DEVELOPING AND TESTING AN INTEGRATED MODEL OF CHOKING IN SPORT

By

Jin Wang

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ABSTRACT

In general, choking has been defined as the occurrence of sub-optimal performance under pressure (Baumeister and Showers, 1986). The most widely accepted theory of choking is what I have labeled the "automatic execution model" (Baumeister, 1984), the basic premise being that choking occurs due to the inhibition of well-learned or automatic skills. The present dissertation was designed to test the automatic execution model in a sport context. Beyond this, I was interested in broadening the research paradigm by concentrating on choking as a process. The five inter-related studies contained in this dissertation tested predictors of choking, perceptions of pressure, coping processes, the automatic execution model, and gender differences. The general aim of this dissertation was to produce an integrated model of choking in sport.

The five studies used to examine choking had a total of 89 competitive basketball players as participants (M = 20.01 years old, SD = 2.12). Sixty-four participants took part in studies, 1, 2, 3 and 5. The remaining 25 participants took part in study 4 only. All participants completed a series of basketball free throws in a low-pressure (LP) condition and a high-pressure (HP) condition. Pressure was manipulated by videotaping performance, using an audience, and offering financial incentives.

In Study 1, dispositional self-consciousness (S-C) and trait anxiety (A-trait) were tested as potential predictors of choking. Participants (N = 66) completed the Self-Consciousness Scale (SCS; Fenigstein, Scheler, & Buss, 1975) and the Sport Anxiety Scale (SAS; Smith, Smoll, & Schutz, 1990). A correlational analysis and a hierarchical multiple regression analysis supported the hypothesis that athletes high in S-C and somatic A-trait were susceptible to choking under pressure.

In Study 2, the effects of manipulated pressure were examined for possible changes in perceived state anxiety (A-state) and subsequently performance. Participants (N = 64) completed the modified Competitive State Anxiety Inventory-2 (CSAI-2; Jones & Swain, 1992) prior to performing in the LP condition and the HP condition. A multivariate analysis of variance (MANOVA) and a correlational analysis showed that participants experienced increased intensity of somatic and cognitive A-state in the HP condition, but the direction (facilitative/debilitative) of somatic A-state and cognitive A-state did not change significantly. Correlation analysis between A-state and performance under pressure was also not significant. In addition, a one-way analysis of covariance (ANCOVA) showed an absence of significant differences in performance between participants who had a negative A-state and participants who had a positive A-state.

Study 3 was designed to examine the relationship between coping styles and choking susceptibility. Participants (N = 64) completed the Coping Style Inventory for Athletes (CSIA; Anshel & Kaissidis, 1997). As stated above participants also completed the CSAI-2 prior to performing in the LP and HP conditions. Correlation and hierarchical regression analyses supported the hypothesis that approach coping strategies would result in heightened A-state and performance decrements under pressure.

In Study 4, the automatic execution model was tested by investigating possible differences in the occurrence of choking as a function of task characteristics. Participants (N = 25) completed a running task (effort-dominant task) and a free throw shooting task (skill-dominant task) in a LP condition and a HP condition. As hypothesized, a series of t tests showed that the HP condition resulted in improved performance for the running task but decrements in performance for the free-throw shooting task.

Study 5 was used to investigate potential gender differences in choking susceptibility. Participants (male = 46; female = 18) had already completed the SCS, SAS, CSIA, and CSAI-2. A one-way MANCOVA showed there were no gender differences in somatic and cognitive A-state changes from the LP condition to the HP condition. Furthermore, a one-way ANCOVA showed no gender differences in performance from the LP condition to the HP condition. In addition, a correlational analysis showed that S-C was more likely to affect performance for females and A-trait was more likely to affect performance for males.

Based on the results of these five studies, previous choking research, and the theoretical choking framework, a proposed choking process model is presented and discussed. This proposed choking process model includes susceptibility factors, perception of pressure, coping process, task characteristics, and skill levels.

To the memory of my brother Pei Wang who passed away on 26th January 2000

DEDICATION

A special thanks to my wife Hong-jin Yu who with her vivid personality has always been supportive. “You showed me that the edge of order and chaos is a truly beautiful place …”

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CHAPTER 1

INTRODUCTION

Choking may be the most miserable and humiliating experience in sport. Choking can affect athletes at all levels of competition, including the most gifted. As Patmore (1986) has noted, "there are very few champions around today on the tennis circuit who have not choked." (p. 91) Champion tennis player Pete Sampras, the record holder for the most singles Grand Slam Championships, confessed after winning his seventh Wimbledon title, "We all choke …. No matter who you are, you just feel pressure in the heat of the moment." (Sampras, 2000, p. 68) Sport media reports frequently describe situations in which high profile performers are accused of choking under pressure. In such reports, journalists speculate that athletes, such as golfer Greg Norman, marksman Frank Gorman, and tennis player Jana Novotna, after being in seemingly unassailable positions, have choked and subsequently lost in dramatic fashion. The media frequently report such incidents, and typically base their accusations of choking on speculation and conjecture, rather than a clear notion of what actually constitutes a choke.

Any confusion from the media about what choking is could possibly be attributed to the difficulty in clearly establishing a definition of choking. Baumeister (1984), a social psychologist, has defined choking as "performance decrements under pressure circumstances" (p. 610) and pressure as "any factor or combination of factors that increases the importance of performing well on a particular occasion." (p. 610) To understand the choking phenomenon better, researchers need to conduct further research to make explicit aspects of choking, such as definitions, causes, and explanatory theories. In the past 16 years, there has been an increase in the number of researchers investigating the choking phenomenon (e.g., Baumeister, 1984; Baumeister, Hamilton, & Tice, 1985; Baumeister, Hutton, & Cairns, 1990; Baumeister & Steinhilber, 1984;

Courneya & Carron, 1990; Gayton, Matthews, & Nickless, 1987; Hardy, Mullen, & Jones, 1996; Heaton & Sigall, 1989, 1991; Leith, 1988; Lewis & Lindner, 1997; Masters, 1992; Schlenker, Phillips, Boniecki, & Schlenker, 1995a, 1995b; Tanner & Sands, 1997). Although this research has led to a number of conceptual developments, much remains to be learned about choking in sport. Baumeister and Showers (1986) noted some problems with the research that remain unresolved after 16 years. Specifically, there are three substantial problems in the choking related research that need resolving. First, few researchers have directly investigated the specific factors that predispose athletes to choking in sport. Second, research into the role of dispositional self-consciousness (S-C) as a cause of choking has resulted in somewhat contradictory findings. Third, although there have been a number of models developed to explain aspects of choking, no one model appears capable of describing and explaining the complexities and contradictions evident in the choking research.

Aims of the Dissertation

General Aims

The present dissertation was designed to clear up some of the inconsistent findings from previous choking research and also to examine some previously ignored aspects of choking. Further, on the basis of the findings in this dissertation and past theoretical frameworks, an integrated model of choking in sport is presented. In addition, a comprehensive definition and description of choking in sport have been proposed.

Specific Aims

1. To test personality components, specifically dispositional S-C and A-trait as potential predictors of choking.

2. To examine intensity and direction of A-state in both low-pressure and high-pressure conditions and possible connections to choking.

3. To test coping styles (i.e., approach coping and avoidance coping) to determine whether coping strategies are related to choking under pressure.

4. To examine task characteristics to determine whether the occurrence of choking is associated with the type of task being performed.

5. To test for possible gender differences in choking susceptibility.

6. To draw together research into a theoretical model of choking in sport.

Chapter Organization

Each chapter begins with an identified objective and a brief overview. In Chapter 1, choking, as both a research theme and topic in the popular press, is introduced. In addition, general aims, specific aims and the organization of chapters are established. Chapter 2 provides a review of literature, including the definitions of choking used by researchers and the limitations of those definitions. Other issues that relate to choking, including causes of choking, coping with choking, choking theories, and the prevention and treatment of choking, are also reviewed. Chapters 3 – 7 are presented as self-contained, but interrelated studies with a focus on testing specific research hypotheses. In this dissertation, because I have attempted to present the 5 studies as self-contained, there is a necessary element of repetition. Chapter 3 focuses on the contribution of S-C and A-trait as predictors of choking under pressure in a sport context. In Chapter 4, the focus turns to the perception of pressure and the relationship between A-state, self-focus, and performance under pressure. Chapter 5 examines the role of coping processes in choking under pressure and presents a study of the relationship between coping styles and choking. Chapter 6 includes an investigation of task characteristics as a fundamental determinant in choking susceptibility by testing the automatic execution model. Chapter 7 is an analysis of the results of the previous four studies from a gender perspective. Based on the experimental findings, Chapter 8 is used to present a preliminary model of choking in sport, and linking findings are discussed. In Chapter 9, the findings of this dissertation are summarized. Furthermore, a brief discussion of future research directions, and contributions of this dissertation are included.

CHAPTER 2

LITERATURE REVIEW

Overview

Although past studies have advanced our understanding of choking, a number of unresolved issues remain. Specifically, a number of definitions of choking have been proposed, but none of these appear adequate. Similarly, theoretical explanations have been advanced and tested with no one theory gaining universal support from choking researchers. There does, however, appear to be almost universal agreement that choking is fundamentally a problem of attention. Yet, researchers view the specifics of how attention affects performance under pressure from different perspectives. For example, the role of self-consciousness (S-C) in choking is frequently discussed, yet some researchers agree that high self-conscious individuals are more susceptible to choking, whereas other researchers believe that low self-conscious people are more likely to choke under pressure. It seems that some issues in choking have had not been examined. For example, although some researchers have suggested that choking may be related to an inability to cope with pressure, no studies to date have examined possible links between coping processes and choking in detail. Similarly, although anxiety has been linked to choking under pressure by some researchers, the large majority of research studies into choking have not actually measured perceived anxiety.

Definitions

Descriptions of Choking

> There was a moment, in the third and deciding set of the 1993 Wimbledon final, when Jana Novotna seemed invincible…. this time, it was worse. Double fault.

> On the next, she was slow to react to a high shot by Graf, and missed badly on a forehand volley ("When It Comes to the Crunch," 2000, p. 44).

The sport media normally apply the choking label to athletes who have been performing well for all but the last part of a competition. For example, when Novotna lost at Wimbledon, she had dominated most of the match, and was only a few points from victory. When Greg Norman eventually lost at Augusta in the 1997 Masters, he had easily outperformed the world's top golfers for the first three rounds (i.e., 54 holes) before his form deteriorated over the final 18 holes and losing easily.

Choking has been described in a variety of ways. Daniel (1981) observed that choking typically occurs to the athlete who practices very hard, but has difficulty replicating their practice form in competition. Similarly, Singer (1986) has suggested that athletes susceptible to choking often perform well in regular season competition, but perform poorly in major competitions. Masters (1992) proposed that choking involves the failure of normally expert skill under pressure. According to Nideffer (1992), choking occurs "when attention becomes so focused on internal cues (thoughts and feelings) that you cannot attend to external task-relevant cues." (p.128)

<u>Definitions of Choking</u>

A major problem for researchers investigating choking has been the lack of agreement in defining what constitutes a choke. Some experts prefer to talk about elements of choking without actually using or subscribing to a fixed definition. Weinberg and Gould (1999) have pointed out that choking is usually related to poor performance in a general sense, but a poor performance does not necessarily equate to choking. Weinberg and Gould proposed that choking is a process that leads to impaired performance, and suggested choking can be inferred from a pattern of behaviour and is essentially an attentional problem. Despite covering choking in some detail, Weinberg and Gould appeared to be sensitive to the difficulty in defining choking.

In general, choking in sport is defined as the inability to perform up to previously exhibited standards (Anshel, 1997; Daniel, 1981; Leith, 1988). This definition is problematic because there are numerous reasons why athletes may not perform up to previous standards, such as injury, poor preparation, or lack of motivation. Baumeister (1984) defined choking as performance decrements in pressure circumstances. This definition is more specific, adding pressure as a necessary condition for choking to occur. Similarly, Baumeister and Showers (1986) defined choking as the occurrence of sub-optimal performance under pressure conditions. Baumeister and Showers also discussed a number of conditions that must be present before the choking label can be applied. First, there must be reasonable certainty that the performer could have done better. Second, the performer must be motivated to perform well. If for example, the performer is not motivated, the choking label cannot be applied because they are not under pressure. Third, Baumeister and Showers used the term "performance" to denote situations where the task calls for optimal outcome and effort, whereas, in practice situations, for example, the goal is usually long-term improvement in skill. Based on the Baumeister and Showers' explanation, choking under pressure could occur among performers at any level of skill. Nevertheless, Baumeister's brief definition that focuses on performance outcome appears inadequate, because no mechanism is suggested to explain why performance decrements occur under pressure.

A number of sport psychologists have adopted Nideffer's (1992) definition and theory of choking (e.g., Bond, 1986; Moran, 1996; Nideffer & Sagal, 1998; Wann, 1997; Weinberg & Gould, 1999). Nideffer has referred to choking simply as an altered state of consciousness. According to Nideffer, perceived pressure can lead to alterations in one's normal state of consciousness. Nideffer explained a normal state of consciousness as a performance focus where an athlete is aware of the task at hand. This normal state of consciousness under the right conditions can result in peak performance. When athletes become anxious in pressure situations, they are likely to immerse in their own thoughts, thus alterations in consciousness result. Consequently, the athlete is unable to concentrate on the task at the hand. Based on Nideffer's definition, choking is essentially a process that leads to a decline in performance, and this process involves task-irrelevant thinking. An advantage of Nideffer's definition is that the focus is not solely on performance outcome, but rather on choking as a process. Nideffer's definition may be more useful than previous definitions in an applied sense, because it helps to explain why choking occurs. A weakness has been that Nidiffer's definition may not fit some performances under pressure. For example, Lewis and Linder (1997) examined whether choking on a golf-putting task was due to distraction (i.e., attending to task irrelevant stimuli) or inhibition of automatic skills. Lewis and Linder found, contrary to Nideffer's explanation, that choking was caused by concentration on task relevant cues, not task irrelevant cues.

In summary, both Baumeister's (1984) and Nideffer's (1992) definitions appear to be inadequate, but for different reasons, one has focused exclusively on choking as an outcome, the other has focused exclusively on choking as a process.

Self-awareness, Anxiety, and Performance

In choking literature, the general understanding has been that choking under pressure is associated with increased self-awareness (Baumeister, 1984; Nideffer, 1992). Wicklund (1991) has proposed that self-directed attention can quickly lead people to becoming aware of discrepancies between expectancies and outcomes. Self-awareness is referred to as the state in which individuals direct their attentional focus inwardly (Fenigstein, Scheier, & Buss, 1975). Early research into choking (Baumeister, 1984) has identified that self-awareness is harmful to performance. Furthermore, Heaton and Sigall (1991), and Kurosawa and Harackiewicz (1995) found that manipulating self-awareness (e.g., presence of audience, video camera, mirror, financial inducement) caused performance decrements in their experiments. Other choking research (e.g., Baumeister, Hutton, & Cairns, 1990; Lewis & Linder, 1997) has also revealed poor performances in conditions involving manipulation of self-awareness (e.g., the presence of audiences or a video camera).

Further investigations by Hardy et al. (1996) and Masters (1992) have shown that choking under pressure was associated with not only heightened self-awareness but also increased A-state. Hardy et al. have proposed that anxious participants may exert extra efforts to ensure the success of their performance, and paradoxically the conscious control in the performing process results in the inhibition of automatic skills. In addition, Nideffer and Sagal (1998) claimed that self-awareness could increase somatic anxiety. Conceivably, alternations in self-awareness have the effect of changing task focus and attention. It appears choking research is also directly related to attention and anxiety under pressure. Thus in essence choking may be a combined attention-anxiety issue.

The concept of anxiety has been explored extensively in sport psychology. Multidimensional anxiety theory separates A-state into somatic and cognitive components. Somatic A-state reflects one’s perception of the physiological response to pressure, and cognitive A-state reflects worry and concerns about oneself (Jones, 1995). Jones, Swain, and Harwood (1996) have claimed that anxiety researchers need to distinguish between intensity and direction of competitive anxiety symptoms, because individuals may have a predisposition to report anxiety symptoms as being either facilitative or debilitative. Thus, the concept of A-state has been explained as including intensity and direction dimensions, with the intensity dimension relating to the amount, or level of A-state, and the direction dimension considering whether anxiety influences performance negatively or positively (Jones, 1995).

In competitive anxiety studies, A-state has been frequently tested using the Competitive State Anxiety Inventory-2 (CSAI-2). Early anxiety research focused on examining the relationship between anxiety and performance based on task characteristics. For example, Jones and Cale (1989) reported that intensity of somatic A-state accounted for 23% of the performance variance on a digit span task, but only 7% of the performance variance on a perceptual-motor speed task. Parfitt and Hardy (1993) reported that somatic A-state explained 36% of the performance variance on a letter span task, and 26% of the performance variance on a rebound task. Some concerns about these studies are that manipulated pressure did not relate to the experimental tasks directly, and performance was measured 1 hour prior to the presence of pressure. In addition, these studies used too many variables relative to the sample size for the regression analysis. Hair, Anderson, Tatham, and Black (1998) argued that inappropriate sample sizes often make the results too specific to the sample, and thus, lack generalisability. Stevens (1986) suggested that a minimum of fifteen subjects per variable is needed for a reliable regression analysis. For example, Jones and Cale looked at four predictors with 20 participants using a multiple regression model. In Parfitt and Hardy's study, two predictors in a regression model only involved 16 participants. A quick calculation using Stevens' 15:1 ratio suggests that at least 60 participants for the Jones and Cale's study and 30 participants for the Parfitt and Hardy's study were needed.

In recent years, Jones and Swain (1992) and Jones, Swain, and Hardy (1993) have found that elite athletes frequently interpreted their A-state as positive, but novice athletes often reported their A-state as negative. Furthermore, Swain and Jones (1996) reported that direction of cognitive A-state was a better predictor of performance than intensity of cognitive A-state (23% vs. 18.4% of accounted variance). For somatic A-state, direction explained 17% of performance variance, whereas intensity explained only 2% of performance variance. In contrast, Edwards and Hardy (1996) found that both somatic and cognitive direction did not predict performance outcome in netball, whereas somatic intensity explained 10% of the performance variance. The differences in the findings may reflect methodological limitations pertaining specifically to these studies. First, self-report was used for performance measures. Jerome and Williams (2000) claimed that the type of performance measure employed by researchers might cause equivocal results. Second, in Edwards and Hardy's study, because 45 observations were involved in repeated measures, the assumption that each observation is independent in regression analysis was violated. Although Edwards and Hardy adjusted the degrees of freedom by calculating it as 202, this still violated the independent observation assumption. In addition, Jerome and Williams argued there has been an inherent problem with anxiety repression, lack of self-disclosure, and social desirability effects in self-report anxiety measures. Using a sample with repressors excluded, they reported intensity of cognitive A-state as accounting for 12.6% of the performance variance in a bowling task, compared to 4.1% with repressors included. Jerome and Williams found that both intensity and direction of cognitive and somatic A-state did not predict performance. Consistent with the Jerome and Williams, Landers and Arent (2001) discussed a meta-analysis conducted by Craft, Magyar, Becker and Feltz (2000) that demonstrated a weak A-state-performance relationship (i.e., somatic

A-state: d = .00 and cognitive A-state: d = .14). Landers and Arent argued that additional limitations such as conceptual distinctions or inappropriate methodological analysis have also been problematic. Although Jerome and Williams were aware of some methodological limitations of previous studies, their study design was not particularly strong. For example, participants completed the CSAI-2 questionnaire 45 minutes prior to performance; Jerome and Williams claimed that 45 minutes was close enough to the commencement of competition. Clearly, for a state measure to be used for predictive purposes the timing of administration of the measure needs to be as close as possible to the commencement of the performance. Emotions change very quickly in sport, and previous research has consistently shown that dramatic changes in A-state can occur in the final hours and minutes before competition (Gould, Petlichkoff, & Weinberg, 1984). For instance, Jones and Cale (1989) have found significant differences in A-state among athletes at various time to event points such as 20 minutes, 2 hours, and 2 days prior to a competition. The highest levels of A-state were found to be at 20 minutes before competition.

A number of studies have shown self-awareness as associated with fluctuations in A-state (e.g., Carver & Scheier, 1991; Hull, Reilly, & Ennis, 1991). Hass and Elsenstadt (1991) have proposed that increased self-awareness may cause anxiety, because the negative feelings often follow from dissatisfaction with oneself. Specifically, Hass and Elsenstadt have explained that self-focus may lead to comparisons between one's expectation and performance outcomes. A discrepancy in this comparison occurs if individuals are not satisfied with their outcomes. Woody (1996) showed that a relationship between self-focus and anxiety was especially strong when participants were unable to cope with the discrepancy between expectation and performance.

In a recent choking study, Hardy et al. (1996) used the CSAI-2 and heart rate as dependent variables to measure A-state in a high-pressure condition. Participants (N = 32) performed a golf-putting task in two distinct phases. The first phase was a skill acquisition phase consisting of four sessions of 100 putts. The second phase was the test phase consisting of a session of 100 putts. Pressure was manipulated by social evaluation and financial incentives. Participants completed the CSAI-2 during the break between trials in the third and fifth sessions. Hardy et al. reported a significant increase in intensity of somatic and cognitive A-state. Unfortunately, Hardy et al. did not provide evidence that increased A-state related to the performance decrements directly. In addition, Hardy et al. did not report direction of somatic and cognitive A-state. Thus, it was unclear whether these participants interpreted their A-state as helpful or harmful to their performance. Although the common understanding is that negative appraisal of A-state may lead to performance decrements, Butler and Baumeister (1998) showed that positive appraisal caused by pressure was also negatively related to performance under pressure. Specifically, Butler and Baumeister investigated the effect of a supportive audience on performance. Although presence of a supportive audience also causes pressure, this type of pressure is usually rated as positive. Butler and Baumeister have claimed that a supportive audience creates “friendly faces” to performers. They found that, although participants appraised the pressure as being helpful, performance decrements tended to occur when participants performed in front of supportive audiences. Butler and Baumeister explained that supportive audiences might engender “the imagination of outcome” for performers, consequently increasing the importance of performing well. It seems situations that promote pressure may result in positive appraisal, but successful performance may not necessarily follow. Based on these findings, further investigation is needed to clarify the relationship between self-awareness, A-state, and performance in situations that promote the importance of performing well.

Hypothesised Causes of Choking

There have been relatively few studies specifically exploring the causes of choking. Hanrahan (1996) noted that occurrences of choking are sometimes hard to predict. The common assumption (Baumeister & Showers, 1986), however, has been that situations where athletes becomes aware of the importance of performing well can induce choking. The importance of performing well may be heightened by the presence of family, friends, or a home crowd. Athletes may also be aware of the importance of performing well when involved in critical events, or when in a commanding position during a competition. These situations may increase perceived pressure, resulting in choking. In general, situational perceptions of pressure may be associated with both stable factors and unstable factors.

Stable Causes of Choking

Some inferred causes of choking are relatively stable. Based on previous choking research dispositional self-consciousness and trait anxiety have received considerable investigation as a potential stable cause of choking.

Self-consciousness. Self-consciousness (S-C) is predicted to mediate choking because it is associated with self-awareness (Baumeister, 1984; Heaton & Sigall, 1991). According to Fenigstein, Scheier, and Buss (1975), and Scheier and Carver (1985), persons habitually direct their attention either inwardly or outwardly. Some individuals seem to become inwardly focused more easily than others, and these people are likely to become concerned about the relationship between themselves and others in most situations. Brown (1991) has noted that S-C is associated with a relationship between the self and other objects. To explain the sensitivity to interpersonal relationships, Hull et al. (1991) have proposed that people high in S-C are likely to show concern about the impressions they make on others. Furthermore, Carver and Scheier (1978) have suggested that individuals high in S-C are generally more aroused than less self-conscious individuals. According to Fenigstein (1979) and Woody (1996), self-conscious individuals believe themselves to be the target of others' observations, and this over-sensitivity leads to further self-focus. Based on these claims on the negative effects of self-focus, people high in S-C should be more strongly affected by situations that induce self-awareness.

In relation to dispositional S-C, Fenigstein et al. (1975) have suggested that S-C may take the form of private S-C (e.g., a tendency to focus on inner thoughts, feelings, moods, and attitudes) or public S-C (e.g., a tendency to focus on outwardly observable aspects of the self, such as physical appearance). Individuals high in private S-C tend to focus on the covert, hidden aspects of the self, whereas individuals high in public S-C tend to think about the self as a social object. These differences in sub-components of S-C may account for differences in response to pressure even among individuals high in S-C. For instance, high private self-conscious individuals are likely to be especially aware of their internal states, such as being shy, when they perform in front of audiences. Publicly self-conscious people, however, tend to be aware of their appearance and are concerned about making a good impression on others. From this perspective, people high in private S-C may be more anxious when they receive negative feedback about their skills, and people who are high in public S-C may experience greater discrepancy between the audience's impression and their behavior when they believe that audiences do not acknowledge their performance. Experimental evidence (e.g., Carver, et al., 1985; Cheek & Briggs, 1982; Edelmann, 1990; Hull &

Young, 1983) demonstrates that persons high in both private S-C and public S-C are likely to be adversely affected by situations where pressure promotes self-awareness.

Existing research into the effects of S-C on performance has yielded inconsistent results. Baumeister (1984) conducted a series of six experiments, which included three experiments that related to testing the effects of S-C on performance in a “roll-up” task. Specifically, in Experiment 3, half of participants were told to attend to the performance process in the experimental condition, while performing the roll-up task. Experiment 4 involved a competition as manipulated pressure, and Experiment 5 involved a reward as manipulated pressure. Results from these three experiments showed that participants low in S-C performed more poorly than those high in S-C. Baumeister claimed that high self-conscious people find it easier to cope with situations that promote self-awareness, because they are accustomed to performing while focusing on themselves. Conversely, people low in dispositional S-C are more susceptible to choking under pressure, because they are less experienced in dealing with situations that promote inward attention.

An alternative perspective on the relationship between S-C and performance outcomes can be drawn from other research. For example, Brockner (1979) unlike Baumeister (1984), found a significant positive correlation between high S-C and poor performance under pressure. In discussing his findings, Brockner claimed specifically that negative outcomes, such as anxiety and poor attentional focus, were underpinned by high S-C and low self-esteem. O’Donnell, Dansereau, Hall, and Rocklin (1987) found that participants high in public S-C recalled significantly less information and expressed more anxiety on a reading or recall task than low S-C participants.

Furthermore, recent studies, such as Lewis and Linder (1997) and Kurosawa and Harackiewicz (1995), did not find any directional evidence for the effects of S-C on performance. Heaton and Sigall (1991) suggested a perspective that explained the relationship between S-C and performance. According to Heaton and Sigall, both high and low self-conscious persons could choke depending on the sources of pressure. Specifically, Heaton and Sigall have proposed that people high in S-C may choke following failure feedback, due to their tendency to direct their attention inwardly, whereas people low in S-C are likely to choke when an audience is watching, because of their tendency to direct their attention outward. Heaton and Sigall tested complex relationships between performance, S-C, audience, and feedback on performance. Participants (N = 78) were randomly assigned to one of six conditions that consisted of the supportive audience with success feedback and failure feedback, non-supportive audience with success feedback and failure feedback, and control conditions with success feedback and failure feedback. In their study, participants took part in a three-round “perfection” competition against another team of participants. The “perfection” game comprised of 25 differently shaped pegs and holes, each peg fitting only one hole on a game-board. Participants were required to match the hole as quickly as possible. Heaton and Sigall demonstrated that individuals low in S-C choked when they believed that audiences were disappointed in their performance, and persons high in S-C were more likely to choke when they believed they had performing poorly.

Some design issues have most likely led to some of these equivocal results in previous research. Specifically, many choking studies (e.g., Baumeister, 1984; Heaton and Sigall, 1991) investigating S-C have used simple low-skilled tasks as the dependent variable. The hypotheses in these studies were based on a belief that choking was due to the inhibition of automatic execution. In this context, if performance does not include a substantial skill execution, then this theoretical model is inappropriate to explain the performance decrements. Most intervention studies of choking to date have used less skilled participants (e.g., Baumeister, 1984; Brocker, 1979; Heaton & Sigall, 1991; Masters, Polman, & Hammond, 1993).

In addition, the most popular data-manipulation technique in choking research has been a median-split technique to dichotomize total S-C scores of the SCS scale (Fenigstin et al., 1975) into high S-C group and low S-C group (e.g., Baumeister, 1984; Brocker, 1979; Heaton & Sigall, 1991; Kurosawa & Harackiewicz, 1995). According to Cohen (1994), using median splits on continuous variables for analyses of variance may result in a high correlation between independent variables, which is outmoded and an unacceptable treatment of data. As a result, a reexamination of dispositional S-C on a skilled task using skilled participants under pressure is needed.

<u>Trait anxiety.</u> Baumeister and Showers (1986), in a choking review article claimed that trait anxiety (A-trait) could influence performance under pressure. They suggested that A-trait negatviely influneces performance under pressure. Spielberger (1966) referred to A-trait as a behavioural pre-disposition to perceive a wide range of circumstances as threatening, and to respond to these with A-state reactions. People high in A-trait tend to respond to pressure situations with A-state, or transitory feelings of tension, more frequently or more intensely than people low in A-trait (Spielberger, Anton, & Bedell, 1976). It has been well documented in the sport anxiety literature that A-trait is a strong predictor of A-state (e.g., Gill & Martens, 1977; Marchant, Morris, & Andersen, 1998; Martens, Vealey, & Burton, 1990; Willams & Krane, 1992).

Research has shown that individuals high in A-trait typically perform more poorly in pressure situations than individuals low in A-trait (e.g., Calvo, Alamo, & Ramos, 1990; Kivimaki, 1995; Kurosawa & Harackiewicz, 1995). Calvo, Eysenck, and Castillo (1997) have suggested that individuals high in A-trait are likely to attend to threat-related, as opposed to neutral, stimuli, and interpret threat from ambiguous stimuli. High

A-trait people frequently focus on self-evaluative, or self-depreciative thinking in pressure situations (Wine, 1971), resulting in an increase in self-awareness and negative effects on performance. Byrne and Eysenck (1995) suggested that high A-trait individuals tended to detect threat in a variety of situations, and this selective attentional bias is likely to distract performance on the task at hand. Halvari and Gjesme (1995) tested the relationship between A-trait, A-state, and performance on a competition task (i.e., "Kasten Bumerang Task"). Using Spielberger, Gorsuch, and Lushene's (1970) State-trait Anxiety Inventory and Martens' (1977) Sport Competition Anxiety Scale, Halvari and Gjesme found that A-trait was significantly related to both A-state and performance. Kurosawa and Harackiewicz (1995) examined the effects of A-trait on performance in situations where pressure promoted self-awareness. Participants were randomly assigned to one of four experimental conditions: mirror, video camera, evaluation, and control. Kurosawa and Harackiewicz found that participants high in A-trait performed more poorly on a puzzle task than those low in A-trait, when they were in a heightened self-awareness condition. Kurosawa and Harackiewicz claimed that high A-trait participants also exhibited more social concerns and performance concerns than low A-trait participants. These concerns reflected performance specific cognitive activity processes relating to performance impairments under pressure.

Although some studies have tested the relationship between A-trait and performance, few studies have examined this relationship specifically in choking research (Baumeister & Showers, 1986). Even 16 years later, the situation remains similar. A methodological weakness in using the median-split technique was again evident in the Kurosawa and Harackiewicz's (1995) study. In addition, Kurosawa and Harackiewicz used an inter-individual design to measure performance. A number of researchers have shown that intra-individual designs are more appropriate for anxiety research, because they are more sensitive to individual difference (e.g., Jerome & Williams, 2000). Thus, further testing of the A-trait effect on performance is needed in choking research.

Unstable Causes of Choking

Unstable causes of choking are factors that do not always appear in pressure situations or are changeable depending on the situation. There is very little research directly investigating unstable causes of choking. A number of unstable internal and external factors may, however, cause choking under pressure. For example, expectations of others, self-expectations, importance of competition, thoughts focused on poor past performances, and situational variables may represent potential unstable causes of choking (Singer, 1986). Tanner and Sands (1997) investigated choking with tennis players, and reported that distraction due to the pressure of an audience and perceived inability to cope with anxiety-induced circumstances were also associated with choking.

Possible reward or punishment. Choking commonly occurs when rewards or punishments are made contingent on performance level, because possible success and failure often reinforce the importance of performing well. Baumeister and Showers (1986) have suggested that attending to, or thinking about the possible rewards may actually increase self-awareness, and consequentially interfere with performance by undermining intrinsic motivation. Baumeister (1984) compared performance between a group who were offered money for successful performance and a control group. Baumeister found choking occurred only among the participants who were offered the money. Recent choking research by Hardy et al. (1996) and Masters (1992), in which offering money for successful performance was used to create performance pressure, also showed that participants who were offered rewards for good performances choked. Participants in both these studies completed a golf-putting task in a control condition and a condition where financial inducements were made available depending on the performance level achieved. To create a reward contingency, the participants were told the money would increase if they performed better in the testing condition compared to the baseline condition. The results of both studies clearly indicated that choking occurred in the reward condition.

There appears to be two primary explanations why contingent rewards mediate performance. First, contingent rewards may lead performers to be aware of the importance of performing well. If athletes believe there is a chance of winning, then they will try harder to perform well. Second, contingent rewards may induce anxiety that is associated with choking. For instance, Hardy et al. (1996) indicated that A-state significantly increased in the reward condition. On the basis of the processing efficiency theory (Eysenck & Calvo, 1992), Hardy et al. proposed that anxious performers might expend extra efforts in an attempt to improve their performance when they believed they could perform well. Consequently, they may paradoxically choke due to the inhibition of automatic skills. Baumeister and Showers (1986) have proposed that contingent punishment also creates performance pressure. When a mistake occurs while performing, performers may become acutely aware of the importance of performing well. According to Heaton and Sigall (1989), contingent punishment induces heightened self-awareness. In pressure situations, performers may attempt to eliminate possible punishment by consciously performing well. Choking may occur because conscious control interferes with automatic execution of skills. Furthermore, contingent punishment may lead to fear of failure for some performers, resulting in choking. Leith (1988) showed that basketball players choked due to fear of choking. In his experiment, the mere mention of the word ‘choke’ was enough to result in a significant decline in performance in free throw shooting. Kim (1997) has also found that fear of failure made the greatest contribution in predicting the perception of pressure among middle school-aged athletes.

Audience. Audience effects may mediate the perception of pressure while performing, because individuals often worry over evaluations about their capabilities when others are watching. Baumeister and Showers (1986) have claimed that the presence of an audience relates to choking, because the audience adds to the importance of performing well, resulting in increased pressure. Furthermore, Wicklund (1975) proposed that the presence of an audience may induce diversion of attention from the task, resulting in performance decrements. Choking studies (e.g., Baumeister, 1984; Butler & Baumeister, 1998; Heaton & Sigall, 1991) have shown that the presence of an audience caused performance decrements. For example, Baumeister in Experiment 6 reported choking caused by the presence of an audience.

Choking research relating to audiences has centered on examining the effects of a supportive audience on performance (e.g., Baumeister & Steinhilber, 1984; Butler & Baumeister, 1998; Heaton & Sigall, 1991). Heaton and Sigall tested audience effects on performance as a function of S-C and feedback. Heaton and Sigall reported that different performance levels between the audience conditions. Another study by Butler and Baumeister, consisting of three experiments, was designed to test the effects of a supportive audience on performance. In Experiment 1, participants (N = 21) were randomly assigned to two conditions (friend and stranger) and were asked to count backward for two minutes. Results showed that participants in the friend condition performed poorly in comparison to the stranger condition. For Experiment 2, participants (N = 23) were randomly assigned to two conditions (supportive and neutral), and performed a video game with two trials (practice and experiment). Results showed that performance was significantly worse in the supportive audience condition.

Butler and Baumeister in Experiment 3 included additional audience categories, such as an adversarial audience who made negative comments about the participant's chances of being successful. Participants (N = 93) were randomly assigned to four conditions (i.e., supportive, adversarial, neutral, and control), and performed a video game with two trials (baseline and experiment). The results indicated that the presence of the supportive and adversarial audiences caused larger performance decrements than the presence of a neutral audience. Based on the research design, some methodological concerns are again evident. Researchers in these studies used either simple tasks or unskilled participants, violating the assumption that skill execution should be involved in the performance process. In addition, researchers in these studies used a between-subject design when a within-subjects design would have been more suitable.

In the social psychology literature, there have been inconsistent reports relating to audience effects on performance. Some researchers (e.g., Bell & Yee, 1989; Dube & Tatz, 1991; Schlenker et al., 1995a; 1995b) have reported that the presence of others can facilitate task performance. Other researchers (e.g., Baumeister & Steinhilber, 1984; Butki, 1994; Croce & Rock, 1991; Martens & Landers, 1972; Sasfy & Okun, 1974) have observed that performance was impaired by the presence of others. Many reviews of audience effects have appeared over the years (e.g., Bond & Titus, 1983; Cottrell, 1972; Geen & Gange, 1977; Zajonc, 1965). In general, two factors, task characteristics and audience features, seem to influence audience effects on performance. Bond and Titus carried out a meta-analysis study calculating effect sizes from 241 studies. They reported that presence of audience caused a small to medium mean effect for harming performance on complex tasks (performance quantity, $d = -.20$; performance quality, $d = -.36$) and a small to medium mean effect for helping performance on simple tasks (performance quantity, $d = .32$; performance quality, $d = .11$). In relation to audience features, Bond and Titus reported that the presence of experts was helpful to performance on simple tasks but there were no significant performance effects for experts on complex tasks. In addition, Bond and Titus reported that the presence of an unfamiliar audience was likely to harm performance on complex tasks, and the presence of a coactor did not affect performance on complex tasks.

The theoretical explanations for audience effects on performance have mainly centered on self-awareness (Duval & Wicklund, 1972), self-presentation (Bond, 1982), and social monitoring and comparison (Guerin & Innes, 1982). Except for the self-awareness explanation, these approaches have been based on arousal theories to explain performance effects. Bond and Titus (1983) noticed that researchers reported an inconsistency with the fluctuation of arousal in the audience conditions, resulting in difficulties in applying these theories to practice. From the current perspective, Baumeister and Showers (1986) argued that appropriate descriptions for audience effects should focus on process based explanations of behavior. They pointed out that arousal theories are vague and incomplete in respect to explaining the process of behavior.

In sport psychology, research has centered on whether presence of audience helps athletes' performance. Researchers (e.g., Iso-Ahola & Hatfield, 1986; Schwartz & Barsky, 1977) have suggested a psychological advantage of performing in front of home audiences. For example, Schwartz and Barsky provided analyses from investigations of baseball, football, basketball, and hockey, revealing a home advantage. Studies by Courneya and Carron (1990), Silva, Andrew, and Richey (1983), and Varca (1980) showed similar results. Some researchers (Baumeister & Steinhilber, 1984; Wright, Voyer, Wright, & Ronry, 1995), however, have claimed that 'home choking' can also occur, and it is associated with supportive audiences. Baumeister and Steinhilber (1984) have proposed that being in a position to win a championship creates enormous pressure on players from devoted home fans. Furthermore, Baumeister and Steinhilber suggested that high expectations from home fans leads athletes to becoming overly conscious of winning. Thus, the presence of a home audience may actually be harmful rather than helpful in some situations.

In relation to ‘home choking’, a dispute arose between Schlenker et al. (1995a; 1995b) and Baumeister (1995). All three papers were published as a series in volume 68, number 4, of the *Journal of Personality and Social Psychology.* Schlenker et al. (1995a) disagreed with Baumeister and Steinhilber’s concept of “home choking” and argued that the presence of a home audience may initiate fears about an important public failure, which they have labeled as the ‘darker’ forms of choking. A ‘darker’ form of choking is often associated with images of S-C, nervousness, anxiety, distraction, and pushing to perform beyond one’s limits. Baumeister and Steinhilber have hypothesized that ‘home choking’ is caused by a presence of supportive audience, which Schlenker et al. (1995a) labeled as a ‘kinder’ form of choking. Baumeister and Steinhilber suggested that a supportive audience caused a pleasant self-attention to performers. According to Baumeister and Steinhilber, a pleasant self-attention is maintained more easily than an unpleasant self-attention, thus a home team is more prone to choking than a visiting team. Baumeister and Steinhilber examined archival data from Baseball’s World Series from 1924 to 1982 and the National Basketball Association Championships from 1967 to 1982. They analyzed 271 games for baseball, and found that home team won 60.2 % of games in Games 1 and 2, but 38.5 % of games in Game 7. In the 220 NBA games, they found the home team won 70.1 % of games in Games 1 and 4, but 38.5 % of games in Game 7. Thus, Baumeister and Steinhilber concluded that field advantage was evident for early games in a playoff series, but not for the later games, especially the all-important game seven. Schlenker et al. (1995a) examined data from the same baseball Games, but this time from 1924 to 1942 and 1946 to 1993. They also examined data from the same basketball Games, but this time from 1967 to 1993. In addition, they added new data from the League Championships of Baseball period from 1985 to 1993. Schlenker et al. (1995a) reported the results from 194 baseball games of the World Series, which showed home teams won 60.0 % of games in Games 1 and 2, and 48.0 % of games in Game 7. Results from 54 baseball games of the League Championships showed home teams won 63.0 % of games in Games 1 and 2, and 67.0 % of games in Game 7. For basketball, Schlenker et al. (1995a) examined 163 games, and found that home team won 72.0 % of games in Games 1 and 4, and 58.0 % of games in Game 7. Schlenker et al. (1995a) claimed that, although there was a significant difference in winning between early games and Game 7 for basketball, 58.0 % winning in Game 7 did not represent a disadvantage. Furthermore, Schlenker et al. (1995a) claimed a 'home-field disadvantage' appeared in Game 6, because home teams only won 41.0 % of games. Schlenker et al. (1995a), thus, argued that focusing on success does not really cause home choking. Baumeister (1995), however, argued that the main findings by Schlenker et al. (1995a) did not differ significantly from what Baumeister and Steinhilber found. Further, Baumeister provided a rebuttal by referring to research findings (e.g., Wright, Jackson, Christie, McGuire, & Wright, 1991) that showed the performance of home golfers deteriorated more than visiting golfers from the first to the final round. Schlenker et al. (1995b) pointed out that 'home choking' did not occur for all World Series data before 1950, which Baumeister and Steinhilber had ignored.

Having reviewed these studies, there are some concerns. First, these studies only focused on performance outcomes, and the authors omitted other relevant factors, such as home team ranking, the state of home team (e.g., injury), opponents' skills, or audience features (e.g., are the all audiences supportive?). Second, the authors did not provide a clear definition about 'home choking'. Thus, interpretations for the occurrence of 'home choking' were not clarified. Finally, archival data were purposively selected, with the authors choosing sample based on the needs of their argument.

The controversy over whether 'home choking' exists may reflect a flaw with choking theories. Although these home choking studies were based on different hypotheses of audience effects on performance, there was little or no underlying theory to explain 'home choking'. According to Baumeister and Steinhilber's (1984), presence of a supportive audience induces performers to control the performing process consciously. Gayton et al. (1987) argued that the equivocal findings on 'home choking' might result from the effect of task characteristics. They pointed out that different attentional demands might result in different forms of choking. Thus, it has appeared that Baumeister and Steinhilber's hypothesis does not cover the range of situations.

Based on the discussion in this section, developing a more comprehensive choking model is needed. The presence of an audience can, however, result in athletes feeling substantial pressure. Whether the presence of an audience induces choking needs further testing.

Competition. Baumeister (1984) has claimed that competition can create pressure and thus also result in choking. In competition, one source of pressure is performance outcome. According to Baumeister and Showers (1986), competition is divided into what they described as explicit competition and implicit competition. Explicit competition comprises situations where people are aware their performance will be compared with others. Implicit competition occurs when people compare a performance with their previous performances. In choking research, competition has been used to manipulate pressure. For instance, Heaton and Sigall (1991) used an explicit competition as manipulated pressure to test the interaction between performance, S-C, audience, and feedback for performance. Participants inserted all the pegs into their correct holes as quickly as possible, with the team using the least total time being the winner. The experiment consisted of three trials. After the second trial participant were told who was the winner. Although Heaton and Sigall reported the manipulation of pressure caused choking successfully they did not report whether the manipulated competition caused an increase in perceived pressure.

In competitions, perceived pressure increase in particular when athletes are slightly ahead or slightly behind their opponents. In these situations, athletes maintain or obtain the possibility of success only if they perform well, and mistakes may end their chance of winning. Two situations, however, may decrease rather than increase pressure. If athletes are well ahead, they can afford to make some errors and still win, thus pressure is minimal. Alternatively, if athletes are a well behind, performing well may become irrelevant, and thus performance effort might decrease. Baumeister (1984) claimed that the greatest pressure was in situations where one is slightly to moderately behind. To create pressure, Baumeister deliberately manipulated a situation where a participant was slightly behind and another situation where a participant was slightly ahead. Specifically, participants were randomly assigned to a low-pressure, high-pressure, or control condition. They performed a roll-up task in a practice trial and an experimental trial. Baumeister termed the situation where participants were slightly behind as the high-pressure condition, and the situation where participants had a slight lead as the low-pressure condition. In the experimental trial, participants were told their opponents had scored either better or worse than them. Baumeister found that participants performed poorly in the high-pressure condition, but performed better in the low-pressure condition, compared to the non-competition condition. To strengthen the design, Baumeister should probably have measured perceptions of manipulated pressure as a manipulation check.

Many sport studies (e.g., Caruso, Dzewaltowski, Gill, & McElroy, 1990; Gould, Jackson, & Finch, 1993; Scanlan & Passer, 1977; Wong, Lox, & Clark, 1993) have shown that participating in competitive sport often causes worry, feelings of concern, and perceptions of threat. From the self-presentation theoretical perspectives (Leary, 1992), sport competitions are thought as highly related to perceptions of threat that may cause choking. Wilson and Eklund (1998) have claimed that the potential exists in competition for athletes to convey a variety of negative images of themselves to a variety of evaluative others, including audiences, teammates, coaches, and opposing team members. For instance, simply as a consequence of participant, athletes risk projecting images of being unskilled, incompetent, unfit, unprepared, unable to handle pressure, and so on. According to Leary and Kowalski (1990), self-presentation refers to the processes by which individuals attempt to control the impressions others form of them. In competition, therefore, self-presentational processes may lead athletes to have impression motivations, such as “showcasing my skills to others,” “trying to please others” and “trying to beat opposing team.” James and Collins (1997), however, have proposed that impression motivation is contingent upon the discrepancy between the desired and current image. This notion refers to the discrepancy between the image one believes others hold of oneself currently, and the image one would like others to hold of oneself. If this discrepancy becomes great, then athletes may worry about “performing up to my level of ability,” “improving on my last performance,” “not wresting well,” and “losing”. Consequently, competitive anxiety may increase due to the self-presentational processes. In addition, to explain why competitions cause performance decrements, Orlick (1986) has claimed, “the winning focus is likely to heighten anxiety and interfere with proper skill execution in virtually all sports.” (p.12) Regarding the outcome focus in competitions, Bond (1986) has suggested that competitions may cause athletes to think about their competitive performance. The chokers seem to be preoccupied with the outcome focus. Such an outcome focus leads the athletes to become controlled by thoughts about the consequence of wining and losing. Subsequently, competitive anxiety may increase due to feedbacks from the negative consequence of performance, such as making a small mistake in competitions.

Because competition may create pressure further research is needed to investigate the effects of competition on performance. For example, the level of competition may have an influence on the perception of pressure and subsequently choking. The higher the level of competition, the more pressure athletes may feel. In addition, an athlete may perceive more pressure in a formal competition than an informal competition, or an international level competition than a national level competition.

Expectation. Although no choking research has tested how expectation affects performance under pressure, Baumeister and Showers (1986) have claimed that a performer’s response to pressure may be mediated by his expectancy of success, possibly based on prior experience. A number of studies (e.g., Boyce & Bingham, 1997; Chase, Lirgg, & Feltz, 1997; McKenzie & Howe, 1997; Slobounov, Yukelson, & O’Brien, 1997) have shown that expectancies for success are associated with performance enhancement. Some researchers (e.g., Baumeister & Steinhilber, 1984; Swann & Snyder, 1980), however, have argued that high expectations for successful performance can induce pressure, resulting in choking. Zanna, Sheras, Cooper, and Shaw (1975) investigated the effects of expectancies for success on performance. They tested performance by comparing a condition that presented an expectation for success with a control condition, and found that performance declined when participants expected success.

Dutman (1988) has noted that high expectations of winning may result in an outcome focus by the performer during competitions. This focus on winning increases perceived pressure and self-doubts and can result subsequently in performance decrements. For instance, Singer (1986) has suggested that choking occurs when athletes begin to doubt their ability to perform. An athlete might be unable to forget a poor past-performance and fear a repetition in similar circumstances. When the critical situation occurs again, a feeling of dread may manifest itself if they doubt their capacity to achieve the performance goal. Baumeister et al. (1985) have suggested that audience expectations do not always facilitate performance. In addition, performance decrements can also be caused by low expectations of performance, but this cannot be attributed to choking because these performance decrements are likely associated with low motivation or effort withdrawal.

Task Characteristics

Research has shown that pressure is likely to affect performance on tasks differently (Baumeister et al., 1990). Researchers have suggested the relationship between task characteristics and arousal levels mediates performance. For example, Oxendine (1970) developed a well-known classification system desorbing optimal arousal levels for various sports or sport tasks. According to Oxendine, sport tasks that require fine-motor skills (e.g., golf putting, free throw shooting, and bowling) need markedly less arousal for optimal performance than gross-motor type tasks, such as in contract sports or sprinting. According to Baumeister and Showers (1986), task characteristics can be viewed from two aspects, task difficulty and task complexity.

Task difficulty refers to the likelihood of executing the correct performance. Task complexity refers to characteristics of the skills or processes needed to perform the task. Baumeister et al. pointed out that task complexity has often been confounded with task difficulty in social facilitation research. Furthermore, researchers have not always made a clear distinction between what constitutes complex and simple tasks. Some researchers (e.g., Landers, 1994; Wrisberg, 1994) suggested that performance on complex tasks requires more coordination, precision, and information processing.

Some researchers (e.g., Nideffer, 1993) have suggested that attention demands also reflect task characteristics. Nideffer has claimed that distraction may significantly influence performance under pressure, especially on tasks that demand the undivided attention to the performance process for successful completion. Eaterbrook (1959) used cue-utilization theory to explain performance under pressure. According to Eaterbrook, pressure first cause increased arousal that may repress useful visual, perceptual, and attentional qualities needed to perform tasks effectively. Similarly, Landers (1980, 1981) has also proposed that a narrowed focus may inhibit information analysis on tasks resulting in blocked or inappropriate responses to task demands.

Baumeister et al. (1990) have distinguished conceptually between skill tasks and effort tasks. Baumeister et al. suggested that skill tasks demand “a gradual learning curve of improvement over successive trials, combined with an inability to improve by simply trying harder” (p.134), and effort tasks are “those on which performance is a function of consciously monitored exertion.” (p.133) Baumeister et al. investigated the effects of an intervening factor (praise by an audience) on performance with a card-sorting task and a video game, Dodgem. They termed the Dodgem task as a skill task, and the Card-sorting task as an effort task. The results indicated that in pressure circumstances trying hard immediately induced a decline in performance on the skill task, but improvements in performance on the effort task. Baumeister et al. reported that audience pressure explained 10.7% of the performance variance for the effort task, and 4.9% of the performance variance for the skill task. Baumeister et al. concluded that effort might paradoxically harm performance on skill tasks, because the effort causes performers to refocus on performance execution, resulting in the inhibition of automatic skills. Similarly, Kimble and Rezabek (1992) reported deterioration in performance occurred when participants performed a skill task. This has implications for sport, because sport psychologists often advocate a greater focus on the performance process under pressure (e.g., Nideffer, 1992).

Coping with Choking

A quote from tennis great John McEnroe illustrates the practical importance of coping for elite athletes, "choking is a big part of every sport, and a part of being a champion is being able to cope with it better than everyone else." (Goffi, 1984, pp. 61-62) Singer (1986) has proposed that athletes can learn to master coping skills. When coping techniques are learned well, as with other high-level athletic skills, they can be employed automatically. To cope with a difficult situation, athletes may attempt to exert control over their performance by 'trying hard' (Hockey, 1986). As discussed above, researchers (e.g., Baumeister, 1984; Masters, 1992; Moran, 1996) have observed that although some athletes tried hard in their performance, they performed poorly under pressure.

Masters (1992) has suggested that choking under pressure may reflect an inability to cope with pressure. Tanner and Sands (1997) in a recent choking study involving over 100 tennis players, reported that a high proportion of players had experienced choking and this was largely attributed to an inability to cope with pressure. Few researchers have investigated the role of coping as a contributing factor to choking, and as such, additional research is warranted in this area.

Coping Processes

Coping is commonly defined as a process of adaptation to perceived threat. Endler and Parker (1990) described coping as “a response to environmental and psychological demands in particularly stressful situations.” (p. 845) According to Stone and Neale (1984), coping could be any conscious effort to deal with stressful demands. Folkman and Lazarus (1988) have suggested that coping is related to emotional experience. Initial appraisal and its attendant emotions induce coping, and individuals try to regulate the person-environment relationship. Consequently, the re-appraisal leads to a change in emotional quality and intensity. From this perspective, negative emotions such as anxiety may result from the inability to cope with existing stressful events. Some researchers (e.g., Anshel & Kaissidis, 1997; McCrae & Costa, 1986; Terry, 1991) have referred to coping as a set of interactions between personal dispositions and situational appraisals, which includes cognitive processes and problem-solving behaviors.

Anshel and Kaissidis (1997) have suggested that individuals’ appraisals may influence the involvement of the coping process. Perceived pressure may cause individuals to manage cognition so as to avoid negative affective consequences. The more stress an individual perceives, the more they want and need to cope with it. Folkman and Lazarus (1985) have claimed that coping under pressure indicates an attempt by an individual to control the situation. Unsatisfactory coping, however, shows how individuals are not always able to control situations, resulting in a possible increase in perceived pressure.

According to Folkman and Lazarus (1985), the coping process may involve either regulating emotion or attempts to solve the problem. Individuals, who attempt to cope with pressure by regulating their emotion, typically avoid approaching problems, whereas some individuals attempt to cope with pressure by focusing specifically on problems. Whether coping reduces perceived pressure seems dependent on whether an individual selects the appropriate coping strategies.

Coping and Choking

Folkman (1984) has suggested that an individual's effort output may be associated with personal control; furthermore, Folkman has proposed that personal control is related to primary appraisal. The more pressure or stress-related emotion there is, the more coping efforts are directed to emotion regulation or diverted to solving problems. According to Baumeister (1984) and Masters (1992), however, effort may not always be helpful to subsequent performance. If a performer under pressure exerts additional effort in trying to perform well, it may paradoxically impair performance due to the conscious control of automatic skills (Simon, 1967).

Research into coping in sport has primarily focused on whether athletes are consistent in their coping responses across various situations (e.g., Anshel, 1996; Anshel & Kaissidis, 1997; Anshel, Porter, & Quek, 1998; Crocker, 1992). Individuals normally deal with problems in their habitual style (Folkman & Lazarus, 1988). Numerous researchers (e.g., Felton, Revenson, & Hinrichsen, 1984; Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986; Folkman, Lazarus, Pimley, & Novacek, 1987; McCrae, 1982, 1984; Vitaliano, Russo, Carr, Maiuro, & Becker, 1985) have suggested that coping efforts can be treated as either approach or avoidance behavior. Crocker found that athletes usually prefer to use active coping and problem-focused coping strategies (i.e., analogous to approach coping).

The most common categorization of coping styles in sport research has been approach and avoidance styles (Anshel, 1996; Anshel & Weinberg, 1999; Roth &

Cohen, 1986). An approach coping style refers to the typical use of coping strategies that direct cognitive and behavioral efforts toward reducing the intensity of stress. Conversely, avoidance coping style refers to the typical use of coping strategies that direct activity away from the threat-related stimulus (Anshel & Weinberg, 1999). Research in non-sport settings (e.g., Mullen & Suls, 1982; Roth & Cohen, 1986) has found that an avoidance coping style is effective in reducing stress in uncontrollable situations. Madden, Summers, and Brown (1990) found an approach coping style was correlated with high-perceived stress in pressure situations. Recent research (e.g., Anshel, 1996; Anshel, & Kaissidis, 1997; Anshel, Porter, & Quek, 1998; Anshel & Weinberg, 1999) has shown that the appropriate coping style is largely a function of situational demands. For instance, Anshel, and Kaissidis investigated coping responses of basketball players following stressful events. They found that situational appraisals have an influence on the selection of coping strategies more so than personal factors. These basketball players were likely to use avoidance strategies when receiving a bad call from a referee, whereas they might use approach strategies after missing an easy jump shot. Thus, the ability to be able to respond to stress appropriately is somewhat dependent on an individual's 'coping flexibility'.

Although coping studies have indicated that athletes may have different coping strategies in competitions, little evidence exists in the sport psychology literature examining coping strategies in relation to choking. Furthermore, there is a dearth of research comparing the effects of coping strategies on performance under pressure. Anshel, Porter, and Quek (1998) found that attempts to try harder (i.e., approach strategy) usually followed an error. In addition, athletes rated the situation as controllable, whereas in reality the situation may have been uncontrollable. Hence some athletes may have chosen an inappropriate coping strategy in pressure situations.

Hypothetical Explanations of Choking

The literature on choking research reveals the most accepted theoretical explanations for choking have been the distraction model and the automatic execution model. The distraction model (Nideffer, 1992; Weinberg & Gould, 1999) is based on the belief that the performer is unable to concentrate on the task relevant cues because of either internal or external distractors. The automatic execution model (Baumeister, 1984; Masters, 1992) is based on the belief that choking occurs because automatic execution processing becomes inhibited. Although the two models have appeared to explain choking most appropriately, there have been some other theories or models that explain phenomena similar or relevant to choking. Because these additional theories or models have been used to explain choking, I include them in the hypothetical explanations of choking.

Arousal-Performance Theories

A number of arousal-performance theories have been postulated and tested in the sport psychology literature. Arousal has been more often defined physiologically as the intensity of behavior, the state of varying on a continuum from deep sleep to extreme excitement (Malmo, 1959). Arousal in this context reflects varying degrees of readiness to perform physically, intellectually, perceptually, and emotionally. Both internal thoughts and external situations may trigger changes in arousal levels. Athletes may under some circumstances improve their performance on a task when they become more aroused. An over-aroused athlete, however, may experience a decline in performance, or an inability to perform well.

Drive theory. Drive theory has been especially dominant in social facilitation research having been used to explain audience effects on performance in particular. Drive theory derived from the learning theory as is based on the notion of drive (Hull, 1943; Spence, 1956). Drive, in this context, is considered as arousal. Hull and Spence have defined behaviour as a multiplicative function of habit strength and generalized drive: in mathematical notation, $E = f(H \times D)$, where E, H, and D represent excitatory potential toward a behaviour, habit strength, and generalized drive respectively. According to Drive theory, performance is believed to improve in a linear relationship with arousal, because increased arousal is likely to elicit the dominant response, which for skilled performers normally equates to the correct response.

To explain performance decrements under audience pressure, Zajonc (1965) used Drive theory. Specifically, Zajonc suggested that the presence of others increases an individual's level of generalized arousal that may either enhance or impair performance. For simple or well-learned tasks, correct responses are assumed to be dominant, whereas on complex or unlearned tasks, incorrect responses are assumed to be dominant. Based on Zajonc's hypothesis, an unskilled individual or an individual who is performing a complex task in the presence of others is more likely to choke, compared to expert performers or when performing simple tasks.

Research has indicated that Drive theory is limited and is inadequate to explain performance decrements among expert performers. For example, Singer (1965) examined performance on a stabilometer balancing in front of an audience. Participants were 16 university athletes and 16 non-athletes selected from required physical education classes. Singer posited that athletes used to performing in front of audiences would perform better in front of an audience than non-athletes, the reverse, however, was found. Consistent with this finding, Paulus and Cornelius (1974) found that skilled gymnasts showed a greater decline in their performance in front of spectators than relatively less-skilled gymnasts. Baumeister and Steinhilber (1984) have contended that "home choking" occurred among professional basketball players in Game 7 at the home venue. These results are difficult to reconcile by applying Drive theory. Overall, research related to Drive theory has indicated an inconsistent predication of arousal between theory and findings. For example, Bond and Titus (1983) reviewed 241 social facilitation studies by examining effect sizes, and reported that the presence of others did not induce a reliable effect on the physiology of persons performing a simple task ($\underline{d}$ = .04). In addition, according to Zaichkowsky and Baltzell (2001), a difficulty with Drive theory is how to determine dominance of correct or incorrect responses for complex motor skills.

Inverted-U hypothesis. The inverted-U hypothesis has been used to describe a progressive changes in performance as arousal level increases from drowsiness to alertness. According to the inverted-U hypothesis, once arousal increases beyond alertness to a state of excitement, a progressive decrease in task performance will occur. Yerkes and Dodson (1908) were the first researchers to show experimental support for the inverted-U hypothesis using mice in a laboratory study. Early experimental evidence (e.g., Broadhurst, 1957; Fiske & Maddi, 1961; Klavora, 1979;Wood & Hokanson, 1965) supported the inverted-U hypothesis. This research involved a wide range of tasks such as, reaction time (Lansing, Schwaartz, & Lindsley, 1965), hand steadiness (Martens & Landers, 1970), auditory reaction (Stennett, 1957), and attention (Bacon, 1974; Easterbrook, 1959).

Three main aspects of the inverted-U hypothesis seem to relate to choking. First, according to Wrisberg (1994), the available evidence has shown that task complexity should be considered when determining the relationship between arousal or anxiety and performance. Gould, Petlichkoff, Simons, and Vevera (1987) proposed that pistol shooting requires a moderate level of arousal. Feltz, Lirgg, and Albercht (1992) and Gould, Horn, and Spreeman, (1983) found that distance running and wrestling were performed best at high levels of arousal. Arguably, given the differences in optimal arousal based on task characteristics, athletes may be more likely to choke if they are unable to regulate the optimal level of arousal that a task requires.

Second, the inverted-U hypothesis in its most basic form is unable to accommodate individual differences in optimal arousal or anxiety, hence the line of research into zones of optimal functioning (Hanin, 1978). Athletes usually differ in perceptual characteristics, cognitive strategies, and approaching tasks, as well as their habitual level of muscular tension. These individual differences dictate that optimal levels of arousal or anxiety are achieved at a range of arousal or anxiety levels. Personality traits, such as A-trait or introversion-extroversion, may also influence an individual’s optimal arousal or anxiety level. For instance, findings have shown that introverts prefer less arousing situations for optimal performance, whereas extroverts generally prefer more arousing situations to perform at their best (Anshel, 1997). In addition, individuals’ skill level may influence optimal arousal. Terelak (1990), for example, testing the effects of individual differences on performance, found that, in learning tasks of moderate difficulty, people who were anxious were hampered in the initial stages of learning. Such people, however, exhibited substantially better performances in the late stages of learning, compared to less anxious people.

Finally, many researchers have suggested that the inverted-U hypothesis explains attentional processes relating to the decline in performance under pressure. Easterbrook (1959) has postulated that as arousal increases, perceptual selectivity also increases. At low levels of arousal or anxiety, attention is broad, and both irrelevant and relevant cues are processed, resulting in poor performance. Increased arousal or anxiety toward an optimal level should facilitate performance by increasing perceptual selectivity and eliminating task-irrelevant cues. When arousal or anxiety increases above this optimal level, however, attention is restricted and the performer tends to “gate” out some task-relevant cues, and performance suffers. To explain why narrow attention inhibits performance under pressure, Landers (1980), suggested that narrowing attention results in a reduced ability to analyze information as well as overall confusion and attentional overloading, with the result being a decline in performance. For example, a response to the secondary task is usually viewed as an overload type stressor that draws one’s attention away from the primary task, and causes decrements in performance on the primary task. Landers, Wang, and Courtet (1985) investigated dual-task demands in rifle shooting under anxiety conditions. When arousal increased among the shooters, they became slower in their response to peripheral stimuli and less accurate in shooting.

Although the inverted-U hypothesis has been frequently used to explain the relationship between arousal or anxiety and performance, researchers have also been aware of its limitations in practice. Some researchers (e.g., Burton, 1988; Gould et al., 1987), therefore, have proposed that performance is linear and inversely related when the cognitive type of anxiety is assessed and quadratically related (i.e., the inverted-U) when the somatic scale is measured. This suggestion predicts that athletes with relatively high somatic A-state, but low cognitive A-state, may not perform poorly. High cognitive A-state, however, may be significantly harmful to performance. Using this concept, sport psychologists explain why cognitive thoughts, such as self-doubt and worry, may be negatively related to performance under pressure. Woodman and Hardy (2001), however, pointed out that one major problem with the inverted-U hypothesis lies in the operationalization of anxiety or arousal, because high level of anxiety or arousal may be associated with both optimal and poor performance. Hardy and Fazey (1987) argued that the inverted-U hypothesis is insufficient to explain the observed changes in performance that often occurs when increased anxiety or arousal is beyond the optimal point (i.e., when an athlete experiences a “catastrophe” or ”chokes”). Zaichkowsky and Baltzell (2001) also pointed out that, because inverted-U hypothesis only explains a relationship between physiological arousal and performance, the interpretation of cognitive process in pressure situations is insufficient.

Catastrophe model. Dissatisfaction with the inverted-U hypothesis led to the development of the relatively more sophisticated catastrophe model as an attempts to clarify the relationship between arousal and performance (Hardy & Fazey, 1987). According to Hardy (1997), the catastrophe model is capable of explaining the complexities of how performance decrements occur under pressure. Based on the catastrophe model, high cognitive anxiety will be beneficial to performance when physiological arousal is low, but will impair performance when physiological arousal is high. In comparison with the gradual decline in performance depicted in the inverted-U hypothesis, the catastrophe model predicts that performance drops suddenly and dramatically (i.e., catastropically) as arousal exceeds the optimal point. For example, Hardy and Parfitt (1991) and Parfitt and Hardy (1993) found that a “catastrophic” drop in performance occurred when cognitive anxiety was high, and physiological arousal was relatively high. Hardy (1997) claimed that cognitive anxiety reflects the perceived importance of the event to the performer, resulting in an increase in effort. This increase in effort may lead to a decrement in performance when directed toward inappropriate processes. Although the catastrophe model involves cognitive elements in the explanation for performance decrements, Woodman and Hardy (2001) noted that no research to date has examined the catastrophe model by manipulating anxiety-induced physiological arousal. Landers and Arent (2001) pointed out some methodological limitations that have blocked researchers examining the catastophe model. More important, according to Woodman and Hardy, the performance decrements explained by using the catastrophe model include those caused by withdrawal of effort. Because the catastrophe model may confound choking with "helplessness", the explanation of choking seems to be less effective from applied prespective.

In summary, although the arousal-performance theories may explains some performance decrements under pressure, there have remained limitations in the explanations for choking. First, in pressure situations, the fluctuations in arousal have appeared to be unpredictable. As Baumeister and Showers (1986) have commented, "on a given task, it is hard to predict what amounts of what factors will lead to sufficient drive that performance will start to deteriorate." (pp. 363-364) Furthermore, there exists an insufficiency of explanations for the actual psychological processes during performance decrements by using the arousal-performance theories.

Attention Theories

A number of researchers (e.g., Baron, Moore, & Sanders, 1978; Baumeister, 1984; Carver, 1979; Carver & Scheier, 1981; Eysenck, 1991; Masters, 1992; Nideffer 1992; Sanders & Baron, 1975; Weinberg, 1988; Wine, 1971) have focused on how attention theories may explain performance decrements under pressure. Attention theories have spawned many models that describe performance decrements under pressure. These models, however, consistently subscribe that choking results from attentional problems.

In recent years, there are two models that have explained choking under pressure based on attention theories, the distraction model and the automatic execution model. Distraction by definition is any stimulus or response requirement irrelevant to the individual's primary task (Sanders, Baron & Moore, 1978) whether it is an external or an internal stimulus. Researchers (e.g., Baron et al., 1978; Haddad, McCullers, & Moran, 1976; Sanders & Baron, 1975; Sanders et al., 1978; Seta & Hassan, 1980) have suggested that in pressure situations individuals may accept too much information during performance, thus reducing their ability to focus on the task at hand. According to Sanders et al., when there is a discrepancy between one's desire and obligation, arousal levels will increase. As a consequence, increased arousal leads to narrowing attention, resulting in a conflict between attending to the task at hand and attending to distracting stimuli (Sanders & Baron, 1975). Furthermore, Baron et al. proposed that the increased arousal is likely to impair performance on complex tasks because such tasks require more attention resources, whereas increased arousal has a curvilinear effect on simple tasks. The arousal fluctuations link this distraction view with arousal-performance theories.

From the perspective of self-focus theory, some researchers (e.g., Carver & Scheier, 1981; Duval & Wicklund, 1972) have suggested that performance decrements under pressure result from the failure to attend to task-relevant cues. This distraction view holds that choking is associated with self-focus. Carver and Scheier (1978) and Duval and Wicklund (1972) have claimed that attention to self distracts one from attending to information necessary for optimal performance. Carver and Scheier found that performing in front of an audience caused heightened self-awareness, resulting in concerns about performance and a subsequent decline in performance. Duval and Wicklund claimed that an individual holds either an external focus (e.g., attending to what is going on in a person's field of vision) or an internal focus (e.g., attending to personal thoughts, feelings, and ideas) at any given moment. Wicklund (1979) has proposed that performers cannot simultaneously be aware of themselves and their environments. Thus, performers who are immersed in internal thoughts are unable to attend to task-relevant cues, resulting in deterioration in performance.

A number of sport psychologists (e.g., Browne, 1985; Daniel, 1981; Gould & Weinberg, 1999; Hanrahan, 1996; Jacobs, 1982; Moran, 1996; Nideffer, 1992; Nideffer

& Sagal, 1998; Weinberg, 1988) have suggested that choking is associated with a loss of concentration. Previous research into the relationship between anxiety and performance has generally agreed that 'performance anxiety' is a source of distractions that relate to choking under pressure (Moran, 1996). Specifically, there are two explanations for the detrimental effects of anxiety on concentration and performance. First, anxiety causes environmental scanning, resulting in the allocation of attention away from the task at hand. Second, anxiety consumes working memory resources, which leads to there being less available attentional capacity for the task. From these perspectives, anxiety may exert its influence on performance by leading to the ineffective use of attention. In addition, according to Moran, anxious thoughts that result from pressure situations, probably also cause distraction.

<u>Nideffer's distraction model.</u> Nideffer (1992) has postulated that when athletes become internally immersed in task-irrelevant cues, they are unable to break away from those thoughts, resulting in an inablity to attend to important or required task-relevant cues. Following this perspective, choking is explained as a disruption of performance, whereby an internal focus distracts the performer's attention from task-relevant cues. Nideffer's hypothesis of choking is widely supported in the field of sport psychology (e.g., Daniel, 1981; Gould & Weinberg, 1999; Jacobs, 1982; Moran, 1996; Nideffer & Sagal 1998; Weinberg, 1988). According to Nideffer's (1992), choking is an altered state of consciousness, and this altered state of consciousness results from changes in attention. Nideffer suggested that attention is directed either to task relevant cues or to task irrelevant cues while performing. Focusing on task relevant cues can result in peak performance, but focusing on task irrelevant cues can result in choking. Nideffer labeled a task relevant focus as an external focus, and a task irrelevant focus as an internal focus. Nideffer explained that 'normal consciousness' relates to the experience of peak

performance, wereby an athlete's focus of attention is directed to external, task relevant cues (see figure 1).

Nideffer has suggested two types of peak performance experience can occur when an athlete is immersed in an external focus of attention. When athletes maintain a broad external focus, they may experience a feeling of complete awareness, as if they are able to predict what will happen. When athletes maintain a narrow external focus, they may experience an enhanced sense of control because events seem to be occurring more slowly. In contrast, two types of choking experiences can occur when an athlete is immersed in an internal focus of attention. If attention is internal and narrow, the athlete's behavior may become frozen or rigid, and, if attention is internal and broad, the athlete is likely to become scattered and flustered. Situations, which emotionally important to athletes, such as critical points in the match, trigger attentional changes, resulting in the reduction of attentional flexibility.

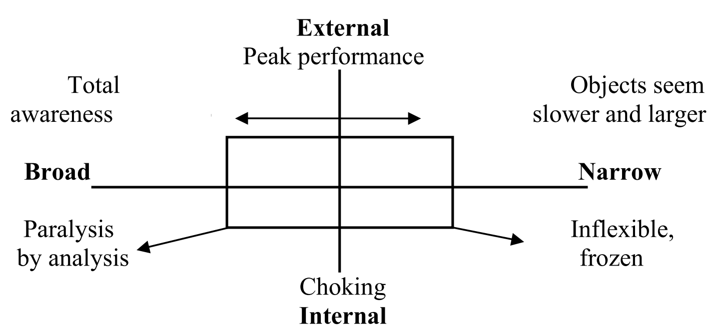

Figure 1. Dimensions of consciousness, from Nideffer (1992) Psyched to Win (p. 34).

Furthermore, Nideffer and Sagal (1998) have suggested that over-attention to task-irrelevant factors, such as internal distractions (e.g., self-doubt, self-evaluation, awareness of fatigue or pain, anxiety) leads to physiological changes (e.g., increases in muscle tension, heart rate, respiration) and attentional changes (e.g., narrowing of attention, internal focus of attention). Furthermore, these attentional and physiological changes invariably lead to a poor performance (see Figure 2).

Nideffer and Sagal (1998) have stressed that choking occurs when athletes are unable to focus on the task at hand. With less attention being paid to the task, time seems to speed up, resulting in the athlete feeling that they unable to respond to task demands. To diminish the occurrence of choking, Nideffer and Sagal have suggested that sport psychologists teach athletes to use a ‘process focus’ under pressure. From a theoretical perspective, although the direction model is widely accepted as an explanation for choking, it has received little direct support from choking research.

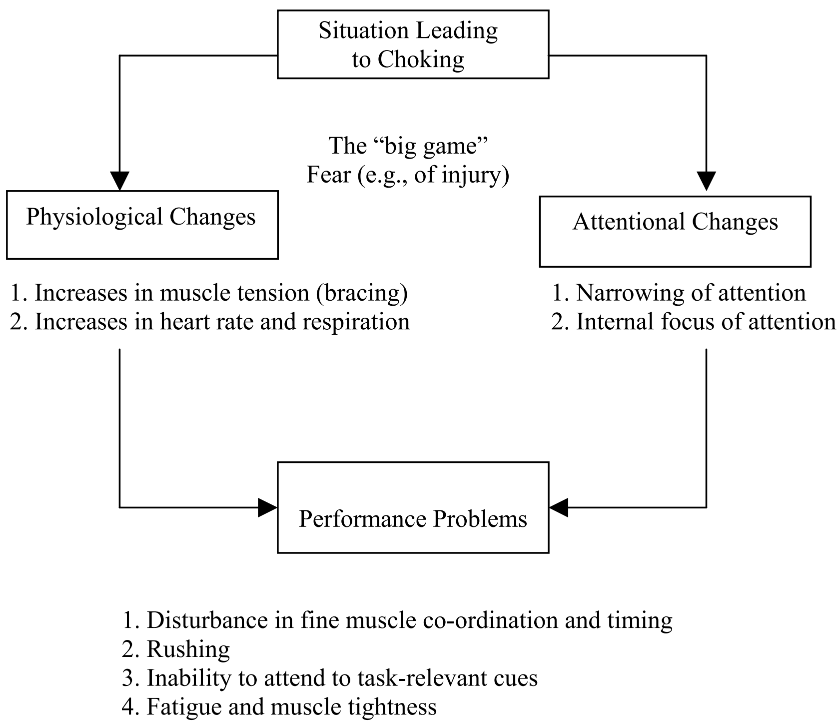

Figure 2. From Nideffer and Sagal (1998) Concentration and attention control training. In J. M. Williams (Ed.) Applied sport psychology (3rd ed., pp. 296-315).

Automatic execution model. Baumeister (1984) and Masters (1992) have proposed the automatic execution model. This model predicts that choking under pressure is due to the inhibition of automatic skills. The automatic execution model derives from skill-acquisition theory. According to Anderson (1982) and Langer and Imber (1979), when individuals first approach a task, they have to attend to the particulars of the task, referred to as controlled processing. With repeated practice, less and less attention to those task particulars is required for successful completion. The expert, for example, can perform the task without conscious control of the steps that make up the performance (i.e., automatic processing). Langer and Imber (1979) and Kimble and Perlmuter (1970) proposed that, if skilled performers try to consciously re-control their skills, disruptions of automatic skills can occur. According to Simon (1967), a special effort can lead to attention being focused on the relevant execution of performance. In such cases where the performer focuses on skill that have become automatic, paradoxically performance levels decrease. Simon provided an example of a reading comprehension task. Individuals, who recognized that they had a slow reading speed caused by stopping their eye on each line, try to avoid stopping their eye to improve reading speed. The movement of eye is normally an unconscious action while reading. Once the reader consciously tries to control the movement, paradoxically reading comprehension diminishes. Simlarly, proficient typists can relate to the difficulties associated with consciously attending to which key to press.

Choking under pressure can be explained as inhibiting automatic execution while performing. Baumeister (1984) has claimed that pressure induces heightened self-awareness, and consequently, it results in transfer to conscious control of the performance process. Baumeister first demonstrated choking effects in a series of six experiments. To specifically examine whether shifting attention to performance processes causes choking, in Experiment 1, Baumeister compared performance on a ‘roll-up’ task between when attention was directed to a performing process and when attention was directed to a non-performing process. Half of the participants were told to attend to their hands (i.e., attending to the performing process) while performing, and the remaining participants were instructed to attend to the ball (i.e., attending to the non-performing process). Baumeister hypothesized that performance decrements would occur in the ‘hand’ condition, compared to in the ‘ball’ condition. The results illustrated participants in the ‘hand’ condition performed more poorly than those participants in the ‘ball’ condition. In Experiment 2, Baumeister tested performance on the ‘roll-up’ task in a ‘hand’ condition and a control condition. Although Baumeister did not find a significant effect on performance between the ‘hand’ condition and the control condition, he reported that the performance mean score of the control group was quite close to the performance mean score of the ‘ball’ group in Experiment 1. On the basis of results of Experiments 1 and 2, Baumeister claimed that performance is disrupted by increased awareness of one’s movements and efforts. Furthermore, Baumeister determined whether a situational manipulation of pressure could induce choking similar to that caused by attentional refocusing in the first two experiments. Experiments 4 and 5 involved a competition and a reward respectively as manipulated pressure. In Experiment 4, participants (N= 45) were randomly assigned a manipulated condition and a control condition; they had two trials for performing the ‘roll-up’ task. After the baseline trial (i.e., first trial), participants in the manipulated condition had one trial, which they performed against their opponents. Experiment 5 was designed similar to Experiment 4, but the manipulated pressure was offering a reward for improved performance. The results from these two experiments showed that pressure significantly caused choking. In addition, Experiment 6 involved skilled participants in a video-game task. Participants (N = 13) were labeled as skilled performers, because they had to reach a criterion score before playing in the experiment; they had one trial of the video-game task and performed in front of an audience. Baumeister reported that the manipulated pressure accounted for 25% of performance variance. On the basis of these findings, Baumeister claimed that “situational demands for excellent performance (i.e., pressure) cause the individual to attend consciously to his or her internal process of performance, and this consciousness disrupts that process and harms the performance.” (p. 618) To explain this occurrence, Baumeister suggested that attending to the performing process consciously interferes with the automatic execution of skills.

Similarly, Masters (1992) suggested that choking is explained in terms of refocusing on control processing in automatic skills. In pressure situations, individuals begin thinking about how they are executing the skill, and attempt to control it with their explicit knowledge of its mechanics. When skilled performers are required to focus on performance suddenly, they normally lack specific information about skill execution, because they are not accustomed to thinking about the specific process while performing. To test this hypothesis, Masters conducted an experimental study, using a golf-putting task. Participants (N = 40) were randomly assigned to one of five conditions: explicit learning, implicit learning, implicit learning control, stressed control, and non-stressed control. Participants in the explicit learning group used technical information labeled as the ‘correct’ way to putt during practice sessions, whereas participants in the implicit learning groups performed a random letter generation task in parallel with the putting task while practicing sessions. After 400 trials, participants completed 100 trials in a pressure situation. To create pressure, reward and evaluation apprehension were manipulated. The results showed that participants in the explicit learning group performed poorly compared to participants in the implicit learning groups. On the basis of the findings, Masters has claimed that the implicit motor learning can reduce the occurrence of choking in the pressure situations.

Hardy et al. (1996) suggested that Masters' experimental design was weakened by not using the random letter generation task in the implicit learning group under pressure, because participants in the implicit learning group were still in the learning stage when they performed in the pressure condition (i.e., after 400 trials). Hardy et al. argued that performance might be confounded by the continued improvement in the implicit learning group. As such, Hardy et al. included an additional implicit learning group who were required to continue to perform the random letter generation task during the pressure condition. When the possible confound was controlled, the results still supported Masters' hypothesis that pressure caused poor performance in the explicit learning group, but not in these implicit learning groups.

From the perspective of anxiety, Hardy et al. (1996) have provided an explanation how the inhibition of automatic skills occurs. They suggested that anxious individuals will make greater use of a 'control system' to reduce uncomfortable experiences. According to Dornic (1977) and Eysenck (1992), the function of this 'control system' is to compensate for the adverse effects of worry by increasing effort expenditure. Increased efforts are exerted to try ensuring the correct execution. Attempting to facilitate performance by refocusing on the specific components of skills, contrary to expectations often results in performance decrements (Simon, 1967; Kimble & Perlmuter, 1970). Woodman and Hardy (2001) has claimed the automatic execution model has important practical implications. On the basis of the findings from choking studies, Woodman and Hardy suggested, contrary to Nideffer (1992), that to diminish the occurrence of choking, effort invested in pressure conditions should be directed to global aspects of performance rather than an execution process of the skills.

Although these choking studies have helped to develop our understanding of the automatic execution model, the methods chosen could have been improved. For example, in the Masters' (1992) study and Hardy et al.'s (1996) study, the authors used a repeated measure analysis of variance (ANOVA) to analyze the data from a pretest-posttest design. Because the various treatment effects only influence the posttest data, a repeated measure ANOVA analysis can result in the F test for the main effect of treatment being too small. Furthermore, Huck and McLean (1975) argued that, because the gain-score approach for the main effect F test and the interaction F test of a repeated measures ANOVA are identical in a pretest-posttest design, the interaction F actually reflects the treatment main effect (i.e., the F test for the main effect of treatments). Thus, the three F ratios (i.e., pressure effect, control effect, and interaction) provided by the repeated measures ANOVA result in redundant analyses for the pretest-posttest design. From a statistical perspective, the appropriate data analyses for a pretest-posttest design should be a covariance analysis.

Limitations of the Existing Models

In recent years, a controversy in choking research has developed over which model best explains the choking phenomenon (Baumeister & Showers, 1986; Lewis & Linder, 1997). Although the common understanding in sport is that distraction causes choking in pressure situations, some researchers (e.g., Lewis & Linder, 1997) have argued that trying too hard may also result in choking under pressure. Lewis and Linder tested the distraction models and the automatic execution model in one study. They manipulated an experimental situation to ensure that participants had to deal with an external distractor while performing a golf-putting task. Half of the participants were instructed to count backward from100 by twos while performing. Lewis and Linder hypothesized that, if choking was due to inhibited automatic processing, the addition of an external distractor would prevent the participants from focusing on skill execution, and hence they would be less likely to choke under pressure. If choking, however, was due to distraction, then the addition of an external distractor would result in choking effects under pressure. Lewis and Linder found the distraction manipulation only impaired performance in the low-pressure condition, whereas participants who were required to use the counting distraction improved their performance in the high-pressure condition. They explained that the counting utilized attentional resources, that prevented attention from shifting focus to execution processing, so participants continued to employ automatic processing and performance levels were maintained. Lewis and Linder have argued that, although performance pressure can induce distraction (Caruso et al., 1990; Moran, 1996), performance pressure may also stimulate athletes to try harder to perform well (Baumeister & Steinhilber, 1984; Leary, 1992; Patmore, 1986). Thus, both distraction and trying hard may be relevant to explain choking.

Some concerns, however, also arise from the Lewis and Linder study. First, participants in their study were novices. Although Lewis and Linder used a criterion for performance in their study, by using unskilled participants they violated the need to test choking with truly skilled performers. Second, like previous choking studies, Lewis and Linder used a repeated measure ANOVA for pretest-posttest to analyze their date.

Even a surface perusal of the literature on choking research reveals a lack of theoretical consistency with respect to explanations regarding how people choke. Such ambiguity may be caused from ignoring task characteristics and skill levels in choking research. According to Holding (1989) and Woods (1998), some tasks require perceptual skills predominantly, but other tasks require motor skills. For skill tasks predominantly requiring motor skills, such as golf putting or free throw shooting, precise movements are usually needed, including the use of small muscle groups. Automatic execution of skills in these fine motor skill tasks is more important than catching information for successful performance. In contrast, for tasks predominantly requiring perceptual skills, catching information cues is needed for successful performance. The automatic execution model may be inappropriate to explain choking on skill tasks that are information driven. Furthermore, Baumeister (1984) has pointed out that, because the automatic execution model is based on skill-dominant activities, it does not explain performance based on strength and endurance. Thus, task characteristics limit the use of the two models. In addition, elite athletes and novice athletes may choke in different patterns. Compared to novice athletes, elite athletes are more skilled and able to exert control under pressure. The inhibition of automatic execution may be more likely to interfere with elite performance than a loss of concentration, which may be more relevant for sub-elite performers.

A practical implication for developing a choking model in sport is to assist in guiding sport psychologists in helping athletes set an appropriate focus in pressure situations. At present, no theoretical model exists to suggest appropriate approaches for reducing choking effects for athletes. For instance, based on the distraction model, a therapeutic intervention might emphasize reducing the athlete's distractions and refocusing on task-relevant features while performing. If the automatic execution model is used to drive practice, interventions to reduce choking might emphasize attention away from the specific aspects of skills during performance. It appears that, in general, sport psychology researchers prefer the distraction model, and social psychologists favor the automatic execution model. At this point, it is difficult to provide an unambiguous to guide practice because as Baumeister and Shower (1986) noted, "development of therapeutic techniques for ameliorating choking should wait until this debate is resolved." (p. 377)

Prevention and Treatment of Choking in Sport

In general, choking occurs in situations that are emotionally important to the athlete, such as important competitions or critical moments in competition. Many sport psychologists (e.g., Bond, 1986; Browne, 1985; Hanrahan, 1996; Moran, 1996; Nideffer, 1992; Wann, 1997; Weinberg & Gould, 1999) agree that one of the biggest contributors to choking is the switch from a performance focus to a task-irrelevant focus. Bond and Nideffer and Sagal (1998) have suggested that an outcome focus often causes choking in competitions. Bond discussed three possible consequences that relate to outcome focus in competitions. First, an outcome focus leads athletes to experience a lack of consistency and control in their performance. Second, an outcome focus may typically induce a ‘lapse in concentration’, evident when athletes are unable to focus on the task at hand. Third, an outcome focus may lead to trying too hard when athletes face possible loss. To help athletes break out of these thoughts, sport psychologists have suggested that athletes should avoid focusing on outcome while performing. For example, Anshel (1997), Hanrahan (1996), and Weinberg and Gould (1999) have suggested that athletes should develop performance routines to reduce outcome thinking, such as having pre-competition and competition plans. Furthermore, Nideffer and Sagal have recommended that athletes use the ‘process focus’ while performing to reduce the distraction of an outcome focus. For example, Nideffer and Sagal provided an example of avoiding outcome focus by suggesting that in competitions, swimmers should attend to some technical aspect of their stroke during performance.

In addition, some sport psychologists (e.g., Hanrahan, 1996; Singer, 1986) have pointed out that choking can occur in many different situations, thus, treatments of choking should be different. For example, Singer (1986) has suggested that some athletes choke because they become more anxious in increasingly meaningful competitions. To reduce the occurrence of choking, anxious athletes in competitions should learn how to manage competitive pressure. Some athletes are chronic chokers and repeatedly suffer choking experiences. These athletes are perhaps unable to forget poor past performances, and once they face a similar situation, choking occurs again. Likewise, Research by Leith (1988) showed that merely thinking about the word 'choking' could cause choking. In this context, Singer has suggested that, in competitions, athlete should avoid thinking about choking. Once performance level is not as good as the athlete hopes, the athlete should not accept the label of a choker. In addition, Singer has proposed that some athletes may choke because of added pressure. For example, a second-string basketball guard performs well in practicing scrimmages. Suddenly, however, the starting guard is injured with the team behind by two points only minutes to go in the game. The guard finally gets his chance, but proceeds to play poorly. To prevent choking from occurring, Singer suggested that these athletes should learn to make a slow transition from practice to competition. Similarly, Anshel (1997) also proposed that athletes should try to practice under pressure situations. The aim is to learn to adapt to pressure in realistic conditions.

In an attempt to assist athletes, sport psychologists have offered many suggestions for treating choking in sport. Browne (1985), Nideffer and Sagal, (1998), Weinberg and Gould (1999), for example, have suggested that rehearsal procedures, relaxation, and self-talk may help prevent choking under pressure. These cognitive techniques provide important interventions for dealing with anxiety and maintaining appropriate attentional focus. Particularly, the attention control training, such as thought stopping, centering, and countering, is thought as the effective method to prevent athletes from choking under pressure. Although sport psychologists' efforts have resulted in the growth of prevention and treatment techniques for choking, this is not satisfactory because there are inconsistencies in theoretical approaches and probable applied strategies as a result of which theory is adopted.

Investigations in This Dissertation

Based on reviewing the choking literature this dissertation involved five interrelated studies. Specifically, performance under pressure is thought as a fundamental condition of choking in these studies. To determine possible stable factors that underlie choking, the first study tested S-C and A-trait as dispositional factors. To determine the perception of pressure, the second study tested somatic and cognitive A-state in a situation where choking may occur. To determine whether increased personal control related to choking, the third study tested coping styles (i.e., approach coping versus avoidance coping). The fourth study tested task characteristics (i.e., effort task versus skill task) to determine whether choking is associated with tasks. In addition, because gender differences may have an influence on the susceptibility to choking, Study 5 is included as a measure of gender differences in choking based on the data collected in Studies 1 to 3.

This dissertation involved four studies with similar or identical procedures for data collection. Studies 1, 2, 3, and 5 consisted of essentially the same participants, but each participant only took part once. In Study 4, I used a separate sample, participants completed a running task and a free throw shooting task in the low-pressure and high-pressure condition.

CHAPTER 3

STUDY ONE: TESTING PREDICTORS OF CHOKING

Introduction

This chapter includes a study that tests dispositional self-consciousness (S-C) and A-trait as the predictors of choking. The focus of this study is on determining whether dispositional S-C and A-trait relate to choking under pressure.

Self-Consciousness and Choking

A number of researchers have examined the relationship between S-C and performance particularly under conditions of low-pressure and high-pressure (Baumeister, 1984; Heaton & Segall, 1991; Kurosawa, & Harackiewicz, 1995). Fenigstein, Scheier, and Buss (1975) defined S-C as the tendency of persons to direct attention inward or outward. Similarly, Scheier and Carver (1982) have referred S-C as the tendency to be self-aware. Self-awareness is likely to occur in situations where aspects of the environment direct the attention of performers to themselves. Factors that commonly elicit self-awareness include the presence of cameras, audiences, and reflective devices, such as glass or mirrors (Carver, Antioni, & Scheier, 1985; Heaton & Segall, 1991). Self-consciousness dispositions have relevance for sports contexts, because athletes frequently perform in the presence of audiences. Sport psychologists have discussed the relevance of S-C for sports performance especially in relation to the choking phenomenon (Anshel, 1995; Nideffer, 1992).

Numerous researchers (e.g., Carver & Scheier, 1978; Fenigstein, 1984; Woody, 1996) have suggested that S-C often links to negative self-focus. With respect to the relationship between S-C and anxiety a number of studies have reported that high self-conscious individuals are more likely to report increased state anxiety (A-state) under pressure conditions than low S-C individuals (Daly, Vangelisti, & Lawrence, 1989; Saboonchi & Lundh, 1997). Thus, it was expected that people who were high in S-C would be more susceptible to choking than people who were low in S-C.

Trait Anxiety and Choking

Little research has been conducted to examine the extent to which A-trait predicts extreme forms of A-state such as choking. Individuals with high dispositional anxiety typically perform poorly in high-pressure situations (Calvo et al., 1990; Kivimaki, 1995; Kurosawa & Harackiewicz, 1995). Byrne and Eysenck (1995) have suggested that high A-trait individuals perform poorly under pressure because they respond to pressure situations with elevated A-state more frequently and/or more intensely than low A-trait individuals. In addition, high A-trait individuals are more likely to attend to threat-related stimuli as opposed to neutral stimuli, and often interpret threat from ambiguous stimuli (Calvo, Eysenck, & Castillo, 1997). In a similar vein, Wine (1980) has discussed how high anxiety individuals focus more frequently on self-evaluative or self-depreciative thinking in pressure situations, thus detracting from their ability to use task relevant cues and task appropriate strategies.

Present Research

The present study was designed to test whether S-C and A-trait predict choking under pressure on a complex motor task. A number of previous studies have shown that pressure can be successfully manipulated by using an audience, financial inducements, and video taping performances (e.g., Butler & Baumeister, 1998; Heaton & Sigall, 1991; Kurosawa & Harackiewicz, 1995; Hardy et al., 1996; Masters, 1992). The primary aims of the present study were, (a) to examine whether pressure manipulations affect performance levels on a common sports task (i.e., free throw shooting), (b) to examine whether dispositional S-C predicts choking, (c) to examine whether A-trait predicts choking, and d) to examine whether there is an interaction between S-C, A-trait and pressure in predicting choking. I hypothesized that performance outcome on a free throw shooting task would decline in a high-pressure situation. In addition, I hypothesized that high self-conscious participants would be most susceptible to choking under pressure. Furthermore, I hypothesized that participants high in A-trait would be susceptible to choking under pressure.

Method

Participants

The participants were 88 student basketball players (Age; M = 19.3, SD = 1.7). All participants played competitive basketball ranging from local recreational competition through to National Basketball League level. Of the 88 participants, 66 completed both the baseline condition (low-pressure) and the manipulated condition (high-pressure). To ensure a reasonably high skill level 22 participants who completed the baseline testing condition were not included in further testing because they failed to reach 50% successful shooting in the baseline testing condition. This exclusion criterion is consistent with previous research (Lewis & Linder, 1997).

Task

Basketball free throw shooting was the experimental task. Free throw shooting is a combination of gross motor activity (i.e., knee, shoulder, and elbow extension) and fine motor activity (i.e., wrist and finger pronation) that requires a relatively narrow focus of attention and moderate arousal level (Leary, 1992; Wrisberg, 1994). Previous researchers have successfully used free throw shooting to experimentally induce choking (Leith, 1988).

Pressure Manipulation

The essential difference between the low-pressure and high-pressure experimental manipulations was the inclusion of performance contingent rewards, an audience, and a video recorder in the high-pressure condition. Previous researchers (e.g., Butler & Baumeister, 1998; Heaton & Sigall, 1991; Kurosawa & Harackiewicz, 1995; Lewis & Lindner, 1997) have successfully used financial inducements, audiences, and video cameras as pressure manipulations to induce performance pressure. I note, that although I have labelled the baseline condition as low pressure (LP), I do not mean to imply low pressure in an absolute sense, but rather in a comparative sense. Even in the LP condition participants did perform in front of an audience, albeit one person, the research assistant. Arguably, this manipulation might create "some pressure" or "moderate pressure" for some participants. My primary interest was to test whether S-C and A-trait predict performance under pressure. The labels "low" and "high" were used as a comparison in this experiment, but equally it might be argued that the two manipulated conditions were "low" and "moderate" or "moderate" and "high". The condition I have labelled as "high" does not necessarily equate to the pressure sometimes experienced in sporting competition in the "real" world. The label is not important, but having two distinct comparison conditions was. I was merely trying to create two distinct conditions where the pressure in one situation was greater than the other.

There is a lack of ensuring the efficiency of pressure intervention in previous choking studies, causing no information about whether those manipulated pressure lead participants to experience increased pressure. In this study, therefore, modified version of the CSAI-2 was administered pre- and post-pressure intervention, to assess participants' levels of somatic and cognitive anxiety. The scale also includes a self-confidence subscale, which was excluded for the purpose of this study. The scale therefore comprised 18 items, with 9 items in each subscale. Examples of somatic anxiety items included, “I feel jittery”. Cognitive anxiety items included “ I am concerned about losing.” Participants were asked to rate the intensity of their anxiety symptoms on a 4-point Likert scale (1= not at all to 4 = very much so). In addition, a “direction” scale developed by Jones and Swain (1992) in which each participant rated the degree to which the experienced intensity of each symptom was either facilitative or debilitative to subsequent performance on a scale from –3 (very debilitative) to +3 (very facilitative), with the midpoint of 0 representing unimportant; thus the possible direction scores on each subscale range from +27 to –27. In recent years, the modified version of the CSAI-2 has become the standard measure of A-state in sport anxiety research (Edwards & Hardy, 1996; Perry & Williams, 1998).

Measures

Self-Consciousness Scale.

As with previous research into choking, the full Self-Consciousness Scale (SCS; Fenigstein et al., 1975) was used to measure dispositional S-C (e.g., Baumeister, 1984; Butler & Baumeister, 1998; Heaton & Sigall, 1991; Kurosawa & Harackiewicz, 1995; Lewis & Linder, 1997). The SCS is a 23-item questionnaire composed of three distinct sub-scales with 10 items measuring private S-C (e.g., “I’m generally attentive to my inner feelings”), 7 items measuring public S-C (e.g., “I usually worry about making a good impression”) and 6 items measuring social anxiety (e.g., “I get embarrassed very easily”). A 4-point Likert scale is used for all items. The SCS has been shown to have adequate psychometric properties (e.g., Klonsky, Dutton, & Liebel, 1990). Fenigstein et al. reported that test-retest correlations for the subscales were $r = .79$ for private S-C, $r = .84$ for public S-C, and $r = .73$ for social anxiety.

Sport Anxiety Scale. The Sport Anxiety Scale (SAS; Smith et al., 1990) has been used widely in sport psychology research. It is comprised of 21 items reflecting three sub-scales of A-trait: somatic anxiety (e.g., “my body feels tight”), worry (e.g., “I am concerned about choking under pressure”), and concentration disruption (e.g., “my mind wanders during sport competition”). Smith et al. (1988, 1990) have reported that test-retest reliability coefficients over seven days exceeded ($r = .85$) across all scales and alpha coefficients were above $\alpha = .81$.

Procedure

Participants were initially given general instructions about the basketball free throw experiment and an envelope consisting of an informed consent form, the SCS, and the SAS. Approximately one week later, participants reported to a basketball stadium to participate in the experiment. Participants returned the completed consent form and the SCS and SAS questionnaires. Participants were then read the following instructions prior to commencing the LP condition:

> Thank you for participating in this experiment. You will be introduced to a research assistant in the gymnasium who will supervise your participation, score the number of successful shots you make, and return the ball to you between shots. You will first be given two minutes to practice your free throw shooting. Following this, you will take 20 free throws taken in two groups of 10. At the conclusion of the 20 shots you will be told your score and given a time to return and complete the second part of the study. Before starting we would like you to spend a couple of minutes completing the questionnaire in front of you (i.e., CSAI-2).

Prior to commencing the high pressure condition participants were read the following instructions.

The procedure will be similar to last time, with a few alterations. Again, you will still be given a two-minute warm-up period. This time, however, you will be paid for your participation. We have estimated how many shots you might get by totalling the number of successful shots you made from the 20 shots you took previously. You will receive $1.00 for every shot you make and an additional $4.00 for every shot you make above your expected score. For instance, if you made 14 shots last time and make 15 this time you will receive $15.00 plus $4.00 (i.e., $19.00). The reverse occurs if you make less than your score from last time. For instance, if you made 14 shots last time and make 13 this time you will receive $13.00 minus $4.00 (i.e., 9.00). The minimum amount you will receive is $5.00. In this way you are guaranteed to make $5.00 or more depending on how well you shoot. You will also notice that a number of audiences will be watching you. They have been told not to interact with you. In addition, we are videotaping your participation. The camera has been placed directly beyond the baseline and will be recording continuously. Before commencing we want you to fill out the same 18-item questionnaire that you completed before starting last time. Once you have finished your 20 shots please do not communicate any of these instructions with other participants who are yet to take their second round of shots. After you have finished you will be paid as promised.

Once participants had completed the high-pressure condition they were de-briefed, paid and thanked for taking part.

It might be argued that the present pattern of findings is due to ordering effects since all participants were deliberately asked to perform the LP condition first and the HP condition second. To clarify this issue, I offered several feathers of this study, which practice effects (Campbell & Stanley, 1966) could reasonably be avoided. First, based on the theoretical framework of choking a well-learned task is required. Thus, with the use of skilled basketball players who were required to demonstrate their skill in free throw shooting, a well-learned task, possible confounding practice effects should be unlikely. It was ensured I had reasonably skilled participants by including a criterion score in the LP condition. Clearly, for all participants free throw shooting was a task they had performed on many occasions previously, thus learning effects were unlikely. In addition, and probably more important, I was concerned that counterbalancing might result in low motivation for those participants placed into a HP-LP ordering group. That is, I felt that having been extrinsically rewarded in the HP condition these participants might withdraw effort in the LP condition that followed. Thus, I chose to use a one order design rather than counterbalance because I felt that poor performance due to low motivation in the LP condition was a greater threat to validity that practice effects. My decision to not counterbalance is consistent with the approach taken by other choking researchers. For example Beilock and Carr (2001) found in pilot testing that high pressure testing preceding a low-pressure test altered the motivation level of participants in the low-pressure test that followed. Furthermore, Beilock and Carr argue that high pressure testing following low pressure testing actually makes choking harder to induce because under the power law of practice individuals should improve from the low pressure to the high pressure test (S. Beilock, personal communication, December 27, 2001). In this study I feel confident that skill and practice effects as a validity threat can be discounted because one would normally expect participants to get better over time, yet there was a general decline in performance on the second (high pressure) task, thus choking seems the most plausible explanation.

Results

Manipulation Check

The essential difference between the LP and HP conditions was the addition of a pressure manipulation in the HP condition (i.e., performance contingent financial incentive, audience, and video taping). Table 1 displays the means and standard deviations for the CSAI-2 sub-scales prior to the LP and HP conditions. A One-way Multivariate Analysis of Variance (MANOVA) was used to assess whether the manipulation of pressure led to increased A-state in the HP condition. The MANOVA was significant, Wilks's lambda = .87, F (4, 127) = 4.28, $p < .001$, $\eta^2 = .13$, suggesting that the manipulation of pressure was clearly successful in creating two distinct pressure conditions. Specifically, the univariate analyses on the CSAI-2 sub-scale scores (see Table 1) showed that there were significant main effects for both somatic intensity, F (1, 130) = 9.65, $p < .01$, $\eta^2 = .07$, and cognitive intensity, F (1, 130) = 13.96, $p < .001$, $\eta^2 = .10$. The difference in both somatic intensity and cognitive intensity is considered a medium effect size (Cohen, 1988). No significant main effects were found for either somatic direction, F (1, 130) = 1.86, p = n.s., or cognitive direction, F (1, 130) = .28, p = n.s..

Performance Analysis

The performance score for both LP and HP conditions was simply the number of successful shots made from 20 shots. There was a decline in total performance standard from the LP condition, M = 13.56, SD = 2.51 to the HP condition, M = 12.53, SD = 3.94. This performance decrement was significant, t (65) = 2.68, p = .001, d = .32. In addition, a differential score was calculated to determine the level of change in performance across the two conditions by subtracting the LP condition score from the HP condition score. For example, a participant with scores of 15 in the LP condition and

13 in the HP condition would have a differential score of -2. Thus, a negative score reflects an inability by the participant to maintain or improve their performance under pressure (i.e., evidence of choking). The results showed that participants were 36 with a negative score, 5 with zero score, and 25 with positive score.

Table 1

Means, Standard Deviation, F Rations for One-Way Analyses of Variance on Manipulated Pressure (N = 66)

	LP M (SD)	HP M (SD)	dfs	F	p	η^2
Somatic Anxiety						
Intensity	14.32 (3.01)	16.33 (4.33)	1, 130	9.65	.01	.07
Direction	2.45 (11.54)	-.32 (11.79)	1, 130	1.86	n.s.	.02
Cognitive Anxiety						
Intensity	15.70 (5.85)	19.48 (5.80)	1, 130	13.96	.00	.10
Direction	.98 (11.78)	-.08 (11.16)	1, 130	.28	n.s.	.00

Note. LP = Low Pressure; HP = High Pressure. η^2 = Effect size or percent of variance accounted for

Reliability of Self-consciousness and Trait Anxiety Scores

Because I used a relatively small sample size, internal reliability estimates were calculated for scores on the SCS and SAS subscales using Cronbach alpha. The coefficients for the present sample of basketball players were α = .83 for private S-C, α = .80 for public S-C, and α = .74 for social anxiety. For the SAS subscales the resultant coefficients were α = .81 for somatic anxiety, α = .84 for worry, and α = .74 for concentration disruption. Thus, all six subscales were above the standard acceptable criterion of α = .70 (Aron & Aron, 1999).

Table 2
Total Self-Consciousness and Trait Anxiety as Predictors of Poor Performance under Pressure: Hierarchical Multiple Regression

Step	Total R^2	$R^2\Delta$	dfs	$F\Delta$	β	t
Step 1. Total score of S-C	.15	.15**	1, 64	11.32**	-.39	-3.36**
Step 2. Total score of A-trait	.17	.02	1, 63	1.20	-.13	-1.10
Step 3. S-C × A-trait	.18	.01	1, 62	1.00	1.08	1.00

Note. Adapted ** $p < .001$; $N = 66$; $R^2\Delta$ = added effect size; $F\Delta$ = changed F ratio; β = standardized discrimination function coefficient.

Regression Analyses

The purpose of the study was to test the relative contribution of S-C and A-trait in predicting choking. A hierarchical regression analysis was used to test hypotheses that participants high in dispositional S-C and A-trait would perform poorly under pressure. In the hierarchical regression analysis, performance differential score was used as the dependent variable. I included total SCS score (i.e., self-consciousness) and total SAS (i.e., trait anxiety) as independent variables. Specifically, the S-C score was entered the regression equation as the first step and the A-trait score was entered as the second step. To test whether a possible interaction between S-C and A-trait could account for a significant portion of the explained variance in performance under pressure an interaction term (i.e. S-C × A-trait cross-product) was entered the regression equation as the third step. The results of this regression analysis, showing in Table 2, indicated that the Step one was significant, $R^2_{change} = .15$, $F_{change}(1, 64) = 11.32$, $p < .001$, but Steps two and three were not significant. Thus, the hypothesis that high S-C would predict choking was accepted, but hypotheses relating to trait anxiety and a SC x trait anxiety interaction as predictors of choking were rejected.

Table 3
Correlation Matrix for Self-consciousness Subscales, Trait Anxiety Subscales, and Performance under Pressure

Variable	2	3	4	5	6	7	8	9
1. Differential Performance	-.49**	-.02	-.27*	-.39**	-.30*	-.08	-.17	-.24
2. Private Self-consciousness		.23	.16	.71**	-.07	-.01	.20	.20
3. Public Self-consciousness			.32**	.72**	-.07	.26*	.18	.16
4. Social Anxiety				.67**	.32**	.46**	.40**	.53**
5. Total Self-consciousness					.07	.31*	.36**	.31*
6. Somatic Trait anxiety						.41**	.17	.77**
7. Worry Trait anxiety							.34**	.84**
8. Concentration Disruption								.58**
9. Total A-trait								

Note. There were 66 participants for each correlation, with two-tailed significance tests; *$p < .01$; **$p < .001$.

Because S-C and A-trait are multidimensional, we were also interested in their various sub-components (e.g., private S-C, public S-C, social anxiety, somatic A-trait, worry A-trait and concentration disruption) as possible predictors of choking. To avoid the potential for confounding of results due to the relatively small sample we first ran a correlational analysis with the intension of identifying relevant predictor variables for subsequent regression analyses. The correlation matrix is presented as Table 3, including 9 variables. The results showed significant relationships between performance and private S-C, $r = -.49$, $p < .001$, social anxiety, $r = -.27$, $p < .01$, total S-C, $r = -.39$, $p < .001$, and somatic A-trait, $r = -.30$, $p < .01$. Among these significant relationships for subscales, private S-C and somatic A-trait represented the dominant significant correlations with the performance differential score. These results also indicated that total S-C score as a predictor of choking, was significant largely because of the contribution of private S-C. In addition, total A-trait score as a predictor of choking, was not significant largely because worry A-trait and concentration disruption were poorly correlated to performance differential score.

Table 4
Self-Consciousness Subscale and Trait Anxiety Subscale as Predictors of Poor Performance under Pressure: Hierarchical Multiple Regression

Step	Total R^2	$R^2\Delta$	dfs	$F\Delta$	β	t
Step 1. Private S-C	.24	.24**	1, 64	19.75**	-.49	-4.44**
Step 2. Somatic A-trait	.35	.11*	1, 63	10.54*	-.33	-3.25*
Step 3. Social Anxiety	.35	.01	1, 62	.73	-.09	-.86

Note. Adapted * $p < .01$, ** $p < .001$; $N = 66$; $R^2\Delta$ = added effect size; $F\Delta$ = changed F ratio; β = standardized discrimination function coefficient.

Given the evidence that private S-C and somatic A-trait were significantly associated with performance from the correlational analysis, a second hierarchical regression analysis was conducted to investigate a possible improved regression model. Private S-C score was entered into the regression equation as a first step, followed by somatic A-trait score as the second step, and social anxiety score was entered as the third step. Results of this regression analysis showed that in the first step, private S-C scores contributed 24% of the variance in performance, $R^2_{change} = .24$, $F_{change}(1, 64) = 19.75$, $p < .001$. In the second step, the addition of somatic A-trait significantly increased the proportion of explained variance in performance, $R^2_{change} = .11$, $F_{change}(1, 63) = 10.54$, $p < .01$. Social Anxiety score in the third step, however, was not significant to account for the variance in performance, $\underline{R}^2_{change} = .01$, $\underline{F}_{change}(1, 62) = .73$, $\underline{p}$ = n.s. (see Table 4). These findings provided clear evidence that private S-C with somatic trait anxiety contributed 35% of the variance in performance. This relatively large explained variance using essentially trait based questionnaires completed before the experiment commenced confirms that aspects of self-consciousness and trait anxiety are important predictors of choking.

Discussion

The findings of this study can be summarized in several ways. As expected, but contrary to some previous research (Baumeister, 1984; Heaton & Sigall, 1991), high self-conscious participants were more likely to choke than their low self-conscious counterparts. Furthermore, this tendency was particularly evident for the relationship between private S-C as a predictor of choking. I offer a number of tentative explanations for this discrepancy including: the choice of experimental tasks, the level of skill, previous manipulations of pressure, and the consequences of prior learning and experiences of performing under pressure. For trait anxiety, I found that only somatic trait anxiety was a significant predictor of choking.

Choking under Pressure

To date, researchers have usually operationalized choking based on the definition of choking as a drop in performance, whether this drop is small or large. Some researchers might argue that choking occurs primarily when a substantial drop in performance is recorded. From a researcher's perspective, trying to set a criterion score to determine at what level a drop in performance constitutes a choke is difficult and controversial. In the present study, I chose to use Baumeister's (1984) definition largely because I was attempting to test Baumeister's findings in a sports specific context. I do, however, concede that not all negative performances under pressure are necessarily a result of choking and invite researchers to consider possible alternatives to the currently accepted definitions of choking in sport.

A manipulation check showed that participants did perceive the HP situation as considerably more anxiety inducing than the LP situation. The results of a triangulated assessment of A-state (i.e., self-report, interview, and observation) indicated that the participants generally felt more anxious in the HP condition (see Drinan, Williams, Marchant, & Wang, 2000). The effectiveness of the combination of audience, monetary incentives, and video taping for increasing perceived pressure in the present study is consistent with previous research (Baumeister, 1984; Hardy. et al., 1996; Heaton & Sigall, 1991; Masters, 1992). A number of participants choked under pressure, with more than half of the participants performing worse in the high-pressure condition. This translated into a statistically significant decline in overall performance between the LP condition and the HP condition. Given that the majority of participants performed worse under pressure, the question may be raised whether the decrement of performance was due to participants trying too hard or whether participants withdrew or decreased their effort? Although I do not have a direct measure of effort and, therefore, cannot rule out withdrawal as a possibility, the indirect evidence from the Drinan et al. study indicates that effort withdrawal is not what accounts for the results. Given that choking occurred in the present study with pressure induced experimentally, some discussion of the ramifications for choking in actual sports competition is requisite. In comparison with the present study, the potential pressure faced by elite athletes in real competition is much greater, since the audience size and monetary rewards are often multiplied many times over. As a consequence, based on simple extrapolation from my results, I expect that the occurrence, severity, and implications of choking in real competition would be amplified considerably.

The data from this study shows that not all participants performed poorly under the pressure. In fact a good number of participants improved their performance under pressure. While the present study was focused on choking I believe that researchers might learn a good deal from athletes that are choking resistant. Presumably, choking resistant athletes are less self-conscious and less trait anxious. Again, however, a qualitative study might juxtapose the behavior, cognitions, emotions and reactions to pressure that choking resistant athletes experience in comparison to choking susceptible athletes.

Self-Consciousness as a Predictor of Choking

The results of the hierarchical multiple regression analyses showed an overall negative relationship between S-C and performance under pressure. This finding is consistent with previous research (e.g., Brockner, 1979; Dollinger, Greening, & Lloyd, 1987; Masters, et al., 1993). Other researchers (Baumeister, 1984; Heaton & Sigall, 1991) have reported the opposite result, with low S-C participants performing worse under pressure. Some researchers (Kurosawa & Harackiewicz, 1995; Lewis & Lindner, 1997) have found no significant differences between high self-conscious people and low self-conscious people performing under pressure. These different findings in relation to the role of S-C and performance decrements under pressure may be related to the experimental task used. In reviewing previous studies, I found that when complex tasks were used as experimental tasks the result was generally a negative relationship between S-C and performance. In contrast, when simple tasks were employed studies the relationship between S-C and performance was generally positive or neutral. For example, Masters et al. (1993) who used questions from the SCS in their Reinvestment

Scale indirectly found that participants high in S-C performed poorly under pressure while they were involved to complete golf-putting (i.e., complex task), but no relationship between S-C and performance was found when a two-dimensional rod-tracing task (i.e., simple task) was used. Masters et al. claimed that choking could be caused by “reinvesting” towards the performance process. When the task, however, involves few technical components, “reinvestment” might result in deautomatization. According to Baumister’s (1984) theoretical framework of choking performance decrements are due to the inhibition of automatic skills. Baumeister, Hutton, and Cairns (1990) have distinguished tasks conceptually into those that primarily involve either effort or skill. Thus, it has been argued that high self-conscious individuals may perform better than low self-conscious individuals on simple tasks because high self-conscious persons have been shown to translate self-focus into effort increases under pressure circumstances (Carver & Scheier, 1991). Conversely, when the task is complex high self-conscious individuals adopting the same strategy of increasing effort are susceptible to choking, because they tend to shift their focus back to the performance process, resulting in the inhibition of automatic execution of skills (Masters et al., 1993). In colloquial language this might be called “paralysis by analysis”. Individuals low in S-C are more likely to maintain an external focus under pressure (Heaton & Sigall, 1991) and as such, direct their attention away from the performance execution processes. Maintenance of performance level is the likely result for these low self-conscious individuals on complex tasks under pressure.

Level of skill may also be a key factor in explaining the different findings in how S-C affects performance. In the present study, experienced basketball players performed a series of basketball free throws as the experimental task. I used free-throw shooting because, for experienced basketball players free throw shooting is a well learned or “overlearned” skill. Consciousness has been shown to be detrimental to the performance of complex skills, because consciousness interferes with the automaticity of task execution (Kimble & Perlmuter, 1970; Simon, 1967). I believe that testing athletes who are relatively skilled performers is important, particularly in the context of Masters (1992) definition that choking is “the failure of normally expert skill under pressure.” (p. 344) Although, as Baumeister (1984) rightly points out, choking is not restricted to overlearned tasks, we felt that the combination of a well-learned task with manipulation of pressure would be a good test of the S-C model. That is, I anticipated, as Baumeister stated, “under pressure, a person realizes consciously that it is important to execute the behavior correctly. Consciousness attempts to ensure the correctness of this execution by monitoring the process of performance” (p. 610). Paradoxically, the attempt to control performance through consciousness impairs, rather than improves, performance. In comparison, Baumeister chose to use a commercially available “roll-up” game and Heaton and Sigall also used a commercially available “perfection” game as the experimental task with participants being given five minutes for test performance (Baumeister, 1984) and no practice time (Heaton & Sigall, 1991) to acquaint themselves with the game. Although choking was shown to occur for some participants in the Baumeister and Heaton and Sigall studies, the results would appear to have most relevance for performing under pressure in the early stages of learning a new task. Successful outcomes for novice performers require concentration on the performance process. Highly self-conscious individuals may hold an advantage at the novice stage of learning because of their tendency to focus on the performance processes. Skilled performers who are highly self-conscious may be likely to choke because they have a tendency to focus inwardly, resulting in concerns about their performance and subsequent attempts to consciously control the performance process. The differences in the findings of the present study and Baumeister's (1984) study, thus, may be explained by the level of skill needed to perform the experimental task. In addition, in experiments 4 and 5 of Baumeister's (1984) research, where low self-conscious individuals performed worse under pressure than high self-conscious participants, the manipulation of pressure included a rivalry manipulation (study 4) and cash incentive (study 5), but the most likely manipulation to affect self-conscious individuals negatively, an audience, was not used.

Central to studies investigating the relationship between S-C and performance is the differing focus of attention of high self-conscious and low self-conscious individuals. I expect that for the highly self-conscious people the change of situations precipitates an inward focus, where questions such as "did people notice that mistake?" and "does my technique look right?" occupy their attention. Indeed, to watch a highly self-conscious person perform even in non-competitive situations often includes subtle eye contact with the performer, who will briefly "sneak a glance" at the audience, while asking themselves "are they still watching me?" In comparison, the low self-conscious person is free to direct their attention outward (or inward) as they choose because their thinking is not dominated by self-concerns.

The role of prior learning and experiences seems relevant in determining the likelihood of an athlete choking. Baumeister (1984) clearly believes that high self-conscious individuals perform better under pressure, because they are accustomed to performing while self-conscious. This is akin to suggesting that high anxious people will perform better under pressure than low anxiety people, because they are accustomed to performing while anxious. On the contrary, I expected high S-C individuals to perform worse under pressure in our study, because they are all too familiar with the deleterious effect of their S-C on their focus of attention and performance. Singer (1986), in discussing choking in sport, suggested that the inability to forget poor past performances, in particular, affects the athlete's perception of a current situation. Under similar circumstances (i.e., high pressure), the athlete remembers their previous choking experience and a sickening feeling of dread manifests itself. The media in sport often label certain athletes "chokers" and in so doing remind athletes of their poor record of performing under pressure. When attention is drawn to choking and the athlete consciously thinks of choking, performance decrements occur (Leith, 1988).

The present study indicated that private S-C was the strongest predictor of choking compared to other sub-scales. According to Scheier and Carver (1977), private S-C influences how people deal with various sorts of information in circumstances that are usually viewed as provoking cognitive dissonance. The manipulated pressure in the present study including, financial inducements and an audience in particular might for instance have lead to high private self-conscious participants experiencing dissonant thinking about their image as a competent basketball player. Reno and Kenny (1992) suggest that high private S-C individuals spend more time examining their private thoughts. This private concern potentially increases attention to a range of possible thoughts relating directly to the task (i.e., "is my technique right?") or outside concerns (i.e., "what will people think of me if I stuff up?"). Although the present study can't ensure this link additional qualitative investigations might examine the content of thinking in pressure circumstances.

A-trait as a Predictor of Choking

In the present study somatic trait anxiety was found to predict poor performance under pressure. A possible explanation is that increases in somatic trait anxiety under pressure act as a trigger for greater self-focus, whereby some athletes may re-direct their attention to their physiological changes.

The results, however, seem to suggest some reasons not to conclude an interaction between S-C and trait anxiety on poor performance in this study. First, in the assessment of three sub-scales of trait anxiety, quantitative analyses showed that only somatic A-trait was related to performance in the pressure situation. Another possible explanation may be the manipulated pressure in terms of that the "direction" of state anxiety would not be high enough to cause a negative effect on performance. The predication of choking mainly affected by S-C in this study may be because participants under pressure switched their focus on the performance process, rather than were distracted by anxiety.

Conclusion

High S-C participants, especially high private S-C participants, were susceptible to poor performance under pressure. I theorised why previous studies into 'choking', mainly conducted by social psychologists, have shown equivocal results. In particular, I argued that high self-conscious athletes are unlikely to benefit from being accustomed to performing under pressure. In addition, the predominantly internal focus of high self-conscious individuals that is associated with poor performance is most likely precipitated by concerns about performance outcomes, emanating from being watched and evaluated by outside sources (audiences). The primary purpose of this study, however, was to concentrate on predictors of choking. As such, I have deliberately presented a somewhat lop-sided discussion with little reference to the performers who improved under pressure. Future research might take the alternative approach by examining "choking resilient" athletes. Choking is a problem in elite competitions and has topical relevance for the media and general public. As such, I believe additional studies need to be undertaken in sports settings.

CHAPTER 4

STUDY TWO: A-STATE UNDER PRESSURE

Introduction

Sport psychologists (e.g., Browne, 1985; Daniel, 1981; Hanrahan, 1996; Nideffer & Sagal, 1998; Weinberg & Gould, 1999) agree that choking usually occurs in situations that are emotionally important to athletes. Further, Weinberg (1988) has noted that an athlete's appraisal of pressure has an influence on the importance an athlete places on performing well. An athlete does not have to be playing at an elite level for a match to be important. They may choke at their local club tournament, because they rate the match as important. Research has shown that situations where an athlete feels pressure increase anxiety (Lox, 1992; Marchant et al., 1998; Martens et al., 1990). According to Jones (1995), perceived pressure reflects an anxiety response that describes cognitive concerns about oneself, the situation at hand, potential consequences of performance, and perceptions of physiological response to pressure.

Perceived pressure has also been associated with self-awareness (Hass & Eisenstadt, 1991). According to the self-awareness theory (Duval & Wickund, 1972; Wicklund, 1975), self-awareness tends to enhance various activities that involve introspection. Hutton and Baumeister (1992) have proposed that increased self-awareness stimulates processes biased towards self-relevant messages. In relation to negative effects of self-awareness, Hass and Eisenstadt (1991) have suggested that self-awareness provokes self-evaluation that may result in a discrepancy between expectation and outcomes. Thus, self-awareness may increase perceived pressure by a cognitive process. Research (e.g., Wells, 1985; Woody, 1996) has shown a positive relationship between A-state and self-awareness. According to Saboonchi and Lundh

(1997), if individuals immerse themselves in thinking about the self, they may start to doubt themselves, subsequently experiencing increases in A-state. Krane, Joyce, and Rafeld (1994) found that, in critical situations, increases in A-state were associated with self-doubt about an athlete's perceived ability to be successful. In sports, A-state may result from meaningful events that increase self-awareness. For example, thoughts about winning, receiving medals, defeating opponents, performing well in front of the coach, fans, country, friends or relatives, may lead to an increased self-awareness. Because such situations increase the importance an athlete places on performing well, these satiations may also result in the athlete experiencing high levels of A-state.

Previous research into choking (e.g., Baumeister, 1984; Butler & Baumeister, 1998; Carver & Scheier, 1978; Heaton & Sigall, 1991; Lewis & Linder, 1997) has shown that pressure (e.g., the presence of an audience, video camera, mirror, or financial inducement) increases self-awareness, and consequently, results in an increased occurrence of choking. For example, in early research, Baumeister tested a choking model by manipulating self-awareness through offering performance rewards. Baumeister identified a strong link between self-awareness and performance decrements. Fenigstein et al. (1975) have claimed that the consistent tendency of a person to direct attention inward or outward reflects their trait S-C. According to Fenigstein et al., individuals high in S-C exhibit habitual tendencies towards self-awareness. The Self-Consciousness Scale (SCS; Fenigstein et al., 1975) has been used widely to test the tendency of individuals to be self-aware. For example, using the SCS scale, Carver and Scheier (1978) and Daly et al. (1989) found that high self-conscious people are more self-aware than low self-conscious people in situations where promote self-awareness. Kurosawa and Harackiewicz (1995) and Lewis and Linder (1997) have also used the SCS scale to test individuals' self-awareness in choking studies.

Baumeister (1984) suggested that performance pressure causes individuals to become more aware of themselves, increasing their motivation to ensure the correctness of performance. Paradoxically, this conscious control leads to an inhibition of automatic skills, resulting in choking (Simon, 1967). Linked with increased A-state, Hardy et al. (1996) have provided an explanation of how the inhibition of automatic skills occurs under pressure. Hardy et al. proposed that high A-state might cause individuals to make greater use of a control system that is though to mediate the effects of anxiety on processing and performance. According to Eysenck (1992), a major function of this control system in anxious performers is to exert more effort in order to maintain performance effectiveness at an ‘acceptable’ level. In this way, anxiety is thought to affect processing efficiency more than performance effectiveness. Although both self-awareness and A-state have been associated with choking under pressure, very little research has tested the relationship between self-awareness, A-state, and choking under pressure.

The primary purposes of this study were: (a) to test whether situations that promoted self-awareness would induce increased A-state; (b) to test whether the increased A-state would relate to performance decrements under pressure. Given the reported relationship between self-awareness and A-state, I expect that situations that promote self-awareness would be likely to heighten A-state. If self-awareness increases A-state in most cases, then both increased self-awareness and A-state should be significantly linked with performance decrements under pressure.

Method

Participants

Participants were 88 undergraduate Human Movement students. All participants (age, M = 20.10, SD = 1.91) played competitive basketball ranging in standard from local competition through to national level. Of the 88 participants, 64 completed both the baseline condition (low-pressure) and the manipulated self-awareness condition (high-pressure). To ensure skilled performance, a total of 24 participants completed the baseline testing condition, but were not included in further testing because they failed to reach 50% success rate shooting in the baseline testing condition. Data from 58 participants in Study 1 (which employed an identical data collection procedure) was combined with six new participants. Analysis was subsequently completed using 64 participants.

Task

Using identical procedures as in Study 1, basketball free throw shooting was the experimental task.

Measures

To measure A-state, the modified version of the CSAI-2 (Jones & Swain, 1992) was used (see Study 1 for a description of this scale). In addition, consistent with previous research (e.g., Kurosawa & Harackiewicz, 1995; Lewis & Linder, 1997), the Self-Consciousness Scale (SCS; Fenigstein et al., 1975) was used to measure participants' tendency towards self-awareness (see Study 1 for a description of this scale).

Pressure Manipulation

This study involved in the same pressure manipulation as Study 1 (see a description of pressure manipulation in Study 1).

Procedure

The procedures in this study replicate those in Study 1 (see a description of the procedure in Study 1).

Results

Perception of Pressure

To test whether participants experienced high levels of A-state in the HP condition, a one-way multivariate analysis of variance (MANOVA) was used for the analysis of the CSAI-2 scores. Experimental conditions (i.e., the LP and HP conditions) were used as independent variable. Table 5 displays the means and standard deviations for intensity and direction of A-state for both cognitive and somatic sub-scale scores immediately prior to the LP and HP performances. There was a significant multivariate effect for pressure, $\underline{F}$ (4, 123) = 4.25, $\underline{p} < .01$, $\eta^2 = .12$ (a medium to large effect size). Thus, participants experienced increased A-state from the LP condition to the HP condition. The univariate F tests for each dependent variable were conducted. The results showed there was a significant univariate main effect for the intensity of somatic A-state, $\underline{F}$ (1, 126) = 8.83, $\underline{p} < .01$, $\eta^2 = .07$ (a medium effect size), and a significant univariate main effect for the intensity of cognitive A-state, $\underline{F}$ (1, 126) = 13.25, $\underline{p} < .001$, $\eta^2 = .10$ (a medium to large effect size). In relation to direction, the effects for somatic A-state, $\underline{F}$ (1, 126) = 1.09, $\underline{p} > .05$, $\eta^2 = .01$ and cognitive A-state, $\underline{F}$ (1, 126) = .34, $\underline{p} > .05$, $\eta^2 = .00$, were not significant.

Table 5
Mean (SD) Anxiety Scores for the CSAI-2 in the LP and HP conditions (N = 64)

	Intensity		Direction	
	LP	HP	LP	HP
Somatic A-state	14.36 (3.04)	16.34 (4.39)	2.23 (11.64)	-.08 (11.75)
Cognitive A-state	15.59 (5.84)	19.34 (5.82)	1.19 (11.88)	-.02 (11.33)

Note. LP = Low Pressure; HP = High Pressure.

Performance

The score for LP was simply the number of successful shots made out of the 20 shots. Similarly, the score for HP was the number of successful shots made out of 20 shots. A repeated t test was used to compare performance between conditions. The result showed there was an overall decline in performance in free throw shooting accuracy in the HP condition. The decrement in performance was significant, t (63) = 2.56, $p < .05$, $d = .50$ (a medium effect size).

To determine whether participants who reported negative appraisal of A-state performed more poorly than those who reported positive appraisal of A-state, two one-way analyses of covariance (ANCOVA) were performed on free throw shooting scores. Performance scores in the HP condition were used as the dependent variable, and performance scores in LP condition were used as the covariate. Perceived appraisals of manipulated pressure (i.e., directions of somatic and cognitive A-state) were used as independent variables. The first analysis involved the direction of somatic A-state as the independent variable. Based on the CSAI-2 sub-scale scores in the HP condition, somatic direction scores ranged from +24 to –27 (M = -.08, SD = 11.75). To create a negative A-state group and a positive A-state group from the total 64 participants, I selected 30 participants who responded in an extreme manner to their A-state. The negative somatic A-state group included the top 15 participants who rated their somatic A-state as extremely negative (ranging from –8 to –27), and the positive somatic A-state group consisted of the top 15 participants who rated their somatic A-state as extremely positive (ranging from +7 to +24). A t test on performance scores for the 30 participants showed a significant decline in performance from the LP to the HP condition, t (29) = 2.52, $p < .05$, $d = .45$. Furthermore, the results of ANCOVA showed an absence of significant differences in performance between negative somatic A-state group and positive somatic A-state group, F (1, 27) = .13, $p > .05$, $\eta^2 = .00$.

The second analysis involved the direction of cognitive A-state as the independent variable. Based on the CSAI-2 sub-scale scores in the HP condition, cognitive direction scores ranged from +27 to –27 (M = -.02, SD = 11.33). Similarly, the negative cognitive A-state group included the top 15 participants who rated their cognitive A-state as extremely negative (ranging from –10 to –27), and the positive cognitive A-state group consisted of the top 15 participants who rated their cognitive A-state as extremely positive (ranging from +9 to +27). A t test on performance scores for the 30 participants showed a significant decline in performance from the LP to the HP condition, t (29) = 2.10, $p < .05$, $d = .41$. Furthermore, the results of ANCOVA showed that the performance differences between negative cognitive A-state group and positive cognitive A-state group were not significant, F (1, 27) = .63, $p > .05$, $\eta^2 = .02$.

Relationship between A-state and Performance under Pressure

To assess whether increased A-state related to poor performance under pressure, a correlational analysis was performed on the CSAI-2 sub-scale scores in the HP condition and the difference performance scores between the two conditions. The difference performance scores are calculated by subtracting the free throw shooting score in the LP condition from the free throw shooting score in the HP condition for each participant. In addition, based on the self-awareness theory that S-C reflects a tendency towards self-awareness, the SCS total score was included in the correlational analysis. The results, presented in Table 6, indicated an absence of significant relationships between the CSAI-2 sub-scales scores and difference performance scores. In relation to the tendency towards self-awareness, results showed there was a significant relationship between the SCS total scores and differential performance scores, $r = -.31$, $p < .05$, suggesting that the greater the tendency towards self-awareness the poorer the performance. Further, the results showed significant relationships between the S-C total score and direction of somatic and cognitive A-state. Relationships between the S-C total score and intensity of somatic and cognitive A-state, however, were not significant. In summary, these results illustrated that S-C negatively related to directions of somatic and cognitive A-state and performance.

Table 6
Correlation Matrix for A-state Sub-scale Scores, Self-consciousness and Performance

Variable	2	3	4	5	6
1. Differential Performance Score	-.17	-.04	-.03	.08	-.31*
2. Intensity of Somatic A-state		.58**	-.54**	-.49**	-.22
3. Intensity of Cognitive A-state			-.52**	-.61**	.19
4. Direction of Somatic A-state				.82**	-.30*
5. Direction of Cognitive A-stat					-.40**
6. Self-consciousness Total Score					

Note. There were 64 participants for each correlation, with two-tailed significance tests. *$p < .05$. **$p < .01$.

Discussion

Two hypotheses were tested in the present study. The first hypothesis suggested that participants would experience increased A-state under pressure. The second hypothesis was that the increased A-state would be negatively related to performance outcomes. As expected, the participants reported significant increases in their intensity of somatic and cognitive A-state in the HP condition. The results, however, have showed that the direction of somatic and cognitive A-state did not change significantly from the LP condition to the HP condition. Further, the present study has showed that increased A-state did not significantly relate to performance outcomes under pressure. Thus, results of this study do not support the second hypothesis that increased A-state would relate to performance decrements.

The manipulated pressure accounted for 7% of the variance in intensity of somatic A-state (a medium effect) and 10% of the variance in intensity of cognitive A-state (a medium to large effect), reflecting the efficacy of the techniques used to manipulate pressure. It may be argued that the levels of A-state reported in the present study were lower than those that might be expected in “real” competitions. Hardy et al. (1996), however, used similar techniques (financial inducements) to manipulate pressure and reported similar increases in intensity of A-state to the present study. The authors reported that this manipulation of pressure was sufficient to induce a choking effect.

The direction of somatic and cognitive A-state between the LP and HP conditions did not change significantly. This may be explained in terms of the debilitative-facilitative continuum on which direction of A-state is measured. The manipulation of pressure in this study was designed to encourage participants to perform well. In the HP condition, the participants were aware that they had to perform better than they did in the LP condition. Based on results of this study, in the HP condition, the direction of A-state included a negative perception of pressure and a positive perception of pressure. In comparison with pervious performance, participants who achieved a higher performance outcome in the LP condition might have been worried about their subsequent performance when they were required to perform better in the HP condition, because requiring a higher performance outcome may increase the difficulty of the task. In contrast, participants who had a lower performance outcome in the LP condition might have expected to improve their performance in the HP condition, resulting in positive appraisal of A-state. The opposite ends of the debilitative-facilitative continuum may cancel themselves out for scores on the CSAI-2.

The results of the present study, consistent with Wells (1985) and Woody (1996), indicated that participants who had strong tendencies towards high self-awareness reported greater negative somatic and cognitive A-state under pressure than those who had weak tendencies towards self-awareness. Following previous self-awareness research (e.g., Carver & Scheier, 1978; Daly et al., 1989), I have created a situation that promoted self-awareness as manipulation of pressure in this study. These results demonstrated that negative appraisal of A-state was associated with persons who had a tendency towards self-awareness.

In comparison to performance with the LP condition, performance in the HP condition showed a significant overall decline with a medium effect size. The manipulated pressure was successful in eliciting performance decrements in this study. Regarding the relationship between performance and A-state, this study, consistent with previous research (e.g., Jerome & Williams, 2000; Landers & Arent, 2001), did not provide evidence that increased A-state relates to performance decrements under pressure. Correlational analyses, however, showed a significant relationship between S-C and performance decrements. Thus, it appeared that participants who had a tendency towards self-awareness performed more poorly under pressure than those who had fewer tendencies towards self-awareness. Based on this finding, it is suggested that increased A-state that is associated with performance decrements may link with internal focus. According to Heaton and Sigall (1991), individuals who have a tendency towards self-awareness habitually focus attention inward, that is, such persons are likely to hold an internal focus. If individuals who have a tendency towards self-awareness report increased A-state in pressure situations, then the A-state should be likely associated with internal focus. For example, Saboonchi and Lundh (1997) have found that, in pressure situations, increased A-state reported by persons who had a tendency towards self-awareness was associated with the internal-focus relevance, such as being worried about making mistakes or the quality of their behavior. Conversely, increased A-state reported by individuals who have fewer tendencies to self-awareness was associated with the external-focus relevance. For example, when facing an audience, a performer who has fewer tendencies towards self-awareness may be more concerned about environmental conditions such as audience noise. A performer who has a tendency to self-awareness, however, may become more concerned about the impression that he or she makes on the audiences. Increased A-state can relate to either an internal focus or an external focus. Based on the results of this study, A-state relating to internal focus of attention may be more negative and likely to harm performance under pressure than A-state that related to external focus of attention. Supporting this view, Hass and Eisenstadt (1991) have suggested that an internal focus is more likely to contribute to negative A-state, consequently affecting performance negatively. Hass and Eisenstadt have explained that internally-focused people are often more sensitive to discrepancies between what one is like and one’s ideal. Additional research (e.g., Brewer & Karoly, 1989; Hsieh, Lee & Tai, 1995; Ingram & Smith, 1984) has also shown that focusing internally has more negative influences on individuals' self-perception. In sport research, Gill and Strom (1985) provided evidence that athletes who internally focused their attention performed more poorly than those who externally focused their attention.

Results of the present study have shown that participants who had both negative appraisals and positive appraisals of A-state performed poorly under pressure. Pressure explained 19% of the performance variance with a medium effect size in this study. There was an absence of significant differences in performance between negative A-state group and positive A-state group. This result contrasts those of Jones et al. (1993) and Swain and Jones (1996) who reported that athletes who experienced positive A-state performed better than those who experienced negative A-state. Both Jones et al. and Swain and Jones' studies have used data based on a poor performance group and a good performance group to test A-state. It could be argued that their results may be confounded by a potential flaw in the interpretation of the CSAI-2 scores in these studies. Specifically, athletes in the good performance group may have had previous experiences of successful performances that resulted in higher task self-efficacy. Athletes in the poor performance group may not have had previously successful experiences and, therefore, may have had lower task self-efficacy. Previous successful performances may lead athletes in the good performance group to report positive A-state on the CSAI-2. In addition, based on the classification of performance outcomes, Jones et al. and Swain and Jones' studies may reflect a difference in initial skill levels between two groups. Thus, skill level may have an influence on the perception of pressure between the poor performance group and the good performance group. For example, skilled athletes may rate the national competition as a challenge, resulting in positive appraisal of A-state on the CSAI-2, whereas less-skilled athletes may rate the same competition as stressful, resulting in negative appraisal of A-state on the CSAI-2.

Thus, directions of A-state reported by participants in Jones et al. and Swain and Jones' studies might be influenced by "pre-existing" factors, such as performance experiences or skill levels, rather than cognitive factors, such as situational importance. In contrast, data analyses in this study have involved a classification of A-state to test performance outcomes. Thus, participants who have had successful or unsuccessful performance experiences may be included in both the negative and positive appraisal groups. This analysis method may be more useful in assessing the effects of A-state on performance, because participants' sensibility to perceived pressure should better reflect cognitive influences than "pre-existing" influences.

A possible explanation for the performance decrements of participants who positively appraised A-state may be that high expectations of performing well lead them to try harder. Butler and Baumeister (1998) found a similar tendency in a recent investigation. In Butler and Baumeister's study, participants rated a supportive audience as more helpful and less stressful than a neutral audience, even though supportive audiences caused performance decrements. Butler and Baumeister explained that the supportive audience created an encouraging environment for the performers, resulting in positive appraisals of anxiety by participants. A supportive audience, however, causes performers to be more aware of the importance of performing well, resulting in them trying harder to perform well.

An alternative explanation for performance decrements related to positive A-state may be that athletes try harder in a situation that is beyond their control. According to Jones' (1995) control model of debilitative and facilitative A-state, the interpretation of anxiety symptoms derives from the perception of personal control. That is, if athletes believe they are able to control a pressure situation, then they will interpret their A-state positively. In some instances, however, athletes may perceive they have control over the situation when they actually do not. This then results in an incorrect interpretation of the pressure situation resulting in the athlete misinterpreting A-state positively. This may be more likely when performers are encouraged to perform well. It could be argued that positive appraisal of A-state may occur when athletes incorrectly recognize an uncontrollable situation as controllable, or athletes are using performance-enhancing strategies (e.g., positive self-talk). In this context, individuals may perceive A-state positively despite performing in an uncontrollable situation with resulting performance decrements.

In sport, performance decrements with positive appraisal of A-state may be more likely to occur among elite athletes than novice athletes. For instance, Thomas Enqvist, a tennis player who was labeled as a choker by the media at the 1999 Australian Open, recalled, “I felt pretty good out there. I was not nervous” (Matthews, 1999, p.34). When elite athletes believe they face a challenge in pressure situations, they may be likely to rate increased A-state as positive. Elite athletes may have higher skills, better performance experiences and higher confidence than novice athletes. Thus, in comparison with novice athletes, elite athletes may be more likely to rate high-pressure situations as positive.

Although more research is needed, these findings enhance our understanding of A-state during competitive situations. First, situations that promote self-awareness induce an increased intensity of somatic and cognitive A-state. Whether increases in A-state cause a decline in performance may be dependent on whether attention is focused internally or externally. Future research may need to investigate whether an internal focus results in a significant relationship between A-state and performance decrements. The present study showed that a positive appraisal of A-state did not help athletes’ performances under pressure.

CHAPTER 5

STUDY THREE: CHOKING AND COPING STYLE

Introduction

This chapter is focused on examining the relationship between coping styles and performance under pressure. Although a number of studies have developed explanations why some people choke, a gap exists in the choking literature in regard to how coping strategies affect choking susceptibility. Athletes are generally highly motivated to succeed, yet their performance level may at times decline dramatically (Moran, 1996). A number of researchers have provided experimental evidence to support the hypothesis that increasing effort can paradoxically hinder rather than help performance (Baumeister, 1984; Hardy et al., 1996; Lewis & Linder, 1997; Masters, 1992). These studies have consistently demonstrated that participants characterized as 'highly motivated' often suffer substantial decrements in performance under pressure. Some researchers (e.g., Masters 1992; Tanner & Sands, 1997) have proposed that the inability to cope with pressure may also cause choking. At present, no experimental research has tested whether inappropriate coping process is associated with choking. Anshel (1996) has proposed that efforts to cope do not necessarily indicate an effective outcome in reducing distress. Thus, coping strategies can be either successful or unsuccessful. For instance, an athlete who under pressure exerts more effort may still choke in competition, despite using additional effort as a coping strategy.

Anshel (1996) has proposed that athletes' coping styles can be categorized as approach coping and avoidance coping. Approach coping is referred to as strategies focusing on problem solving by using direct effort (Crocker & Graham, 1995). Moreover, Krohne (1993) has proposed that approach coping is the process of taking active steps to deal with a perceived problem. Conversely, avoidance coping refers to desensitisation or repressive coping (Anshel, 1996). On the basis of the different functions between approach coping and avoidance coping, Miller (1990) has proposed that using avoidance coping in uncontrollable situations could be more likely to reduce anxiety compared to using approach coping. A number of researchers (e.g., Coyne & Lazarus, 1980; Endler & Parker, 1990; Folkman, Schaefer, & Lazarus, 1979; Folkman, 1984; Lazarus, Kanner, & Folkman, 1980) have also demonstrated that avoidance coping in uncontrollable situations is associated with a reduction in perceived stress. Along this line, research in sport (e.g., Anshel et al., 1998; Anshel & Kaissidis, 1997; Gould, Eklund, & Jackson, 1993) has shown that athletes use certain types of coping strategies following a distressful experience.

To date, researchers have not specifically investigated the extent to which choking susceptibility is associated with athletes' use of coping strategies under pressure. Research has shown athletes are most likely to use an approach coping strategy when confronted by a situation that is appraised as stressful. For instance, Anshel et al. (1998) found that athletes were most likely to use an approach coping strategy to overcome feelings of low self-control following an acute stressor. Choking under pressure may be associated with the manner in which athletes use inappropriate coping strategies under pressure. Specifically, approach coping strategies are likely to result in performers shifting their focus from performance demands to problem solving and resolution. Consequently, the performers may exert additional effort to ensure skill execution is correct in subsequent performances. Paradoxically, trying harder re-directs conscious control to skills that are normally governed by automatic execution, resulting in choking (Baumeister, 1984; Masters, 1992). In addition, previous research (e.g., Anshel & Kaissidis, 1997; Krohne & Hindel, 1988; Madden et al., 1990) has revealed that individuals who typically use approach coping are more likely to experience anxiety than those who typically use avoidance coping in situations they appraise as stressful. Anxiety may prove to be debilitative for athletes who predominately use approach coping strategies in pressure situations. Research investigating the relationship between coping styles and choking is needed in order to assist athletes in developing adaptive coping strategies under pressure.

Although previous research (e.g., Anshel & Kaissidis, 1997; Johnston & McCabe, 1993; Krohne & Hindel, 1988; Madden et al., 1990) has demonstrated that avoidance style is more likely to help athletes to deal with acute stress, these studies have not been conducted in pressure situations that promote the importance of performing well. The primary aims of the present study were (a) to examine the relationship between coping style and state anxiety (A-state), and (b) to examine which coping style is most closely associated with the occurrence of choking under pressure. It was expected that individuals who typically use approach coping strategies would report higher levels of A-state than those who typically use avoidance coping strategies. Furthermore, I hypothesized that individuals who typically use approach coping strategies would be more likely to choke under pressure than those who typically use avoidance coping strategies.

Method

Participants

Because the data collection procedure in this study and Studies 1 and 2 was identical, analysis was subsequently completed using 64 participants in Study 2.

Task

The experimental task was the same as Studies 1 and 2 (see task section in Study 1).

Measures

Coping Style Inventory for Athletes. Coping Style Inventory for Athletes (CSIA, Anshel & Kaissidis, 1997) is a 16-item questionnaire with two major dimensions of coping style; approach coping (8 items) and avoidance coping (8 items). Anshel and Kaissidis adapted CSIA items from a previously validated scale of approach and avoidance coping (Roth & Cohen, 1986). Approach coping refers to coping strategies such as, "I quickly became more aggressive or enthusiastic for the purpose of improving my performance," whereas avoidance coping refers to strategies such as "I did not let the unpleasant experience bother me" and "I reasoned that it was just part of the game." Participants are asked to rate coping strategies on a 5-point Likert scale (1 = very untrue to 5 = very true). Anshel and Kaissidis (1997) have reported that the CSIA had satisfactory concurrent validity and construct validity. Internal consistency is acceptable, with Cronbach's alphas being $\alpha = .72$ and $\alpha = .75$ for the approach and avoidance scales respectively.

Competitive State Anxiety Inventory-2. The modified version of the CSAI-2 developed by Jones & Swain (1992) was used in the present study (see the scale in Study 1).

Pressure Manipulation

This study involved in the same pressure manipulation as Study 1 (see the pressure manipulation in Study 1).

Procedure

Like the completions of SCS and SAS questionnaires, participants completed the CSIA one week before the experiment day. The procedure in this study was the same procedure as Study 1 (see the procedure in Study 1).

Results

Manipulation Check

To assess whether the manipulation of pressure led to an increase in A-state from the LP condition to the HP conditions, a one-way multivariate analysis of variance (MANOVA) was performed on the CSAI-2 sub-scale scores. Table 7 shows the mean CSAI-2 scores prior to the LP condition and the HP condition. An alpha level of .05 was used for all statistical tests. A significant multivariate effect for pressure was found, $\underline{F}$ (4, 123) = 4.25, $\underline{p} < .01$, $\eta^2 = .12$ (a medium to large effect size), initially suggesting that the manipulation of pressure was successful. Furthermore, an examination of the univariate $\underline{F}$ tests for each dependent variable indicated there were significant univariate main effects for somatic intensity, $\underline{F}$ (1, 126) = 8.83, $\underline{p} < .01$, $\eta^2 = .07$(a medium effect size), and cognitive intensity, $\underline{F}$ (1, 126) = 13.25, $\underline{p} < .001$, $\eta^2 = .10$ (a medium to large effect size), thus demonstrating that the participants experienced substantial increases in the intensity of somatic and cognitive A-state from the LP condition to the HP condition (i.e., somatic intensity means: LP, $\underline{M}$ = 14.36, $\underline{SD}$ = 3.04; HP, $\underline{M}$ = 16.34, $\underline{SD}$ = 4.39; cognitive intensity means: LP, $\underline{M}$ = 15.59, $\underline{SD}$ = 5.84; HP, $\underline{M}$ = 19.34, $\underline{SD}$ = 5.82). There were no main effects of pressure for either somatic direction $\underline{F}$ (1, 126) = 1.09, $\underline{p} > .05$, $\eta^2 = .01$or cognitive direction $\underline{F}$ (1, 126) = .34, $\underline{p} > .05$, $\eta^2 = .00$.

Table 7
A-state and Performance Scores for the Low-pressure Condition and the High-pressure Condition (N = 64)

	LP Condition		HP Condition	
	M	SD	M	SD
Intensity of Somatic Anxiety	14.36	3.04	16.34	4.39
Intensity of Cognitive Anxiety	15.59	5.84	19.34	5.82
Direction of Somatic Anxiety	2.23	11.64	-.08	11.75
Direction of Cognitive Anxiety	1.19	11.88	-.02	11.33
Free Throw Shots	13.52	2.53	12.54	3.85

Performance Analysis

The score for the LP condition was simply the number of successful shots made for the 20 shots. Similarly, the score for the HP condition was the number of successful shots made out of 20. Cohen's d was used for these statistical tests. There was a substantial decline in performance from the LP condition, $M = 13.52$, $SD = 2.53$, to the HP condition, $M = 12.54$, $SD = 3.85$. With an alpha level of .05, a repeated measures t test showed that this performance decrement was significant, $t(63) = 2.56$, $p < .05$, $d = .50$ (a medium effect size).

Coping Styles and A-state

The intensity and direction of somatic and cognitive A-state were measured with the modified CSAI-2 prior to participants commencing both the LP and HP conditions. To examine whether coping styles were associated with perceived pressure, a correlational analysis was carried out between the CSIA and CSAI-2 sub-scale scores (see Table 8). The results indicated that an approach coping style was significantly, positively related to cognitive intensity of A-state in both the LP and HP conditions. An avoidance coping style was significantly, negatively related to cognitive intensity of A-state in both LP and HP conditions. In addition, the results showed that avoidance coping was positively associated with the cognitive direction of A-state in both the LP condition and the HP condition. These results confirmed the first hypothesis that individuals who typically use approach coping strategies report higher levels of A-state under pressure than those who typically use avoidance coping strategies.

Table 8
Correlation Matrix for Coping Styles and A-state (Intensity and Direction) in the LP and HP Conditions

LP condition	2	3	4	5	6
1. Approach coping style	-.18	.16	.29*	.00	.05
2. Avoidance coping style		-.23	-.25*	.23	.31*
3. Intensity of somatic anxiety			.52**	-.29*	-.29*
4. Intensity of cognitive anxiety				-.30*	-.38**
5. Direction of somatic anxiety					.76**
6. Direction of cognitive anxiety					

HP condition	2	3	4	5	6
1. Approach coping style	-.18	.13	.35**	-.10	-.09
2. Avoidance coping style		-.12	-.32*	.20	.30*
3. Intensity of somatic anxiety			.58**	-.54**	-.49**
4. Intensity of cognitive anxiety				-.52**	-.61**
5. Direction of somatic anxiety					.82**
6. Direction of cognitive anxiety					

Note. * Correlation is significant at the .05 level (2-tailed); ** Correlation is significant at the .01 level (2-tailed). N= 64.

Coping Styles and Performance

To assess the effectiveness of coping styles, a hierarchical regression analysis was performed on the CSIA and performance. Performance differential score in was used as the dependent variable. Approach coping score on the CSIA, which used as the predictor variable, was entered into the regression equation as the first step, and avoidance coping score on the CSIA was entered as the second step. The results, presented in table 9, showed that approach coping style accounted for significant variance in performance under pressure, $R^2_{change} = .06$, $F_{change}\ (1, 61) = 7.05$, $p < .01$ (equivalent to a medium effect size). The beta value for approach coping was negative, $\beta = -.25$, $p < .01$, thus high scores for approach coping predict poor performance under pressure. With avoidance coping added the model was not significant, $R^2_{change} = .01$, $F_{change}\ (1, 60) = .83$, $p > .05$. Thus, avoidance coping style did not relate to poor performance under pressure. Based on the results of the hierarchical regression analysis, the second hypothesis that individuals who typically use approach coping strategies would be more likely to choke under pressure than those who typically use avoidance coping strategies was accepted.

Table 9
Prediction of Choking under Pressure Using Hierarchical Multiple Regressions

Step	Total R^2	$R^2\Delta$	$F\Delta$	β	t
Step 1. Approach coping style	.06	.06*	7.05*	-.25	-2.66*
Step 2. Avoidance coping style	.07	.01	.83	.09	.91

Note: Adapted * $p < .05$, ** $p < .01$. $N = 64$.

Discussion

The aims of this study were to examine predicted relationships between coping styles, A-state, and basketball free throw performance. The results show that participants experienced a decline in performance under the manipulated HP condition. The fact that performance declined under pressure is noteworthy because basketball games are often won and lost by small margins. It is expected that in 'real competition' the effects of pressure could conceivably be magnified. The athlete's perceived pressure in 'real competition' may be considerably higher than what I induced in this study. In addition, I have concentrated on one discrete skill-free throw shooting. Performance decrements may possibly extend beyond the free throw task to other basketball skills. While accepting performance decrements as a working definition in my study of choking, I include the caveat that performance decrements and choking are not always synonymous.

In relation to whether coping styles had an influence on A-state, this study, consistent with previous research in sport (e.g., Anshel & Kaissidis, 1997; Krohne & Hindel, 1988; Madden et al., 1990), indicates that an approach coping style is related to high-perceived A-state. The present results showed that both approach coping style and avoidance coping style were significantly related to the intensity of cognitive A-state with different implications. Participants using an approach coping style experienced a higher intensity of cognitive A-state. In contrast, the negative relationship between an avoidance coping style and intensity of cognitive A-state demonstrated that an avoidance style tended to reduce the intensity of perceived pressure. It is worth noting that these relationships became stronger when participants moved from the low-pressure situation to the high-pressure situation. Furthermore, the avoidance coping style was positively associated with the direction of cognitive A-state.

Based on the findings of this study, it seems that approach coping strategies may increase the perceived threat in pressure situations, and avoidance coping strategies may reduce that perception of threat. Thus, the approach coping style, where people actively seek to reduce anxiety, for example by seeking explanations for their performance, often results in an increase in anxiety rather than a reduction in anxiety. In addition, the results of this study indicate that coping style has more influence on cognitive A-state than somatic A-state, particularly in high-pressure situations. Given that coping is essentially a cognitive process it seems logical that cognitive A-state rather than somatic A-state acts as a trigger to initiate a planned coping response.

With regard to the relationship between coping styles and free throw performance under pressure, the results showed that an approach coping style was negatively associated with performance under pressure. Specifically, the regression analyses indicated that approach coping style makes a significant contribution as a predictor of poor performance. Anshel and Weinberg (1999) have found that 'approachers' are more likely to become distracted from the task by becoming immersed in a process of explanation. The old adage 'paralysis by analysis' seems to sum up much of what 'approachers' engage in. Conversely, 'avoiders' under pressure avoided thinking about the threatening information. Consequently, avoiders may be less likely to take action for controlling the situation. From the perspective of the choking process (Baumeister, 1984), avoiders under pressure may be less likely to choke because they are less involved in trying hard to ensure the execution of skill during performance. Furthermore, the findings from this study illustrate that approach coping can cause performers to experience more anxiety in a pressure situation. Based on the processing efficiency theory (Eysenck & Calvo, 1992), the increased anxiety may induce the performers to exert more effort in an attempt to improve performance. Consequently, choking may occur due to trying too hard. In summary, individuals who typically use an approach coping style, rather that those who typically use an avoidance coping style are more susceptible to choking under pressure.

A fundamental difference in the present research compared with previous sports coping research was that pressure was experimentally manipulated. Previous coping studies have generally been based on non-experimental designs by having participants complete a coping scale based on how they might respond to a pressure situation (e.g., Crocker & Graham, 1995; Krohne & Hindel, 1988; Madden et al., 1990). One advantage of using a LP-HP manipulation is that participants respond to an actual pressure rather than being asked to either recall previous situations or speculate on how they might respond to a particular situation. Experimental designs that actually manipulate pressure are less likely to suffer from internal threats to validity, such as memory artifacts. Anshel (1996) cautioned researchers about the potential inaccuracy of self-report data caused by recall of distant earlier experiences. In this study, as with a number of actual pressure situations that confront athletes in sport, participants were given little warning about the ensuing pressure manipulation, and thus had only a short time to mentally prepare. Thus, the coping process in this study reflects the processes associated with participants having to deal with acute stressors almost immediately.

The recent trend in sport psychology to use anxiety instruments that measure both intensity and direction of A-state allows for a more refined analysis of coping style-anxiety relationships. This study, consistent with previous studies (e.g., Anshel & Kaissidis, 1997; Krohne & Hindel, 1988; Madden et al., 1990; Miller, 1987), demonstrated that an approach coping style is positively associated with increased intensity of cognitive A-state, and an avoidance coping style is negatively related to the intensity of cognitive A-state. Furthermore, this study illustrated that the participants who typically used avoidance coping style were more likely to interpret their A-state as helpful to their performance. It is suggested that athletes who use an avoidance coping style attempt to avoid stressful situations, resulting in the reduction of threatening information. When confronted with stressful situations where they cannot avoid, 'avoiders' will deliberately reinterpret the situation in a positive manner as a means of avoiding thinking about what might be an unpleasant situation. By contrast, participants who use approach coping strategies try to gain a sense of self-control over unpleasant situations and actively pursue information and engage in problem solving strategies. As a result 'approachers' increase the intake of threatening information. In this sense, threatening information can lead to an increase in negative A-state either intentionally or unintentionally.

The identification of how coping styles relate to choking susceptibility has implications for applied sport psychology. The present study, consistent with Johnston and McCabe's (1993) research, highlights that an inappropriate coping strategy can lead to poor performance under pressure. More specifically, although an approach style may be advantageous in a number of situations, it is likely to lead to high levels of A-state and poor performance in situations where athletes perceive themselves to be under considerable pressure. According to Anshel and Kaissidis (1997), elite athletes often appraise situations where choking may occur, such as having a commanding position in the match, as controllable. Thus, the elite athletes' appraisal may lead to the tendency to use approach coping strategies. Furthermore, elite athletes, who generally demonstrate confidence in their ability to control situations, may experience considerable success using an approach style. When uncontrollable situations arise, the inability, or possibly unwillingness of athletes who generally use an approach style to switch to an avoidance style, may increase the likelihood of poor results under pressure. Thus, ineffectiveness of coping may be caused by the individual's incorrect appraisal. Athletes, therefore, should be encouraged to develop a range of potential coping strategies and to explore the potential benefits of using the coping strategy most appropriate for each situation.

CHAPTER 6

STUDY FOUR: WHEN EFFORT GETS YOU NOWHERE

Introduction

Baumeister (1984) has defined choking as performance decrements under pressure. To explain choking under pressure, Baumeister has proposed the automatic execution model, which holds that perceived pressure causes performers to examine their execution of well-learned skills for correctness, and this focus inhibits automatic skill execution. Baumeister carried out a series of experiments to test the automatic execution model. He claimed that performance pressure heightened self-awareness on internal performance processes. The results from his study showed that pressure caused significant performance decrements.

Although the automatic execution model has been supported by experimental evidence in social psychology (e.g., Lewis & Linder, 1997; Masters, 1992), in the sport psychology literature (e.g., Moran, 1996; Nideffer & Sagal, 1998; Weinberg & Gould, 1999), the dominant model used to explain choking has been the distraction model. At this point, it is difficult to provide unambiguous recommendations to guide practice. During the past 16 years, efforts to test the automatic execution model in choking research have been far more extensive and purposive than attempts to test the distraction model. Although there is little formal recognition of the automatic execution model by sport psychologists, the popular press generally uses explanations of choking that are derivatives of the automatic execution model (e.g., Gladwell, 2000; Nejad, 2000**;** Sobczak, 2000). Because of little experimental support for the automatic execution model in sport psychology, the present study was designed to examine the automatic execution model in sport setting. The primary aim of this study was to test performance under pressure where skill involvement varied from task to task. As discussed in the literature review, Baumeister et al. (1990) have previously tested different tasks that were categorized as either effort (e.g., simple card sorting) or skill (e.g., video game). According to Baumeister et al., simply trying harder does not help performance on a skill task. Effort tasks are underpinned by a conscious marshalling of exertion and should be aided by motivation and trying hard. From the theoretical perspective, the necessary condition for the automatic execution model is that performing must involve skill execution for choking to occur. If performance does not involve skill execution, then the automatic execution model will be inappropriate to explain the performance decrements. In sport, differences in task demands are apparent where the performer might require various degrees of skill, physical fitness, and mental qualities to perform successfully. Apart from a skill component, effort-dominant tasks often have a strong reliance on elements of physical fitness (e.g., strength, speed, endurance). In contrast, skill-dominant tasks, such as basketball free throw shooting, rifle shooting, and putting in golf, often do not require a high level of fitness to be successful.

In addition, performing under pressure is a key to the occurrence of choking. According to Baumeister (1984), pressure can be any factor that increases the perceived importance of performing well. Previous choking studies (e.g., Butler & Baumeister, 1998; Heaton & Sigall, 1991; Lewis & Linder, 1997; Masters, 1992) have demonstrated that having an audience present, video-taping performances, or using monetary inducements can significantly increase the perceived pressure for participants. Using the State-Trait Anxiety Inventory (Spielberger et al., 1970), Masters (1992) in a choking study reported that manipulated pressure (i.e., using monetary inducements) significantly increased state anxiety (A-state). Hardy et al. (1996), however, argued that Masters only provided a one-dimensional measure of A-state. Hardy et al. used the

Competitive State Anxiety Inventory-2 (Martens et al., 1990) as a measure of participants' A-state in a similar choking study. They reported that intensity of somatic and congtive A-state significantly increased when the monetary inducements were presented. Although Hardy et al. (1996) pointed out that the multidimensional A-state may be better to reflect participants' perceived pressure, they did not report the direction of somatic and cognitive A-state in the pressure situation. It is unclear how these participants labeled the intensity of cognitive and perceived physiological symptoms they experienced. Jones et al. (1996) have suggested perceived pressure may reflect positive or negative. According to Jones et al., the direction of A-state describes that performers report intensity of A-sate as either "helpful to performance" or "harmful to performance". In pressure situations, performers may report similar intensity of A-state, but some may interpret their A-state as negative and others may hold positive appraisal. This study would include the measure of direction of A-state.

The present study tested the automatic execution model by using two distinct tasks, a basketball line drill test (an effort-dominant task) and free throw shooting (a skill-dominant task). Participants completed these tasks in a low-pressure (LP) situation and a high-pressure (HP) situation. Consistent with the previous research, an audience, a video camera, and performance contingent monetary inducements were used to induce pressure. It was expected that performance decrements under pressure (i.e., choking) would be more likely to occur when participants were performing a skill-dominant task under pressure, compared to performing an effort-dominant task under pressure.

Method

Participants

This study initially involved 29 competitive basketball players (age, M = 19.92, SD = 4.8). A wide range of abilities was represented, from local level through to National Basketball League level. Of the 29 basketball players who volunteered to participate in this study, 25 completed free throw shooting and running in both the low-pressure condition (LP) and the high-pressure condition (HP). To ensure skilled performance, four participants were excluded after completing the LP condition, because they did not reach a 50% success criterion. This exclusion criterion is consistent with previous research into choking (Lewis & Linder, 1997).

Tasks

The present study used two distinct sports tasks to represent a skill-dominant task and an effort-dominant task. Like almost all sports tasks, the ones used in the present study are not pure skill or pure effort, and are described as skill-dominant and effort-dominant.

Skill-dominant task. The skill-dominant task was basketball free throw shooting. Free throw shooting requires fine motor coordination (Leary, 1992; Wrisberg, 1994), which includes synchronizing the extension of the legs, back, and shoulders, and shooting the ball with a smooth evenly-paced, rhythmical, lifting motion. According to Singer et al. (1991), tasks such as the free throw shooting require selective attention and narrow focus. It is argued that free throw shooting has the fundamental component of Baumeister et al.'s (1990) description of skill tasks namely, it is subject to learning through practice and has the potential to become automatic.

Effort-dominant task. The effort-dominant task chosen for this study was a modification of the line drill test. The line drill test is essentially a speed task consisting of four-repetition “suicide” sprints performed on an indoor basketball court. It was developed as a basketball specific fitness test (Semenick, 1990). Each participant’s time was recorded to the closest .01 of a second using dual beam electronic timing. I shortened Semenick’s original line test because participants were asked to complete the test on two occasions, and I did not want residual fatigue to confound the results. The Semenick’s test normally takes approximately 30 seconds to complete, whereas this shortened version took approximately 12 seconds to complete. McDougall, Wenger, and Green (1991) demonstrated that a 30-second maximal test requires only 20% contribution from the ATP-CP energy system compared to 50% contribution for a 12-second test. In addition, the relative contribution from the glycogen to lactate energy system reduces from approximately 65% to 40% in the modified test. Simply put, the contribution from energy systems that quickly recover and are less subject to high levels of lactate was greatly enhanced as a result of modifying Semenick’s test. In addition, Semenick’s line drill test is typically used as a repeated test with short recovery to deliberately maximize lactate levels. This modified test was used with the intention of allowing participants to exert maximal effort throughout and avoid fatigue.

Experimental Conditions

Low-Pressure condition. The defining characteristic of the LP condition was the presence of only the participant and one research assistant. The research assistant was present to ensure the tasks were completed as instructed and to record results.

High-Pressure condition. In the high-pressure condition, participants performed the modified line drill test and free throw tasks again. On this occasion, however, participants performed in the presence of audiences, were video taped performing, and were promised performance contingent monetary inducements.

Measures

Competitive State Anxiety Inventory-2. Similarly, the modified version of the CSAI-2 developed by Jones & Swain (1992) was used in the present study (see this scale in Study 1).

Procedure

All participants were given a five-minute warm-up in both conditions to ensure they had time to adjust to the research assistant, the playing surface, the backboard, and the ball before starting.

Participants were invited to come to a briefing room beside the basketball stadium on the day of the experiment. They returned an informed consent form that had been distributed previously. Then, each participant was read the following instruction prior to commencing the LP condition:

> Thank you for participating in this experiment. You will be asked to first complete the brief 18-item questionnaire (i.e., modified CSAI-2) placed on the desk in front of you. Following this, you will be taken to the basketball stadium where you will be introduced to a research assistant who will supervise your participation. First, you will be asked to perform a short running task. You will be given five minutes to warm up before completing a running test. The research assistant will explain exactly what is requested of you in doing this sprint task. Naturally, we want you to run your fastest. Following the running task you will be given five minutes to rest and then five minutes to practice your free throw shooting. Then, you will take 20 free throws, taken in two groups of 10. We want you to make as many baskets as possible out of these 20 shots.

Following their participation in the LP condition, scores for the free throw shooting were calculated to determine whether participants would be asked to continue in the HP condition. Participants who achieved a level of shooting success at 50% were re-scheduled to return to the briefing room approximately one hour later. After returning they were read the following instructions prior to commencing the HP condition. Then, participants were given time to complete the 18-item questionnaire version of the CSAI-2.

> The procedure will be very similar to last time, with a few alterations. Again you will complete the same running and basketball free-throw tasks as before, however, this time you will be paid for your participation. The financial rewards will be calculated relative to how we expect you to perform based on your previous running time and previous free throw score. For the running task, you will receive $8.00 for improving on your earlier score plus an additional $4.00 for each .10 sec below your previous score. For the shooting task, you will receive $8.00 for improving on your earlier score plus an additional $4.00 for each successful shot above your previous score. A number of students who are studying human movement will be watching you from either the baseline or from the side of the key. A video camera will be placed directly beyond the baseline and will be recording continuously.

Once participants had finished the experimental tasks, they were told not to communicate any of these instructions to any other participants who had yet to complete the experiment. After finishing, participants were told this experiment was testing whether pressure affected tasks differently. Then, they were thanked for participating and were paid.

Results

Manipulation Check

Summary descriptive data, means, and standard deviations for the CSAI-2 are shown in Table 10. To assess whether the manipulation of pressure led to an increase in A-state from the LP condition to the HP condition, a one-way multivariate analyses of variance (MANOVA) was performed on the CSAI-2 scores (i.e., two intensity scores and two direction scores). An alpha level of .05 was used for all statistical tests. The results revealed that there were significant multivariate effects for pressure, $\underline{F}$ (4, 45) = 4.51, $\underline{p} < .01$, $\eta^2 = .29$ (very a large effect size). Thus, the manipulation of pressure was successful with an increase in reported A-state from the LP condition to the HP condition. Furthermore, the univariate $\underline{F}$ tests for each dependent variable showed that there were significant main effects for somatic intensity scores, $\underline{F}$ (1, 48) = 4.20, $\underline{p} < .05$, $\eta^2 = .07$ (a medium effect size), and cognitive intensity scores, $\underline{F}$ (1, 48) = 8.75, $\underline{p} < .01$, $\eta^2 = .15$ (a large effect size). There were no main effects for somatic direction scores, $\underline{F}$ (1, 48) = .94, $\underline{p} > .05$, $\eta^2 = .02$, and cognitive direction scores, $\underline{F}$ (1, 48) = .02, $\underline{p} > .05$, $\eta^2 = .00$.

Table 10
Mean Anxiety Scores of the CSAI-2 in the Low Pressure and High Pressure Conditions for the Running Task and Free Throw Shooting Task (N = 25)

	Low-pressure Condition		High-pressure Condition	
	M	SD	M	SD
Intensity of Somatic Anxiety	14.36	3.35	17.32	4.91
Intensity of Cognitive Anxiety	15.36	5.30	20.24	6.32
Direction of Somatic Anxiety	3.80	11.44	.52	12.48
Direction of Cognitive Anxiety	1.96	12.77	1.48	12.34

Performance on The Running and Free Throw Shooting Tasks

The means and standard deviations for performance on the free throw and running tasks under low pressure and high pressure are presented in Table 11. To assess whether there was any change in performance on the two tasks from the LP condition to the HP condition, two repeated-measures t tests were performed on the scores for the two performance tasks. The results revealed that there were significant changes in both the running task, t (24) = 3.83, $p < .001$, $d = .77$, and the free-throw shooting task, t (24) = 2.32, $p < .05$, $d = .46$. For the running task, there was a substantial decrease in times for the HP condition compared to the LP condition. The effect size (Cohen's d) for the running task was .77, which represents a large effect. For the free-throw shooting task, there was a substantial decrease in the number of successful shots for the HP condition compared to the LP condition. The effect size for the free-throw shooting task was .46, which represents a medium effect.

Table 11
Mean and Standard Deviation for Running and Free Throw Shooting

Indexes	Low Pressure	High Pressure	Difference
Running Task (seconds)			
M	11.94	11.71	-.23
SD	.96	.81	
Free Throw Shooting Task (number of successful shots)			
M	13.68	12.12	-1.56
SD	2.48	4.04	

Note. N = 25. A negative difference score for the running task reflects improving performance, and a negative difference score for the free throw shooting task reflects declining performance.

Discussion

The main aim of the present study was to examine the automatic execution model in a sports setting. It was expected that, in situations promoting the importance of performing well, pressure would result in a decline in performance on a skill-dominant task (free throw shooting) and an improvement in performance for an effort-dominant task (sprinting). The results show there were significant increases in overall A-state, thus illustrating that manipulated pressure significantly affected intensity of A-state for participants in this study. In addition, there was a significant decline in overall performance on the free throw-shooting task and a significant improvement in overall performance on the running task. Thus, the evidence supported our hypothesis that performance decrements under pressure would be more likely to occur on the free throw-shooting task.

It is believed that, although the intensity of A-state reported in this study increased significantly from the LP condition to the HP condition, an argument could be mounted that in many 'real' competitions intensity of A-state may be much higher. Although I have labeled the baseline condition as low pressure, I do not mean to imply low pressure in an absolute sense, but rather in a comparative sense. Even in the LP condition participants did perform in front of an audience, albeit one person, the experimenter. Arguably, this manipulation might create 'some pressure' or 'moderate pressure' for some participants. My primary interest was to test whether performance on the running task and the free throw task would change under high pressure. The labels 'low' and 'high' were used as a comparison in this experiment, but equally it might be argued that the two manipulated conditions were 'low' and 'moderate' or 'moderate' and 'high'. By extension, the significant differences in performance reported here for the two experimental tasks might be magnified in situations where pressure, real or perceived, is higher. Although choking is not confined to elite sport where participants have much to gain or lose, the term is most frequently applied and reinforced where the performance of high profile athletes declines rapidly, often under conditions of extreme pressure. The evidence of the present study shows that pressure can be experimentally manipulated and changes in A-state, performance, and other dependent measures can be tracked.

The results of the present study seem favorable to suggest that the declines in performance on the free-throw task in this study resulted from the inhibition of automatic execution. Specifically, according to the distraction model, declines in performance can be caused from either external distraction (i.e., noise, gamesmanship, visual distraction, and weather and playing conditions) or internal distraction (i.e, task irrelevant thinking). If the assumption had been based on that the declines in performance under pressure caused from the distraction in this study, then it would have been most likely to derive from internal distraction, because the external distractions were well controlled by the experimental design. On the basis of the distraction model, Nideffer and Sagal (1998) claimed the choking processing, suggesting that an internal distraction induces attentional changes through somatic effects. In this sense, arousal level should be a key to deicide whether the decline in performance is related to an internal distraction. Nideffer (1992) has suggested a relationship between internal distraction and performance, which depends on arousal levels. That is, if the internal distraction (e.g. caused by the techniques of though stopping) results in dropping arousal level, then it should be positive to performance. In contrast, if the internal distraction (e.g. anxiety, stress, and worry) induces a high level of arousal, then it should be negative to performance. Following Nideffer’s suggestion, it could be reasonable that choking in distraction model is most likely the time when performers experience relatively high levels of arousal or anxiety. The manipulation checking of this study, however, shows no tendency of this fashion, because in the HP condition, mean scores for intensity of somatic anxiety and cognitive anxiety were 17.32 (SD = 4.91) and 20.24 (SD = 6.23), respectively. When compared to CSAI-2 norms for basketball players reported by Martens et al. (1990), the somatic anxiety intensity score equates approximately to the 42nd percentile, while the cognitive anxiety intensity score for the sample of basketball players in this study equates approximately to the 44th percentile. Clearly, these results suggest that participants in this study only experienced "moderate" anxiety in the HP condition. Given the inability to explain the declines of performance by distraction in this study, we must contribute the performance decrements to the inhibition of the performance process.

Assessing state anxiety through the CSAI-2, it was found that participations with "moderate" anxiety dropped their performance in the present study. There are at least two reasons suggesting that this fashion may be related to the inhibition of automatic execution. First, according to Zaichkowsky and Baltzell (2001), "moderate" anxiety normally increases attentional selection. That is, "as performance anxiety increases, perceptual selectivity also increases. At optimal levels of arousal, better perceptual selectivity should occur through the elimination of task-irrelevant cues." (p. 333) Arguably, the arousal fluctuations in this study tended to this fashion, which therefore increases attention to takes at the hand. Second, the skilled basketball players were involved in accessing closed-skill task (i.e. free throw shooting) in the experiment. Automatic processing, thus, should exist in the performance, which may be inhibited by increased attention on. It would be noticed here that directly measuring arousal in terms of physiological recordings excluded in this study. A difficulty by using the measurement of arousal was a lack of norms for the samples, causing no information to assess arousal levels for a special task. It would be arguable that future research may need to examine arousal directly linking performance.

Consistent with Studies 1 and 2, the absence of significant changes in the direction of either somatic or cognitive A-state from the LP to the HP condition was found in this study. The direction of somatic A-state has a moderate drop, but the direction of cognitive has a drop of .50 on a scale that can range from + 27 to –27--that is a meaningless change. The present results showed that, in the HP condition, 13 participants rated their somatic A-state as negative, and 3 participants rated their somatic A-state as neutral, whereas 9 participants rated their somatic A-state as positive. Furthermore, for cognitive A-state, 10 participants rated it as negative, and 4 participants rated it as neutral, whereas 11 participants rated it as positive. The distraction model is based on the premise that, when under pressure, athletes become so anxious that they are unable to control their focus of attention, even though they generally know these concerns may hinder their performance. Applying the tenets of the distraction model to choking seems reasonable for athletes reporting negative A-state. On the basis of a relative small sample in this study (i.e., $\underline{N}$=25), I was unable to assess whether there would be different performances on the two tasks between participants who rated their A-state as negative and participants who rated their A-state as positive. Based on previous research (e.g., Butler & Baumeister, 1998; Study 2 in this dissertation), however, participants who rated their A-state as positive performed poorly on skill tasks. The distraction model seems not to fit choking among participants who report positive A-state, because these individuals are often able to control their focus of attention in pressure situations. Further study may be needed to test whether direction A-state has an influence on different tasks.

Baumeister et al. (1990) distinguished tasks conceptually into those that primarily involve effort and skill. The present study included a running task and a free-throw shooting task as distinct effort-dominated and skill-dominated tasks respectively. These results show that there was a clear difference in performance trends of the two tasks under pressure. Performance levels under pressure in the effort-dominated running task improved for nearly all participants. The trend for performance under pressure in the skill-dominant free-throw task was less clear-cut. There was, however, an overall decline in performance. Based on the primary aim of this study, which was to examine the automatic execution model in the sporting context, task characteristics was emphasized in the experiment. A possible explanation why pressure causes negative effects on skill-dominant tasks, rather than effort-dominant tasks may be that participants under pressure attempt to try especially hard to perform well. The old adage "he is trying too hard" rings true here with the paradoxical effect of poor performance with the best of intentions being evident. The automatic execution model predicts that choking is due to the inhibition of automatic skills. Following this point, the occurrence of choking may be dependent on whether a given task mainly requires skill or effort. Perhaps performance improvement on the running task is because trying harder is helpful a minimal skill task. In contrast, trying harder on the free throw-shooting task may lead to conscious control of well-learned skills, resulting in inhibition of the smooth and rhythmical automatic execution. Based on these results, it would be expected choking to be more evident in skill-dominated tasks, such as free throw shooting, putting and chipping in golf, rifle shooting, archery, and basketball.

A limitation in the present study may remain in term of order effects, since all participants performed in the LP condition first and the HP condition second. As discussed in Study 1, I considered counterbalancing but rejected it as not practical for a number of reasons (see discussion in Study 1).

The theoretical implication of this study is that the experimental evidence has provided support for the automatic execution model in a sport setting. In recent years, findings from both social psychologists and sport psychologists have demonstrated unexpected performance outcomes not explained by using the distraction model. For example, Lewis and Linder (1997) demonstrated that participants improved performance on golf putting with distraction in pressure situations. A sport investigation by Janelle, Singer, and Williams (1999) showed a similar tendency. It appears that the distraction model is unable to explain some performance outcomes in the sport world. Unfortunately, although social psychologists have provided a theoretical framework to explain these phenomena of performance under pressure, little research to date has supported this in the sport setting. The automatic processing theoretical framework has largely been ignored in sport psychology research. Of particular interest in this study was examination of the performance outcome based on task characteristics. In this attempt, it is expected to provide an alternative pattern for explaining performance decrements under pressure in sport. Both the distraction model and the automatic execution model are similar in that pressure causes a change in focus of attention. At this point, an athlete may choke, but for different reasons, according to the tenets of the two models. The automatic execution model outlines a process where, under pressure, performers generally focus their attention on the performance process to ensure correct skill execution. This focus is often coupled with the tendency to try harder. Choking may result, especially in highly skilled motor tasks, because automatic skills are inhibited through conscious control. In contrast, the distraction model as proposed by Nideffer (1992) outlines a process whereby choking under pressure mainly results from anxiety (e.g., worry, rumination), because athletes who are anxious are unable to stop thinking about task-irrelevant cues. It is suggested that task characteristics are a critical factor in trying to explain performance decrements under pressure. For example, the distraction model may be appropriate to explain performance decrements on tasks requiring a response to relevant cues (i.e., tasks demanding information processing), because successful performance on these tasks relies on correctly responding to task-relevant cues. While athletes are performing these tasks, distracting thoughts may create an effect in which “an increase in the allocation of resources to one task leads inevitably to a decrease in the resources available for a concurrent task” (Moran, 1996, p. 108). As such, performers may experience time to speed up, resulting in an inability to respond to task demands (Nideffer, 1992). The automatic execution model may be appropriate to explain performance decrements on tasks requiring complex motor skill execution (e.g., free throw, golf putting, shooting, or tennis serve).

The present study also has direct implications for athletes and coaches. To reduce the occurrence of choking, Nideffer and Segal (1998) suggested that athletes should focus on process cues rather than outcome cues (e.g., “swimmers might attend to some technical aspect of their stroke”). From the perspective of the automatic processing theoretical framework in this study, a ‘process focus’ may be detrimental to performance under pressure in some situations. Unfortunately, in sport choking literature, coaches and athletes are often advised to train athletes to think about the process under pressure. So, when the situation gets difficult or pressure mounts, the athletes may habitually think that they should focus their concentration exclusively on the task. The results of the present study, and similar studies by social psychologists, suggest that this focus may sometime be harmful for performance on skill-dominant tasks under pressure.

CHAPTER 7

STUDY FIVE: CHOKING AND GENDER DIFFERENCES

Introduction

Baumeister and Showers (1986), in a comprehensive review of the choking literature, have claimed that self-consciousness (S-C) influences performance under pressure. Choking studies (e.g., Baumeister, 1984; Brockner, 1979; Masters et al., 1993) have reported inconsistent results, however, in regard to the effects of S-C on performance under pressure. Baumeister (1984) claimed that people low in S-C were less aware of pressure. When pressure increases, they often are not accustomed to perform under pressure, resulting in choking. In the present dissertation, variations in S-C resulted in changes to performance which contradict Baumeister's assertions. Consistent with Brockner (1979), Study 1 in this dissertation illustrated that high self-conscious people are more susceptible to choking under pressure. In relation to A-trait, Kurosawa and Harackiewicz (1995) have suggested that situations that promote self-awareness are likely to cause performance decrements among people high in A-trait compared to those low in A-trait. In Study 1 of this dissertation, results suggested that somatic A-trait is a more effective predictor of choking than overall A-trait. The effects of S-C and A-trait on performance under pressure may reflect gender differences, because gender differences have been acknowledged as an important interpersonal factor in competitive sport (Gill, 1988). Thus, this study was included with the purpose of examining S-C and A-trait based on possible gender differences.

Gender differences are often assumed to underlie differences in self-focused attention. Stack, Blaney, Ganellen, and Coyne (1985) and Wells (1985) have suggested that females are more susceptible than males to engage in self-focused attention. For instance, Ingram, Cruet, Johnson, and Wisnicki (1988) found females reported higher scores on the S-C Scale (Fenigstein et al., 1975) than males when they were in situations that promoted self-awareness. To explain gender differences in experiences of self-awareness, Ingram et al. proposed that females tend to respond to pressure situations by actively experiencing emotions, whereas males are more likely to repress similar emotions. Thus, differences in patterns of response to situations that promote self-awareness between genders may result in differences in the experience of self-awareness.

Anxiety research has consistently shown that females tend to report higher levels of anxiety compared to males (e.g., Felson & Trudeau, 1991; Furst, Tenenbaum, & Weingarten, 1985; Maccoby & Jacklin, 1974). A similar pattern of gender differences is found with sport competition anxiety (e.g., Jones, Swain, & Cale, 1991; Martin & Mack, 1996; Rainey & Cunningham, 1988; White & Zellner, 1996). To explain why females are usually more anxious than males in pressure situations, Martin and Mack have claimed that the relatively high levels of A-state among females may be derived from self-focused attention. Martin and Mack found that females showed more concern about impressions of others when performing in front of an audience compared to males. Worries relating to evaluation of their bodies were especially evident in females. In relation to the direction of A-state, Perry and Williams (1998) have reported that female athletes usually interpret their anxiety symptoms as more debilitating prior to competitions, compared to male athletes.

Although anxiety research has shown that females are usually more sensitive to pressure, this has not resulted in consistent subsequent performance decrements. For example, White and Zellner (1996) found a negative relationship between A-state and performance among female athletes. Slapion and Carver (1981) also found that females high in A-trait exhibited performance decrements in situations that promoted self-focus, whereas high A-trait males improved their performance in the same situation. Plass and Hill (1986), however, found that high-anxious females performed better under pressure, whereas high-anxious males performed worse. Likewise, Maria and Nuovo (1990) and Felson and Trudeau (1991) also reported that high A-trait had a facilitating effect on performance among females, but was debilitating to males. Other social psychology studies (e.g., Brown, Hall, Holtzer, Brown, & Brown, 1997; Sowa & La Fleur, 1986) have found no gender differences in performance in situations that promoted self-awareness. The lack of consistency in the relationship between anxiety and performance for males and females warrants further investigation. Testing gender differences in susceptibility to choking under pressure of males and females who vary in S-C and A-trait might provide a greater understanding of choking.

A further aim of this study was to test gender differences in the coping process. In pressure situations, increased A-state may illustrate athletes' responses to stressful events (Anshel, 1995). Further, anxious athletes may consciously or unconsciously use cognitive and behavioral efforts in dealing with stressful demands (Lazarus & Folkman, 1984; Stone & Neale, 1984). Based on the findings of gender studies (e.g., Miller, 1989; Ptacek, Smith, & Dodge, 1994; Stone & Neale, 1984), males tend to use direct action in coping with stress, whereas females are more likely to avoid pressure situations. Thus, different coping strategies may be implemented by males and females when they are in a situation where choking may occur. According to Masters (1991), choking under pressure may result from the inability to cope with the pressure of competition. Consistent with previous coping studies (e.g., Anshel & Kaissidis, 1997; Krohne & Hindel, 1988), the results of Study 3 of this dissertation indicated that avoidance coping strategies are more effective in dealing with pressure situations than approach coping strategies. Study 3 also found that approach coping styles related more closely to choking than avoidance coping styles.

The purposes of this study were: (a) to test whether a difference exists between males and females in perceived pressure; (b) to test whether differences in performance outcomes under pressure exist between males and females; (c) to examine whether S-C and A-trait relate to performance decrements under pressure for male and female participants; and (d) to examine whether there are gender differences in prediction of styles of coping with performance under pressure.

Method

Participants

The participants were 88 undergraduate Human Movement students. All participants, 56 males and 32 females (age, $\underline{M}$ = 20.10, $\underline{SD}$ = 1.91), played competitive basketball ranging in standard from local competitive level through to national level. Of the 88 participants, 46 males and 18 females completed both the baseline condition (Low-pressure) and the experimentally manipulated condition (High-pressure). To ensure skilled performance, a total of 24 (males = 10, females = 14) participants completed the baseline testing condition, but were not included in further testing because they failed to reach 50% successful shooting in the baseline testing condition. Because this study was identical in design and procedures to Studies 1, data analyzed in this study was collected as a part of Studies 1.

Task

Basketball free throw shooting was the experimental task. Details of task procedures can be found in Study 1.

Measures

Self-Consciousness Scale. The full SCS (Fenigstein et al., 1975) was used to measure dispositional S-C (see the description of this scale in Study 1).

Sport Anxiety Scale. The SAS (Smith, Smoll, & Schutz, 1990) was used to measure dispositional A-trait (see the description of this scale in Study 1).

Coping Style Inventory for Athletes. The CSIA (Anshel & Kaissidis, 1997) was used to measure coping style (see the description of this scale in Study 3).

Competitive State Anxiety Inventory-2. The modified version of the CSAI-2 developed by Jones & Swain (1992) was used to measure intensity and direction of A-state (see the description of this scale in Study 1).

Pressure Manipulation

Pressure manipulation was the same as Study 1 (see an explanation of the pressure manipulation in Study 1).

Procedure

The procedures in this study were the same procedures as Study 1 (see an explanation of the procedure in Study 1).

Results

Gender and Perceived Pressure

Based on the results from Studies 1, 2, and 3, the manipulated pressure significantly induced an increase in the intensity of somatic and cognitive A-state, whereas the direction of somatic and cognitive A-state did not change from the LP to HP condition. To assess whether females and males responded differently to the manipulated pressure situations, a multivariate analysis of covariance (MANCOVA) was performed on the CSAI-2 sub-scales in the HP condition. The CSAI-2 sub-scales of the LP condition were used as the covariates. The gender difference was used as an independent variable. Table 12 displays means and standard deviations for A-state scores of male and female participants immediately prior to the LP and HP performances. There was no significant main effect for gender in the intensity of somatic A-state, $\underline{F}$ (1, 58) = .05, $\underline{p} > .05$, $\eta^2 = .00$, intensity of cognitive A-state, $\underline{F}$ (1, 58) = .00, $\underline{p} > .05$, $\eta^2 = .00$, direction of somatic A-stat, $\underline{F}$ (1, 58) = .70, $\underline{p} > .05$, $\eta^2 = .01$, and direction of cognitive A-state, $\underline{F}$ (1, 58) = 3.93, $\underline{p} > .05$, $\eta^2 = .06$. The effect size for direction of cognitive A-state, however, reached a medium level. This result suggested that there was a tendency of gender differences in direction of cognitive A-state. Males reported their cognitive A-state as positive ($\underline{M}$ = 2.47, $\underline{SD}$ = 10.58), whereas females reported their cognitive A-state as negative ($\underline{M}$ = -6.38, $\underline{SD}$ = 10.93).

Table 12
Means and Standard Deviation for the Sub-scores of the CSAI-2 Between the Low-pressure and High-pressure Conditions by Gender Difference

	Low-pressure Condition			High-pressure Condition		
Sub-scores	M	SD	n	M	SD	n
Intensity						
Somatic A-State						
Male	13.98	3.00	46	15.91	4.46	46
Female	15.33	3.00	18	17.44	4.15	18
Cognitive A-State						
Male	13.96	4.16	46	18.15	5.02	46
Female	19.77	7.40	18	22.39	6.71	18
Direction						
Somatic A-State						
Male	4.04	12.34	46	2.02	10.77	46
Female	-2.39	8.23	18	-4.89	12.96	18
Cognitive A-State						
Male	2.63	11.63	46	2.47	10.58	46
Female	-2.50	12.04	18	-6.38	10.93	18
Free Throw Shooting						
Male	13.24	2.41	46	12.24	3.95	46
Female	14.22	2.76	18	13.33	3.59	18

Gender Differences and Performance Outcome

Based on the results from Studies 1, 2, and 3, the manipulated pressure caused an overall performance decrement. To test whether a gender difference exists in performance under pressure, a one-way analysis of covariance (ANCOVA) was performed on free throw shooting scores. Performance scores in the HP condition were used as the dependent variable, and performance scores in LP condition were used as the covariate. The gender difference was used as independent variable. The results showed no significant main effect for gender, $\underline{F}$ (1, 61) = .13, $\underline{p} > .05$, $\eta^2 = .00$. The result showed that there were no gender differences in performance. Thus, both male and female participants had comparable overall performance decrements in the HP condition, compared to the LP condition.

Relationship between Self-Consciousness, A-trait and Performance Outcome

To test whether S-C and A-trait related to performance under pressure as a function of gender, a series of correlation analyses were performed on the SCS (including sub-scales), SAS (including sub-scales), and performance outcomes for males and females. Differential performance scores were included, because they more accurately represent performance decrements under pressure than performance scores in the HP condition alone. The differential score of performance was calculated by subtracting the free throw shooting score in the LP condition from the free throw shooting score in the HP condition for each participant. The results are presented in Table 13. For the male participants, the results showed a significant negative relationship between total A-trait scores and differential performance scores, $\underline{r} = -.32$, $\underline{p} < .05$. A significant negative relationship was found between somatic A-trait scores and differential performance scores, $\underline{r} = -.39$, $\underline{p} < .01$.

Given a moderate relationship between S-C scores and differential performance scores for males, I considered that there might be a sample outlier that affected the results of the correlation analysis (Aron & Aron, 1999; Grimm, 1993) because of the relatively small sample size (male = 46, female = 18) in this study. Using a conventional technique (Grimm, 1993), one case was identified as extreme and removed from the correlation analysis when examining the relationship between S-C total scores and differential performance scores for males. The result showed a significant negative relationship between S-C total scores and differential performance scores, $r = -.30$, $p < .05$ ($n = 45$).

Table 13
Correlation Matrix for S-C, A-trait, and differential scores of performance for the male participants (n = 46)

Variable	2	3	4	5	6	7	8	9
1. Self-consciousness	.68**	.56**	.58**	-.09	.08	-.16	.39**	-.28
2. Private self-consciousness		-.19	.10	.14	.13	.09	-.03	-.19
3. Public self-consciousness			.11	.04	-.14	.14	-.07	-.12
4. Social Anxiety				.42**	.19	.39**	.12	-.17
5. Total Score of A-trait					.60**	.85**	.16	-.32*
6. Somatic A-trait						.09	.36*	-.39**
7. Worry							-.04	-.14
8. Concentration disruption								-.23
9. Differential scores of performance								

Note. * Correlation is significant at the .05 level (2-tailed). ** Correlation is significant at the .01 level (2-tailed).

For the female participants, the results showed a significant negative relationship between S-C total scores and differential performance scores, $r = .49$, $p < .05$. No other scores were significantly related to the differential performance scores (see table 14). With a conventional technique (Grimm, 1993), no outlier effect on correction analysis was identified for females.

Table 14
Correlation Matrix for S-C, A-trait, and differential scores of performance for the female participants (n = 18)

	2	3	4	5	6	7	8	9
1. Self-consciousness	.55*	.63**	.78**	-.46	-.44	-.44	.39	-.49*
2. Private self-consciousness		.70**	.59**	.19	.18	.19	.26	-.43
3. Public self-consciousness			.40	.12	.08	.14	.23	-.29
4. Social Anxiety				.26	.15	.33	.46	.15
5. Total Score of A-trait					.94**	.95**	.16	.37
6. Somatic A-trait						.79**	.05	.28
7. Worry							.24	.41
8. Concentration disruption								.11
9. Differential scores of performance								

Note. * Correlation is significant at the .05 level (2-tailed). ** Correlation is significant at the .01 level (2-tailed).

Gender, Coping Styles, and Performance

Two hierarchical regression analyses were performed on the coping styles for males and females. Based on concerns about small sample sizes in this study, the hierarchical regression analyses were different from those employed in Study 3 of this dissertation. The differential performance score was used as dependent variable to reduce the number of independent variables. The approach coping score and avoidance coping score were used as the independent variables. Based on the findings reported in Study 3, the approach coping score was entered first in the regression equation. Then the avoidance coping score was entered as the second step. Table 15 shows the regression analysis results. For males, approach coping styles accounted for significant variations in performance, R^2_{change} = .09 (a medium effect size), F_{change} (1, 44) = 4.38,

$p < .05$. Adding avoidance coping styles to the regression equation did not contribute significantly to variations in performance decrements, $R^2_{change} = .01$, $F_{change}(1, 43) = .56$, $p > .05$.

For females, because of a small sample ($n = 18$), the regression analysis was performed on scores of the approach coping style and avoidance coping styles separately. These regression models demonstrated that both approach coping styles, $R^2_{change} = .21$, $F_{change}(1, 16) = 4.24$, $p > .05$ and avoidance coping styles, $R^2_{change} = .02$, $F_{change}(1, 16) = .36$, $p > .05$, did not significantly contribute to variations in performance decrements. Approach coping styles, however, showed a larger effect in terms of accounting for the variations in performance decrements (21%) from the LP to HP condition.

Table 15
Hierarchical Multiple Regressions for Coping Styles

Model and Step	Total R^2	$R^2\Delta$	$F\Delta$	β	t
Males ($n = 46$)					
Step 1. Approach Coping	.09	.09*	4.38*	-.30	-2.09
Step 2. Avoidance Coping	.10	.01	.56	.11	.75
Females ($n = 18$)					
Step 1. Approach Coping	.21	.21	4.24	-.46	-2.06
Step 1. Avoidance Coping	.02	.02	.36	.15	.60

Note: * Regression is significant at the .05 level (2-tailed).

Discussion

One purpose of this investigation was to test whether differences in perceived pressure exist between males and females in the LP and HP conditions. A further aim was to determine whether performance outcomes under pressure differed between males and females. In addition, the effects of S-C, A-trait, and coping styles on performance were assessed based on gender differences.

Gender Differences in Perceived Pressure

In relation to perceived pressure, this study showed that manipulated pressure did not result in a difference in A-state between males and females. Both males and females reported significant increases in intensity of somatic and cognitive A-state in the HP condition, compared to the LP condition. Female participants, however, tended to report their cognitive A-state as more negative than male participants. Consistent with Perry and Williams' (1998) study, this study also showed that females generally interpreted somatic and cognitive A-state as unhelpful to their performance, whereas males interpreted the A-state as helpful to their performance. It appeared that male participants experienced less anxiety than female participants in this study. For example, male participants reported lower cognitive A-state in the HP condition than female participants reported in the LP condition. Further, male participants interpreted their somatic and cognitive A-state as positive in both LP and HP conditions, even though the positive level tended to decrease from the LP to HP condition. Female participants, however, interpreted their somatic and cognitive A-state as negative in both LP and HP conditions. A possible explanation for males' positive appraisal of A-state in the HP condition may be that males had high expectations of improvement in their performance in the HP condition. According to performance scores in the LP condition (see Table 12), males had lower mean scores of free throw shooting than females at baseline. In the

HP condition, all participants were encouraged to improve their performance based on their performance scores in the LP condition. Thus, these relatively low performance scores for male participants might lead them to being aware they were performing a less difficult task in the HP condition. Males might, therefore, expect more improvement in their performance than females. Consistent with Furst et al. (1985) and Maria and Nuovo (1990), this study showed that females reported more A-state but performed better than males. In the present study, A-state reported by females may reflect that female participants tend to report fear or anxiety on self-report measures more than male participants. Furst et al. found that, although females reported more A-state than males, females did not worry more than males. Furst et al. suggested that females who were cognitively and somatically anxious tend to have low expectations for success regardless of their ability. Males who had lower A-state than females, however, tended to overestimate their expectations for success in relation to their subsequent performance.

Gender Differences in Performance

Although male participants reported less anxiety and appraised their A-state as positive, males did not perform better than females in the HP condition. Results showed no gender differences in performance outcomes under pressure. The HP condition resulted in a significant overall decline in performance regardless of the direction of A-state. A possible explanation for performance decrements being associated with positive appraisal among the male participants could relate to males trying harder under pressure. According to Baumeister (1984) and Masters (1992), performers under pressure become more aware of the importance of performing well and attempt to ensure successful performances. Butler and Baumeister (1998) reported that, when performing in front of supportive audiences, participants performed poorly despite reporting less anxiety. Butler and Baumeister explained these performance decrements in terms of participants becoming more aware of the importance of performing well and consequently trying too hard.

Gender Differences in Relationships between S-C, A-trait, Coping Style, and Performance

In relation to S-C effects on performance, results showed there was no significant relationship between S-C and performance for males. This may result from a sample outlier because of small sample sizes in this study. For females, results showed that there was a significant negative correlation between S-C and performance in this study. Compared to the relationship between S-C and performance for males, this stronger association may be explained in terms of being linked to females' higher skill level compare to males. Specifically, based on the theoretical choking framework, performance decrements relate to self-focus that causes an inhibition of automatic skills. Conscious control of performance restrains automatic skill execution. The higher the skill level, the more likely it is that the self-focus affects performance under pressure. As such, higher skilled performers may be more likely to suffer performance decrements from negative self-focus. Results in this study revealed that females were more skillful than males (see baseline scores in Table 12), thus, S-C related more to performance for females compared to males. In addition, results showed a moderate negative relationship between private S-C and performance for females. Correlation analyses showed a tendency of negative relationship between private S-C and performance for females. According to Wells (1985), high private S-C persons tend to perceive more pressure when they are in situations that are changed suddenly. This tendency may be replicated by high private self-conscious females in this study, because participants were not told to expect any pressure prior to performance in the HP condition.

Regarding A-trait effects on performance, results showed gender differences in this study. Specifically, male participants who had a high score on A-trait, especially those who had high scores on somatic A-trait, performed more poorly than those who had a low score on A-trait. Performance decrements for high A-trait males may be explained in terms of males' high perceived importance towards performing well. According to Gill (1988), males are more oriented toward achievement in competitions. High A-trait males may be more sensitive to the importance of performing well when performance improvement is required. Further, Eysenck (1991) suggested that high A-trait people tend to be sensitive to substantial demands when a task is requested. In the HP condition, participants were asked to perform better. This may have resulted in participants being more aware of the importance of performance improvement for high A-trait male participants. Thinking about performance improvement may cause high A-trait males to become more worried about performance outcomes. In contradiction to male participants, females exhibited a positive relationship between A-trait and performance. Even though this relationship was not significant from the statistical perspective, the magnitude of the association was moderate. There was a tendency for female participants who were high in A-trait to perform better in the HP condition compared to the LP condition. This finding is consistent with previous studies (e.g., Maria & Nuovo, 1990; Felson & Trudeau, 1991). According to Byrne and Eysenck (1995), high A-trait individuals are more likely to have experienced A-state than low A-trait individuals. In this study, females reported more A-state than males. Thus, high A-trait females in this study may be more accustomed to performing well while anxious, resulting in performance maintenance in the HP condition.

As I reported in Study 3, approach coping styles were associated with performance decrements under pressure. Avoidance coping styles, however, were not associated with performance. This study attempted to determine if gender differences exist in the relationship between coping styles and choking. Results showed that male participants who typically used an approach coping strategy performed poorly under pressure. For females, the approach coping style also resulted in a large drop in performance (21%) in the HP condition. This result, however, was not significant, because of the smaller sample size. Based on these results, approach coping styles appear to be more closely associated with performance decrements under pressure than avoidance coping styles for both males and females. Although the small sample size limits power in this study, these findings tend to be consistent with findings in Study 3.

In summary, the results of this study indicate that manipulation of self-awareness did not cause gender differences in perceived pressure, and performance decrements occurred among both males and females. Further, this study found consistent results with Study 1 for S-C, whereas there are gender differences in the effects of A-trait on performance under pressure. Finally, consistent with Study 3, results of this study show that coping styles may help predict performance in high-pressure situations.

CHAPTER 8

GENERAL DISCUSSION

As stated earlier, although the term choking is well known and widely used in the popular press, sport psychology researchers have not examined choking very closely. The general aim of this dissertation was to examine a number of factors relating to choking in a sports context. As such, I believe the results of these five interrelated studies advance our (i.e., sport psychologists) understanding of the key factors that underlie choking. While the present general discussion recaps on the major findings from the five studies, the emphasis is primarily on presenting a new integrated model of choking in sport. Given that each of the previous research study chapters have their own self-contained discussion, I felt that anything more detailed than a general overview might be laborious and repetitious. The culmination of the present dissertation is a first attempt at linking susceptibility factors, perception of pressure, coping processes, task characteristics, and skill level into a choking process model. Models are important because they provide a framework for making connections between theory and practice. Researchers are invited to examine components of this model and based on their findings offer suggestions for improving this preliminary model. Readers will notice that the model combines elements of anxiety research, choking research, choking theories that are largely based on how attention relates to choking. Although choking research has mainly focused on performance problems in attentional processes, I contend that choking is attentional problem relating to anxiety. For choking theories to fully explain the choking phenomenon they should show how attention and anxiety are both involved.

Before presenting this process model of choking, the key features and an alternative definition of choking are discussed. Following this, a flow chart of my proposed choking model is presented. The model delineates the complexities of choking by following the process pathway that choking athletes are likely to experience. One caveat is important; the model presented here consists of aspects that have been directly tested in this dissertation. Other aspects of the model have, however, not been tested in this dissertation and are derived from the findings of previous research. Aspects of the new process model directly tested in this dissertation are bolded (see Figure 3). The remainder of the chapter is structured to discuss each of the components of this choking process model, in particular with reference to the findings of the studies pertaining to this dissertation.

Features of Choking and An Alternative Definition

Two Features of Choking

Choking describes a very specific kind of failure with two necessary conditions. First, choking is a process synonymous with progressive performance deterioration, whereby the athlete is unable to recover (Nideffer & Sagal, 1998; Weinberg, 1988; Weinberg & Gould, 1999). According to Woods (1998), performance in sport consists of perceptual processes, decision-making, and movement. Baumeister (1984) suggested that choking only occurs in pressure situations. Perceived pressure influences changes in cognitive and somatic responses leading to incorrect decision-making and associated incorrect movements. Second, pressure, whether real or perceived, causes performers to be aware of the importance of performing well. Importantly, if a performer under pressure, for whatever reason, lacks motivation to perform well, then poor performance cannot be attributed to choking. Indeed, people sometimes deal with pressure by withdrawing effort from the task at hand. In such cases, performance decrements derive from the notion of "helplessness" (Carver & Scheier, 1981; Scherier & Carver, 1982; Seligman, 1975), which is contrary to choking (Langer & Imber, 1979).

Existing Definitions of Choking

There is no universally accepted definition of choking at present. Existing definitions seem to emphasize different aspects of choking. Traditionally, choking in sport is defined as *the inability to perform up to previously exhibited standards* (Daniel, 1981), *decrements of performance under pressure* (Baumeister, 1984) or *an altered state of consciousness* (Nideffer, 1992).

Specifically, Daniel's definition confounds choking with other legitimate reasons underlying performance decrements (e.g., injury, luck, equipment failure, lack of motivation, withdrawal of effort). The Daniel's definition pre-supposes that athletes are somehow capable of performing at their best whenever they compete. In addition, both the Daniel (1984) and Baumeister (1984) definitions focus on performance outcomes rather than the process underlying poor performance. Weinberg and Gould (1999) emphasized choking as a process that leads to impaired performance. If we accept that choking is a process then we (i.e., sport psychologists) need to develop a definition of choking that is not purely outcome based.

Nideffer's (1992) definition describes choking as a process where changes in consciousness underlie choking. Nideffer's definition, however, appears insufficient to explain choking in some situations because distraction is emphasized as the primary causal factor. For instance, distraction may be less likely to influence skill tasks that do not necessarily require a response to information cues while they are performed. Performance decrements on fine motor tasks, such as golf putting and free throw shooting, may result from the inhibition of automatic skills because successful performance on these tasks requires automatic execution of well-learned skills. Because of the limitations with the present definitions of choking an alternative definition is advanced in this dissertation. This alternative definition emphasizes the importance of both pressure and process.

Alternative Definition

A possible alternative definition of choking is *deterioration in the execution of habitual processes of performance under pressure*. Deterioration refers to a clear disruption in the quality of performance, which is characterized by the performer trying too hard. Similar to other definitions, choking only occurs under pressure circumstances. According to this definition, choking reflects the combined problems of both perceptual control and skill execution. Pressure may cause these problems, resulting in an altercation of an athlete's *habitual processes of performance*. This process is repeated in a cyclical pattern, resulting in choking. *Habitual processes of performance* refer to performance patterns that performers typically execute. According to Baumeister et al. (1990), the performance patterns depend on over-learned response sequences that become automatic. For tasks predominantly requiring information, a habitual process of performance can be the response to relevant cues followed by acquiring information. The change in the habitual process may result in information being missed. For tasks predominantly requiring motor skills, a habitual process of performance can be the unconscious execution in skills. The change in the habitual process may result in conscious control in automatic execution of motor skills.

An Integrated Model of Choking in Sport

The integrated process model of choking presented here combines aspects of the present research with findings from previous choking research. Both the automatic execution model and the distraction model are relevant, however, neither completely explains choking satisfactorily. Thus, both the distraction model and the automatic execution model are incorporated into the model presented here and follow different process pathways. The proposed integrated choking process model is based on likely sequences of events with contingencies also built in. Initially, stable and unstable causal factors combine to affect an athlete's perception of pressure. Once the athlete perceives pressure, self-awareness and state anxiety (A-state) becomes important in deriving meaning and understanding. The combination of self-awareness and A-state becomes elevated leading to increases in the perceived importance of performing well. From this point, the model is more multidimensional because the combination of such factors as, coping strategies, task characteristics, and skill levels can result in a range of performance outcomes. Arrows are provided to show the complex set of propositions that underlie this integrated choking process model (see Figure 3).

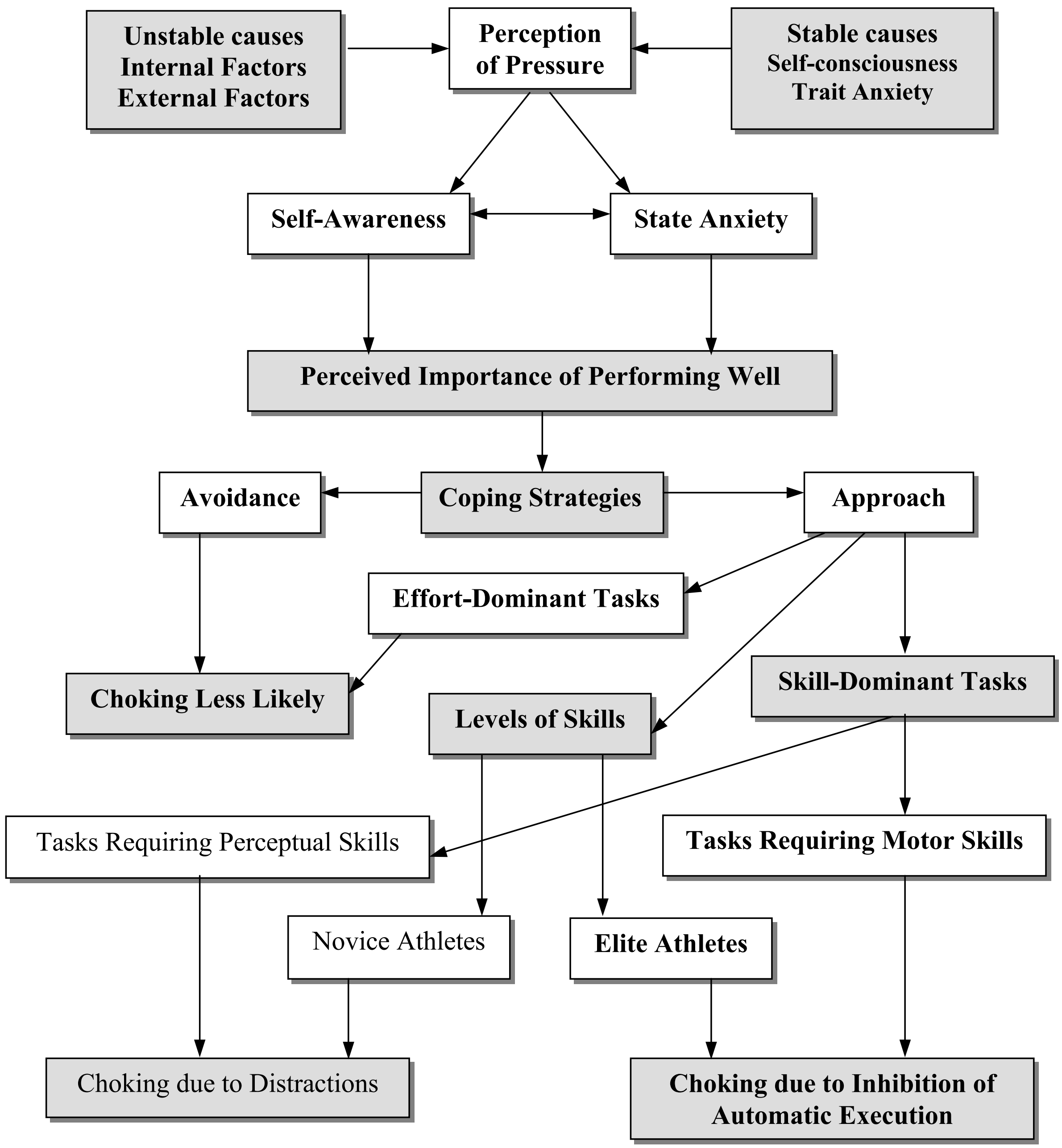

Figure 3. Proposed Choking Process Model in Sport

Susceptibility Factors

Stable Causal Factors

Stable causal factors refer to pre disposing personality factors, such as self-consciousness and A-trait. In this integrated choking model stable causes combine with unstable factors to determine the level of perceived pressure. Choking is unlikely to occur unless at least some of these causal factors are present. The importance of the two personality factors included here, self-consciousness and A-trait is evident from both previous research and the findings of the present research (see Chapter 3). Previous research has examined the link between self-consciousness and choking extensively. A-trait has been more closely linked with competitive anxiety research rather than directly with choking per se. Study 1 (i.e., Chapter 3) in this dissertation did, however, examine links between A-trait and choking directly. Researchers examining choking have frequently used the Self-Consciousness Scale (Fenigstein et al., 1975), which includes a social anxiety scale as a dependent measure, and thus, the need to examine A-trait independently may have been overlooked or perceived to be redundant.

Self-consciousness. Self-consciousness (S-C) has been consistently linked to how an individual senses and becomes preoccupied with how other people see them. Self-consciousness has also been consistently linked to choking. Self-conscious people are concerned about the impression they create in other people and therefore, try to control the impression. For this reason, dispositional S-C is usually tested in choking research as a pre-disposing causal factor. Masters et al. (1993) have suggested that the higher the individual's S-C, the more likely it is that they will think about what they are going, and S-C is highly related to "reinvestment". Hence, the greater the chance that choking will occur. Study 1 in the present dissertation, consistent with previous studies (e.g., Brockner, 1979; Dollinger, et al., 1987; O'Donnell, et al., 1987), provides evidence supporting Masters et al.'s postulation.

The majority of research testing S-C and performance has been based on the theoretical framework of the automatic execution model. Some studies, however, have ignored the task characteristic and skill level that might have an influence on results. As discussed in Study 1, even Baumeister (1984) himself has chosen experimental tasks that are questionable in terms of whether the skill has been truly automated. In Baumeister's series of six experiments, a simple novel task was used. Arguably, if the experimental task involves less skill, or participants are in the learning stage, the results may be confounded. For instance, a novice usually needs to focus on the research task while performing, because they are still in the cognitive stage of learning. In such cases, highly self-conscious people under pressure may maintain their performance, because their tendency toward self-focus is helpful in terms of carrying out the performing process. In contrast, low self-conscious people may perform poorly on a learning task, because they are more likely to attend to external distractions resulting in an inability to focus their attention on performance processing.

Using inconsistent concepts of S-C may also result in different explanations for studies testing S-C. Heaton and Segall (1991) claimed that low self-conscious individuals habitually focus their attention outward, whereas high self-conscious individuals habitually focus their attention inward. Heaton and Segall, thus, predicted that the presence of an audience would most affect low self-conscious individuals who are outwardly focused. "Self-presentational attempts to please the audience should be greater for persons low in S-C than those high in S-C" (p. 178). This prediction is counterintuitive and ignores potentially debilitating effects of internal focus. High self-conscious people focus inwardly because they are concerned about what others think of them. Definitions become important here in emphasizing shame and embarrassment as the core emotions of S-C (Costa & McCrae, 1992). The Dictionary of Psychology defines S-C as:

> Self-awareness, but with a twist, the additional realization that it is possible that others are similarly aware of oneself. Specifically, a sense of embarrassment or unease that derives from the sense expressed in 1 (i.e., self awareness) when the individual suspects that the awareness that others have contains critical evaluative aspects that are incompatible with one's own personal self-assessment or reveals one to be inadequate (Reber, 1985, p. 677).

Clearly, S-C is underpinned by concerns about how the self is perceived by others. Brown (1991) in discussing S-C focused on the relationship between the self and objects in the high S-C individual. "Self-awareness or introspection is not awareness of the self but the self awareness of objects…This is not a self one is conscious of but a relation between a self and its objects, both image and object representations." (p. 62) According to Brown (1991), high self-conscious performers in pressure situations (e.g., in presence of an audience) may become more concerned about the audience's impression than low self-conscious performers, resulting in an increase in performance pressure.

Based on these concerns about issues in previous studies, I have re-examined the effect of S-C on performance under pressure in this dissertation. The results show performance decrements under pressure appears among the high self-conscious participants rather than the low self-conscious participants, at least for a complex, well-learned task.

<u>Trait anxiety.</u> Of all the hypothesized antecedents of competitive anxiety, A-trait has probably received the most support (Cooley, 1987; Gould, et al. 1983; Martens, et

al. 1990; Poteet & Weinberg, 1980; Scanlan & Passer, 1978, 1979; Weinberg & Genuchi, 1980; Williams & Krane, 1992). The overwhelming support of A-trait as an antecedent of A-state provides a pointer to athletes who are likely to experience high levels of A-state, depending on the presence of other factors.

Previous research (e.g., Kurosawa & Harackiewicz, 1995) revealed that A-trait was associated with performance decrements under pressure. Specifically, Kurosawa and Harackiewicz (1995) found that high A-trait participants had poorer performance than low A-trait participants in self-awareness situations. Kurosawa and Harackiewicz explained that high A-trait individuals tended to think about performance issues in situations where pressure highlights self-awareness. The results from Study 1 in this dissertation partly support Kurosawa and Harackiewicz's findings. In addition, Study 5 showed high A-trait male participants were more susceptible to performance decrements, compared to high A-trait female participants.

Unstable Causal Factors

Unstable causal factors are situational and state based. The number and transience of unstable causal factors is sub-divided in the process model of choking into internal and external factors. Unstable causal factors link with stable causes to determine the level of perceived pressure. In respect to published research, the link between the factors described here is based on competitive anxiety literature, rather than choking per se. Nevertheless, since, self-awareness and A-state are vital components of the integrated choking model, these factors are important.

Choking is associated with many situational factors. Anshel (1997) has suggested that the causes of choking can be both internal and external. Internal causes of choking include: somatic aspects, cognitive aspects, and ego relevance. External causes of choking include: environmental aspects, such as audience, coach, and opponents. Some situations may be closely associated with choking under pressure. For example, choking may occur when an athlete becomes distracted by an audience. An athlete may also choke while performing in front of friends or relatives. In addition, athletes may choke when they are afraid to win or lose, or afraid to be labeled a choker.

Imminent failure and success. Fluctuations in the level of A-state can occur depending on how well the athlete is performing. For example, A-state may increase quickly in response to an unexpected poor performance, or when an opponent is performing exceptionally well. McAuley (1985) found that post-competition A-state was more closely related to performance than was pre-competition A-state. McAuley concluded that A-state is more likely a result of performance than an antecedent. In his study, golf performance had a significant influence on cognitive A-state, accounting for 26% of the variance in A-state. Attempts to predict performance based on pre-competition A-state are often confounded by the effects of both ongoing performance results and situation criticality. Taken together, these two variables reflect the tendency for A-state to be reactive, and thus, fluctuate throughout the competition period. Labels are sometimes given to athletes who repeatedly respond to critical situations in a particular way, for example, maladaptively (e.g., “Choker”) or adaptively (e.g., “Iceman”). Krane et al. (1994) investigated the effects of situation criticality with collegiate softball players. Krane et al. found a significant increase in cognitive A-state when the score differential in competition was close and when a player was on third base, compared to when there was a two run or more score differential and when third base was not occupied. Their study followed up on earlier work by Lowe (1973), who found that little league baseball players experienced higher heart rates during critical moments of games.

Heaton and Sigall (1989) claimed that intra-game factors, such as results that transpire during a game, contribute to pressure, and thus affect choking. There are two intra-game factors, taking the lead and falling behind. By falling behind, one heightens the chances of a failing outcome. Thus, it increases one's self-awareness, which may lead to choking. Baumeister and Steinhilber (1984) claimed that impending success also emphasizes the importance of becoming the champion, causing the heightened self-awareness.

<u>Ego threat/fear of evaluation.</u> A similar but more specific proposed cause of increased self-awareness and A-state is ego threat (Fisher & Zwart, 1982). Ego threat comprises situations where there is an apparent negative spotlight on the athlete, such as after making a foolish mistake (Fisher & Zwart, 1982). Furthermore, self-presentational implication of athletes' performance related to social evaluation is highly associated with the perception of threat (Leary, 1992). Dunn and Nielson (1993), in a study of soccer and ice hockey players, found situations focusing attention negatively on players were consistently perceived as sources of threat. The types of situations included: being benched, receiving criticism from the coach, and making a bad pass that led to an opposition goal. Similarly, Scanlan, Stein, and Ravizza (1991) found that figure skaters experienced a number of perceived ego threats including: not wanting to let others down, worries over what others would think and say if they performed poorly, and losing one's sense of self-worth/identity. Fisher and Zwart (1982) found ego threat to be the most pervasive facet of anxiety responses among male college basketball players. They found that criticism by the coach and crowd rated as two of the three highest anxiety-inducing situations in a list of eighteen anxiety eliciting basketball-related scenarios.

Performance expectancy. Another prevalent source of A-state relates to internal pressure associated with performing, such as not performing up to expectations and not improving on previous performances (Gould & Weinberg, 1985). Where a discrepancy occurs between expectancy and performance, significant levels of stress are often reported (Scanlan & Passer, 1978). This proposed cause rates highly when athletes are asked to describe their most frequent sources of worry and stress. In an exploratory study with intercollegiate wrestlers, Gould and Weinberg (1985) identified 33 separate sources of worry. Of these, two of the top four perceived worries related directly to performance expectations. Over 40% of participants rated worry “about improving on my last performance” and worry “about performing up to my level of ability” as major sources of distress. In a similar study of competitive stress among intercollegiate golfers, Cohn (1990) identified 29 separate sources of stress. Of these, the most frequently cited source of stress was “playing up to personal standards” with all golfers identifying this source as a perceived stressor.

Perceived uncertainty of outcome. Martens et al. (1990) referred to Kagan (1972) who stated that perceived uncertainty is “the inability to predict the future, especially if the doubt centers on the experience of potentially unpleasant events like punishment, physical harm, failure, or rejection” (p. 52). Martens et al. argued that people attempt to resolve the uncertainty, and simultaneously calculate their chances of success by seeking information from four sources. First, athletes seek information about the quality of the standard to which their performance will be compared. Second, athletes gather information about their own performance capacity. Third, they seek estimates of the probability that actual performance will approximate performance capability. Fourth, athletes will estimate the probability that actual performance will determine performance outcome.

Social debilitation (audience effects). A number of studies have directly lent support to the hypothesis that the presence of others can lead to performance decrements. The studies in this dissertation, consistent with previous choking research, show the presence of an audience added preesure and transmited unrealistic performance expectations. In these studies, increased A-state resulted from the presence of an audience. The results from the five studies illustrated that, although participants rated the audience pressure as either negative or positive, their performance showed a general decline under the pressure. In another qualitative study by Scanlan et al. (1991), skating in front of people and falling in front of the crowd were mentioned as sources of stress for skaters.

Position goal (i.e., task difficulty). The perceived difficulty of the task has been related to A-state (Dowthwaite & Armstong, 1984; Gruber & Beauchamp, 1979; Jones, et al., 1990). In a study of university basketball players, Gruber and Beauchamp found game difficulty to be closely related to A-state. Mean scores for global A-state were significantly different for two practice situations (M = 19.5, SD = 3.9), compared to three easy games (M = 22.0, SD = 6.7), and three crucial games (M = 25.4, SD = 6.5), thus demonstrating that as task difficulty increased so did A-state.

In short, there are a number of possible contributing factors to the sense of pressure and hence choking. Apart from the unstable causal factors discussed above, other external and internal causal factors, such as parental and coach pressure or real life stressors, may also affect athletes' perception of pressure depending on their particular circumstances. In addition, goat orientation (i.e., winning focus) may also lead athletes to choke under pressure. I only discuss some unstable causal factors because testing unstable causal factors was not the central core in this dissertation.

Perception of Pressure

Athletes are often defined in terms of success and failure perceptions. Hence, an argument could be made for extrapolation of the current findings where performance decrements were evident under pressure.

Negative Appraisal and Positive Appraisal Under Pressure

Findings from Study 2 (i.e., A-state) showed performance decrements were linked to the relationship between self-focus and the direction of A-state. Specifically, perceived pressure positively related to S-C. Furthermore, high self-conscious participants appraised their A-state as more negative that low self-conscious participants. Based on findings from Study 2, negative appraisal derived from increased S-C was more harmful to performance than negative appraisal derived from decreased S-C. Performance decrements caused by negative appraisal relating to S-C may be explained in terms of debilitative effects of self-focused attention. Focusing attention on the self may result in a discrepancy between performance and expectancy, whereby the individual tries to bring the real outcome closer to the ideal by changing performance. As a result, negative appraisal based on increased self-awareness may in turn, increase the importance of performing well for the performers, subsequently resulting in choking.

Although the common assumption is that debilitative A-state is associated with performance decrements under pressure (e.g., Jones, 1995), findings from Studies 2 and 5 (i.e., gender) of this dissertation showed that participants with positive appraisal were equally likely to experience performance decrements in the HP condition. As discussed earlier, there exists a difference in control of focused attention between individuals with negative appraisal and positive appraisal. Individuals with negative appraisal are normally unable to control their focus of attention, because their anxiety makes it hard for them to stop thinking about task irrelevances in pressure situations. Individuals with positive appraisal, however, often appear to be able to control their focus of attention in pressure situations. It is understandable that performers with negative appraisal choke under pressure, because anxious performers may be unable to control their attention to match the task demands. The possible explanation why individuals with positive appraisal choke under pressure could be that the performers use an inappropriate focused attention during performing, such as focusing on the performance process when they perform free throw shooting.

Choking among the performers with positive appraisal may be likely to appear in elite sports. Although elite athletes may also feel anxious in competitions, elite athletes under pressure usually prefer to look on their emotion as turning from nervousness to challenge to performance (Keller & Schilling, 1997). Previous anxiety research (e.g., Jones, Hanton, & Swain, 1994; Orlick & Partington, 1988) showed that elite athletes typically reported more positive A-state during competitions, compared to novice athletes. Furthermore, Jones and Swain (1992) also found high competitive athletes reported A-state as more facilitative than low competitive athletes. According to Jones (1995), elite athletes often exhibit high personal control in competitions, resulting in positive appraisal under pressure. Jones has explained that elite athletes, rather than novice athletes, have more confidence in their ability and subsequently may report facilitative competitive anxiety. Researchers in these studies have claimed that elite athletes under pressure are more likely to hold the positive appraisal than novice athletes. Keller and Schilling, however, found that there was no positive relationship between positive appraisal and performance. Studies of this dissertation, consistent with Butler and Baumeister's (1998) study, also showed that, when participants were aware of the importance of performing well, positive appraisal did not facilitate performance under pressure.

An implication for practice is that these findings regarding the effects of positive appraisal may help our understanding of choking among elite athletes. Although many elite athletes, especially superior athletes, know they have an excellent chance of winning under any circumstances, no matter who the opponent is, or how the match is going, the sports media and public frequently report that elite athletes choke under pressure. Interestingly, athletes who choked under pressure usually declared themselves as having less anxiety and more confidence. For example, a tennis player, Carlos Moya, who was labeled as a choker by media at the 1998 ATP Tour world championship final, said, “I felt I should have won this match…. The problem is just that I couldn’t play well enough at important moments.” (Reuters, 1998, p. 74). Thus, there may be an element of denial in choking, because athletes are perhaps concerned about being labeled as “chokers”.

Perceived Importance of Performing Well

The importance of performing well has been included in the model as a separate step because previous choking researchers have consistently listed importance as a pre-condition to choking. Those who are familiar with competitive anxiety research might prefer to include perceived importance as an internal/unstable cause of choking. For this integrated model of choking, I have, however, included “perceived importance of performing well” as a separate step because previous research has emphatically linked importance with. According to Baumeister (1984), pressure that leads to choking refers to any factor or combination of factors that increases the importance of performing well. Baumeister and Showers (1986) claimed that perceived importance of outcome relates to the perceived value of attaining a favorable result. According to Martens et al.

(1990), the perceived value is a combination of the intrinsic and extrinsic consequences of the result. Extrinsic consequences include tangible rewards, such as money or positive reinforcement, whereas intrinsic consequences include a sense of mastery, feelings of competence, and increased self-esteem. A number of researchers have found that high levels of perceived importance relate to competitive anxiety (Gould et al., 1983; Lewthwaite, 1990; Marchant et al., 1998; Martens et al. 1990; Prapavessis, Cox, & Brooks, 1996; Rainey & Cunningham, 1988; Scanlan et al. 1991).

The studies in this dissertation illustrated that performance decrements occurred when pressure was used to emphasize the importance of performing well. Rewards or punishments in these studies reflect the performance contingent reward manipulation that induced the importance of performing well (Baumeister & Showers, 1986). Consistent with previous research, I expect that the pressure manipulation would have also induced increased self-awareness for participants in the present studies. According to Hass and Eisenstadt (1991), situations that promote self-awareness, such as the presence of audiences, cameras, and tape recorders, normally produce a comparison of what one believes one is like with one's ideal. Reno and Kenny (1992) explained that increased self-awareness could lead individuals to be concerned about making a good impression on others, resulting in awareness of the importance of performing well. In addition, the manipulated pressure in the series of studies pertaining to this dissertation reduced the possibility that inferior performance could be attributed to effort withdrawal. Baumeister (1984) reported a limitation of his research by suggesting that some participants had "given up" in his fifth experiment, because an absolute criterion of offering a reward for all participants was used. Thus, some participants might have thought the criterion was too high to reach and, consequently, they gave up even before commencing. In the present dissertation, how much money participants could win in the

HP condition was linked to their previous performance in the LP condition. That is, the criterion for each participant was modified, according to their previous performance that presumably was a reasonable indicator of their ability in a non-pressured situation.

The manipulated pressure in this dissertation has a practical implication for the understanding of choking under pressure in sport. Pressure in sport commonly creates the importance of performing well. For instance, success in some athletes' minds is central to their self-esteem and their perceived ability in the eyes of others, even though this might be quite irrational. These athletes are obviously in a very vulnerable position, especially when the majority of sport competitions are negative sum situations, this is, they have more losers than winners. Thus, contingent rewards or punishments for athletes undoubtedly emphasize the importance of performing well. In addition, athletic pressure may also be exacerbated with the perceived importance of people watching (e.g., competitors, coaches, home fans, family, and relations). Choking in sports may test an athlete's nervous equilibrium with the smallest discrepancy causing serious reverberations.

Coping with Choking

Choking can ruin an athlete's performance, but an inability to cope will most likely make the situation worse. The principal question in regard to coping processes is whether athletes are using appropriate coping strategies in situations where choking may occur.

Approach Coping and Avoidance Coping

Study 3 of this dissertation shows that participants who used approach coping strategies were more likely to choke under pressure than those who used avoidance coping strategies. According to Anshel et al. (1997), approach copping refers to the process of taking active steps in attempting to deal with stress, and an orientation toward attending to situation-relevant characteristics. Avoidance coping is defined as turning away from the threat-related cues. Thus, athletes who use approach coping strategies may take direct action like increasing their efforts and seeking information to explain the source of stress in pressure situations. Athletes who use avoidance coping strategies, however, may disregard irrelevant information in pressure situations, such as various potential distractors. From this perspective, the use of approach coping strategies may be inappropriate in a situation where choking may potentially occur, because such coping patterns may increase self-awareness, negative A-state, and consequently performers may either be distracted or make an attempt to over control the performing process. Consistent with Krohne and Hindel (1988), Study 3 showed that participants who frequently used avoidance coping strategies reported less A-state in pressure situations than participants who used approach coping strategies. Conversely, Study 3 has demonstrated greater use of approach coping strategies leads to increased negative A-state, and performance decrements under pressure.

Coping studies in sport (e.g., Anshel et al., 1998) have shown that the majority of athletes tended to use approach coping strategies in situations where acute stressors existed, thus, increasing the likelihood of choking. Based on these findings, athletes in high-pressure situations should be encouraged by coaches and sport psychologists to use avoidance coping strategies when they perform skill-dominant tasks, because avoidance coping strategies may protect them from interfering thoughts and actions, thereby helping performers in their regular manner. Athletes may obtain benefits from these findings that suggest appropriate coping strategies for practice. From the perspective of task characteristics, approach coping does not always harm performance under pressure.

Approach coping may increase one's efforts in high-pressure situations, and for effort-dominant tasks this may help performers maintain or improve their performance.

Task Characteristics

The sport media often report choking especially in such sports as golf and tennis, but few cases of choking are reported in such sports as running and football codes. Study 4, consistent with previous research (e.g., Baumeister, et al., 1990), has provided experimental evidence that skill-dominant tasks, rather than effort-dominant tasks, are associated with choking under pressure.

Effort-Dominant Tasks versus Skill-Dominant Tasks

Study 4 demonstrates that choking was more likely to occur in a skill-dominant task than an effort-dominant task. Specifically, in Study 4, pressure caused an improvement in performance on a running task (accounting for 28% of performance variance), whereas the same pressure induced a decline in performance on a free throw shooting task (accounting for 18% of performance variance). Based on these findings, task characteristics that mediate choking are emphasized in the proposed choking process model. In reality there is a continuum of skill involvement and effort involvement in the majority of sports tasks. Very few sports tasks could be safely categorized as pure skill or pure effort. Nevertheless, tasks that involve primarily skill would seem to be most susceptible to choking effects.

Tasks Requiring Perceptual Skills and Tasks Requiring Motor Skills

Skill has both performance and behavioral connotations. Skill generally refers to a learned movement or pattern of movement that have been honed and polished through repeated trials (Pargman, 1986). According to Alderman (1974), skill also refers to a specific task and the level of the person's proficiency in that task. Furthermore, Holding

(1989) has distinguished tasks requiring skills as a continuum from those with mainly perceptual demands to those with mainly motor demands (see Figure 4). Holding's classification of tasks combines the 'controlled-automatic' (Shiffrin & Schneider, 1977) dimension and the 'open-closed' (Poulton, 1957) distinctions. According to Shiffrin and Schneiders' (1977), controlled performance processing makes heavy demands on attentional capacity, but automatic performance processing is relatively effortless, unaffected by capacity limitations, and improvable by practice. Furthermore, Holding has pointed out that the "open-closed" distinction is actually similar to the older dichotomy between skill and habit because the closed skill tends to be become habitual.

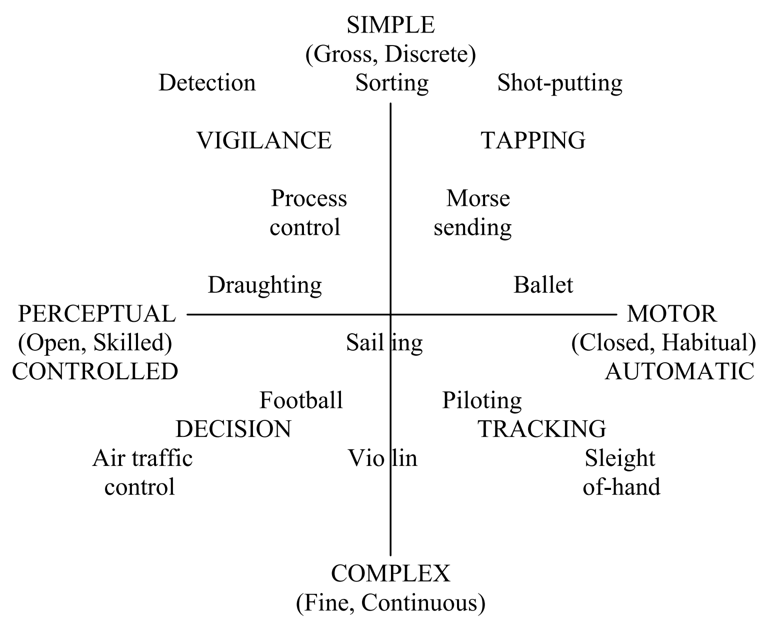

Figure 4. A suggested classification of skilled tasks by Holding (1989). In D. H. Holding (Ed.) Human skills (2nd ed., p. 6).

On the basis of the term of perceptual-motor skills, he has suggested a distinction between tasks requiring skills. Holding has proposed that tasks involving motor skills require the coordination of different muscle groups. Performance on these tasks is dependent on that skills become habitual. Conversely, task involving perceptual skills require information handling. Skills for these tasks imply information integration.

Similarly, according to Woods (1998), skill is divided into three different types: perceptual skill, cognitive skill, and motor skill. Perceptual skill refers to those processes used to make sense of information coming to the brain via the senses. Cognitive skill consists of planning, thinking, and decision-making. Motor skill is the level of motor proficiency a person has for performing an athletic task. From the perspective of skill characteristics, any sporting task can require these three sub-domains of skill. For tasks predominantly requiring a response to information cues, the performance process would largely involve perceptual skills and cognitive skills rather than motor skills. Yet, for tasks predominantly requiring movement execution, the performance process is more likely to emphasize cognitive skills and motor skills rather than perceptual skills.

Tasks, such as defensive movements in basketball that require mainly information cues, are primarily executed in an ever-changing environment (Abernethy, 1991; Calvo et al., 1990; Finkenberg, Dinucci, McCune, & McCune, 1992; Gentile, 1972). In responding to information cues (perceptual processes), athletes attempt to develop patterns of movement that match the stimuli encountered (Gentile, 1972). When tasks predominantly require information, perception of the environment is also important. According to Nideffer (1992), irrelevant stimuli can interfere with the attainment of information. If performers have inadequate perceptual processes and perhaps do not obtain enough information, they will experience problems making correct decisions about how to match task demands. For instance, defensive tasks in sports generally require a quick and correct response to information cues. Thus, Nideffer's distraction model might best fit in terms of how performance decrements are associated with a breakdown in perceptual processes.

Tasks, such as free throw shooting that predominantly require motor skills, are normally performed in a relatively constant environment (Abernethy, 1991; Calvo et al., 1990; Finkenberg et al., 1992; Gentile, 1972). When these tasks are performed, attentional processes are normally under control by performers (Singer, 1980). According to Knapp (1964) and Konorski (1967), performance on these tasks relies on habitual, established or over-learned motor skills. When motor skills become well learned, performance on these tasks is normally of a high standard. For example, premeditated tasks in sports, such as free throw shooting, shooting, archery, and golf putting, often require precise fine muscle activity. The ability to automatically perform these tasks without conscious control is of paramount importance for the successful execution of such tasks. Thus, Baumeister's automatic execution model might best fit in terms of how performance decrements are associated with a breakdown in motor processes.

Baumeister (1984) and Masters (1992) have suggested that, if performers under pressure attempt to perform well, they may refocus on the specific steps of execution during performing. As a result, the performer regresses into conscious control of automatized skills and this may lead to the inhibition of automatic execution (Baddeley & Woodhead, 1982; Kimble & Perlmuter, 1970; Simon, 1967). A concern expressed by Gaton et al. (1987) is that the automatic execution model does not necessarily fit all choking phenomena equally in sport. Gayton et al. examined choking in professional ice hockey based on the automatic execution model. Gayton et al. claimed "this failure to find a home court disadvantage may be related to the fact that the attentional demands of hockey are different from those of baseball and basketball." (p. 185) Gayton et al.'s study gives rise to the claim that the automatic execution model does not necessarily account for all the perceptual aspects of some tasks.

Choking among Elite Athletes

Choking can occur for athletes at any level of proficiency. It would seem that distraction might be the chief cause of choking for novice athletes. The inhibition of automatic execution, however, may be the primary cause of choking for elite athletes. If performing does not involve automatic execution of skills, then performance decrements may not result from the inhibition of automatic skills. Elite athletes typically practice their skills to very high levels. As Masters (1992) has noted in relation to decrements of skilled performance, choking involves "the failure of normally expert skill under pressure." (p.344)

To explain choking, proponents of the distraction model have suggested that anxiety plays an important role in creating sources of distraction. Gould, Eklund, and Jackson (1992), and Moran (1996) have suggested that competitive anxiety is one of the major factors that cause the restraint of athletes' concentration. In pressure situations, performers become concerned or worried about their performance and are usually immersed in task-irrelevant cues, causing performance problems. These worries lead to poor judgment and poor decision-making. Thus, performance decrements are the result of distraction brought about by excessive A-state. Given that novice athletes under pressure are more likely to become worried than elite athletes, choking among novice athletes may be primarily due to distraction.

Summary

This chapter has been devoted to discussing the major findings of the present dissertation, particularly in reference to the proposed choking process model. Perceived pressure is associated with numerous stable and unstable causal factors. Perceived pressure links these potential causes with self-awareness and A-state. Increased self-awareness and A-state are associated with the importance of performing well. In dealing with increased self-awareness and A-state, athletes are likely to use coping strategies. In general, avoidance coping strategies help skilled performance under pressure. Approach coping strategies, however, affect performance differently depending on task characteristics. For effort-dominant tasks, approach coping strategies that manifest in an increase in effort can improve performance under pressure. For skill-dominant tasks, approach coping strategies that manifest in an increase in effort can harm performance under pressure. The choking process model indicates that, apart from coping style, task characteristics are also important in determining the likelihood of choking. Specifically, distraction is likely to interfere with performance on tasks predominantly requiring perceptual skills, whereas, performance decrements on tasks predominantly requiring motor skills most likely derive from inhibition of automatic execution. In relation to skill levels, distraction is thought to relate to choking among novice athletes, whereas the inhibition of automatic execution is likely to relate to choking among elite athletes.

CHAPTER 9

CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes the main findings of five studies and their relation to the proposed choking process model. In addition, a particular focus is placed on recommendations for future research and the significance of this dissertation.

Summary and Conclusions

General Findings

The five studies contained in this dissertation have addressed a number of issues related to the choking phenomenon. These five studies were designed to test the choking process in terms of individual differences in S-C and A-trait, A-state, coping processes, task characteristics, and gender differences.

Previous research has shown inconsistent results in relation to the effects of S-C and A-trait on performance under pressure (Baumeister, 1984; Masters et al., 1993). Study 1 has attempted to predict choking through S-C and A-trait scores. The results have supported the hypothesis that high self-conscious participants were more susceptible to performance decrements under pressure than low self-conscious participants. Study 1 has also confirmed that high somatic A-trait participants were more likely to suffer performance decrements under pressure than low somatic A-trait participants.

Curiously, the majority of previous research has not examined A-state responses to the manipulation of pressure. Study 2 has tested the extent to which participants felt anxious both in the low and high-pressure situations. The results of Study 2 have illustrated that participants experienced significantly increased intensity of somatic A-state and cognitive A-state in the increased pressure situations. Furthermore, the results have showed that some participants rated their A-state as negative, whereas other participants rated their A-state as positive. The results of this study, however, do not show a meaningful relationship between A-state and performance. An indirect relationship between self-awareness, A-state, and performance is suggested in this study. Specifically, A-state associated with an internal focus may be more detrimental to performance than A-state associated with an external focus. In addition, results from this study have illustrated that positive A-state do not always help performance under pressure.

Although the common understanding has been that coping processes influence performance under pressure, few researchers investigate the relationship between coping and performance under pressure. Study 3 has tested how the coping styles of participants related to choking susceptibility. The results have confirmed the hypothesis that participants who typically used approach coping strategies were more likely to choke than those who predominantly used avoidance strategies.

In general, sport psychologists have attempted to explain choking as a distraction problem. Recent choking studies (Lewis & Linder, 1997), however, have showed that choking may not be a distraction problem per se. These studies have illustrated that performers may also choke under pressure, when they focus on the performing process, especially in skill-dominated performance tasks. In Study 4, the automatic execution model (Baumeister, 1984; Masters, 1992) was tested in a sporting context, based on task characteristics. The results have shown that choking was more likely to occur under pressure, when participants were performing a skill-dominant task, compared to when they were performing an effort-dominant task. According to Baumeister et al. (1990), the differences between skill-dominant tasks and effort-dominant tasks relates to performance patterns. Performance pattern for skill-dominant tasks involves the automaticity of skilled processes. Successful performance on a skill-dominant task requires automatic execution of skills, and increased conscious control can disrupt the automatic quality of skilled execution. In contrast, successful performance on an effort-dominant task demands increases in effort, regardless of automatic execution of skills. Increased control during performance is often facilitative for effort-dominant tasks, whereas it is harmful for skill-dominant tasks. This study has provided evidence to support the automatic execution model as an appropriate exploratory explanation of choking in sporting contexts.

There is no published literature examining gender differences in choking under pressure. Previous research has shown that females were more susceptible to performance-threatening information than males. Whether such susceptibility in females is associated with substantial performance decrements has been unknown. Study 5 has tested gender differences in choking in situations where pressure promoted the importance of performing well. The findings of this study have indicated no differences between males and females in choking under pressure, though females reported higher intensity and debilitative A-state. Males reported their A-state as more positive, however, the positive A-state did not help their performance comparatively. Based on gender differences, this study has shown that S-C was more useful in predicting choking for females than males, whereas A-trait was more predictive of choking for males than females. In addition, the results of this study have revealed that the approach coping style was more likely to relate to performance decrements under pressure among males than females.

Integrated Model of Choking in Sport

The principal aim of this dissertation was to develop a choking process model that could accommodate both the distraction model and the automatic execution model to explain choking. First, athletes' perception of pressure depends on stable factors (e.g., individual differences in self-consciousness and A-trait) and unstable factors. Athletes high in S-C and A-trait may be more sensitive to pressure than athletes low in S-C and A-trait. Therefore, athletes high in S-C and A-trait, when placed under pressure, are more likely to experience increased A-state. Furthermore, unstable factors may also affect individuals' perceptions of pressure. For example, if athletes have a high expectancy of winning, they may experience increased pressure in competitions. Second, perceived pressure is associated with increases in both self-awareness and A-state. Thus, the combination of self-awareness and A-state increases the importance of performing well. Third, when athletes experience high performance anxiety, they generally revert to their dominant coping style. Specifically, approach coping strategies may not only increase A-state in pressure situations, but may also lead to choking. Avoidance coping may help athletes reduce their perceived pressure in situations, and thus lower their likelihood of choking. Fourth, approach coping strategies can be efficient when effort-dominant tasks are performed under pressure. If athletes are performing effort-dominant tasks, then the use of approach coping strategies may help to improve performance because of increased effort. For skill-dominant tasks, however, performance is likely to decline under pressure. Fifth, it is suggested that choking under pressure follows two patterns, when performing skill-dominant tasks. The occurrence of choking characterized by athletes being unable to respond to task demands may reflect athletes missing task-relevant cues. This pattern of choking may be more likely to appear when athletes are performing tasks predominantly requiring perceptual skills. In contrast, the occurrence of choking when athletes are consciously controlling performance may reflect inhibiting automatic execution. This pattern links to performance on tasks predominantly requiring motor skills. Finally, choking can occur at any level of athletic expertise. The inhibition of automatic execution most likely occurs among elite athletes, because they have high level of skills and can control their focus of attention in pressure situations. Distraction may be more likely to cause choking among novice athletes, because they have less skill and are easily affected by increased anxiety.

Implications for Sport Practice

Based on the theoretical framework of the proposed choking process model in this dissertation, choking is associated with the attention problems in terms of either an increase in task-irrelevant thought processes or too much task-relevant thinking about the skill requirements of the task. These attention problems ultimately result in changes in habitual performance patterns. Thus, keeping habitual performance patterns at any moment may be the most effective way to reduce the occurrence of choking. Because many internal and external factors can easily increase self-awareness and A-state resulting in attention problems, sport psychologists and coaches should teach athletes to avoid internal and external distractions and maintain their habitual performance patterns in pressure situations. Particularly, for high self-conscious or high A-trait athletes, when facing increased pressure, they may be likely to suffer from changes in their habitual performance patterns. For these athletes, it may be helpful to learn some avoidance coping strategies. In relation to interventions for ameliorating choking, task characteristics and skill levels should be considered as vital factors. According to the proposed choking process model, choking is more likely to occur at skill-dominant tasks than effort-dominant task. When athletes perform a task predominantly requiring perceptual skill, they may be encouraged to concentrate on the performance process. When athletes perform a task predominantly requiring motor skills, however, the appropriate focus of attention should be on global features of the task. In addition, if athletes' skill is at a novice level, then an appropriate focus may be on the performing process. For elite athletes, the use of performance focus should be avoided in pressure situations.

Future Research into Choking under Pressure in Sport

This dissertation has addressed a number of issues in choking research and attempted to test these issues. Although the five studies have exhibited considerably valuable findings, research needs to supply further support because of some limitations still existing in these studies. For instance, the limitation of sample size resulted in that I had to control the Type II error (β) at the minimal level to obtain an acceptable power (power = $1-\beta$) for data analyses (Nix & Barnette, 1998). Consequently, with a .05 alpha level ($\alpha = .05_{\text{2 tail}}$) rejecting a series of the null hypotheses, the analyses may leave a potential of Type I error**.** While some studies in this dissertation test aspects of choking not previously studies (e.g., coping processes and choking) additional research is also needed to consolidate, extend, or even deny these findings is needed. For example, a recent study by Giacobbi and Weinberg (2000) has shown that high A-trait athletes were more likely to use avoidance coping strategies in pressure situations than low A-trait athletes. Avoidance coping strategies may help high A-trait athletes reduce the likelihood of choking under pressure. In addition, anxiety studies (e.g., Byrne & Eysenck, 1995) have found high A-trait individuals are more likely to attend to threat-related, as opposed to neutral stimuli, to interpret threat from ambiguous stimuli, or preferentially recall threat-related information. This does not necessarily mean that high A-trait persons always perform poorly under pressure. Perhaps, there are a number of factors that may reduce the precision of predicting choking. The absence of a meaningful relationship between A-trait and performance for females found in Study 5 may reflect that females are more accustomed to pressure. Ntomumanis and Jones (1998) found that individuals with an internal locus of control viewed their A-trait as more facilitative than individuals with an external locus of control. Thus, further research in this area may be needed to investigate mediating factors that influence performance based on the function of A-trait or interactions with other variables.

Based on the findings of this dissertation, an integrated model of choking in sport is suggested. According to this integrated model, for example, two forms of choking are distinguished depending on task characteristics and skill levels. A recent choking study by Beilock and Carr (2001) tested skill levels and task characteristics as functions of susceptibility to choking. Beilock and Carr found that expert golfers were likely to use generic knowledge while performing a golf-putting task, but novice golfers were likely to use episodic memories. Beilock and Carr claimed that automatic execution processes should involve generic knowledge and proposed that in the automatic stage, episodic memory for performance is minimized. Thus, performing patterns are different between the expert golfers and novice golfers. Furthermore, Beilock and Carr found that choking occurred at a putting task but not at an ‘alphabet arithmetic’ task that is thought to be declaratively accessible at all stages of skill learning. Based on claims of this dissertation, performance on tasks predominantly requiring perceptual skills is more likely to be associated with the perceptual process closely, but performance on tasks predominantly requiring motor skills is more related to the executive process. Future research may be needed to investigate whether performance problems occur in the perceptual process for tasks predominantly requiring perceptual skills, and whether performance problems occur in the executive process for tasks predominantly requiring motor skills. In addition, further research may focus on whether this proposed choking process model predicts choking in sporting situations. The research questions may include (a) if elite athletes are more likely to choke due to the inhibition of automatic skills, (b) if novice athletes are more likely to choke due to distraction, (c) if choking on tasks predominantly requiring motor skills is due to the inhibition of automatic execution, and (d) if choking on tasks predominantly requiring perceptual skills is due to distraction. Exploratory research is also needed to ascertain whether choking is linked to other factors that are associated with self-awareness, such as self-esteem, self-confidence, and self-presentation. Research is also needed to investigate the effect of other mediators on the relationship between S-C and performance. For instance, levels of self-confidence and self-esteem may influence how low or high S-C people respond to pressure. In addition, from a theoretical perspective, the definition of choking needs to be refined. Finally, to prevent athletes from choking, therapeutic techniques for ameliorating choking may need to be developed based on the results of choking intervention type studies.

Contribution of this Dissertation to Sport

Choking in sport is relatively common; most athletes can relate circumstances where their performance suffered under pressure. The popular press, frequently report instances where well-known athletes are perceived to have choked. Clearly there is considerable interest in choking, yet very few sport psychologists have pursued choking, at least in terms of related research. Developing an understanding of choking in the sport context is, therefore, very important. This dissertation has carried out systematic investigations into factors associated with choking in sport setting. These studies have examined the antecedents of choking and the coping mechanisms involved in more detail than has previously been attempted. In addition, an alternative definition of choking has been suggested. Furthermore, an integrated model of choking in sports is presented, which draws together findings from previous research with the findings from this dissertation. This proposed choking process model reflects a refresh view about choking from theoretical perspective. This model incorporates key causative factors, the perception of pressure, the coping process, task characteristics, and the level of skills required to complete tasks. More important, this integrated model allows for the inclusion of both distraction and automatic execution explanations of choking.

From an applied perspective, this proposed choking process model provides some direction for the design of interventions that help athletes prevent choking in sport. For instance, based on this proposed choking process model, the skill level of athletes and the skill characteristics of the task should be emphasized to design a specific therapeutic intervention for ameliorating choking. In general, the applied sport psychology literature (e.g., Bond, 1986; Nideffer & Sagal, 1998) illustrates that one of the biggest contributors to choking is thinking about the performance outcome, because it distracts athletes' concentration during performance. Thus, "process focus" is typically suggested to help prevent choking during competition. If choking involves an inhibition of automatic skills, then thinking about performing process, for elite athletes, may increase performance decrements under pressure. Whether the process focus is appropriate for athletes depends on their skill levels. If elite athletes try to refocus on controlling the skill execution, this may increase the likelihood of choking. The findings in this dissertation may help sport psychologists work with athletes and coaches to reduce the occurrence of choking. On basis of the findings and proposed choking process model, sport psychologists, coaches, and athletes may develop useful strategies in competitions.

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APPENDICES

Appendix A: Informed Consent 1

Victoria University

School of Human Movement, Recreation & Performance

Informed Consent

Your participation is requested in a project Human Movement students are taking part in as part of the 1st year subject Sport Psychology. Please read the instructions below and sign if you are willing to participate in this study.

We are interested in your feeling and reactions to competitive situations in sport. We would like you to fill in three short straightforward questionnaires, about your thoughts and feelings while playing sport. These questionnaires are mainly about how you respond to competitive pressure. In completing the questionnaires please answer all questions based on how you feel when playing the sport you are most active in. Each of the questionnaires has further instructions that you should read before starting. There are no right or wrong answers. Your responses to these questionnaires will be kept confidential. You will need approximately 25 minutes to complete these questionnaires.

Your results will remain strictly confidential, and be stored by code not by name. You are also encouraged to ask questions of the student administering these questionnaires at any time if you have any further queries.

STATEMENT

I certify that
I have the legal ability to give valid consent
I have had the chance to have my questions answered
My responses will be totally confidential

Signed ____________________________

*Parent Consent ____________________________ Date: _______________

Any queries about your participation in this project may be directed to Lecturer for Sport Psychology Code HPE 2150 (Name: Dr. Daryl Marchant ph. 9248 1135)

(*Please note: where the subject/s is aged under 18, separate parental consent is required; where the subject is unable to answer for themselves due to mental illness or disability, parental or guardian consent may be required.)

Appendix B: Informed Consent 2
Victoria University

School of Human Movement, Recreation & Performance

Informed Consent

Please read the instructions below and sign if you are willing to participate in this study.

We are interested in your feeling and reactions to competitive situations in sport. We would like you to fill in three short straightforward questionnaires, about your thoughts and feelings while playing sport. These questionnaires are mainly about how you respond to competitive pressure. In completing the questionnaires please answer all questions based on how you feel when playing the sport you are most active in. Each of the questionnaires has further instructions that you should read before starting. There are no right or wrong answers. Your responses to these questionnaires will be kept confidential. You will also be asked to complete a free throw shooting task and a running trial. Your results will remain strictly confidential, and be stored by code not by name.

STATEMENT

I certify that
I have the legal ability to give valid consent
I have had the chance to have my questions answered
My responses will be totally confidential

Signed ______________________________

*Parent Consent ____________________________ Date: _______________

Any queries about your participation in this project may be directed to: Dr. Daryl Marchant (ph. 9248 1135)

(*Please note: where the subject/s is aged under 18, separate parental consent is required; where the subject is unable to answer for themselves due to mental illness or disability, parental or guardian consent may be required.)

Appendix C: Experimental Time Table

Experimental Schedule

(Footscray Campus, DD___ MM___ YY_____)

Meeting in staff room	8:30 AM	Experimenters
Group 1 (n = 4)	9:00 – 9:15 9:15 – 9:30	CSAI-2 Baseline Text
Group 2 (n = 4)	9:15 – 9:30 9:30 – 9:45	CSAI-2 Baseline Text
Group 3 (n = 4)	9:30 – 9:45 9:45 – 10:00	CSAI-2 Baseline Text
Group 4 (n = 4)	9:45 – 10:00 10:00 – 10:15	CSAI-2 Baseline Text
Group 5 (n = 4)	10:00 – 10:15 10:15 – 10:30	CSAI-2 Baseline Text
Group 6 (n = 4)	10:15 – 10:30 10:30 – 10:45	CSAI-2 Baseline Text

Appendix D: Participants Instruction 1

Experimental Instructions

Thank you for participating in this experiment. You will be required to first complete the brief 18-item questionnaire (modified CSAI-2; cognitive and somatic scales) placed in front of you. Following this, you will be introduced to a research assistant in the gymnasium who will supervise your participation, score the number of successful shots you make, and return the ball to you between shots. You will first be given two minutes to practice your free-throw shooting. Following this, you will take 20 free throws, taken in three groups of 10. At the conclusion of the 20 shots you will be told your score and given a time to return and complete the second part of the study.

Appendix E: Participant Instruction 2

Experimental Instructions

The procedure will be similar to last time, with a few alterations. This time you will be required to take 20 shots. You will still be given a two-minute warm-up period. This time, however, you will be paid for your participation. You will receive $1.00 for every shot you make and an additional $4.00 for every shot you make above your expected score. For instance, if you made 14 shots last time and make 15 this time you will receive $15.00 plus $4.00 (i.e., $19.00). The reverse occurs if you make less than your score from last time. For instance, if you made 14 shots last time and make 13 this time you will receive $13.00 minus $4.00 (i.e., 9.00). The minimum amount you will receive is $5.00. In this way you are guaranteed to make $5.00 or more depending on how well you shoot. You will also notice that a number of your fellow students will be watching you. They have been told not to interact with you. In addition, we are videotaping your participation. The camera has been placed directly beyond the baseline and will be recording continuously. Before commencing we want you to fill out the same 18-item questionnaire that you completed before starting last time. Be sure to fill out the questionnaire based on how you currently feel. Once you have finished your 20 shots please do not communicate any of these instructions with other participants who are yet to take their second round of shots. After you have finished you will be paid as promised.

Appendix F: Participant Instruction 3

Experimental Instructions

Thank you for participating in this experiment. You will be required to first complete the brief 18-item questionnaire (i.e., modified Competitive State Anxiety Inventory-2 CSAI-2, Jones & Swain 1992) placed on the desk in front of you. Following this, you will be taken to the basketball court where you will be introduced to a research assistant who will supervise your participation. First you will be given five minutes to warm up before completing a running test. The research assistant will explain what is required of you in doing the running test. Naturally, we want you to run the fastest you can. After this you will be given five minutes to practice your free throw shooting. Following this, you will take 20 free throws taken in two groups of 10. Again we want you to make as many baskets as possible out of these 20 shots.

Appendix G: Participant Instruction 4

Experimental Instructions

The procedure will be very similar to last time, with a few alterations. Again you will complete the same running and basketball free-throw tasks as before, however, this time you will be paid for your participation. The financial rewards will be calculated relative to how we expect you to perform based on your previous running time and previous free throw score. For the running task, you will receive $8.00 for improving on your earlier score plus an additional $4.00 for each .01 sec below your previous score. For the shooting task, you will receive $8.00 for improving on your earlier score plus an additional $4.00 for each successful shot above your previous score. A number of students who are studying human movement will be watching you from either the baseline or from the side of the key. A video camera will be placed directly beyond the baseline and will be recording continuously.

Appendix H: Baseline Score Table 1

Baseline Free Throw Shooting Score

Date: __________________

Group ___________

Experimental ID ______________

Exp. Score ____________

First Trial:

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Successful ___________

Second Trial:

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Successful ____________

Total Scores: _______________

Appendix I: Baseline Score Table 2

Baseline Free Throw Shooting Score and Running Score

Date: ________________________

Group: __________________

Experiment ID: ______________________________

Free Throw Shooting

First Trial:

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Successful _____________

Second Trial:

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Successful _____________

Total Scores:

Running

Time: _________________

Appendix J: Experimental Testing Score Table 1

Experimental Free Throw Shooting Score

Date: _________________

Group __________

Experimental ID _____________

Exp. Score ___________

First Trial:

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Successful __________

Second Trial:

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Successful ___________

Total Scores: ______________

Appendix K: Experimental Testing Score Table 2

Experimental Free Throw Shooting Score and Running Score

Date: ________________________

Group: __________________

Experiment ID: ______________________________

Free Throw Shooting

First Trial:

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Successful _____________

Second Trial:

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Successful _____________

Total Scores:

Exp. Scores: ______________

Baseline Score: _______________

Running

Exp. Time: _________________

Baseline Time: ___________________

Appendix L: Self-Consciousness Questionnaire

General Feeling Questionnaire

	Extremely Uncharacteristic			Extremely Characteristic
1. I'm always trying to figure myself out.	1	2	3	4
2. Generally, I'm not very aware of myself.	1	2	3	4
3. I'm concerned about my style of doing things.	1	2	3	4
4. I reflect about myself a lot.	1	2	3	4
5. I'm concerned about the way I present myself.	1	2	3	4
6. It takes me time to overcome my shyness in new situation.	1	2	3	4
7. I'm often the subject of my own fantasies.	1	2	3	4
8. I'm self-conscious about the way I took.	1	2	3	4
9. I have trouble working when someone is watching me.	1	2	3	4
10. I never scrutinize myself.	1	2	3	4
11. I usually worry about making a good impression.	1	2	3	4
12. I get embarrassed very easily.	1	2	3	4
13. I'm generally attentive to my inner feelings.	1	2	3	4
14. I'm constantly examining my motives.	1	2	3	4
15. I sometimes have the feeling I'm off somewhere watching myself.	1	2	3	4
16. One of the last things I do before leaving my house is look in the mirror.	1	2	3	4
17. I don't find it hard to talk to strangers.	1	2	3	4
18. I'm alert to changes in my mood.	1	2	3	4
19. I'm concerned about what other people think of me.	1	2	3	4
20. I feel anxious when I speak in front of a group.	1	2	3	4
21. I'm aware of the way my mind works when I work through a problem.	1	2	3	4
22. I'm usually aware of my appearance.	1	2	3	4
23. Large groups make me nervous.	1	2	3	4

Appendix M: Trait Anxiety Questionnaire

Victoria Competition Scale

Reactions to Competition

Date: __/ __/ __ ID: __________

A number of statements which athletes have used to describe their thoughts and feeling 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 feeling 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 reaction with us. There are, therefore, no right or wrong answers. Do not spend too much time on any one statement, but choose the answer which best describes how you commonly react.

How you usually feel prior to, or during competition

Statements:	Not At All	Somewhat	Moderately So	Very Much So
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 competition.	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 N: Coping Style Questionnaire

Coping Scale for Sport

This survey consists of questions relating to your typical reactions to stressful events (i.e. making a mistake during performing) that you have experienced in sports competition. In the box before each statement, write the number that best describes how much each statement reflects your immediate reaction to the stressful experience (stressor).
Note: There are no right or wrong answers, so please be as candid as possible

Very Untrue	Somewhat Untrue	Undecided	Somewhat True	Very True
1	2	3	4	5

1. I thought that I was just having a bad day, so it did not upset me. ☐
2. I concerned on what I had to do next. ☐
3. I immediately turned my attention to the next physical task at hand. ☐
4. I became very critical after the unpleasant experience. ☐
5. I did not take the unpleasant experience very seriously. ☐
6. I quickly became more aggressive or enthusiastic for the purpose of confronting the stressor. ☐
7. I quickly became more aggressive or enthusiastic for the purpose of improving my performance. ☐
8. I tried to forget about the unpleasant experience. ☐
9. I immediately became angry, but then quickly continued playing without thinking about it. ☐
10. I thought about the unpleasant experience for quite some time. ☐

11. I tried to analyse the reasons for the unpleasant experience. □

12. I felt like talking to another person about the unpleasant experience. □

13. I felt like giving up. □

14. I became more “psyched up” and excited after the unpleasant experience. □

15. I did not let the unpleasant experience bother me. I reasoned
    that it was just part of the game. □

16. I tried to learn from the unpleasant experience. □

Appendix O: State Anxiety Questionnaire

CSAI-2-Directional

Date: ___/____/___ ID:________

A number of statements which athletes have used to describe their feeling before competition are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now about your next event. Following this, rate the degree to which you believe that feeling you have right now is facilitative or debilitative 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 feeling right now.

	How you feel right now				Degree to which that feeling is facilitative or debilitative to your performance						
Statements:	Not At All	Somewhat	Moderately So	Very Much So	Very Unhelpful						Very Helpful
1. I am concerned about this experiment.	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 experiment 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