Tel. 03 9688 4710).

Appendix I

Study 2 Interview Schedule

1. GENERAL RAPPORT BUILDING AND INTRODUCTION

Purpose: to introduce the interview, generate rapport and look for any general themes that might be relevant to the interview.

Explanation of the purpose of the interview:

The purpose of this interview is to explore some of the experiences you generally have leading up to and during competition.

Highlight anonymity, confidentiality etc.

Rapport building and general information gathering:

First, tell me a bit about yourself . . . (sport / general).

Follow any relevant themes.

2. GOAL IDENTIFICATION

Purpose: to determine goals relevant to life/sport.

Life goals.

Elicit general information.

Goals specific to athletics?

Tell me about your motivation for competing in bowling.

Describe for me any goals you have associated with the sport? (attempt to determine LT and ST technical, mental, physical, performance goals).

Sample Probes:

Tell me more; Oh really; Go on; And then; I see; Is that so; Please continue; Yes…

3. EMOTIONAL CONSEQUENCES

Purpose: to determine the individual's emotional experience (somatic, cognitive and behavioural) around competition and attempt to distinguish whether these emotions are perceived to be helpful or harmful.

What characteristic emotions do you experience at this time ?

Describe your experience of ____ ?

For each distinct emotional experience determine somatic, cognitive and behavioural characteristics.

Somatic characteristics:

Can you describe for me how your body usually feels at this time when you experience ____ ?

Attempt to gauge:

- *Frequency of feelings (constant / sporadic / intensifying / fading).*
- *Intensity of feelings (mild / moderate / strong).*
- *Directional interpretation (harmful / helpful to your competitive goals).*

Cognitive characteristics:

Can you describe the sorts of thoughts that would be going through your head at this time when you experience____ ?

Attempt to gauge:

- *Frequency of cognitions (constant / sporadic / intensifying / fading).*
- *Intensity of cognitions (mild / moderate / strong).*
- *Directional interpretation (harmful / helpful to your competitive goals).*

Behavioural characteristics:

Describe how you usually behave at this time when you experience ____?

Attempt to gauge:

- *Frequency of behaviour (constant / sporadic / intensifying / fading).*
- *Directional interpretation (harmful / helpful to your competitive goals).*

Sample Probes:

Tell me more; Oh really; Go on; And then; I see; Is that so; Please continue; Yes…

4. ACTIVATING EVENTS

Purpose: to determine what the individual perceives to be important activating events.

For participants who reported harmful (goal blocking) emotions earlier:

Why do you experience ____ (each emotion listed earlier) just prior to competing ?

OR/

Can you describe for me exactly what happens just before you experience ____ (each emotion listed earlier) just prior to competing ?

OR/

Can you describe some things/events that may have lead you to experience ____ (each emotion listed earlier) just prior to competing ?

For participants who did not report harmful (goal blocking) emotions earlier:

Can you describe some things/events that could hypothetically lead you to experience harmful (goal blocking) emotions just prior to competing ?

Sample Probes:

Tell me more; Oh really; Go on; And then; I see; Is that so; Please continue; Yes…

5. INFERENCES AND BELIEFS RELATING TO ACTIVATING EVENTS

Purpose: to determine what inferences and underlying beliefs are held by the individual in relation to potential/experienced activating events described above.

For participants who reported harmful (goal blocking) emotions earlier:
When you experience this activating event (each as identified previously), what sorts of things do you say to yourself ?

For participants who did not report harmful (goal blocking) emotions earlier:
If you were to experience this hypothetical activating event (each as suggested previously), what sorts of things would you say to yourself ?

Inference chain each to underlying beliefs.

Sample probes:
When ____ happens you think/feel/behave ____ because____
When ____ happens, what are you saying to yourself ?
Why do you think you say ____ to yourself ?
What do you mean by____ ?
Are you aware of what you may have been thinking at that moment ?
Repeat questions to find beliefs.
Conjunctive phrasing - and that would mean ____ ;and then ____ ;and therefore____ ; because ____.

6. INFERENCES AND BELIEFS RELATING TO CONSEQUENCES

Purpose: to determine what inferences and underlying beliefs are held by the individual in relation to their secondary emotional disturbance (note that this section is only relevant to individuals who report experiencing harmful emotional consequences).

You mentioned that it is harmful (goal blocking) for you to experience ____ (each emotion elicited earlier) just prior to competing. Why is this so ?
OR/
When you experience ____ (each emotion elicited earlier), what sorts of things do you say to yourself about your experience of that emotion ?

Inference chain each to underlying beliefs.

Sample probes:

When you experience this emotion, you think ____ because ____

When you experience this emotion, what are you saying to yourself ?

What do you mean by ____

When you experience this emotion, what is going through your mind ?

Are you aware of what you may have been thinking at that moment ?

Repeat questions to find beliefs.

Conjunctive phrasing - and that would mean ____ ;and then ____ ;and therefore____ ; because ____.

CLOSING

Purpose: summarise main points, look for any additional relevant details.

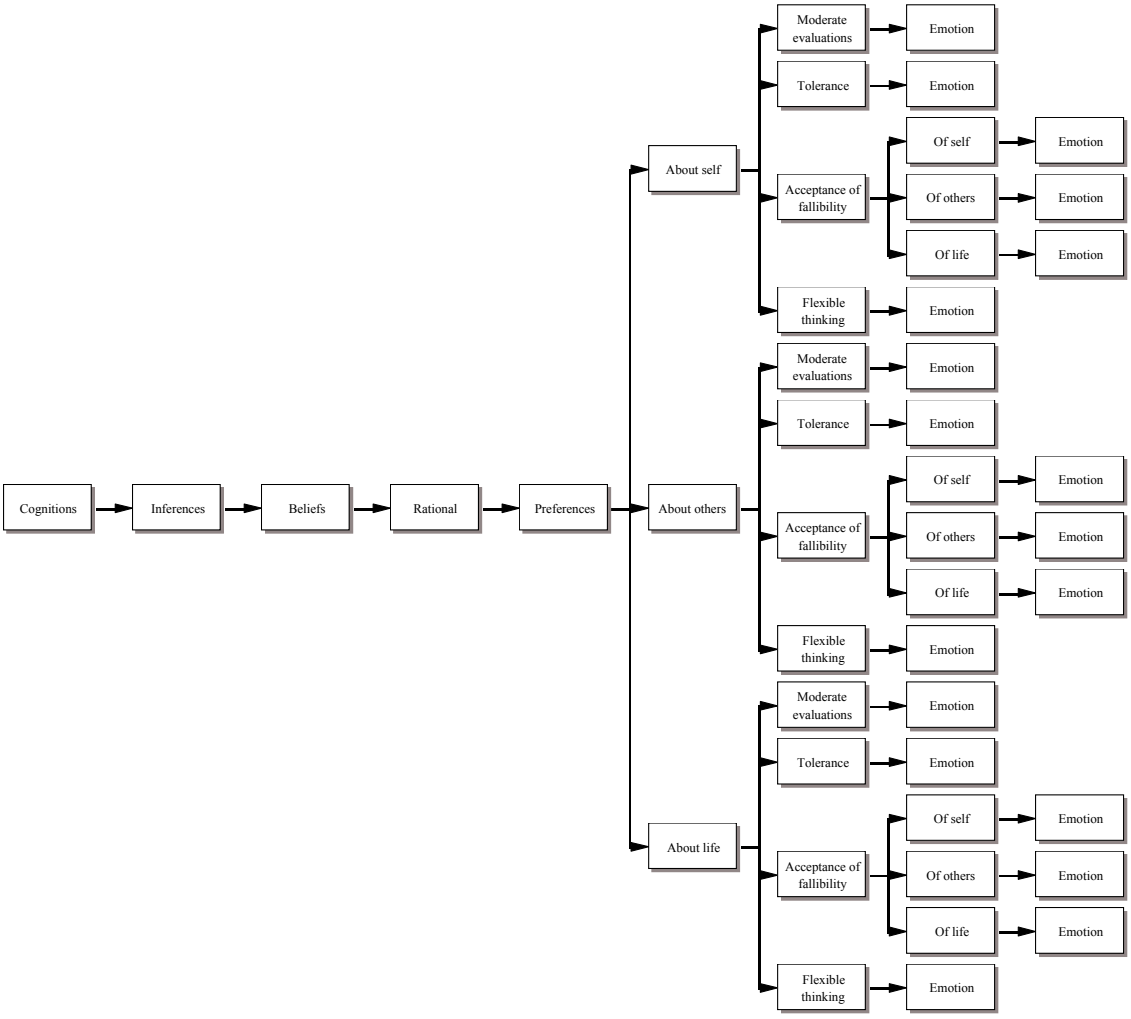
Summarise main points.

Can you think of anything else that is relevant?

Questions from the participant.

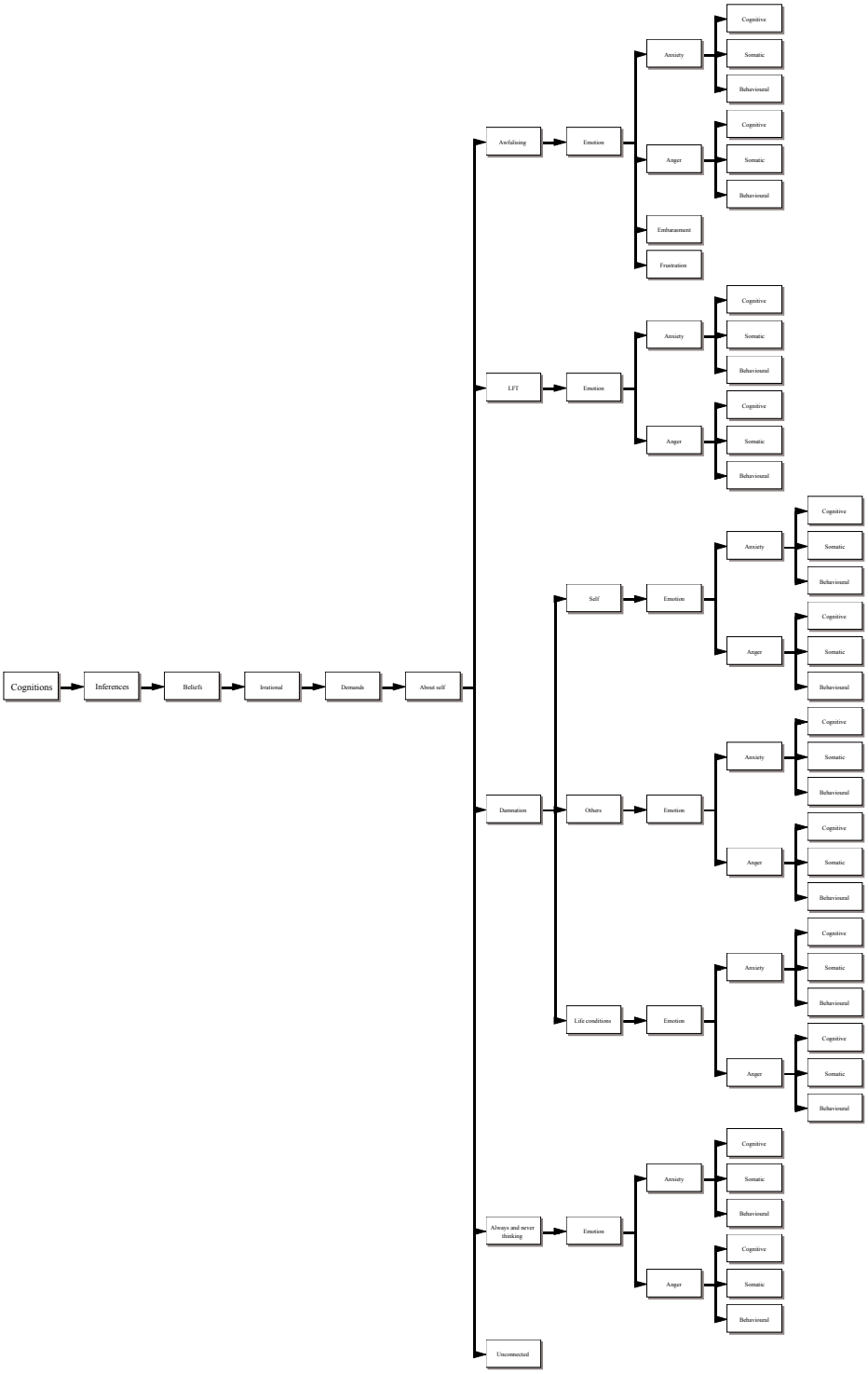
Appendix J

Study 2 Rational Cognitions Coding Tree



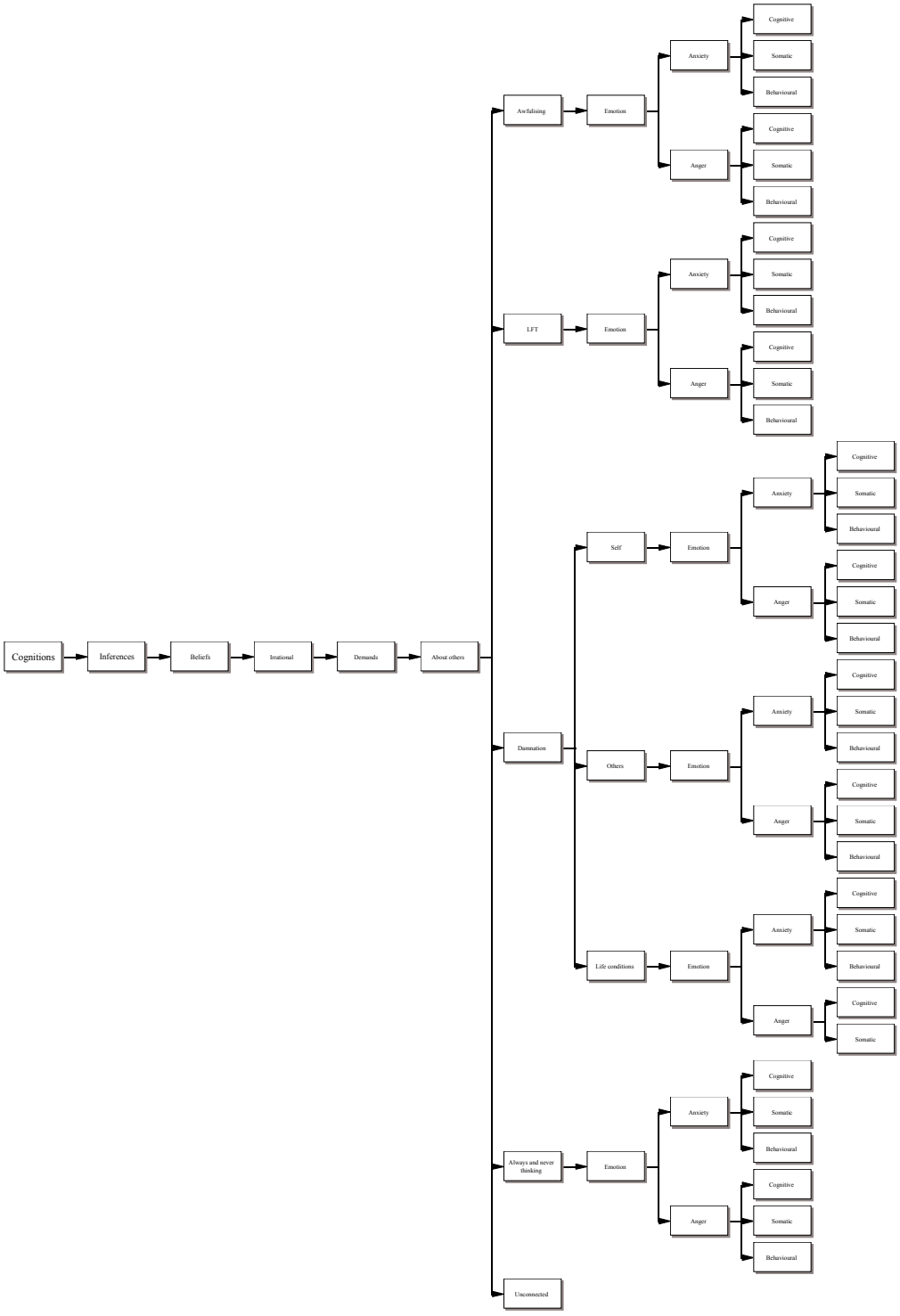
Appendix K

Study 2 Irrational Cognitions (Self directed) Coding Tree



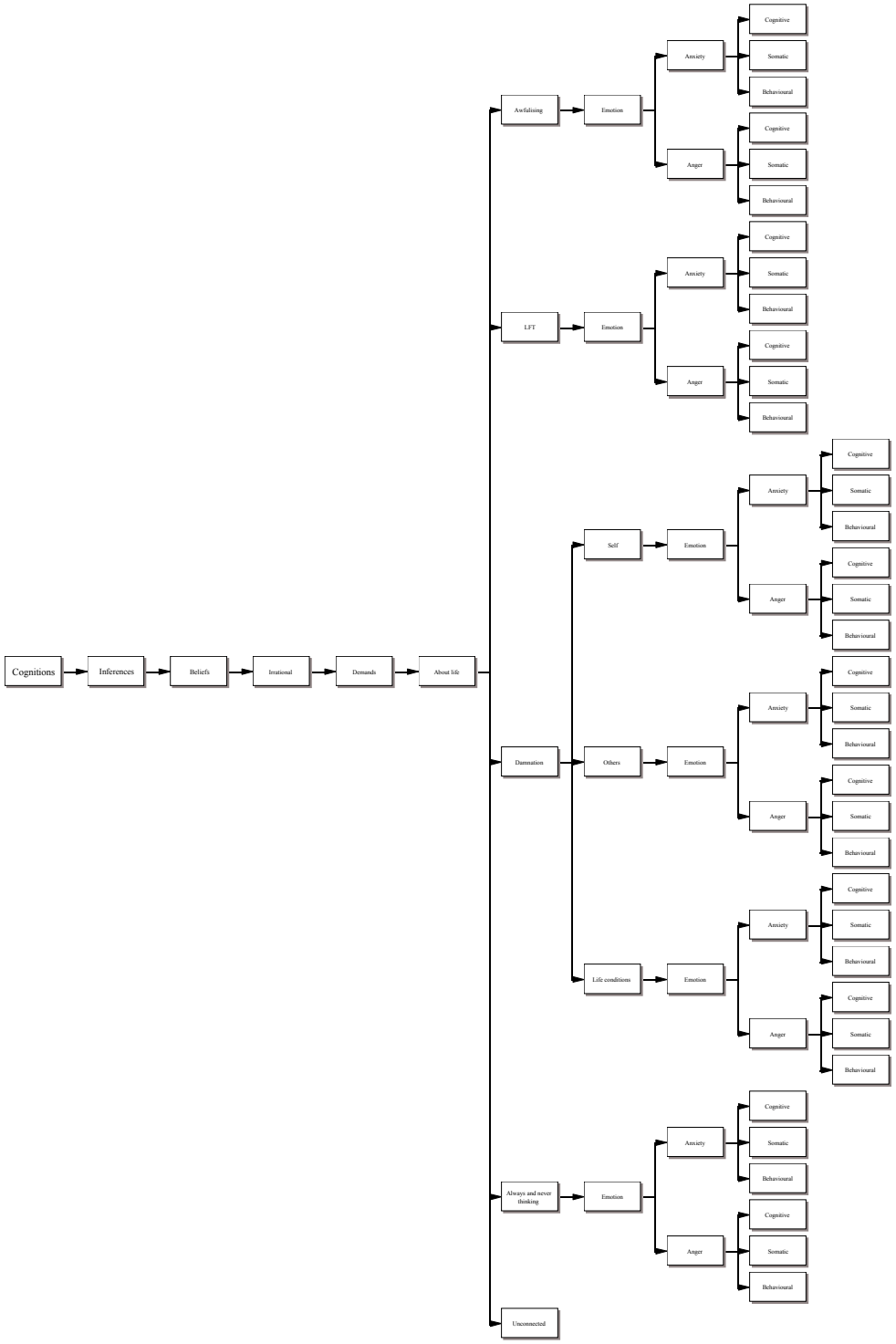
Appendix L

Study 2 Irrational Cognitions (Other directed) Coding Tree



Appendix M

Study 2 Irrational Cognitions (Life directed) Coding Tree



Appendix N

Participant Details Form

Please print the following details

General Details:

First name:

Surname:

Address:

Suburb:

Postcode:

Telephone:

Gender: Male / Female

Age: ___ (years)

Bowling Details:

1. How long have you competed in this event? _____ *(years).*
2. What is your average result in this event (*if known*)? _____
3. Do you currently have any injuries that limit your ability in this event? ☐ Yes / ☐ No.
4. Which of the following best describes your current competitive level in tenpin bowling (*please tick one*)?
   ☐ Recreational
   ☐ Local club
   ☐ State
   ☐ National/International

Appendix O

Study 3 Social Desirability Scale

Personal Attributes Scale

Listed below are a number of statements concerning personal attributes and traits. Read each item, decide whether the statement is true or false as it pertains to you personally, and circle the most appropriate response.

1	Before voting I thoroughly investigate the qualifications of all the candidates.	(T / F)
2	I never hesitate to go out of my way to help someone in trouble.	(T / F)
3	It is sometimes hard for me to go on with my work, if I am not encouraged.	(T / F)
4	I have never intensely disliked anyone.	(T / F)
5	On occasion I have had doubts about my ability to succeed in life.	(T / F)
6	I sometimes feel resentful when I don't get my way.	(T / F)
7	I am always careful about my manner of dress.	(T / F)
8	My table manners at home are as good as when I eat out in a restaurant.	(T / F)
9	If I could get into a movie without paying and be sure I was not seen, I would probably do it.	(T / F)
10	On a few occasions, I have given up doing something because I thought too little of my ability.	(T / F)
11	I like to gossip at times.	(T / F)
12	There have been times when I felt like rebelling against people in authority even though I knew they were right.	(T / F)
13	No matter who I'm talking to, I'm always a good listener.	(T / F)
14	I can remember "playing sick" to get out of something.	(T / F)
15	There have been occasions when I took advantage of someone.	(T / F)
16	I'm always willing to admit it when I make a mistake.	(T / F)
17	I always try to practice what I preach.	(T / F)
18	I don't find it particularly difficult to get along with loud-mouthed, obnoxious people.	(T / F)
19	I sometimes try to get even rather than forgive and forget.	(T / F)
20	When I don't know something I don't at all mind admitting it.	(T / F)
21	I am always courteous, even to people who are disagreeable.	(T / F)
22	At times I have really insisted on having things my own way.	(T / F)
23	There have been occasions when I felt like smashing things.	(T / F)
24	I would never think of letting someone else be punished for my wrongdoings.	(T / F)
25	I never resent being asked to return a favour.	(T / F)
26	I have never been irked when people expressed ideas very different from my own.	(T / F)
27	I never make a long trip without checking the safety of my car.	(T / F)
28	There have been times when I was quite jealous of the good fortune of others.	(T / F)
29	I have almost never felt the urge to tell someone off.	(T / F)
30	I am sometimes irritated by people who ask favours of me.	(T / F)
31	I have never felt that I was punished without cause.	(T / F)
32	I sometimes think when people have a misfortune they only got what they deserved.	(T / F)
33	I have never deliberately said something that hurt someone's feelings.	(T / F)

Please check that all questions have been answered.
Thank you for your co-operation in this study.

Appendix P

Study 3 Shortened General Attitude and Belief Scale

Beliefs Questionnaire

Here are a set of statements which describe what some people think and believe. Read each statement carefully, decide how much you agree or disagree with it, and then circle the appropriate number that corresponds to your response.

		Responses				
	Items	*Strongly Disagree*	*Disagree*	*Neutral*	*Agree*	*Strongly Agree*
1	It's unbearable to fail at important things, and can't stand not succeeding at them.	1	2	3	4	5
2	I can't stand a lack of consideration from other people, and I can't bear the possibility of their unfairness.	1	2	3	4	5
3	It's unbearable being uncomfortable, tense or nervous and I can't stand it when I am.	1	2	3	4	5
4	I have worth as a person even if I do not perform well at tasks that are important to me.	1	2	3	4	5
5	I can't stand being tense or nervous and I think tension is unbearable.	1	2	3	4	5
6	It's awful to be disliked by people who are important to me, and it is a catastrophe if they don't like me.	1	2	3	4	5
7	If important people dislike me, it is because I am an unlikable bad person.	1	2	3	4	5
8	When I am treated inconsiderately, I think it shows what kind of bad and hopeless people there are in the world.	1	2	3	4	5
9	If I am rejected by someone I like, I can accept myself and still recognise my worth as a human being.	1	2	3	4	5
10	If I do not perform well at tasks that are so important to me, it is because I am a worthless bad person.	1	2	3	4	5
11	It's awful to do poorly at some important things, and I think it is a catastrophe if I do poorly.	1	2	3	4	5
12	I think it is terribly bad when people treat me with disrespect.	1	2	3	4	5
13	When people I like reject me or dislike me, it is because I am a bad or worthless person.	1	2	3	4	5
14	I cannot stand being treated unfairly, and I think unfairness is unbearable.	1	2	3	4	5
15	I believe that if a person treats me very unfairly they are bad and worthless.	1	2	3	4	5
16	I can't stand hassles in my life.	1	2	3	4	5
17	It's awful to have hassles in one's life and it is a catastrophe to be hassled.	1	2	3	4	5
18	I cannot tolerate not doing well at important tasks and it is unbearable to fail.	1	2	3	4	5
19	It is important that people treat me fairly most of the time, however I realise I do not have to be treated fairly just because I want to be.	1	2	3	4	5
20	If I do not perform well at things which are important, it will be a catastrophe.	1	2	3	4	5
21	It is unbearable to not have respect from people, and I can't stand their disrespect.	1	2	3	4	5
22	If important people dislike me, it goes to show what a worthless person I am.	1	2	3	4	5
23	I must be liked and accepted by people I want to like me, and I will not accept their not liking me.	1	2	3	4	5
24	I want to be liked and accepted by people whom I like, but I realise they don't have to like me just because I want them to.	1	2	3	4	5
25	When people who I want to like me, disapprove of me or reject me, I can't bear their disliking me.	1	2	3	4	5
26	If people treat me without respect, it goes to show how bad they really are.	1	2	3	4	5

Appendix Q

Study 3 Mental Readiness Form-L-D

Pre-Competition

Date __ / __ / __ Time before competition (__ minutes) ID: _____

The two statements below address feelings and thoughts athletes have before and during competitions. Read each statement and then circle the appropriate number to the right of the statement to indicate the intensity of the thoughts/feelings you are having **right now** about your next event. Following this, rate the degree to which you believe that feeling/thought you are having **right now** is helpful or unhelpful to your performance. There are no right or wrong answers.

	Not worried										*Worried*
My thoughts are . . .	1	2	3	4	5	6	7	8	9	10	11

	Unhelpful				*Helpful*			
These thoughts are . . .	-3	-2	-1	0	1	2	3	**. . . to my performance**

_____

	Not tense										*Tense*
My body feels . . .	1	2	3	4	5	6	7	8	9	10	11

	Unhelpful				*Helpful*			
This feeling is . . .	-3	-2	-1	0	1	2	3	**. . . to my performance**

_____

Performance Details

Please circle the appropriate competition: **State League** **Premier League** **Interclub**

My best time / distance achieved for my main event on this day was: _____

My main event placing on this day was: _____ (*specify heat or final*)

My personal performance rating in this event on this day was: _____ (*where 1 = very poor, and 10 = excellent*).

Appendix R

Study 3 REBT Intervention Structure

Session 1

General introductions.

Intervention Guidelines.

Emotions in Sport

Healthy and unhealthy emotions

Anxiety

- Definitions (ego / discomfort anxiety)
- Triggers
- Physical Symptoms
- Behavioural Responses

Stress the value of homework tasks.

Assign homework task.

Session 2

Homework review

The ABC Model of Emotions

Secondary emotional problems

Assign homework task.

Session 3

Centrality of Beliefs

- Rational vs. Irrational Beliefs
- Demands
- Evaluations

Session 4

Cognitive Disputation

- Empirical
- Pragmatic
- Logical

Developing Rational alternatives

Session 5

Cognitive Disputation Continued

- REI
- Catastrophe scales

Session 6

Cognitive Disputation Continued

- Cost Benefit Analysis
- Shame Attacking

Unconditional Self/Other Acceptance

Overview and Summary

Appendix S

Study 3 Relaxation Imagery Intervention Structure

Session 1	Imagery defined:
	Visualisation
	Mental rehearsal
	Mental practice
	Multi-sensory experiences.
	Visual, kinaesthetic, auditory, tactile, olfactory
Session 2	Jacobsen's relaxation response.
	Detail and practice.
Session 3	Factors
	Internal perspective
	External perspective
	Vividness
	Controllability
Session 4	Theoretical Explanations:
	Psychoneuromuscular Theory
	Symbolic Learning Theory
	Information-Processing Theory
	Psychological Skill Hypothesis
	Attentional - Arousal Set Explanation: Mental Set
Session 5	Usage
	Before & after practice
	Before & after competition
	During breaks in action
	During personal time
	When recovering from injury
Session 6	Different Uses of Imagery in Sport:
	Mental practice of specific performance skills
	Tactical rehearsal and problem solving
	Controlling arousal and anxiety
	Performance review and analysis
	Preparation for performance
	Within pre-performance routines
	Tailoring programs to individual needs, abilities, and interests.
	Daily practice and evaluation.

Appendix T

Study 3 Invitation to Participate

Dear Bowler,

Thankyou for expressing an interest in this study. The following section outlines the nature of the research being conducted, including what is required of you (if you decide to participate), and what you can gain by participating.

The study has the general aim of investigating a range of commonly applied interventions often used by sport psychologists. You can help by initially providing information about your experiences prior to and during competitions in the form of a series of general questionnaires in your own time, followed by some very brief measures that are to be completed just prior to competing over ten weeks of competition. These brief measures take no more than a few minutes to complete. At the end of this period you will again complete the same set of the general questionnaires. These questionnaires are regularly used by competitors in a range of sports. Your responses to the questionnaires will remain entirely confidential (only available to the principal researchers involved in this study).

In addition to the questionnaires, you may be invited to receive weekly sessions of psychological skills training sessions at a time and location yet to be finalised.

The information obtained in this study will help sport psychologists, coaches and competitors better understand the unique experience of competitive sport.

If you do decide to participate you should know that you are free to withdraw at any time.

If you would like information beyond what is included in this booklet, please call me on (03) 9583 3687.

Thankyou for taking the time to read this, and I look forward to working with you in the near future.

Find following general details about the nature of the research, instructions to participants, a consent form and a number of questionnaires. If you wish to participate in this study you must complete all the required sections of this booklet. Once complete, return the entire booklet in the supplied reply paid envelope. The information you provide will then be analysed and you will be contacted shortly.
If you decide to participate in the study you must complete the following section.

- Read and sign the consent form (if you are under the age of 18 you will need to have a parent or legal guardian sign this form on your behalf).
- Complete the 'Participant Details' section and the first three questionnaires in your own time away from competition and return then to the investigator in the reply paid envelope.

Study 3 Participant Instructions – Following Inclusion

Decide on a challenging competition league that you compete in regularly (at least weekly), and perform the following tasks once a week at each of your next ten competitions in that league.

- Complete the section titled **'Just Before Competing'** as close to the start of your chosen event as you can without interfering with your preparation. Do not forget to record how many *minutes* prior to the event it was completed.
- Once the event is over, complete the section titled **'Performance Details'**.

If you play more than one game in that league each week, apply the questionaries to the first game you play only.

Try to complete all of the questionnaires away from others. Do not print your name on any of the pages except the Participant Details form.

After the ten weeks of competition, complete a second copy of the general measures away from your competition venue, and post the fully completed questionnaires in the reply paid envelope.

Appendix U

Study 3 Informed Consent form

We are interested in exploring the management of anxiety in sport. To participate in this study, you will be required collect information across 10 competitions, and attend a total of 6 psychological skills training sessions. You are free to withdraw from the study at any time, and all the information you give us will remain confidential.

_____

STATEMENT

I certify that:

- I have the legal ability to give valid consent,
- I understand the procedures to be used in the study,
- I have had the chance to have my questions answered,
- I am free to withdraw at any time,
- My responses will be totally confidential, and
- I freely give my consent to participation using the procedures.

Signed: _____)
)
Witness or legal guardian other than experimenter:) Date:_____
)
_____)

Any queries or complaints about your participation in this project may be directed to the experimenter, or to the secretary, Human Research Ethics Committee, Victoria University of Technology, PO Box 14428 MCMC, Melbourne 8001. (Tel. 03 9688 4710).