INVESTIGATING THE USE OF CHOKING INTERVENTION STRATEGIES WITH CHOKING-SUSCEPTIBLE ATHLETES

By

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A dissertation submitted to the faculty of Human Development in fulfilment of the requirement for the degree of

DOCTOR OF PHILOSOPHY

VICTORIA UNIVERSITY

SCHOOL OF HUMAN MOVEMENT, RECREATION, AND PERFORMANCE

MELBOURNE, AUSTRALIA

August 2006

STUDENT DECLARATION

"I, Christopher Mesagno, declare that the PhD thesis entitled 'Investigating the Use of Choking Intervention Strategies with Choking-Susceptible Athletes' is no more than 100,000 words in length, exclusive of tables, figures, appendices, references, and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work."

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ABSTRACT

Based on recently proposed definitions (e.g., Hall, 2004; Wang 2002), choking is defined as a critical deterioration in the execution of habitual processes as a result of an elevation in anxiety levels under perceived pressure. The self-focus model of choking (Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992), distraction model of choking (Nideffer, 1992), and recently an integrated model of choking (Wang, 2002) have been proposed to explain choking. Predictors of choking are also relevant in terms of identifying choking-susceptible athletes. Thus, applied sport psychology techniques are important for assisting athletes in countering choking effects. The three interconnected studies in this dissertation were designed to further develop applied sport psychology techniques to predict and alleviate choking.

The primary purpose of Study 1 was to investigate whether choking and non-choking behaviour can be predicted using a battery of psychological inventories. Forty-six experienced netball players completed three psychological inventories and categorised as either choking-susceptible (CS) or choking-resistant (CR). Eight purposively sampled participants then completed a total of 180 netball shots each in a series of single-case A_1-B-A_2 designs, with the B phase as "high-pressure" and the A phases as "low-pressure". Participants were interviewed upon completion of the netball shooting to investigate cognitions related to choking and non-choking behaviour.

Results from Study 1 indicated that established psychological inventories, measuring trait anxiety (A-trait), self-consciousness (S-C), and coping styles, were accurate predictors of non-choking behaviour with the 4 CR athletes. The psychological inventories, however, were less accurate predictors of choking behaviour with the 4 CS athletes (predicting two out of four instances of choking). The 50% success rate is perhaps

understandable given that even highly CS athletes are likely to experience choking infrequently.

Using inductive content analysis, each participant's interview was analysed individually and a cross-case analysis was also included for the CS participants. The interview results indicated that the 2 CS participants who performed poorly under pressure used approach coping strategies, such as information seeking, to manage the pressure situation. Conversely, CR participants typically used avoidance coping strategies, such as blocking out the audience/camera, to cope with the pressure. Overall, the interview results corroborated the findings that the manipulated "high-pressure" in the B phase resulted in increases in state anxiety (A-state). Furthermore, the interview added valuable detail about how participants responded in the A_1-B-A_2 phases that generally fitted with the responses from the initial battery of questionnaires. A key finding in Study 1 was that all participants differed substantially in their capacity to absorb competitive pressure and similarly their coping repertoire ranged greatly.

Drawing on principles of Nideffer's (1992) distraction model and the qualitative results of Study 1, as foundations, Study 2 was designed to investigate whether a pre-shot routine (PSR) reduced choking effects. Five CS participants were purposively sampled (using the same inventories and selection criteria as Study 1), from 87 participants, to complete ten-pin bowling deliveries in a single-case A_1-B_1-A_2-B_2 design with the A phases as "low-pressure," and the B phases as "high-pressure." Five experienced tenpin bowlers completed at least 180 ten-pin bowling deliveries in a single-case A_1-B_1-A_2-B_2 design with the A phases as "low-pressure," and the B phases as "high-pressure." Three of these participants completed an additional 60 deliveries (totalling 240 deliveries) because they experienced a decrease in performance (i.e., experienced choking) in the B_1 phase and were instructed to use the planned intervention (i.e., the PSR) prior to the B_2 phase. The 3 participants that utilised the PSR improved accuracy in the B_2 phase. The interviews, conducted after the 240 deliveries, indicated that choking effects were partially due to an increase in S-A and, in this regard, were similar to the results of Study 1. An increase in S-A coincided with increases in distraction or conscious processing of execution, and thus, provided qualitative support for both the self-focus model and the distraction model of choking. Participants also explained that performance improvements were a result of the PSR minimising S-A during the B_2 phase. The reduction in S-A permitted other positive psychological outcomes to occur, including a decrease in the perception of pressure, decreased negative self-talk, increased concentration, and increased confidence. Thus, the PSR produced adaptive and relevant, task-focused attention.

In Study 3, music was used as a dual-task intervention under pressure. Similar to Studies 1 and 2, I also re-examined cognitive processes and perceptions of pressure using in-depth interviews. Five purposively sampled CS participants (with selection criteria similar to those used in Studies 1 and 2), from 41 screened basketball players, performed basketball free throws in a single-case A_1-B_1-A_2-B_2 design similar to Study 2. Three participants showed evidence of choking by decreasing performance during the B_1 phase. These participants were then instructed to listen to the lyrics of a song as an intervention prior to and during the B_2 phase. These 3 participants either maintained or improved performance in the B_2 phase. Similar to the qualitative results of Studies 1 and 2, participants explained that choking resulted from attention to the audience. Using the music intervention, in the B_2 phase, resulted in decreased S-A, enabling participants to decrease explicit monitoring of execution and reducing general distractibility. The results

of Study 3 extended the findings of Study 2 by identifying that specific interventions could facilitate performance or ameliorate choking. Based on the results of the three interconnected studies, and previous choking research, choking processes are relatively complex, and differ based on personality characteristics and coping strategies employed. Implications for theory, practitioners and future research on choking are also discussed.

ACKNOWLEDGEMENTS

I wish to express my appreciation to many people who contributed to the successful completion of this dissertation. I am extreme grateful to my two supervisors, Dr. Daryl Marchant and Professor Tony Morris, for their persistent feedback, open communication, attention to detail, and continual support during this research. Daryl, your professionalism, enthusiasm, constant support, and expertise have been invaluable along this educational journey. I also appreciate your compassion in making a “foreign” bloke feel “at home”. Tony, thank you for your keen interest during the completion of this research. I appreciate the thoughtfulness you expressed and your perseverance to help me produce quality writing. Having the opportunity to work with both of you has been an honour and privilege. Without your dedication, none of this would have been possible.

I am very thankful to Victoria University (VU) and the School of Human Movement, Recreation, and Performance for their monetary support for this project. The financial donation contributed helped me conduct and attend conferences related to this research, which was helpful in the completion of this project and my future career goals. Thank you also for the use of the indoor sports arena, without your benevolence completing this project would have been more financially challenging.

Very special thanks to the netball and basketball coaches, athletes, and clubs used to complete Study 1 and Study 3. I am also grateful to the AMF bowling staff and league members at various bowling centres in Melbourne (Keon Park, Sunshine, Dandenong, Moorabin, and Highpoint) as well as Edi Pelligrin (Werribee Superbowl) and Steve Arundell (Mentone Bowl) for their help in successfully completing Study 2. Rod East (Highpoint), Brett Best (Keon Park), and Steve Arundell should be especially commended for their generosity in allowing me to use their lanes free of charge. Without their kindness and support for the promotion of tenpin bowling, Study 2 may not have been possible.

I would also like to acknowledge a number of students and faculty members within and outside VU for their help and suggestions with this dissertation. I am appreciative of the efforts of Scott Fletcher and Clare Briggs for their help with data collection during all studies conducted. I would also like to thank Emma Hall for her recommended editorial changes in this dissertation. To Associate Professor Mark Andersen for comments regarding the methods of Study 2 and Dr. Harriet Speed for her suggestion of song selection in Study 3. External to our university, I would like to acknowledge Professor Owen White for advice with the split-middle data analysis technique and Dr. Dennis Hrycaiko regarding methodology of the single-case design research. Without all your recommendations, I may not have grasped the difficult concepts of this research design.

I would also like to thank my parents, Patricia and Emanuel Mesagno, for their support and encouragement throughout my education. It has been a long and tedious road journey, but I am very appreciative of your continuous financial (especially the last year of my Ph.D.) and emotional assistance throughout my educational experience. Essentially, you have given me the inspiration to follow my dreams and provided me with motivation along the way. Despite the distance between us, you have always been in my thoughts throughout this educational mission.

Finally, to Kristin N. Kusel, my girlfriend/ fiancé/ future wife (whatever you are when this is completed), since we started dating you have supported me toward this goal. Your keen interest, strong encouragement, and substantial motivation have assisted me to strive toward the completion of this dissertation. You have provided me with passion and inspiration that no one else could provide. I genuinely appreciate everyone’s help.

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CHAPTER 1

INTRODUCTION

With lucrative contracts, sponsorship arrangements, and high expectations from the public and media, many athletes experience pressure to perform in sport. From sinking a tournament winning two-foot putt in golf to making the game winning shot in basketball, sporting competitions are replete with pressure, sometimes causing athletes to experience detrimental performance effects. Researchers (e.g., Baumeister, 1984; Masters, 1992) have shown that heightened pressure can negatively affect performance. Pressure may also result in behavioural and attentional changes whereby athletes can sometimes experience the embarrassing and uncomfortable phenomenon often referred to as “choking under pressure.”

In dissecting the phrase “choking under pressure,” Wallace, Baumeister, and Vohs (2005) explained,

> The choking part of the term “choking under pressure” simply refers to underachievement. Individuals can be said to have choked when their performance under high pressure is inferior to their performance under low pressure. In other words, choking implies a negative change in performance (under high pressure). (p. 430-431)

In sport, choking is limited to high-pressure situations, therefore, using the full phrase “choking under pressure” is superfluous. To this end, throughout this dissertation, I have referred to “choking under pressure” simply as choking.

The popular press often classifies athletes as “chokers” based on observable performance decrements under pressure. Examples of professional athletes who, according to the popular press, have succumbed to choking and been labelled “chokers” include, professional golfers Greg Norman (1996 U.S. Masters) and Jean Van de Velde (1999 British Open) and tennis player Jana Novotna (1993 Wimbledon final). In each event, a commanding lead diminished rapidly and the athlete lost the tournament unexpectedly. In fact, according to Clarkson (1999), a journalist, “Australian professional golfer Greg Norman has lost so many leads in major tournaments that to ‘choke’ in golf has been labelled as ‘pulling a Norman’” (p. 203-204).

Literally hundreds of newspaper headlines have used the term choking (or “choke”) to report instances where well-known athletes are perceived to have performed poorly under pressure. “Rafter goes for broke after last year’s final choke” (Pearce, 2001), “Final no choke for Russian” (Pearce, 1999), “Indians hit choker tag” (Indians hit choker tag, 2002), and “Choker to free-throw hero” (Howell, 2001) are only a few examples of the “media hype” related to the choking label. Victoria Titans’ (Australian National Basketball League team) coach Brian Goorjian illustrated the apprehension athletes experience when being labelled a “choker”, “To be branded a ‘choker’ in professional sport cuts deep, and, as far as I am concerned, it is as bad as being labelled a quitter. Neither are descriptions a sportsman wants” (Goorjian, 2002, p. 28). Goorjian’s quote indicated that public perception may be important to athletes and being perceived with a negative public image, such as “choker” or “quitter”, is detrimental to an athlete’s psychological state. Nevertheless, the media directs considerable attention to choking, and has substantial influence over public perceptions and athletes’ experiences of choking.

In Australia particularly, journalists frequently speculate that athletes have experienced choking based on inference, rather than a clear understanding of the phenomenon. The media’s misunderstanding of choking could possibly stem from the difficulty in clearly defining choking. Even researchers have not yet universally agreed on an operational definition of choking. For example, Daniel (1981), Baumeister (1984), Nideffer (1992), Wang (2002) and Hall (2004) have all proposed definitions of choking, with each appearing to be limited in scope. I have formulated my own definition based on aspects of Hall's and Wang's definition, which states that choking is a critical deterioration in the execution of habitual processes as a result of an elevation in anxiety levels under perceived pressure. In seeking to better understand choking, researchers have developed a number of explanatory models (see Chapter 2) to help us more fully comprehend the mechanisms involved in choking.

There is much to be learned and various problems that still need to be resolved in choking research. For example, limited attention has been devoted to testing interventions to alleviate choking. The results of the present research should assist applied sport psychologists in consulting with athletes who experience choking. If athletes can be trained to be more resistant to choking, they may likely perform in accordance with their ability in pressure situations.

Aims of the Dissertation

General Aims

The present dissertation was designed to further extend choking research by examining the extent to which psychological inventories predict non-choking and choking behaviour. Furthermore, on the basis of qualitative experiences of choking and extant theory, two interventions were tested as a means of alleviating choking.

Specific Aims

1. To examine whether psychological inventories can successfully predict non-choking and choking behaviour (Study 1)

2. To test a pre-shot routine as an intervention designed to alleviate choking in CS athletes (Study 2).

3. To test attentiveness to the words of background music as an intervention alleviate choking in CS athletes (Study 3).

4. In all three studies (Studies 1, 2, and 3), an additional aim was to investigate cognitive strategies and perceptions related to "choking-resistant" (CR) and "choking-susceptible" (CS) athletes, using qualitative methods.

Chapter Organisation

Each chapter commences with an identified objective and a brief synopsis. In Chapter 1, I introduce choking, media attention is summarised, and general and specific aims are discussed. In Chapter 2, I provide a review of literature including a detailed summary of choking definitions. Also in Chapter 2, fundamental constructs, models, predictors, and potential interventions are reviewed. Chapters 3 – 5 are presented as independent, but interconnected studies with a focus on testing specific research hypotheses. Chapter 3 is focused on predicting choking and non-choking behaviour with CS and CR athletes, respectively. Qualitative research is also used to supplement the empirical and quantifiable data. In Chapter 4, I test whether a pre-shot routine is a potential choking intervention for CS athletes. In Chapter 5, I test whether music can be a potentially viable choking intervention for CS athletes. Chapter 6 is used to summarise and link the interrelated studies, whereby implications for theory, implications for practitioners, and future research directions are discussed.

CHAPTER 2

REVIEW OF LITERATURE

The experience of choking can be humiliating to elite athletes who may be labelled as “chronic chokers” (athletes that “choke” repeatedly). Athletes who are unable to perform under pressure may subsequently experience increased social anxiety and diminished enjoyment. Although choking is widely recognised by sport psychologists, the prevalence rates are unknown. Only over the past two decades has an increasing number of sport psychologists and social psychologists investigated issues related to choking in sport (e.g., Baumeister, 1984; Beilock, Bertenthal, McCoy, & Carr, 2004; Beilock & Carr, 2001; Beilock, Carr, MacMahon, & Starkes, 2002; Butler & Baumeister, 1998; Drinan, Williams, Marchant, & Wang, 2000; Hall, 2004; Hardy, Mullen, & Jones, 1996; Heaton & Sigall, 1989, 1991; Leith, 1988; Lewis & Linder, 1997; Masters, 1992; Wang, Marchant, & Morris, 2004; Wang, Marchant, Morris, & Gibbs, 2004). Although these studies have advanced the understanding of choking, unresolved issues still remain. Some researchers have investigated the underlying mechanisms of and personality traits associated with choking, however, interventions designed to alleviate choking have not been widely tested. Hall found a broad array of interventions being used by renowned researchers, and surprisingly, few of the interviewees related their suggested interventions to evidence-based research support.

Research developments on the antecedents of choking have progressed considerably in recent years. A number of hypotheses relating to the mechanisms of choking have been researched, however, different perspectives limit the generalisability of the findings. For example, researchers (e.g., Baumeister 1984; Nideffer, 1992) argue that choking is essentially an attention-related problem. Baumeister and Nideffer, however, have provided different attention-related pathways in explaining the process of choking. Baumeister suggested that choking is a cognitive, information-processing problem, mediated by self-consciousness, whereas Nideffer suggested that choking is a cognitive distraction problem exacerbated by task-irrelevant information, such as internal (e.g., self-talk) or external (e.g., environmental) factors. Masters (1992) postulated that choking occurs because of heightened pressure, whereas some researchers would contend a recent qualitative investigation by Drinan et al. (2000) posited that choking results from combined of both attention and anxiety. The relative paucity of choking research has prolonged the debate regarding the causes of choking for more than 20 years. As early as 1986, Baumeister and Showers explained, "The development of therapeutic techniques for ameliorating choking must wait until this debate [what causes choking] is resolved" (p. 377). As will be discussed in detail, Baumeister's automatic execution hypothesis has gained greater support than Nideffer's distraction hypothesis in terms of explaining the causes of choking. Wang (2002), however, has discussed how integrating Baumeister's automatic execution hypothesis and Nideffer's distraction hypothesis into a combined model of choking is viable.

This chapter will first provide a general background regarding choking definitions along with a discussion of perceptions of choking. A number of definitions have been proposed (e.g., Baumeister, 1984; Daniel, 1981; Hall, 2004; Nideffer, 1992; Wang, 2002), however, debate continues about each definition's acceptability. Next, a general background regarding attention and anxiety will be presented to explain their role in choking. A discussion will then follow, examining predictors of choking, underlying mechanisms of choking, and potential choking interventions. These factors are central to choking and will provide an explanation of how dispositional and situational factors, as well as choking models, may help researchers and sport psychologists develop efficacious choking interventions.

Conceptualisations of Choking

Current conceptions of choking can be categorised into explicit definitions and perspectives on choking. Although contemporary perspectives are important, operational and universal definitions are necessary to advance choking research. Researchers are not unanimous in defining choking.

Existing Definitions

Over the past 20 years, researchers have made serious attempts to understand choking, in part, by proposing three definitions, but no definition is universally accepted. Daniel (1981) perceived choking as “the inability to perform up to previously exhibited standards” (p. 70). Although a respectable initial definition, given the minimal choking research conducted at that time, there are many reasons why athletes may not perform to previous standards apart from choking (e.g., poor concentration, lack of interest, or injury). Weinberg and Gould (2003) stated that, although choking is usually linked with suboptimal performance, poor performance does not necessarily indicate choking. Another limitation of Daniel’s definition is that anxiety is not included as a contributing factor. Daniel’s definition is most notable for being the first proposed definition of choking, but has not been widely adopted in subsequent research.

The most widely used definition, proposed by Baumeister (1984), is simply “performance decrements under pressure circumstances” (p. 610), with pressure being “any factor or combination of factors that increases the importance of performing well on a particular occasion” (p. 610). Unlike Daniel (1981), Baumeister’s definition includes pressure, however, two potential limitations are a) the quantity of performance decrement is not stated and b) no differentiation in skill level is proposed, thus all athletes whether elite or recreational are treated the same. Operationally defining the amount of decrement required for choking to have occurred may be important for researchers. For example, using a phrase such as a considerable decrease in performance in comparison to previous self-standards may suffice. Thus, Baumeister's definition, although an improvement on Daniel's definition, is still somewhat limited.

A third definition posited, by Nideffer (1992), is that "choking is an altered state of consciousness" (p. 16). According to Nideffer, perceived pressure leads to an alteration in normal state of consciousness, represented when an athlete maintains a performance focus. Choking occurs when a normal state of consciousness is interrupted and "attention becomes so focused on internal cues (thoughts and feelings) that you cannot attend to external task-relevant cues" (Nideffer, p.128). Nideffer suggested that choking constitutes a process whereby a task-irrelevant focus is the basis of performance decrements. A shift of attention from task-relevant cues (i.e., hitting a target) to task-irrelevant cues (e.g., worry, feelings about anxiety) may result in performance decrements. Two main deficiencies in Nideffer's definition, however, are that an increase in anxiety and a performance decrement are not explicitly included in the definition.

Recently Proposed Definitions

Two definitions have been proposed to help resolve inadequacies of previous choking definitions. Wang (2002) identified choking as "deterioration in the execution of habitual processes of performance under pressure" (p. 141). Wang's definition incorporates three potential elements that relate to choking (e.g., importance of the situation or pressure, performance decrement, and automatic skill execution). As will be described in detail later, Wang's definition is somewhat at odds with Baumeister and

Showers (1986) position that choking occurs at any skill level. Wang's definition implies that choking only occurs in athletes who have achieved a level of "execution of habitual processes", whereas Baumeister and Showers suggested novices might also experience choking. Wang's definition is the first to incorporate the three potential factors represented when choking occurs.

In a recent investigation, Hall (2004) critically examined the existing definitions of choking by interviewing researchers who had investigated choking with a view to establishing a more adequate operational definition. Hall conducted 13 interviews with choking researchers, all of whom had published in peer review journals, to critically examine the three existing definitions (i.e., Baumeister, 1984; Daniel, 1981; Nideffer, 1992) and to ascertain researchers' perspectives about an adequate definition of choking. Hall suggested current definitions were unpopular among researchers and constructed an alternative explaining choking as an elevation in anxiety and arousal levels under perceived pressure, leading to a critical deterioration in skilled performance. Two main problems with this definition are that anxiety is presented first and attention is not included. First, if anxiety causes choking, and choking is an increase in anxiety, then this suggests anxiety is anxiety, which then becomes circular and tautological (R. F. Baumeister, personal communication, June 2006). Second, the definition by Hall does not include a reference about attention being disrupted. Therefore, I have formulated a definition, based on aspects of Hall's and Wang's separate definitions, in which choking is a critical deterioration in the execution of habitual processes as a result of an elevation in anxiety levels under perceived pressure. This definition incorporates the essential elements of choking (i.e., perceived pressure, decline in performance, and diversion of attention) and identifies possible reasons (i.e., increased anxiety) for the decline in performance.

Perspectives on Choking

Despite progress toward a better understanding of choking, uncertainty still exists about what exactly constitutes a “choke” (Nideffer & Sagal, 2001; Weinberg & Gould, 2003). Baumeister and Showers (1986) explained that a number of conditions must be present before the choking “label” is justified. First, there must be reasonable evidence that the person could have performed better. For example, it is difficult to interpret when novices experience choking because performance decrements may be due to insufficient skill level. Second, the performer must be motivated to perform well under the circumstances. If performance is not important to the athlete, choking cannot be attributed clearly. If an athlete lacks motivation to succeed, the likelihood of experiencing pressure is reduced, thus reducing the likelihood of choking. Baumeister and Showers suggested that, as long as maximum performance is the goal, choking might occur. This statement may imply that choking can not occur during practice because skill acquisition and learning is usually the central purpose. Choking may, however, be evident if, for example, impressing the coach generates feelings of anxiety and importance. Motivation to impress the coach may produce feelings of pressure or may be exacerbated by self-consciousness. Third, choking may occur among performers at any level of skill. Some investigators (e.g., Baumeister & Showers; Beilock et al., 2002) have proposed that choking occurs at any skill level, but other researchers (e.g., Masters, 1992; Wang, 2002) have maintained that choking can only occur among skilled performers. Although the debate over what skill level is required for athletes to experience choking has not been discussed in published research articles, differences of opinion were expressed in Hall’s (2004) interview study. The general consensus of researchers was that choking might occur for novices, but only when performance is relatively consistent so that unpredictable execution is not the reason of poor performance.

Excessive use of the term “choker”, when labelling athletes, may become a self-fulfilling prophecy. Leith (1988) conducted a study involving the effects of coaching behaviours on choking. Leith randomly assigned 80 undergraduate students equally into four groups to identify whether a brief talk about “choking” would elicit a choking effect. Using a Solomon-Four design, the experimental conditions were arranged as follows: Group 1 performed 25 pre-test basketball free throws, listened to a brief talk about choking and then performed 25 post-test free throws, Group 2 received the pre-test and post-test only, Group 3 received no pre-test, listened to the brief talk and then received the post-test, and Group 4 received only the post-test (Leith). Results indicated that negative performance occurred when the brief talk about choking was used. The Solomon four-group design is underused in research (Walton-Braver & Braver, 1988), however, it allows for examination of treatment effects, both with and without a pre-test. In this way, the potential reactivity of the pre-test could be determined, as would be evident if analysis with and without the pre-test differed. It also allows for any sensitising effect because of the pre-treatment measure to be detected.

Some perspectives of choking extend beyond mere psychological explanations and include physiological aspects of human movement. For example, the ‘yips’ is similar to choking in that poor performance under pressure occurs. The ‘yips’ is defined as a jerk, tremor, or freezing in the distal upper extremity that interrupts the putting stroke (Smith et al., 2000) and, although usually associated with golf, may be evident in cricket and darts (Bawden & Maynard, 2001). Smith et al. (2003) described the ‘yips’ as “a motor phenomenon of involuntary movements affecting golfers, with multiple possible aetiologies, spanning a continuum from the neurological disorder of dystonia to the psychologic disorder of choking" (p. 14). Apparently, 'yips' behaviour is experienced when anxiety and arousal surpass a threshold, thus, as anxiety increases, the probability of 'yips' symptoms occurring intensifies. To date, however, causes of the involuntary movements are not fully understood. Based on the existing research related to the 'yips', Smith et al. (2000, 2003) concluded that the 'yips' generally affects experienced, middle-aged (aged 45 to 55) golfers on short putts (i.e., usually 1 to 5 ft from the cup) during tournaments.

Although psychological factors (e.g., increased anxiety and arousal) have been linked to the incidence of 'yips' behaviour, physiological factors have also been identified. For example, dystonia is a neurological disorder characterised by involuntary movements resulting in spasms, twisting, and posturing of a body part (Smith et al., 2003) and is strongly implicated in the 'yips.' Smith et al. (2000, 2003) deduced that performance anxiety is a common factor that affects the likelihood of choking or dystonia, increasing the probability of 'yips' behaviour. After extensive discussion about the 'yips', Smith et al. (2003) explained that the 'yips' could be differentiated into two categories: Type I (dystonia; a neurological disorder) and Type II (choking; a psychological phenomenon). To date, no research has examined whether causes of choking (e.g., anxiety and attention) are related to performance decrements in 'yips'-affected individuals. Further investigations are necessary to fully understand the mechanism of 'yips' behaviour and to test Smith et al's proposed Type I, Type II differentiation.

Constructs Related to Choking

Research to date has been focused on either the attention component of choking or the anxiety component of choking, however, recently Drinan et al. (2000) asserted that choking is a combined attention and anxiety problem, involving both a debilitative effect of anxiety and improper allocation of attention. Further research is necessary to investigate the sequence in which attention and anxiety occur, because ambiguity exists regarding whether anxiety and attention act concomitantly or whether one precedes and affects the other. An evaluation of both attention and anxiety is necessary to completely understand the antecedents of choking.

Attention and Choking

A range of features contributes to the composition of attention. One characteristic is that attention is a limited capacity or resource (Kahneman, 1973). Attention limitations are the result of restricted resources available to complete information-processing demands. Attending to multiple tasks at one time decreases attention capacity, which limits the number of skills that can be performed together. Thus, when demands of information exceed attentional capacity, performance on one or multiple tasks may suffer. Features that may occupy attentional space may be emotional (e.g., arousal, anxiety, or worry), environmental (e.g., crowd noise or watching an opponent) or skill-specific (e.g., body mechanics or selective visual attention toward a target). If the majority of attentional resources are dedicated to processing one particular set of information, fewer resources are available to process other data (Kahneman). Similarly, when attention is allocated to irrelevant information (e.g., negative thoughts or worry) less attentional space is available to process relevant information (e.g., a defender's moves or whether a ball hits a target).

The proportion of available attentional capacity may be dependent on how well the skill is learned. Generally, newly acquired tasks are simultaneously performed less accurately with other tasks than well-learned tasks, because novel skills require greater attention to complete correctly. Conscious thought toward skill mechanics is important when acquiring a new skill, yet limits attentional capacity to perform other tasks simultaneously. As the new skill is continually practiced, a progression to automatic processes occurs that require less attentional capacity or resources (Shiffrin & Schneider, 1977). Increases in skill level release attentional space due to movement automaticity and permit an increase in attention to other information. For example, when learning how to drive a car, beginners attend to the micro processes of driving (e.g., hand-over-hand turning, executing pedal actions, steering) that consume available attentional space. As learning and automaticity is achieved, less attention is needed for driving operations and attentional resources for processing other information (e.g., other traffic, changing the radio station, talking to a passenger) are liberated.

In addition to being a limited resource, another feature of attention is selectivity. As Abernethy (2001) pointed out, "selective attention is the general term used to describe this process by which certain information is preferentially selected for detailed processing while other information is ignored" (p. 67). Athletes are required to select where mental effort (i.e., amount of mental resources allocated to task demands [Paas, van Meeriënboer, & Adams, 1994]) is focused in order to process relevant information. Selective attention involves two major factors: the ability to focus attention without being overloaded or distracted and the ability to direct that focus to the most important stimuli for successfully performing the task (Summers & Ford, 1995). Overloading and distracting information are constantly present in sport and pertain to environmental, emotional, or information-processing sources. An example of a combination of these factors is when an athlete is anxious and also processing skill-execution information. The two information sources compete for attentional space and may overload attentional capacity. Selecting relevant information, especially in open-skilled sports, such as football codes or racquet sports, where the environment is constantly changing, is a key performance determinant.

Although various attention theories have been proposed, Kahneman's (1973) central resource theory is relevant to choking, in part, because of the inclusion of arousal. Duffy (1962) defined arousal as "the extent of release of potential energy, stored in the tissues of the organism, as this is shown in activity or response" (p. 179). Arousal is the natural activity of one's physiology ranging from deep sleep to extreme excitement (Malmo, 1959), and reflects fluctuating degrees of physical and emotional readiness. Increases or decreases in arousal may be activated by internal, cognitive thoughts or external, environment factors and may differentially affect performance (Zaichkowsky & Baltzell, 2001).

According to Kahneman (1973), there is a central (within the nervous system), flexible pool of resources for which all activities compete and problems in attention occur because of the limited amount of processing capacity that can be allocated. Attention capacity is, therefore, subdivided to various tasks and several conditions affect the individual's allocation policy (i.e., where attention is assigned). The first condition is that the available attention capacity is flexible, depending on the individual's arousal level. That is, the amount of attentional resources available may increase or decrease depending on arousal levels. According to Kahneman's attention model, additional attentional capacity is typically available with moderate levels of arousal. The second factor determining adequate attentional capacity is attention requirements of the task. Evaluation of task demands and estimation of task difficulty are necessary to determine appropriate attention allocation. Notably, variations of attention demands cause corresponding variations of arousal, but variations of arousal also affect the policy by which attention is allocated to different activities (Kahneman). For example, if high task difficulty is perceived, arousal may increase due to cognitive appraisal of the difficult task. Increases in level of arousal lead to a reduction in attention capacity, which may affect the likelihood of successful performance. Moderate arousal levels increase the range of attentional cues available, whereas low and high levels of arousal restrict the range of cues a person uses in the guidance of action (Easterbrook, 1959). Finally, three features influence the distribution of attention: allocation of attention according to enduring predispositions, allocation of attention to ensure completion of the activity, and allocation of attention to a person's momentary intentions. Among these allocation factors, the aspect closely associated with choking is the allocation of attention to enduring predispositions. Attentional predispositions are personality characteristics that naturally attract our attention and may be involuntary and potentially attention demanding. Athletes under pressure may unconsciously allocate attention toward general predispositions (e.g., self-consciousness and anxiety) that researchers suggest can negatively affect performance (Baumeister, 1984; Masters, 1992). Thus, Kahneman's model of attention is relevant to choking because attentional predispositions and arousal both influence the allocation of attention.

Anxiety and Choking

Baumeister (1984; Masters, 1992; Nideffer, 1992) generally agree that anxiety contributes to choking. Spielberger (1975) defined anxiety as "an emotional state or reaction characterised by the presence of recognisable unpleasant feelings of intensity, preoccupation, disturbance, and apprehension and a simultaneous pronounced activation of the autonomic nervous system" (p. 137). Some early researchers (e.g. Scanlan & Passer, 1978; Simon & Martens, 1977) investigated anxiety from a unidimensional perspective; however, other researchers in mainstream psychology (e.g., Davidson & Schwartz, 1976; Liebert & Morris, 1967) generally agree that anxiety is a multidimensional construct.

Multidimensional anxiety theory. Multidimensional Anxiety Theory (MAT; Burton, 1988; Martens, Burton, Vealey, Bump, & Smith, 1990) has been supported recently within sport anxiety research. Advocates of MAT posit that anxiety is represented in both a mental (cognitive anxiety) and a physiological component (somatic anxiety). Davidson and Schwartz (1976) proposed a differentiation between cognitive and somatic anxiety, however, original operational definitions of cognitive and somatic anxiety were proposed by Morris, Davis, and Hutchings (1981). Morris et al. defined cognitive anxiety as "negative expectations and cognitive concerns about oneself, the situation at hand, and potential consequences" (p. 541). Cognitive anxiety is characterised by a state of worry, the awareness of unpleasant feelings and concerns about ability to perform and concentrate in an environment. Choking may be linked to cognitive anxiety because, as probability of success negatively changes, worry increases. As additional attentional space is allocated to worry, a point is reached where insufficient attentional resources remain to process task-relevant information, thereby decreasing performance (Wine, 1971).

Whereas cognitive anxiety represents the mental component preoccupied with unpleasant cognitions, somatic anxiety is the physiological component of MAT. Morris et al. (1981) defined somatic anxiety as "one's perception of the physiological-affective elements of the anxiety experience, that is, indications of autonomic arousal and unpleasant feeling states such as nervousness and tension" (p. 541). Somatic anxiety is represented in perceptions of physiological processes such as shakiness, sweating, increased heart rate, rapid respiration, and "butterflies" in the stomach (Rotella & Lerner, 1993). In sport, researchers (Gould, Petlichkoff, & Weinberg 1984; Martens et al., 1990) have suggested somatic anxiety is based on a conditioned response to competitive situations elevated immediately prior to the start of an event, and often dissipates once performance commences. Wang, Marchant, Morris, and Gibbs (2004) found, however, individuals high in somatic anxiety are likely to direct attention to physiological changes under pressure, which may disrupt performance. Specifically investigating choking research, Wang et al. may demonstrate the potential link between choking and somatic anxiety.

Catastrophe model. Of the existing anxiety-performance models, perhaps the most relevant to choking is the Cusp Catastrophe Model (CCM; Hardy, 1990; Hardy & Fazey, 1987) because of the similarities between catastrophic performance, arousal surpassing a threshold, and choking. Hardy and Fazey proposed that different combinations of cognitive and somatic anxiety are associated with separate performance outcomes. Researchers advocating the CCM have contended that a three-dimensional description of the anxiety-performance relationship explains how cognitive anxiety and physiological arousal influence performance. That is, a combined influence on performance is produced when cognitive anxiety and arousal are both involved. According to Hardy (1990, 1996), high cognitive anxiety positively effects performance when arousal levels remain low. When cognitive anxiety and arousal exceed an optimal level, however, detrimental performances may occur. Hardy and Parfitt (1991; Parfitt & Hardy, 1993) have provided evidence that under high cognitive anxiety and elevated arousal, a “catastrophic” drop in performance occurs. Once the decline occurs, substantial reductions in arousal levels are necessary to restore previous performance level. Thus, the CCM is related to choking because when cognitive anxiety and arousal levels exceed an optimal level, a catastrophic decrement in performance may occur. As Hall (2004) explained, choking is a critical deterioration in skilled performance as a result of an elevation in anxiety and arousal levels under perceived pressure. Behaviourally, a substantial performance decrement is noticeable when choking occurs, which is likely due to increased anxiety and arousal. Unlike the CCM, however, superior performance may not be regained even if moderate or low levels of anxiety and arousal are attained.

Attention and anxiety are two constructs central to choking and may influence sport performance in various ways. A common hypothesis is that situations in which athletes become aware of the importance of performing well may induce choking (Baumeister, 1984; Baumeister & Showers, 1986). Other variables, however, may also affect an athlete's ability to perform well. By recognising variables that affect performance, sport psychologist may increase their ability to predict choking. Incidences of choking are difficult to predict (Hanrahan, 1996), but researchers, including Baumeister and Showers, have hypothesised variables that may assist in the prediction process.

Predictors of Choking

Although choking is difficult to predict, researchers have identified both dispositional and situational factors associated with choking.

Dispositional Causes of Choking

Some predictors of choking are personality characteristics that are essentially stable. Researchers have demonstrated that self-consciousness, trait anxiety, and coping style are dispositional characteristics that may identify a person as potentially susceptible to choking.

Self-consciousness. One mediator that has received considerable attention in choking literature is self-consciousness (S-C). Fenigstein, Scheier, and Buss (1975) explained that, “the consistent tendency of persons to direct attention either inward or outward is the trait of S-C” (p. 522). S-C is the realisation that others may be aware of oneself, resulting in a sense of uneasiness when the individual suspects critical evaluation by others. S-C is predicted to mediate choking because of close associations with self-awareness (Baumeister, 1984; Heaton & Sigall, 1991). Self-awareness (S-A) is the existence of self-directed attention, as a result of transient situational variables, chronic dispositions, or both (Fenigstein et al.). Generally, S-A is the state of being attentive of oneself in a relatively objective, but open and accepting manner. S-A is elevated when environmental factors lead performers to direct attention to self. S-C and S-A are similar, because either S-C or S-A can be manifested in self-attention. A fundamental difference is that S-C is a predisposition to direct attention either inwardly or outwardly, whereas S-A is a state of attentional focus reflected inwardly during a specific event. A predisposition to being self-conscious, however, does promote the likelihood of being self-aware during pressure situations (Masters, Polman, & Hammond, 1993).

Fenigstein et al. (1975) described two dimensions of S-C: private S-C and public S-C. Private S-C is the tendency to focus on inner thoughts, feelings, moods, and attitudes. Individuals high in private S-C may focus on the suppressed, personal aspects of the self. For example, an individual high in private S-C may characteristically analyse inner thoughts and feelings to understand emotions during particular situations. Public S-C is the tendency to focus on outwardly observable aspects of the self (e.g., physical appearance). Individuals high in public S-C consider the self as a social object and often seek approval to maintain a sense of identity.

Differences between individuals high and low in S-C may be represented in dissimilar responses to pressure. When performing under pressure, individuals high in private S-C are predisposed to focus on emotions and feelings. Individuals low in private S-C are likely to ignore emotions and feelings during pressure circumstances. Highly public self-conscious individuals, alternatively, are likely to become aware of being observed when under pressure because social appearance and acceptability are important to them. The highly public self-conscious person is concerned with what people think or say about them, whereas low publicly self-conscious individuals are sometimes oblivious of others' perceptions. Private S-C and public S-C are moderately correlated (Wang, 2002) and scores in both private and public S-C are often to be comparable.

Researchers in general psychology (e.g., Carver, Antoni, & Scheier, 1985; Cheek & Briggs, 1982; Kurosawa & Harackiewicz, 1995) have found people high in both private and public S-C are more adversely affected by situations where pressure promotes S-A. In these studies, pressure was induced by a number of methods, including presence of a mirror, video camera, or audience. Carver and Scheier (1987) argued that experimental manipulations of S-A also have conceptually distinct private (self-directed attention) and public (external evaluation) components. Presence of a mirror, for example, may emphasise more personal, covert attention associated with private S-C, whereas presence of a video camera or audience may encourage a more external, overt degree of evaluation related to public S-C. In an effort to clarify this concept, Kurosawa and Harackiewicz found that the presence of a video camera or mirror during a paper-and-pencil word game produced social concerns (i.e., public S-C) and also created the highest overall level of concern (i.e., combined public and private S-C) compared to other groups. The strongest detrimental performance effects were evident when public and private S-C concerns were combined. That is, the video camera and mirror increased combined private-public S-C evaluation, and had a detrimental effect on performance.

High self-conscious individuals are more susceptible to becoming inwardly focused due, in part, to their constant thoughts about private and public evaluation. Continuous attention to evaluation may result in concern over others' perceptions. Hull, Reilly, and Ennis (1991) suggested that people high in S-C are often worried about others' expectations, which may consume resources needed by other cognitive processes and cause performance disruptions. Furthermore, high S-C elicits over-sensitivity to others' opinions, leading to further self-focused behaviour (Fenigstein, 1979; Woody, 1996). High self-conscious individuals, then, could be more negatively affected by increased S-A because self-evaluation increases attention to self-assessment and others' impressions.

Researchers investigating the effects of S-C on performance have produced equivocal findings. For example, using a non-sport task, Baumeister (1984) found that participants low in S-C performed poorly under pressure compared to high self-conscious individuals. Baumeister asserted that individuals high in S-C cope more easily with situations that promote S-A, because they are more familiar with performing while self-focused. Baumeister asserted that individuals low in S-C might be more susceptible to choking because inward attentional focus is less common and they are less experienced in being self-aware. The uncharacteristic self-reflection at a time when conscious monitoring is unnecessary may disrupt execution and decrease performance. From this perspective, pressure induces individuals low in S-C to become more self-aware and they may be unable to cope with the change (Berglas & Baumeister, 1993).

In sport, Masters et al. (1993) and Wang, Marchant, Morris, and Gibbs (2004) have provided support for the opposing argument that high S-C is a predictor of choking. Recently, Wang et al. conducted a study in which 58 participants completed two questionnaires to ascertain if dispositional S-C and trait anxiety were predictors of choking. Participants completed basketball free throws under both low- and high-pressure conditions. Pressure was manipulated by the presence of a video camera, audience, and performance contingent rewards (i.e., offering money based on performance outcomes). Correlational analysis and hierarchical multiple regression analysis confirmed the expectation that individuals high in S-C perform poorly under high-pressure. Wang et al. found that high self-conscious, rather than low self-conscious, individuals are more affected because their susceptibility to reflect inwardly disrupts automatic execution.

Heaton and Sigall (1991) provided a plausible explanation for the equivocal evidence between S-C and performance. Seventy-eight participants were randomly assigned to one of six conditions (i.e., supportive audience, non-supportive audience, or no audience conditions, with each receiving either success or failure feedback) and performed three rounds of a game of “perfection” against another team. Heaton and Sigall hypothesised that choking would occur in individuals high in S-C following failure feedback because of their predominantly inward focus and inherent self-presentational concerns, whereas individuals low in S-C would “choke” when an audience was present due to direct attention to public appraisal (i.e., pleasing the audience). When positive self-presentation (i.e., characterised by individuals high in S-C) was important, greater effort was given to self-preservation than pleasing the audience. Individuals low in S-C “choked” when disappointing the audience was likely because pleasing the audience added pressure. According to Heaton and Sigall, individuals low in S-C are more likely to focus on pleasing the audience than aspects of self-presentation. High self-conscious individuals are more concerned with self-standards than audience standards and performed poorly when negative performance was inevitable. Apparently, individuals high in S-C required success feedback to protect a positive self-presentation and improve performance.

Carver et al. (1985) found that participants high in S-C were more likely than participants low in S-C to obtain performance norms after success feedback and to avoid such information after failure feedback.

S-C seems to be important in predicting choking, however, it is still unclear whether choking can be predicted from measures of S-C. Intuitively, one would expect that people high in S-C would be likely to “choke” because of the tendency to turn inward when anxious. Wang (2002), however, suggested that the equivocal results of S-C studies might be due to limitations in methodology, such as inadequate control and monitoring of task difficulty and participants’ skill level. Although limitations in methodology exist, other characteristics, such as trait anxiety, may also be a possible predictor of choking.

Trait anxiety. Trait anxiety (A-trait) is the disposition to perceive a wide range of situations as threatening, and to respond to such situations with state anxiety (Spielberger, 1966). The situations may be influenced by emotional and cognitive components in which the person is preoccupied with irrelevant thoughts and eventual perception of excitement when the ego is threatened (Janelle, 1997). A person high in A-trait perceives minimally threatening situations as being anxiety-inducing. Test anxiety researchers have confirmed that individuals high in A-trait react to pressure situations with greater levels of A-state than individuals low in A-trait (Spielberger, Anton, & Bedell, 1976). Furthermore, Calvo, Alamo, and Ramos (1990; Kurosawa & Harackiewicz, 1995) have found that high A-trait individuals perform more poorly under pressure than low A-trait individuals, which may be due to focus on self-evaluative thinking in pressure situations (Wine, 1971).

Test anxiety researchers have suggested a relationship may exist between high A-trait and poorer performance. Accordingly, Baumeister and Showers (1986) have posited that A-trait may be a possible predictor of choking. For example, individuals high in A-trait would be more susceptible to performance pressure than individuals low in A-trait and may perform poorly under pressure. Sport anxiety literature has confirmed that A-trait is a strong predictor of A-state (e.g., Marchant, Morris, & Andersen, 1998; Williams & Krane, 1992). Halvari and Gjesme (1995) found that A-trait was related to both A-state and performance errors. High A-trait was accompanied by associated increases in A-state, which was depicted by a strong U-shaped relationship to performance errors. Moderate A-state was associated with fewer errors than low or high A-state. Until recently, however, researchers have not examined whether A-trait is a predictor of choking in motor skills. Wang, Marchant, Morris, and Gibbs (2004) examined A-trait as a likely predictor of choking and found that A-trait was a significant predictor of choking with somatic A-trait being highly correlated with poor performance under pressure. Further research is necessary to understand the underlying mechanisms regarding A-trait as a predictor, as well as other factors that may predict choking. Coping styles, for example, have been investigated to identify their affect on predicting choking.

Coping styles. Coping is defined as “a response to environmental and psychological demands in particularly stressful situations” (Endler & Parker, 1990, p. 845). When athletes are confronted with pressure, the effectiveness of their coping skills may determine success or failure. According to Folkman and Lazarus (1985), the coping process may involve either regulating emotion or attempting to solve the problem. Individuals who attempt to cope with pressure by regulating emotions may do so by simply avoiding or focusing specifically on the problem. Whether coping reduces perceived pressure, however, seems dependent on the individual’s coping style. A coping style is a psychological disposition that reflects an athlete’s tendency to respond in a predictable manner when confronted with a particular situation (Anshel, Jamieson, &

Raviv, 2001) and is reflected in an athlete’s preference and selection for using certain types of coping strategies under pressure (Holahan & Moos, 1987). A coping strategy, then, is a situation-specific method of coping and reflects an athlete’s coping response following a pressure situation (Anshel et al.). When pressure is perceived, coping strategies are activated to deal with the situation. Coping styles and coping strategies are often interchangeably used within coping research, however, in the current dissertation, coping styles are operationalised as the participant’s dispositional coping mechanisms, whereas coping strategies are the coping methods actually used (or not used) during the pressure situation.

Athletes use coping strategies to alter cognitions of a pressure situation or increase resources to deal with the situation. Generally, an athlete's coping style is a predictor of the coping strategies used in competition. Choking may be partially caused by the use of inappropriate coping strategies to deal with pressure. Two coping styles, approach coping and avoidance coping, have recently been examined to determine whether approach or avoidance coping can predict choking. Approach coping involves focusing on problem solving by using direct effort (Crocker & Graham, 1995). Krohne (1993) suggested approach coping is the process of actively dealing with a perceived problem. Continuing to contemplate the emotions related to the pressure would be an example of approach coping in sport. Avoidance coping, also referred to as desensitisation or repressive coping, is typically used to direct activity away from the threat-related stimulus (Anshel & Weinberg, 1999). An example of avoidance coping is when an athlete mentally distracts himself from the pressure by focusing on the next task. Approach coping involves directing cognitive and behavioural efforts toward solving the problem causing stress, whereas avoidance coping is aimed to reduce stress by directing activities away from the stressful stimulus (Anshel & Weinberg). According to Anshel (1996), the athlete actively attempts to understand the perceived pressure when using approach coping, whereas the athlete does not attempt to solve the problem when using avoidance coping, thus, allowing them an opportunity to maintain attentional focus. Researchers (e.g., Miller, 1990; Mullen & Suls, 1982; Roth & Cohen, 1986) have shown that avoidance coping reduces anxiety in uncontrollable situations more effectively than approach coping. In most sports, perceived pressure may be uncontrollable and with avoidance coping, an anxiety reduction may be obtained while maintaining focus on the task.

To examine the affects of coping styles on the likelihood of choking, Wang, Marchant, and Morris (2004) asked 66 basketball players to complete a coping questionnaire (Coping Style Inventory for Athletes; Anshel & Kaissidis, 1997) one-week prior to participation in a basketball task. Participants then performed 20 free throws under both low-pressure and high-pressure conditions. Based on a multiple regression analysis, Wang et al. found that approach coping accounted for 7% of the explained performance variance under pressure. Athletes that predominantly used approach coping performed less accurately under high-pressure than those that predominantly used avoidance coping strategies. Thus, approach coping was established as a predictor of choking. According to Wang et al., approach coping may increase perceived threat, leading those who actively seek a reduction in anxiety to divert attention to irrelevant cues. Avoidance “copers,” as the name implies, tend to avoid reflecting on anxiety and persistently use relevant information to maintain performance. Conversely, approach “copers” may become immersed in searching for an explanation, increasing perceived anxiety, and potentially decreasing performance.

Situational Causes of Choking

An understanding of situational causes of choking is imperative to help athletes overcome choking. Situational causes of choking may be either internal (e.g., cognitive style) or external (e.g., environmental factors). Internal factors may include the athlete's awareness of others' perceived expectations, self-expectations, and effort, whereas external factors may involve the presence of an audience, video cameras, possible rewards, and variations in skill characteristics. External characteristics may increase the athlete's awareness of the situations perceived importance, and may negatively affect performance (Baumeister, 1984). Situational factors can affect performance negatively, yet, athletes' perceptions may be modified to manage them.

Expectations. Expectations, whether from self or family and friends, can increase perceived pressure. Expecting favourable performance under pressure may help in producing desired outcomes, and may be associated with previous performance expectations. Bond (1982; Geen, 1980) found that participants who recently experienced success performed more successfully, whereas participants that recently experienced failure were less successful with the presence of an audience. Successful performance under pressure may promote feelings of confidence and stability and lead to resilience during subsequent performance under pressure. In addition, previous poor performance under pressure may lead to self-doubt and success may be inhibited (Singer, 1986). Fear of recurrence of past inferior performance may introduce anxiety, resulting in further suboptimal performances.

The expectations of significant others may also lead to suboptimal performance. Baumeister and Steinhilber (1984) suggested that an increase in expectations from others may increase pressure and can lead to inferior performance. Baumeister, Cooper, and Skib

(1979) also explained expectations (desirable or undesirable), if known to others, might influence the performer, whereas if self-expectations are the only expectancy source, performance is not affected. Baumeister et al. asked participants to complete a “bogus” personality test that identified them as a desirable or undesirable personality type and were informed that individuals with the “bogus” (i.e., desirable or undesirable) personality trait usually performed poorly on an anagram-solving task. As predicted, when the expectancy was desirable (i.e., positive personality trait) and publicly known, participants performed poorly on the anagram-solving task in relation to previous performance, thus indicating the importance of self-presentational concerns about whether the expectancy will influence behaviour. Apparently, if the performer believes other people expect a certain performance under pressure, then performance outcome may actually conform to that expectancy in a self-fulfilling manner. Although expectations can affect performance, Baumeister, Hamilton, and Tice (1985) have suggested that audience expectations do not always facilitate performance. In fact, when the performer perceives the audience expects successful performance, additional pressure may be added, which may be detrimental to performance.

Audience. The presence of an audience is an environmental factor that may add pressure to competitive situations. The characteristics of the audience, such as size, support (or opposition), and performing before an informed audience, may also affect the perceived importance of the situation. Many researchers have used audiences to manipulate perceived pressure (Baumeister, 1984; Butler & Baumeister, 1998; Hardy et al., 1996; Heaton & Sigall, 1991; Masters, 1992; Tice, Buder, & Baumeister, 1985). Pressure was manipulated in most of these studies as an independent variable with an expectation that the dependent variable (e.g., performance) would be affected. Participants in the study by Hardy et al. performed a golf-putting task with an audience that comprised a professional golfer and without an audience. Performance decrements occurred when the professional golfer evaluated participants' performance. Based on these studies, it seems that unsupportive audiences are likely to increase pressure and impede performance.

Public speaking or performing in front of an audience can be intimidating, especially with unsupportive audiences. People performing before an audience may even persuade a network of friends and acquaintances to attend the public engagement to engender encouragement and support. But does a supportive audience have a positive influence on performance like many people believe? Butler and Baumeister (1998) conducted a series of experiments designed to examine the effects of supportive audiences on performance. Experiment 1 included 21 participants randomly assigned into two audience conditions (friend or stranger). Participants performed a mental arithmetic task, while a friend or stranger watched behind a one-way mirror. Poorer accuracy and speed were evident in the supportive audience condition. In Experiment 2, the researchers again found that participants' performance was negatively influenced when performing an Atari video game in front of a supportive audience. In Experiment 3, the researchers randomly assigned 93 participants into four conditions (i.e., supportive, adversarial, neutral, and control). In the supportive condition, the participant and audience member would each receive money, if the participant were successful, compared to previous performance. If the participant succeeded in the adversarial audience, the participant would receive money, whereas, if the participant were unsuccessful, the audience member would receive the money. In the neutral condition, only the participant received money for success; no audience or monetary incentive was used for the control group. Butler and Baumeister again confirmed that a supportive audience had a detrimental performance effect.

Negative perceptions about anxiety may be debilitating to performance, however, Butler and Baumeister demonstrated that positive assessment of a supportive audience was also negatively related to performance. Although a supportive audience may promote pressure and positive perceptions are associated with a supportive audience, debilitating performance may occur. Butler and Baumeister concluded that a supportive audience creates “friendly faces” to performers, but still may hinder performance.

Apparently, age may be a determining factor of whether presence of an audience affects performance. Tice et al. (1985) found that children under 12 years of age improved performance on a video arcade game, whereas adolescents and adults showed moderate to significant performance decreases when an audience was present. Tice et al. explained that the tendency to become self-conscious is less likely in children, permitting a functional task focus, whereas S-C peaks in adolescence (Simmons, Rosenberg, & Rosenberg, 1973) and may affect performance negatively.

Many reviews of audience effects have been published within the last three decades (e.g., Bond & Titus, 1983; Geen & Gange, 1977; Strauss, 2002; Zajonc, 1965). Bond and Titus integrated 241 studies into a meta-analysis of audience effects, using primarily human participant studies. The main finding was that the influence of an audience on performance was minimal. Bond and Titus clarified that the presence of an audience only explains 0.3 – 3% of the performance variance. What appears to be a small variance in performance may be substantial at elite levels of sport where gold medals are won and lost by milliseconds in sports, such as swimming and athletics. Other important findings included: the presence of an audience heightens physiological arousal, experts rather than non-experts in the audience facilitated performance for participants on simple tasks, but not for complex tasks, knowledgeable audience members were facilitative to participants performing simple tasks, but debilitative to participants performing complex tasks, and an unfamiliar audience was debilitative to participants performing complex tasks.

Strauss (2002) recently reviewed research on audience effects for people performing motor tasks. Similar to Bond and Titus (1983), Strauss ascertained that “if any effects of the mere presence of others are to be found at all, they tend to be very weak” (p. 253). Although Strauss suggested weak results for audience effects, three main points from the review were noteworthy. First, the fundamental social facilitation theories and research supporting or contradicting the theories was critically analysed and reviewed. Second, a differentiation among motor tasks and audience effects was acknowledged. A review was offered for separate skills that place demands on conditioning (i.e., tasks that require high levels of energy or physical effort, such as weight lifting), skills that place demands on coordination (i.e., tasks in which various body systems have to be synchronised, such as golf or dart-throwing), or a mixed form of simultaneous conditioning-coordination skills (e.g., basketball or soccer). Strauss noted, “All tasks make demands of conditioning and coordination… the crucial aspect is how strongly these parts relate to each other” (p. 247). Strauss delineated that presence of an audience increased performance in tasks where conditioning skills were pre-eminent. Contradictory evidence, however, was found for coordination skills and skills combining the coordination-conditioning components. Performance can be either facilitative or debilitative when an audience is present for coordination or mixed forms of skills. Finally, coordination and conditioning skills research was matched to the social facilitation models and Strauss found that “the most recent models… tend to be supported only by their authors’ own empirical work… In his review, Zajonc (1980) tends to favour his own model from 1965” (p. 251).

Influence of video camera. Although the intention is essentially the same as presence of an audience, other external factors, such as a video camera, may be used to increase perceived pressure (Beilock & Carr, 2001; Kurosawa & Harackiewicz, 1995; Lewis & Linder, 1997; Linder, Lutz, Crews, & Lochbaum, 1999; Wang, Marchant, & Morris, 2004; Wang, Marchant, Morris, & Gibbs, 2004). Carver et al. (1985) maintained that presence of a video camera might increase S-A, which interferes with processing of task-relevant information. Baumeister (1984; Beilock & Carr; Masters, 1992) have suggested that when S-A increases, performance decrements may occur. Linder et al. demonstrated that a video camera increased A-state in a golf-putting task with 10 experienced golfers. Increased A-state was evident, however, performance differences were equivocal. The presence of a video camera has been shown to increase A-state, which is likely to decrease performance in motor skills (Wang, Marchant, & Morris, 2004; Wang, Marchant, Morris, & Gibbs, 2004).

Performance contingent rewards. Offering monetary incentives has been shown to affect performance (Baumeister, 1984; Beilock & Carr, 2001; Hardy et al., 1996; Lewis & Linder, 1997; Linder et al., 1999; Masters, 1992). The possibility of earning a reward for performance may intensify the perceived importance of a situation and consequently perceived pressure. Attending to the possibility of a reward may distract the performer or interfere with intrinsic motivation (Baumeister & Showers, 1986). Baumeister illustrated that when offering a monetary reward for successful performance, participants performed significantly worse compared to a control group not offered a reward. Similarly, Masters participants' practiced a golf-putting task and then were offered an increase or decrease in monetary payment in a "stress" session. Participants who were hypothesised to perform poorly in the "stress" session demonstrated a decline in performance, while an increase in heart rate and A-state were evident. Thus, the possibility of earning more or less money appears to elevate anxiety. It should be noted that a “golf professional” was used to evaluate participant performance, therefore, it is unknown whether the monetary incentive or the evaluation was the cause of the significant pressure manipulation.

Skill characteristics. A number of researchers have suggested that variations in skill characteristics may differentially affect performance under pressure (Baumeister, Hutton, & Cairns, 1990; Baumeister & Showers, 1986; Beilock & Carr, 2001; Beilock et al., 2002; Mesagno & Janelle, 2002; Wang, Marchant, & Morris, 2004; Wang, Marchant, Morris, & Gibbs, 2004). Two aspects of skill characteristics should be considered under pressure: skill complexity and skill difficulty. According to Naylor and Briggs (1963), skill complexity refers to the number of parts or components in a skill, as well as information-processing demands, whereas skill difficulty refers to the likelihood of executing the correct performance. Researchers have not always made a clear distinction between what constitutes complex and simple tasks. Complex tasks are closely related to skill-based tasks because of their reliance on smooth execution of multiple processes that can be interrupted by pressure. Simple tasks, however, may only require one step to execute and are less susceptible to pressure interference (Beilock & Carr). Baumeister et al. suggested that task complexity has often been confused with task difficulty. For example, short-distance golf putting has been used in choking research. Such putting is arguably a relatively simple, fine-motor task, when constructed and performed under typical laboratory controlled conditions. Beilock and Carr and Masters (1992), however, have suggested that golf putting, even under experimentally controlled conditions, is a complex skill. Thus, an understanding of performance under pressure regarding both complex and simple tasks may be helpful to choking research.

Another task characteristic recently investigated that seems important to choking susceptibility, and similar to Strauss's (2002) social facilitation finding regarding the differentiation among motor tasks and audience effects, is whether the task is predominantly skill-based or effort-based. Baumeister et al. (1990) 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). Skill-based tasks generally become automated with learning, and require less attention to perform. As the mechanics of skill-based tasks become well developed, increases in effort and motivation are unlikely to directly affect performance, except in interfering with automaticity of execution (Baumeister et al.). Skill-based tasks may be more susceptible to pressure by means of an inhibition of well-learned sequences of movement (Kimble & Perlmuter, 1970). Conversely, effort-based tasks benefit from exertion, based on conscious control. An increase in effort to facilitate performance should increase stamina and motivation. Although largely dependent on the task, in effort-based tasks, individuals under pressure may endeavour to assist performance by controlling execution and increasing effort. Baumeister et al. demonstrated that the effects of verbal praise on performance differ depending on the task. Participants performing an effort-based task responded well to praise, whereas participants completing a skill-based task responded poorly to praise. Baumeister et al. suggested that praise disrupts skilled performance through an elevation in S-C, and may also burden the performer with audience expectations for repeated success. Wang (2002) also confirmed the effort-based vs. skill-based task hypothesis under pressure. Wang found participants that completed a running (effort-based) task improved performance in a high-pressure condition, whereas decrements in performance occurred for participants completing a free-throw shooting (skill-based) task under pressure.

The review of research in attention, anxiety, and predictors of choking has lead investigators to a general understanding of the effects attention, anxiety, and dispositional and situational factors have on choking. As suggested, choking has been an illusive construct to define and comprehend, causing difficulty in developing theoretical explanations. Thus, questions still remain regarding underlying mechanisms of choking.

Underlying Mechanisms of Choking

Several studies have verified that researchers can induce choking behaviour within controlled, experimental conditions (e.g., Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992). Researchers, however, have not yet demonstrated more ecologically valid (e.g., field setting) evidence. Although choking may be an ideographic phenomenon, Clark (2002a, 2002b) suggested choking should also be tested outside the research laboratory. Clark (2002a) recently investigated the susceptibility of choking of professional golfers. Statistical analyses on 41 archival golf championships were completed to identify the occurrence of choking. Clark found that choking was not evident. Limitations with the study, nevertheless, made it difficulty to generalise the findings. First, choking is individualistic and situation specific and may not be globalised to statistics and archival data. To strengthen the study, a comparison of each golfer’s initial round with their final round (i.e., pressure) score could have resulted in a more accurate understanding of whether choking occurred. Second, Clark referenced Baumeister’s definition of choking, however, no direct method of pressure confirmation (e.g., arousal or anxiety testing) was used to confirm Clark’s hypothesis that players one shot from the lead experienced the most pressure during the final round. Without a direct measure of anxiety and arousal levels, the pressure hypotheses are merely speculative. Perhaps controlled field studies should be conducted, as they may be more robust in understanding choking than archival data with no direct evidence of pressure.

Despite researchers' suggestions (e.g., Baumeister & Showers, 1986; Beilock & Carr, 2001; Masters, 1992; Nideffer, 1992) about what represents choking, sport psychology theory and practice has not developed to the point where researchers are in total agreement about what constitutes choking. Nonetheless, the causes and mechanisms of choking continue to be investigated. Most research has focused on the role of attention under pressure, although, to a lesser extent, the role of anxiety has also been examined.

Attentional Models of Choking

Attentional theories in sport are based on the principle that optimal performance is contingent on the ability to focus attention on task-relevant information, processes, and behaviours, while concomitantly ignoring task-irrelevant cues (Nideffer, 1992). Although some stimuli cause involuntary attentional shifts (e.g., hearing a loud noise from spectators), most attentional shifts are voluntary; consequently, voluntary attention will be the focus of this discussion.

An athlete's ability to shift attention may be examined as a position on a continuum ranging from complete control to the inability to modify attentional focus. When athletes are predisposed to one attentional style and are incapable of modifying attentional focus, detriments in performance may occur. Attentional flexibility (i.e., ability to direct and alter attention) is an essential component in sport, especially in open skilled sports, because adopting other appropriate attentional styles allows athletes to adapt to constantly changing environments. Nideffer (1992) theorised two main dimensions appropriate in modifying attention: width (scope) and direction (focus). The width dimension refers to the number of concurrent stimuli receiving attention at one time and ranges on a scale from broad to narrow, whereas the direction of attention refers to the origin of the stimuli to which the person attends and is denoted as either external (i.e., stimuli originates in the environment) or internal (i.e., stimuli originates from within the individual) focus of attention. When an athlete applies width and direction dimensions to sport performance, only relevant information should actually be processed through selective attention. Selective attention (i.e., the process by which certain information is preferentially chosen while other information is ignored) is not simply the ability to choose between direction and width, rather the ability to choose among four possible, specific combinations of attention: broad-external, narrow-external, broad-internal, and narrow-internal. Within these four dimensions, athletes (depending on the sport) differentiate important cues by shifting attention. According to Nideffer, a voluntary shift in attention to task-relevant cues assists the athlete in remaining focused on maximising performance. For example, in basketball, an external-broad focus (scanning the court) may be used first, followed by a shift to an external-narrow focus (looking at the basketball rim) when shooting. Voluntary shifts in attention assist the athlete in correct decision-making and increase performance capabilities by attending to relevant cues and disregarding irrelevant cues. Shifts in attention to task-irrelevant cues yield detrimental effects by disrupting task concentration.

Choking may be caused by increases in anxiety levels under perceived pressure (Masters, 1992), which diverts attention to either internal (movement) or external (environmental) irrelevant cues, disrupting task concentration. For example, increased attention to internal, irrelevant cues may negatively influence execution because the preoccupation with internal mechanisms redirects concentration to thoughts not associated with performance. Thus, researchers have formulated two models that predominantly apply to choking: *distraction* and *self-focus* (e.g., Baumeister's [1984] automatic execution hypothesis, Masters' conscious processing hypothesis, and Beilock and Carr's [2001] explicit monitoring of execution hypothesis) models. The distraction model and the self-focus model, in addition to an alternative model recently developed but not empirically tested, hypothesise causes of choking.

Distraction model. Nideffer (1992) may have adapted the distraction model from original explanations of poor performance in test anxiety (Wine, 1971). Researchers involved in test anxiety suggest that poor test-taking performance may be due to task-irrelevant (e.g., worry about outcome), rather than task-relevant (e.g., the question being answered) information. Nideffer proposed an athlete's attention is directed toward a combination of task-relevant and task-irrelevant performance cues and particular stimuli divert attention from task-relevant information. According to Nideffer, athletes that are distracted, experience choking because attention shifts from task-relevant to irrelevant cues. Important emotional modifications (e.g., increases in anxiety and arousal) during competition prompt attentional changes, resulting in reduced attentional flexibility (i.e., ability to modify and direct the dimensions of attention). Nideffer posited that as arousal increases, athletes become too internally immersed in task-irrelevant thoughts (e.g., worry) because of increasing physiological sensations (e.g., heart rate, butterflies, sweating) and are unable to escape inappropriate cognitions, resulting in failure to attend to important cues. An example of choking based on the distraction model is at the start of a basketball game, successful free throw attempts are due to a player using an external, task-relevant mode of attention. When perceived importance of success increases, perhaps near the conclusion of a close game, physiological changes occur and the athlete modifies attention internally (e.g., negative self-talk) when attempting free throws. The voluntary shift to critical self-talk about internal feelings may lead the athlete to miss shot attempts. Nideffer and Sagal (2001) suggested that "over-attention" to task-irrelevant factors, such as internal distractions (e.g., self-doubt, anxiety), leads to physiological (e.g., increases in muscle tension, heart rate) and attentional (e.g., attentional narrowing, internal focus) changes, which in turn results in performance decrements.

Although Nideffer's (1992) distraction model proposes that as an elevation in arousal occurs, physiological changes increase and the tendency to direct attention to internal distractions (e.g., negative thoughts, worry) also intensifies, Beilock and Carr (2001; Lewis & Linder, 1997) have also interpreted that choking may occur when external distractions (e.g., watching an opponent, crowd awareness) interfere with the athlete's attention. External distractions rather than internal cognitions cause attentional shifting, leading to choking. For example, shifts of attention to external cues may occur in individual-based sports like golf or tennis, when an athlete repeatedly watches the scoreboard to determine personal ranking, rather than focusing on personal performance.

Recently, working memory and cognitive control mechanisms, developed in part from Kahneman's (1973) work, have been investigated to further advance the distraction model of choking. Working memory is a short-term memory system that maintains, in an active state, a limited amount of information with immediate relevance to the task at hand while preventing distractions from the environment and irrelevant thoughts (Kane & Engle, 2000). The functions of the central executive of working memory are not fully understood but seem to be attention-related (e.g., Baddeley, 1993, 1996; Engle, Tuholski, Laughlin, & Conway, 1999). Engle (1996) argued that individual differences of "working-memory capacity" reflect the capability to use controlled attention to prevent distraction from the environment and interference from events stored in long-term memory. If the ability of working memory to maintain task focus is disrupted by internal or external factors, then performance may suffer. Beilock, Kulp, Holt, and Carr (2004) conducted a study to investigate the influence of pressure in a task in which performers would be susceptible to choking via distraction. The researchers asked individuals to perform easy (low demand on working memory) and difficult (high demand on working memory) math problems in both low- and high-pressure situations. Similar to Nideffer's (1992) distraction model of choking and Wine (1971) test anxiety research, Beilock et al. found that pressure causes individuals to worry. Moreover, participants that performed difficult math problems (strongly reliant on working memory resources) showed signs of failure under pressure, which indirectly indicated worrisome thoughts. Beilock et al. concluded that pressure could compromise working memory resources, causing failure via distraction in tasks that rely heavily working memory.

Self-focus model. The genesis of the self-focus model was perhaps established in skill acquisition and motor learning research. Hence, a brief discussion of skill learning is essential to understand the self-focus model. Theorists (e.g., Anderson, 1982; Fitts & Posner, 1967) have hypothesised that skill acquisition progresses through stages, transitioning from explicit, retrievable processes to more implicit, automatic processes in which constant attention is not required for task performance. Fitts and Posner explained that in the first stage, the cognitive stage, learners acquire skill by activation of cognitive processes. Skill execution usually depends on a set of control structures held in working memory and attended to in a step-by-step manner (Anderson). Conscious monitoring of skill execution assists the learner in understanding the movement sequence. During Stage 2, the associative stage, performance is usually more consistent and the skill is performed with comparatively less cognitive effort. Due to increases in skill with adherence to practice, accurate methods of performing are ascertained and emphasis is on the role of practice conditions for the development of more proficient skill. As expertise develops, the role of attention during performance also changes. As procedural knowledge is developed, regular conscious control is superfluous. The last stage, the autonomous stage, is characterised by efficient, effortless, automatic performance. Skill development is represented by decreases in required attentional resources and assistance from working memory. Fitts and Posner anticipated that the expert performer should execute the skill without conscious thought. Even at elite levels, however, athletes become self-aware due to increased anxiety levels (Singer, 2002). When S-A is elevated, the athlete reverts to prior stages of learning and conscious attention to execution may ensure proper movement is maintained. Paradoxically, though, conscious control of mechanics may reduce attention to perform automatically and performance decrements result.

There are many examples, however, where the cognitive stage of learning is seemingly bypassed. For example, children acquire dance routines, sport skills, and other complex movements with what seems to be minimal cognitive effort. Consequently, the amount of cognition required or desirable during skill learning is debatable. Fitts and Posner's (1967) cognitive stage has been challenged by researchers in awareness vs. non-awareness conditions (e.g., Lidor, Tennant, & Singer, 1996; Singer, Lidor, & Cauraugh, 1993, 1994) and internal vs. external focus of attention (FOA) studies (e.g., Perkins-Ceccato, Passmore, & Lee, 2003; Radlo, Steinberg, Singer, Barba, & Melnikov, 2002; Wülf, Höb, & Prinz, 1998; Wülf, Lauterbach, & Toole, 1999; Wülf, McNevin, Fuchs, Ritter, & Toole, 2000) in an effort to understand whether FOA influences performance. Typically, S-A and internal FOA strategies are suggested for beginners learning sports. Researchers, however, are currently investigating whether novices should adopt a more autonomous, implicit learning approach to skill acquisition. To illustrate, Singer et al. (1993) asked participants to perform a nondominant overhand throw at a target. Participants were randomly assigned to a nonawareness group (asked to preplan the movement, focus on one cue [i.e., centre of target], and ignore all movement information), and an awareness group (instructed to be aware of ball-throwing execution). Singer et al. found the nonawareness group performed more accurately than the awareness group, suggesting self-focused attention may inhibit performance for unskilled performers. Wülf et al. (1998) studied the effects of external focus (related to performers' actions on the environment) compared to internal focus (self-directed attention) on performance with a ski-simulator and then with a stabilometer (balance board). Similar to findings by Singer et al., external focus led to best performance in comparison to internal focus. Apparently, learners need not always experience increased cognition at early stages of learning, and it may be beneficial to adopt implicit learning strategies.

In the self-focus model, arousal and anxiety levels may increase under perceived pressure that leads to an elevation in S-A during performance (Baumeister, 1984; Masters, 1992; Masters et al., 1993). Wegner and Giuliano (1980) demonstrated that increased arousal eventually leads to focusing attention toward body awareness. Participants were exposed to manipulations designed to vary levels of general arousal. Three tasks were used: running in place, waiting in a chair, and reclining in a lounge chair. All participants were given a measure of focused attention identifying the number of first person pronouns used to complete a sentence, while heart rate was monitored, providing an indication of arousal level. Participants who ran in place displayed greater self-focus than participants in a comparison group whom merely waited for an equivalent time period**.** Wegner and Giuliano concluded that increased arousal levels lead to an elevation in self-focused attention. Supporters of the self-focus model of choking (e.g., Baumeister; Beilock & Carr, 2001; Masters) have suggested that inhibition of performance is a result of increased S-A, either through reduction in response speed (Bond, 1982) or interference of response automaticity (Kimble & Perlmuter, 1970). Although two causes are hypothesised for performance decrements, interference of response automaticity has been the fundamental rationale in choking studies.

Advocates of the self-focus model (Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992) have provided a perspective that follows the work of Carver and Scheier (1978) on S-C, which suggested anxiety increases S-A. To explain choking, Baumeister conducted a series of studies proposing three hypotheses: increased S-A causes decrements in performance, pressure causes decrements in performance, and performance decrements occur in field settings. Participants in Studies 1, 2, and 3 performed a “roll up” game in which two rods were attached to a vertical board at one end and the participant held rods from the other end. The object was to earn as many points as possible by moving the metal ball up the slight incline of the rods and dropping the ball close to participants’ hands. The three studies illustrated that increased S-A was detrimental to performance. In Studies 4 and 5, the hypothesis that pressure may hinder performance, while executing a slightly different task, was confirmed, whereas in Study 6, choking was demonstrated within a field setting. Baumeister emphasised “these experiments do not provide direct evidence that pressure causes increased attention to one’s internal performance processes, although there was ample indirect evidence of relationships between pressure and S-C” (p. 619). Baumeister mentioned a limitation in the study was that a pressure manipulation was not provided. Baumeister initially introduced the automatic execution hypothesis noting that participants having a high motivation to do well may consciously monitor behaviour, whereas Masters explained that pressure produces increased attention to internal performance processes through conscious processing.

To expand Baumeister's (1984) hypothesis, Masters (1992) conducted a classic explicit and implicit motor learning study in which participants learned golf-putting through explicit motor learning (providing instructions about how to perform the skill) or implicit motor learning (no instructions given regarding execution of the skill). Forty novice golfers were randomly assigned to one of five groups, including: explicit learning (EL), implicit learning (IL), implicit learning control (ILC), non-stress control (NSC), and stress control (SC) groups. The EL group was provided with instructions on how to perform a golf-putt. The two implicit groups (i.e., IL and ILC) performed a random letter generation task that interferes with explicit knowledge acquisition; thus ensuring implicit learning (Baddeley, 1992). "Stress" was provided for the IL group in the final session, but not the ILC group. Control groups did not perform the random letter-generating task and were not given explicit information. Participants performed a total of 400 golf putts over 4 sessions during a skill acquisition phase and 100 putts under a "stress" condition. The stress condition involved a monetary incentive and an audience that comprised a professional golfer. The EL, IL, and SC groups were subjected to the stress condition, whereas the other groups performed with no stress. Participants in Masters' study exhibited an increase in somatic anxiety, cognitive anxiety, and heart rate under pressure. The resulting evidence indicated a slight decrease in mean number of putts holed for the EL group under stress in comparison to the IL groups, who increased number of putts holed. Masters concluded that implicit motor learners are relatively more stress-resistant compared to explicit motor learners because of less dependence on task rules. Apparently, implicit motor learners performed automatically under stress, due to their lack of "reinvestment" in explicit rules. More specifically, explicit rules were not formed because participants learned implicitly and were not accessible under stress. The phenomenon of detrimental, conscious processing under pressure, shown by explicit learners, has been called "reinvestment" (Masters et al., 1993) or "deautomatization" (Deikman, 1969).

Masters et al. (1993) conducted a follow-up study to Masters (1992) study to explain the performance decrement for explicit motor learners under "stress." In this investigation, reinvestment scores of participants in the SC and IL groups from Masters study were combined to establish whether high reinvesters (i.e., individuals likely to use instructions for movement execution) or low reinvesters (i.e., individuals not likely to be conscious of movement execution) experienced greater performance decrements under pressure. A reinvestment scale, consisting of 75 questions from various questionnaires (Cognitive Failures Questionnaire [Broadbent, Cooper, FitzGerald, & Parkes, 1982]; Emotional Control Questionnaire [Roger & Nesshoever, 1987]; Self-Consciousness Scale [Fenigstein et al., 1975]), was formulated to identify high and low reinvesters. High reinvesters were chosen from a group of participants that scored more than one standard deviation (SD) above the overall mean score, whereas low reinvesters were selected from a group of participants that scored more than one SD below the overall mean score. A Pearson product moment correlation coefficient was then computed between the reinvestment scores and putting performance differences from pre- to post-stress. The resulting evidence indicated that high reinvesters performed poorly compared to low reinvesters. Evidently, high reinvesters directed conscious awareness to the movement during stressful situations, thereby disrupting automaticity. In contrast, much like implicit motor learners, low reinvesters allowed automaticity to occur leading to an increase in putts made. In summary, Masters has proposed that when stress increases, performance decreases because increases in reinvestment disrupt automaticity. Caution should be used when interpreting these results because the reinvestment scale was not psychometrically validated prior to this study and may have provided inconsistent results. This extension of the self-focus model has been recently identified as Masters' conscious processing hypothesis and is an appropriate inclusion into self-focus models of choking.

A consistent methodological limitation of "reinvestment" research to date (e.g., Hardy et al., 1996; Masters, 1992), however, has been the assumption that explicit motor learners increasingly reinvest knowledge under stress by evaluating explicit knowledge during post-experiment assessment only. Mesagno and Janelle (2002) acknowledged this limitation and provided evidence for Masters reinvestment prediction by directly assessing explicit knowledge within the low and high stress phases of their experiment, rather than post-experiment. Specifically, Mesagno and Janelle found that explicit motor learners indeed relied more upon explicit knowledge under stress in comparison to implicit motor learners. Explicit motor learners increased explicit knowledge in a post-stress in-task assessment in comparison to pre-stress, thus, directly confirming that reinvestment occurs. Results of this study should be viewed with caution because no significant performance differences were obtained between explicit and implicit motor learning groups.

To investigate further the processes behind self-focused attention and expert performance, Beilock and Carr (2001) sought to document the accessibility of declarative (i.e., formal, rule-based [Anderson, 1987]) knowledge about golf putting with changes in skill level. Beilock and Carr hypothesised that generic knowledge increases as level of skill progresses, whereas episodic knowledge decreases with further expertise. Generic knowledge relates to how the skill is typically executed, incorporating general facts and rules about performance. Episodic knowledge captures an autobiographical record of a previous performance in a specific situation or context (Beilock & Carr). The difference in generic and episodic knowledge was theorised because highly practiced skills involve more episodic knowledge than generic knowledge and, thus, require less attention to perform. Beilock and Carr found that episodic recollection of specific putts was poor for experts, denoting that skilled putting is encoded in a procedural form that supports performance without the need for constant attentional control and substantiates the contention that self-focusing is not necessary during skilled performance. Thus, execution of movement should remain at an automatic level to facilitate skilled functioning.

Beilock and Carr (2001) also provided support for the self-focus model when participants performed either a golf-putting or alphabetic arithmetic task. In the alphabetic arithmetic task, participants' were asked to solve equations such as "A + 2 = C by counting two units down the alphabet to C" and answer, as quickly as possible, whether the equation was true or false. Participants in each task practiced until reaching a consistent level, then, subsequently performed in a low-pressure and high-pressure condition. The main finding was that choking occurred within the predominantly sensorimotor skill (i.e., golf putting), but was not evident in the cognitive alphabetic arithmetic task. Beilock and Carr suggested, "Choking arises in a task whose underlying knowledge base is thought to be procedural, but not one in which the underlying knowledge base is assumed to be more explicitly accessible" (p. 719). For sensorimotor skills, pressure apparently leads to impractical efforts to consciously control use of more complex, procedural knowledge that already operate automatically. Another conclusion was that three task properties may be involved in choking: task complexity, degree to which task components become proceduralised with practice, and differences in susceptibility to breakdowns under pressure between cognitive and motor tasks.

In a recent study, Wang (2002) tested the self-focus model and expanded choking research by conducting a series of studies regarding gender differences, predictors of choking, coping styles, and perceptions of choking. Wang attempted to identify choking through direct anxiety manipulations, employing a low-pressure (LP) and high-pressure (HP) design to investigate potential gender differences in choking. Forty-six male and 18 female participants filled out a series of psychological questionnaires before participating in a basketball free throw task. No gender differences were evident between the LP and HP condition. Wang also identified that S-C was more likely to negatively affect females' performance and A-trait was more likely to negatively affect males' performance.

Choking is an idiosyncratic and personal experience that may be explored more readily through other scientific genres such as philosophy. Accordingly, in a summary article, James (1998) discussed a philosophical perspective explaining choking as irrational and self-defeating behaviour (i.e., behaviours that result in failure to achieve one's apparent goals and ambitions). James proposed that irrationality typically involves making inferences, holding beliefs, or performing activities counterproductive to the individual's goals or aims. James suggested that self-defeating behaviours involve misdirected beliefs. He agreed with advocates of the self-focus model, that anxiety might direct a person to become self-aware. James proposed that when a person becomes self-aware, increases in self-reactive attitudes promote inward self-focus and are associated with demands on oneself because of others' opinions (James); excessive demands may promote irrationality. For example, a skilled performer, if believing and behaving rationally, would rely on acquired skills for performance execution. Instead, according to James, the irrational performer becomes self-conscious and the irrational belief develops when the person deduces that to perform well, attention to performance execution is necessary, which is counterproductive to the individual's goals as explained by advocates of the self-focus model of choking. Thus, James argued that when S-A increases, self-reactive attitudes are intensified that cause previously learned skills to be ignored and the person "chokes." The person creates harsh self-reactive attitudes that lead to self-doubt and increases attention to detail, which is typically counterproductive to performance, instead of maintaining confidence in ability level. Thus, instead of executing automatically under pressure, attention is shifted to an unnecessarily controlled execution because thoughts centre around others opinions and irrational self-beliefs.

Distraction model vs. self-focus model debate. Recently, investigators have compared and tested these two predominant models of choking (Beilock et al., 2002; Beilock, Bertenthal, et al., 2004; Gray, 2004; Lewis & Linder, 1997). Lewis and Linder evaluated participants executing golf-putts in a low-pressure and a high-pressure condition under a distraction or a self-focus criterion. To induce S-A in the self-focus condition, participants were informed that performance would be filmed and the videotape analysed by a sport psychologist, golf team, and coaches (Lewis & Linder). The distraction group performed golf-putts, while counting backwards from 100 by 2's. Lewis and Linder hypothesised if choking was due to self-focused attention, the addition of a distraction would prevent participants from self-focusing and hence, be less likely to "choke." If choking were due to distraction, however, addition of the distraction would result in choking effects. Lewis and Linder provided support for the self-focus model and explained that choking is more likely to occur when S-A is heightened as illustrated with the self-focused group. Based on choking research, the self-focus model provided a plausible explanation for the decreased performance exhibited in choking, whereas the distraction model was not supported during Lewis and Linder's study.

Although Lewis and Linder (1997) provided preliminary evidence in support of the self-focus model, additional research is necessary in sport to link the self-focus model with choking. In a study to examine the affect of self-focused attention on sensorimotor skills, Beilock et al. (2002) asked experienced golfers to perform golf putting under conditions of dual-task (DT) and skill-focused (SF) attention. In the DT condition, participants attempted golf putting while listening for a “target tone.” After hearing the tone, participants spoke the word “tone” aloud. Participants in the SF condition were asked to “monitor the swing of the golf club” and at the time the club head came to a stop, say “stop” audibly. The DT condition was designed to distract attention and the SF condition was designed to promote explicit monitoring of performance. Beilock et al. found that participants in the DT condition were more accurate, thus indicating that constant attention control may not be necessary (and possibly detrimental) for experts. In Experiment 2, right-footed novice and experienced soccer players dribbled through a slalom course of cones with the dominant foot under DT and SF conditions. Novice players performed quicker when involved in SF conditions, whereas experienced players performed in less time during the DT condition. Beilock et al. indirectly provided support for the proposition that novice players “choked” while being distracted, whereas experienced players “choked” when self-focusing. That is, self-focused attention enhances performance in novices, whereas self-focused attention is not necessary for experienced players. Finally, inexperienced and experienced soccer players performed the same soccer-dribbling task with their non-dominant foot under SF and DT conditions. Beilock et al. determined that both novice and experienced players performed faster under the SF condition. Evidently, for experienced players, the task was not automated with their non-dominant foot compared to their dominant foot. These results again confirmed the effect that SF attention has on inexperienced performers. When experienced players apply SF attention on skilled movements, detrimental effects may occur.

Similar to Beilock et al. (2002), Beilock, Bertenthal, et al. (2004; Experiment 1) replicated Beilock et al. (2002; Experiment 1), but included novices within the study. Eighteen novice and 18 expert golfers performed 20 golf putts within a single-task condition (i.e., performed the golf putts only), a SF condition (i.e., performed the putts, while "monitoring" their swing), and a DT condition (i.e., performed the putts while listening to tones). Beilock, Bertenthal, et al. confirmed that experienced golfers "choked" when in the SF condition, whereas novice golfers "choked" when in the DT condition. Experiment 2 was designed to reduce the time available to monitor explicit rule-based knowledge in novice and expert golfers. Beilock, Bertenthal, et al. hypothesised that experts under time constraints would perform more accurately because less time was available to attend to skill execution. Participants were randomly assigned into either an accuracy (i.e., performed putts as precisely as possible) or speed (i.e., performed putts within three seconds of set up) condition. Novice golfers performed more accurately with no time constraints, whereas experts performed better with time constraints. Novices, apparently, needed more time to attend to components of the skill, whereas experts' procedural knowledge allowed performance to occur without monitoring execution.

To extend the results of Beilock et al. (2002) and Beilock, Bertenthal, et al. (2004) into open skill sports, Gray (2004) conducted three studies to determine attentional mechanisms during an open skill (i.e., baseball batting). Experiment 1 and 3 were relevant to the current discussion. In Experiment 1, 10 expert and 10 novice baseball batters performed in a batting simulation, while attending to random tones. Participants completed 100 trials in each of three experimental conditions: extraneous dual-task (articulate the tone as high or low in sound frequency), skill-focused dual-task (identify position of bat as moving up or down at time of tone), and single-task (ignore the auditory tone). Participants in each DT condition (i.e., skill-focused and extraneous) verbalised their answers immediately after completion of each trial. Novices in the skill-focused and experts in the extraneous task condition similarly decreased temporal swing errors. Experiment 1 provided additional support for Beilock and colleagues contention that experts attending to movement execution decrease performance. In Experiment 3, 12 expert baseball players were randomly assigned into a pressure or control group. The experts completed 2 blocks of 200 trials in a low-pressure and a high-pressure condition under SF and DT conditions. Significantly higher judgment error percentage for the SF group than the DT group and lower error percentage during high-pressure than low-pressure phase were evident. Apparently, the addition of pressure reduced error percentage for the SF group, but had no effect on errors in the DT condition. Gray suggested that the SF group in Experiment 3 provided direct support that the amount of SF attention is greater in expert performers under pressure, which compliments Beilock and colleagues' findings from their golf putting and soccer-dribbling studies. Some caution should be used when interpreting the findings, however, because no direct assessment of the pressure manipulation was provided during Experiment 3.

Researchers have provided strong evidence for the contention that the self-focus model is the main explanation for choking, however, a predicament in investigations of choking models is whether the distraction model and self-focus model are independent of one another. For example, Baumeister and Showers (1986) argued that the distraction and self-focus models are distinct (but could be overlapping). That is, athletes may experience choking due to internal distraction (e.g., negative self-talk), but, at another time, internal cognitions may cause them to become more self-aware and increase the likelihood of choking. Thus, processes leading a person toward choking are different. If choking occurs due to internal processes, how do researchers know whether choking was due to self-focus or distraction? As will be described in detail, Wang (2002) introduced a model that encompasses the independent parts of the self-focus and distraction model amalgamated into a larger choking model.

Integrated model of choking. As part of his doctoral dissertation, using fundamentals of the self-focus and distraction models, Wang (2002) formulated an innovative model that integrates choking within novice and elite athletes. Not widely known within choking literature, the central tenets of Wang's integrated model (Figure 2.1) are experientially, and empirically, based. Wang argued that the self-focus and distraction models do not explain choking sufficiently when individually presented and the integrated model of choking combines aspects of the self-focus and the distraction models. The model proceeds along a number of pathways to the possibilities of choking through the self-focus model, the distraction model, or where choking is not likely to occur. Wang suggested that, initially, stable (i.e., dispositional characteristics) and unstable (i.e., situational emotional states) "causal factors" combine to affect an athlete's perception of pressure. Stable factors (denoted as dispositional causes of choking previously in this chapter), such as S-C and A-trait, are essentially aspects of the individual's personality. Unstable factors (referred to as situational causes of choking earlier in this chapter), such as presence of a video camera and others expectations, are situation dependent. Although cognitive appraisal is ongoing, in pressure situations, stable and unstable factors combine to generate cognitive appraisal of the situation. If the situation is threatening and/or important, increases in perceived pressure occur. Once an elevation of perceived pressure occurs, the athlete becomes more self-aware, A-state increases, and the significance of performing well increases. To date, researchers are uncertain of the sequence in which these cognitive mechanisms develop and could interact to elicit the importance of performing well. The incipient nature of Wang's integrated model permits refutation and additional research to understand the sequence of these cognitive processes.

The next step, after initial cognitive appraisal and increases in S-A and A-state, is the activation of coping mechanisms to deal with heightened pressure. Wang (2002) suggested that two possible coping strategies (i.e., approach or avoidance coping) might be used to deal with the pressure situation. Approach coping refers to directing cognitive and behavioural efforts toward reducing anxiety intensity and increasing attention on attending to situation-relevant characteristics. Athletes who use approach coping take direct action (e.g., increase effort, obtain information to solve the dilemma, or attempt to explain the source of anxiety). Approach coping strategies may be ineffective for pressure situations because direct information regarding the pressure is irrelevant to performance and directly contradicts Nideffer's (1992) view of maximising performance. Conversely, avoidance coping refers to directing activity away from the threat-related stimulus. Athletes who use avoidance coping may ignore pressure-inducing information, such as potential distracters, and maintain a task-relevant focus. Thus, Wang suggested avoidance coping should be used to decrease the likelihood of choking. Approach coping when applied to effort-dominant tasks, however, has the same performance effect as avoidance coping strategies. Effort-dominant tasks are supported by a conscious organising of exertion, often possessing a strong reliance on elements of physical fitness (e.g., strength, speed), and aided by motivation and trying hard (Wang). Thus, avoidance coping in effort-dominant tasks diverts attention to increased effort and reduces the likelihood of choking.

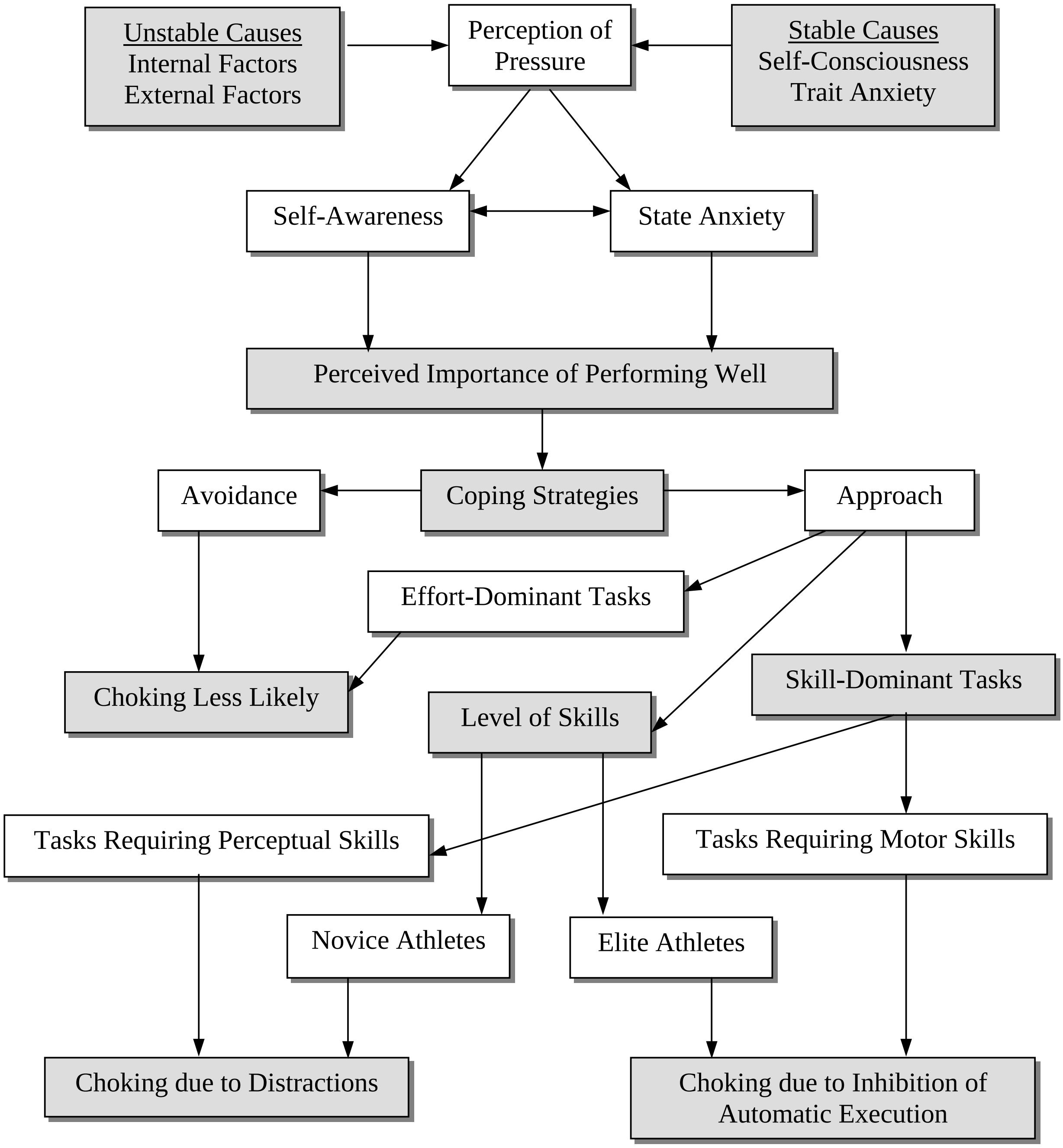

Figure 2.1. Integrated model of choking in sport. Reproduced from Wang (2002) with permission.

As Wang's (2002) model indicates, approach coping usually leads to choking in pressure situations. Nonetheless, the occurrence of choking may depend on task characteristics, mainly type of skill (i.e., skill-dominant or effort-dominant) and skill level (i.e., novice or elite). Skill-dominant, unlike effort-dominant, tasks require sophisticated perceptual and attention control, as well as sufficient motor skills that become automated with learning. If a skill-dominant task that requires refined perceptual skills is performed (e.g., clay shooting or volleying in tennis), choking may be due to distraction. Perceptual skills are cognitive processes used to understand information from the senses. For tasks predominantly requiring a response to information cues (i.e., perceptual processes), performance would largely involve perceptual skills. If performers have inadequate perceptual cues or do not obtain enough perceptual information, decision-making may not match task demands. For example, volleying in tennis requires both the motor ability to perform volleys and advanced perceptual skills to anticipate and react to the ball movement. Arguably, well-developed perceptual skills may be the predominant skill needed, as volleying requires quick attentional shifts to perform well.

If a skill-dominant task that requires well-developed motor skills is performed (e.g., golf-putting), choking may occur because of inhibition of automatic execution. When motor skills are well learned, performance on these tasks is normally of a high standard. The ability to perform these tasks automatically, without conscious control, is important for successful execution. As Nideffer (1992) explained, golf putting requires a narrow-external attentional focus on the golf ball until the stroke is completed. Attention is primarily on performing the motor skill, rather than shifting attention to perceptual information. According to advocates of the self-focus model (Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992) of choking, performing motor skills may permit more time athletes to actually shift attention internally and contemplate the correct movement, increasing the probability of choking. Thus, choking may be due to inhibition of automatic execution because the task is based on motor ability allowing for additional conscious processing of information. The other task variable that may contribute to the likelihood of choking is the athletes' skill level. Wang (2002) did not clearly define novice and elite athletes, therefore, due to recent research involving skill level and choking (e.g., Baumeister; Beilock & Carr; Beilock, Bertenthal, et al., 2004; Beilock et al., 2002; Hall, 2004; Masters), I have interpreted novice athletes as those in the cognitive stage of learning and elite athletes as those in the autonomous stage of learning (i.e., expert). Wang hypothesised that, for novices, choking might be due to distraction because of inexperience with attentional selectivity, whereas, for experts, choking may be due to inhibition of automatic execution because attention is diverted to S-A when anxious, increasing the likelihood of choking. Wang's integrated model of choking was developed from quantitative research (e.g., Baumeister; Beilock & Carr; Beilock et al., 2002; Lewis & Linder, 1997; Masters), although additional research is necessary to verify and support the model.

Developing Trust in Skill Execution

As previously stated, skill development progresses from consciously controlled processing to automatic, effortless performance (Schneider & Shiffrin, 1977). With dedicated practice, the ability to trust execution should develop. Moore and Stevenson (1991, 1994) defined trust, in this context, as letting go of tendencies to conscious control, allowing automatic processes to develop through training. Advocates of the self-focus model (e.g., Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992) have suggested that skill execution with cognitive interference may be counterproductive, especially when anxiety is increased, because trusting may be overruled by dispositional characteristics, such as S-C. Athletes who lack trust in their skill (or development) revert to controlled processes in order to assist execution and thus use “reinvestment” (Masters et al., 1993) or “deautomatization” (Deikman, 1969), and do not allow the skill to advance automatically.

Moore and Stevenson (1991) suggested that breakdowns in trust could occur at two main levels: during selection of movement sequences or during program execution. At times, with closed skills, a number of factors should be considered for optimal skill execution. In golf, for example, wind direction, distance to the green, and club selection are important in determining the amount of swinging power for the selected club. A breakdown in trust during selection of movement sequence occurs when excessive cognitive activity occurs during the selection and execution process. Similarly, breakdowns in trust occur during program execution, when conscious control interferes with proper movement execution. Moore and Stevenson identified three examples of breakdowns in program execution: aiming, pressing, and controlling. Aiming is excessive concern with the target; once aiming occurs, likelihood of fear of missing the target increases. Pressing is unwarranted tension in an attempt to generate more force. Trying too hard may be a form of pressing. Controlling is an attempt to exert excessive control over execution. Controlling during program execution is relevant to the self-focus model and prevents the athlete from fully trusting execution of the skill. Breakdowns in trust may be viewed similarly to reinvestment, although differences exist. In the absence of trust, automaticity is not reliable during either pressure or non-pressure situations. Reinvestment, however, is excessive attention to self and constant processing of movement execution during pressure situations only. Trust (or lack of trust) may occur at any skill level providing that skill proficiency is dominant, whereas reinvestment is associated with high-level performance with needless S-A under pressure. With reinvestment, explicit processes may be elicited to aid performance, whereas with breakdowns in trust, conscious control may result in excessive concern with the target or excessive tension. Reinvestment and trust will not occur concurrently under pressure because reinvestment occurs when there is an absence of trust. Simply put, in any situation, one either trusts or does not trust (Moore & Stevenson); under pressure, one either trusts or "reinvests."

Realising excessive rule-based information about skill execution may lead to self-doubt, nervousness, and momentary failures in concentration, Gallwey (1974, 1979) developed a fundamentally different approach to coaching in tennis and golf. Gallwey recognised that standard coaching methods, emphasising rule-based skill acquisition, frequently place unnecessary anxiety on performers and allow insufficient time to process information. Using basic tenets of motor learning and psychology, such as modelling, imagery, practice conditions, and brain hemisphere functioning, Gallwey encouraged the development of relaxed, effortless concentration through an "inner game" technique. Trust is an underlying technique incorporated in Gallwey's system.

To introduce trust, Gallwey (1974, 1979) dichotomised the mind into two modes of consciousness: Self 1 and Self 2. Based on scientific explanations of brain functioning, Gallwey (1974) explained that Self 1 is mental interference that inhibits both right- and left-brain functioning. Self 1 calculates and computes all aspects of skill execution in order to control movement and ensure proper execution. Self 1 is usually most helpful at beginning stages of learning because conscious attention helps improve the basic development of the sequence of movements. As skill develops, the role of Self 1 should diminish considerably. Self 2 is the total human organism, the body itself. Self 2 coordinates skill execution without conscious effort and produces complex movements with effortless fluidity. Traditional coaching techniques emphasise Self 1, whereas Self 2 development may be encouraged by sport psychology techniques, such as imagery and modelling. Within Gallwey's inner game approach, therefore, modelling and imagery are provided instead of explicit coaching techniques for skill development. By using the inner game approach, the athlete develops skill with less self-doubt and cognitive involvement, which allows the athlete to trust more effectively. Hardy and Ringland (1984) provided the only study conducted on the inner game approach. Adult beginning badminton players were randomly assigned to a traditional instruction group and an inner game instruction group. The traditional instruction group received eight weeks of instruction "by the book" whereas the inner game instruction group received eight weeks of demonstrations followed by practice routines. Participants in the inner game group were asked to observe the demonstration, concentrate on the body position and arc of the shuttle, and then clearly image the shot. Hardy and Ringland found that Gallwey's inner game approach was effective under empirical testing. This suggests that more implicit coaching styles should be used to increase trust and decrease self-focus under pressure. This study should be viewed with caution, however, as a number of limitation were involved. For example, the total number of participants was not explicitly stated in the study and the dependent variable was the number of wins recorded by each player, which may be dependent on other external factors such as opponent's ability level.

Although research dedicated to understanding choking has been minimal in comparison to other sport psychology constructs, such as self-efficacy and A-state, research on choking has increased in the past 25 years. Within the past 15 years in particular, researchers have presented considerable evidence primarily focusing on choking models. In an early review of choking research, Baumeister and Showers (1986) suggested that the debate on whether the self-focus or distraction model best explains choking must be resolved before choking intervention research could be commenced. As support favouring the self-focus model has accumulated, interventions to ameliorate choking can now be empirically tested.

Suggested Choking Interventions

Understanding choking models and factors related to choking does not necessarily translate into prevention of choking at the applied level. Although many suggestions have been proposed regarding choking interventions (e.g., Anshel, 1995; Hall, 2004; Nideffer & Sagal, 2001), to date, applied sport psychology techniques have not been widely discussed or empirically tested to facilitate performance under pressure. Anshel, for example, proposed psychological and behavioural methods to inoculate athletes against choking. Cognitive restructuring, thought stopping, and encouraging athletes to maintain realistic expectations have been discussed, but from a somewhat generic perspective. Anshel also proposed behavioural methods, such as developing performance routines and focusing externally, to deal with pressure. Researchers (e.g., Beilock & Carr, 2001; Lewis & Linder, 1997) have also included interventions as secondary components in published studies. For example, Lewis and Linder used a video camera to simulate and familiarise participants with pressure. Lewis and Linder hypothesised that, if adaptation to performing under pressure is trained, the performer have adapted to the increased S-A under pressure. The hypothesis was confirmed with the S-A adapted group performing more accurately in golf putts than a non-adapted S-A group. Adapting athletes to increased S-A, as suggested by Lewis and Linder, however, may be counterproductive, creating a conditioned response for athletes to increase S-A under pressure. The aforementioned inoculation studies were not the main focus of their investigations, thus, empirical examinations are still needed to identify potential choking interventions.

Potential Choking Interventions

Researchers have investigated various applied sport psychology techniques in an attempt to enhance performance, however, interventions have not yet been empirically tested and applied to pressure situations. Hall (2004) conducted a recent investigation, in part, to determine potential choking interventions. Thirteen sport psychologists and sport psychology researchers, who had published in peer-reviewed journals on choking, agreed to participate in in-depth interviews regarding choking interventions. A variety of interventions, based on the distraction and self-focus models, were identified and discussed. Preventative techniques were suggested to stop choking from occurring, whereas recovery techniques proposed the use of recovery techniques after the onset of choking behaviour. Hall based her recommended interventions on the underlying reasons for choking (e.g., attention- or anxiety-based), and included pre-performance routines, self-talk regulation, simulation training, relaxation techniques, and thought stoppage as potential interventions. Although a literature review of potential interventions is warranted, due to word limit constraints, I have decided to only discuss the two interventions germane to the studies in this dissertation.

Pre-performance routines. A pre-performance routine may help to maintain task-relevant attention and performance consistency. Crews and Boutcher (1986a) defined a pre-performance routine, or synonymously a pre-shot routine (PSR), as “a set pattern of cue thoughts, actions and images consistently carried out before performance of the skill” (p. 291). A decade later, Moran (1996) substantiated the definition by explaining that a PSR is a sequence of task-relevant thoughts and actions an athlete systematically engages in prior to performance of a sport skill. Cognitive and behavioural components assist in producing correct mental and physical organisation prior to performance execution. Pre-performance routines can be applied to closed-skill sports (i.e., sports performed in a stable, unchanging environment during skill execution) or open-skill sports (i.e., sports performed in an unstable, changing environment during skill execution), but are generally used to prepare for self-paced skills. Using a PSR is commonplace in self-paced tasks, such as putting in golf, free throw shooting in basketball, serving in tennis, and execution of a ten-pin bowling delivery.

Anecdotal support for the efficacy of using PSR's in self-paced tasks originates from both self-report and observational studies. Crews and Boutcher (1986a) provided initial empirical evidence by monitoring the PSR of female professional golfers in tournament play. The players' pre-putt and pre-shot behaviours were consistent over several hours of play. Dividing the players into two groups based on professional rank provided further evidence for the positive influence of the PSR. Crews and Boutcher found significant differences between the two groups with lower ranked (more successful) players taking more time on full swings and putts than higher ranked (less successful) players. Crews and Boutcher proposed that successful players applied consistent routines and took more time on swings than less successful players and this may be indicative of better mental preparation techniques, such as imagery and concentration.

Researchers have provided equivocal results on the effectiveness of a PSR for different skill levels. For example, researchers have provided empirical support that a PSR assists novices with sport performance (Beauchamp, Halliwell, Fournier, & Koestner, 1996; Crews & Boutcher, 1986b; McCann, Lavallee, & Lavallee, 2001); however, the effectiveness of a PSR for experienced athletes has been mixed (e.g., Boutcher & Crews, 1987; Cohn, Rotella, & Lloyd, 1990; Kingston & Hardy, 2001; Lobmeyer & Wasserman, 1986; Marlow, Bull, Heath, & Shambrook, 1998). Cohn et al. examined the effects of a cognitive-behavioural intervention on three male collegiate golfers during competition. The intervention was designed to increase adherence to a mental and behavioural PSR. The first step of the intervention was a behavioural treatment in which proper alignment to the target was assessed. The second step was to teach the golfer cognitive components to a routine that would facilitate proper execution of shots. A multiple-baseline design was used with an interview following the completion of the multiple-baseline phase. Cohn et al. reported the intervention increased PSR adherence, but there was no immediate performance increase. Participants expressed immediate subjective improvements in unobservable, mental skills, such as concentration and confidence, during the study. Although not directly observable in the number of strokes per round, participants emphasised a perception of improvement in reference to preliminary performance. A four-month follow-up verified an improvement in all three players' performances. Marlow et al., also using a multiple-baseline design, provided immediate support that employing a PSR prior to a water polo penalty shot improved performance. Three experienced water polo players completed three trial blocks of five penalty shots each over an 8-week period. Participants' accuracy was measured on an 11-point scoring scale, ranging from 0 for a complete miss to 10 for a perfect goal. During the trial blocks, the intervention was introduced with a staggered multiple-baseline. Participants were instructed regarding the personalised PSR, comprising of a concentration cue, relaxation, imagery technique, and a cue word to facilitate performance. After the PSR was implemented, the 3 participants accuracy increased by between 21% and 28% (Marlow et al.). Performance improvements, however, may not be the only positive outcome to PSR development. Researchers have also established a number of additional positive outcomes when using a PSR, including lower arousal levels (Boutcher & Crews), increased intrinsic motivation and reduced negative introspection (Beauchamp et al.), and increased attention to task (Cohn et al.).

A number of researchers (e.g., Anshel, 1995; Bartholomew, 2003; Dale, 2004) have posited that a PSR is a suitable intervention for pressure situations. Dale proposed that, by using a PSR, athletes might experience and perceive more control over the pressure situation, and may manage the pressure more effectively. The individual's belief of control over what is happening may have anxiety-reducing benefits (Bandura, Cioffi, Barr-Taylor, & Brouillard, 1988). The perception of control may reduce anxiety even though actual control of the situation is not possible (Averill & Rosenn, 1972). In addition, Dale posited that regular PSR modification might be important to reduce the likelihood of automaticity of the PSR. When the PSR remains accessible to attention, less attentional resources are available to process irrelevant information, indirectly increasing the likelihood of task-relevant focus and continued proficient performance.

Researchers (e.g., Baumeister, 1984; Masters, 1992) have found that an increase in S-A is a factor that contributes to choking effects, therefore, examining applied sport psychology techniques that may assist athletes in decreasing S-A under pressure would be helpful. Researchers (e.g., Beilock et al., 2002; Lewis & Linder, 1997; Masters, 1992) have found that having experienced athletes use a dual-task (DT) reduces the likelihood of self-focusing and improves performance under pressure. The DT paradigm is a research method wherein participants perform two tasks concurrently. In the DT approach, researchers note the degree of interference caused by one task, while simultaneously performing another. An example of a DT is an experienced basketball player monitoring other players' movements, while dribbling a basketball. The basketball player is capable of performing two tasks concurrently because one task, dribbling the basketball, is essentially automatic, so available attentional resources can be directed to other information. The DT paradigm may be beneficial within choking intervention studies because DT's could decrease the likelihood of self-focusing under pressure. The DT's used in choking research (e.g., counting backwards from 100 by 2's), however, may not be practical for diverting attention under pressure because, in actual competition, athlete's should not be expected to verbalise tones (Beilock et al.) or numbers (Lewis & Linder) during performance, similar to DT's in research. For example, a tennis player should not be expected to articulate numbers while serving in a competition to simulate a DT. Thus, sport psychologists should create practical, empirically-tested methods of overcoming self-focusing under pressure.

Music. Accounts of music in athletic performance are mainly associated with music as an aspect of pre-competition routines. Depending on the content and style, listening to music may "psyche-up", motivate, or relax athletes prior to competition. Listening to music before competition may, thus, help to regulate arousal or mood. Researchers investigating the effects of music have focused mainly on physical activity and exercise (e.g., Anshel & Marisi, 1978; Copeland & Franks, 1991; Ferguson, Carbonneau, & Chambliss, 1994) and have principally overlooked the potential benefits of music on sport performance. For instance, a perusal of music research between 1990 and 2004 indicated only one article dedicated to directly examining the effects of music during sport performance. Pates, Karageorghis, Fryer, and Maynard (2003) examined the effects of a music intervention on the perception of "flow" states and shooting performance in netball. Three experienced netball players performed 12 blocks of netball shooting, each comprising 12 shots within a single-case multiple-baseline design. Immediately before, as well as during, the intervention phase, participants listened to music to promote feelings of flow and to possibly enhance performance. Participants selected their own music "to overcome the numerous problems associated with externally imposed selections within experimental work" (Pates et al., p. 420). Pates et al. found that the music intervention enhanced netball performance and also triggered emotions and cognitions related to flow.

The potential benefits of music on physical activity may be physiological, affective, or psychophysical. Although the physiological and mood-enhancing advantages of using music are fundamental, the psychophysical rewards of music may be central to sport anxiety research and the current dissertation. To illustrate the psychophysical benefits, Karageorghis and Terry (1997) expressed three main hypotheses (i.e., music narrows the performer's attention, music alters arousal, and music provides a rhythmical element in which individuals may be predisposed to respond) regarding the effects of music in sport and exercise, of which the first two may be directly related to this dissertation. First, music narrows and diverts the performer's attention away from sensations of fatigue during exercise. Anshel and Marisi (1978) argued that when physical activity is commenced, attention might be allocated to a number of resources (e.g., environmental distractions, internal movements). As individuals persist with the physical activity, eventually less attentional resources are available to process other information because individuals become fatigued and attention is allocated to the primary attention-demanding resource (i.e., feelings of fatigue). If a second attention-demanding resource is added, such as music, perception of fatigue is decreased because attention is allocated to enjoyment of music and less attentional space is available for processing information about fatigue.

To illustrate Anshel and Marisi's (1978) diversion of attention hypothesis in a sport context, Greg Louganis, one of the most decorated Olympic divers in U.S. history, provided examples of using music before and during dives to focus attention on the rhythm of the dive and performing well. Louganis (1995) explained,

> As I waited at the bottom of the ladder for my turn, I went through my dive in my head, visualising each step and playing music in my head to the beat of the dive. Most of the time I dove to "If You Believe" from *The Wiz*… My dive was announced, and I walked to my starting point on the springboard, got into place, took a deep breath, and told myself to relax. I took the first step, the second step, the third step, and the fourth step, all to the beat of the music from *The Wiz* that only I could hear. (p. 3-4)

Using music was a means of focusing attention on the rhythm of the dive. Concentrating on the music allowed Louganis to focus attention on the dive and diverted attention away from distracting thoughts.

As expressed in the quote by Greg Louganis, music may assist in focusing attention on the rhythm of the task. Although not directly related to choking per se, Greg Louganis' example provides a generic point associated with using the rhythm of the dive as a means of performing successfully under pressure. According to the self-focus model, as anxiety and arousal increase, athletes allocate attention to the primary attention-demanding resource (e.g., anxiety and self-focused attention), which may be detrimental to performance (Baumeister, 1984; Masters, 1992). If, however, a second attention-demanding resource is added, such as music, and attention is allocated toward listening to the words of the music, then less attentional space is available to process other information. With less attentional space, the athlete may decrease attention to anxiety and tendencies to self-focus, enhancing performance.

Karageorghis and Terry's (1997) second hypothesis was that music could alter psychomotor arousal during physical activity. Apparently, the auditory stimulation of music functions as a stimulant or sedative prior to or during physical activity (Smith & Morris, 1976, 1977). Sport psychologists may recommend the use of stimulating music to increase vigour preceding competition, whereas sedative music may be recommended to overanxious athletes in preparation for competition. As athletes respond to music in different ways, sport psychologists should continue to investigate the effects of music on arousal. Terry (2004) provided a robust justification for the enhancing effects of music in a sport context by illustrating the positive performance effects music had on athletes during the 2000 Sydney Olympics. In the review article, Terry gave examples of many athletes that used music within a pre-competition routine to regulate mood and arousal; music was particularly helpful in maintaining pre-competition focus, positive mood, and appropriate arousal level. Researchers have also found that well-chosen asynchronous (background) music has the potential to generate significant mood improvements (Boutcher & Trenske, 1990). With researchers suggesting music positively affects mood, music may be a therapeutic means of arousal control. As arousal levels may be a fundamental component of choking, providing music as an intervention to control arousal levels may assist athletes' during performance under pressure. Finally, Karageorghis and Terry also explained that individuals might have a predisposition to respond to rhythmical elements of music during continual submaximal activity, which may benefit sport and exercise activity.

The Present Dissertation

Based on the review of literature, the purpose of the present dissertation was to examine the extent to which psychological inventories predict non-choking and choking behaviour. To investigate this, there were three aims: to examine whether psychological inventories predict CS and CR behaviour, to understand psychological characteristics of CS and CR athletes, and to investigate whether two interventions may alleviate choking. To investigate the aims, I conducted three interconnected studies with similar procedures for data collection. In the last decade, single-case design (SCD) research has become more common and is being used in sport psychology research. To illustrate the advantages that SCD research may have for sport psychology research, two types of SCD methods (i.e., A-B-A and A-B-A-B design) were used in conjunction with qualitative research to provide a robust and rich empirical investigation of choking. Specifically, I used a single-case A-B-A design in Study 1 to test whether choking and non-choking behaviour (e.g., performance improvements) could be predicted, using established personality inventories for CS and CR athletes. In addition, a secondary purpose was to identify characteristics of CS and CR athletes using qualitative research. Studies 2 and 3 were designed to propose and evaluate strategies to alleviate choking, using task-relevant information to focus attention appropriately and to decrease the likelihood of self-focusing, based on the distraction and self-focus model of choking. In Studies 2 and 3, I used single-case A-B-A-B designs to determine whether selected interventions can ameliorate choking effects. In Study 2, I examined whether a PSR could decrease the likelihood of choking. A PSR was selected so participants could use task-relevant information in the PSR while disregarding task-irrelevant thoughts. In Study 3, I investigated whether listening to the words of music assiduously would facilitate performance under pressure. As advocates of the self-focus model (e.g., Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992) delineate, heightened anxiety may increase the probability that athletes increase S-A and control movement mechanics, subsequently decreasing performance. Thus, listening to the words of music could potentially decrease attentional space and the propensity to become self-aware, allowing automaticity to develop and increasing performance.

CHAPTER 3

STUDY 1: PREDICTING CHOKING AND NON-CHOKING BEHAVIOUR

Introduction

Athletes react distinctively to pressure and consequently exhibit diverse coping strategies. Some athletes perform well under pressure and in colloquial terms “step up to the challenge,” whereas others experience debilitating anxiety and perform poorly. The poor performance can result in the media speculating that the athlete has succumbed to choking. Based on Hall and Wang independent definitions, choking is defined as a critical deterioration in the execution of habitual processes as a result of an elevation in anxiety levels under perceived pressure. Researchers (e.g., Baumeister, 1984; Nideffer & Sagal, 2001; Weinberg & Gould, 1999) have agreed that, if an athlete perceives a situation as important, choking is likely to occur because of changes in anxiety (Masters, 1992), attention (e.g., Baumeister; Nideffer, 1992), or a combination of anxiety and attention (Drinan et al., 2000). The causes and characteristics that may predispose athletes to choking help sport psychologists prevent and possibly predict when choking may occur. Dispositional characteristics that have been researched and identified as possible predictors of choking include self-consciousness (S-C), trait anxiety (A-trait), and coping styles (see Chapter 2 for relevant references). Confirmation regarding how these characteristics predict choking should assist sport psychologists to determine the likelihood of some athletes to experience choking. Thus, potential predictors may help in identifying athletes as either choking-susceptible (i.e., more likely to experience choking) or choking-resistant (i.e., less likely to experience choking). The focus of Chapter 3 is to report on a study designed to examine whether choking and non-choking behaviour could be predicted, using a battery of psychological inventories measuring S-C, A-trait, and coping style.

Self-Consciousness and Choking

One mediator that has received considerable attention in choking literature is S-C. A number of researchers have examined the relationship between S-C and performance (e.g., Baumeister, 1984; Heaton & Sigall, 1991; Kurosawa & Harackiewicz, 1995), however, results to date, have been somewhat equivocal. In social psychology research, for example, Baumeister found that participants low in S-C performed worse under pressure than individuals high in S-C. Baumeister asserted that individuals low in S-C might be more susceptible to choking because an inward attentional focus, precipitated by performance pressure, was uncharacteristic. This inexperience with self-reflection, at a time when conscious monitoring should be superfluous, disrupts movement execution and decreases performance (Baumeister). Sport psychology researchers (e.g., Masters et al., 1993; Wang, Marchant, Morris, & Gibbs, 2004), conversely, have found that individuals high in S-C performed poorly under high pressure. The propensity to focus inwardly may affect highly self-conscious individuals more negatively under pressure because they are chronically conscious of potential distracters. It seems that sport psychology researchers have provided more evidence in favour of high S-C, rather than low S-C, leading to choking. The reader is referred to Chapter 2 for a more detailed discussion of S-C and choking.

Trait Anxiety and Choking

Although, at present, a minimal amount of research has been conducted, another hypothesised predictor of choking is trait anxiety (i.e., A-trait). Of the three proposed predictors of choking (i.e., S-C, A-trait, and coping styles), perhaps A-trait is the most obvious predictor because anxiety has been consistently linked with poor attention selection and performance. Test anxiety researchers have confirmed that individuals high in A-trait react to pressure situations with greater levels of A-state than individuals low in A-trait (Spielberger et al., 1976). In mainstream psychology research, Byrne and Eysenck (1995) reported that high A-trait individuals performed poorly under pressure because they respond to pressure with elevated A-state more frequently or more intensely than low A-trait individuals. In sport psychology research, Wang, Marchant, Morris, and Gibbs (2004) found that A-trait was a significant predictor of choking, with somatic A-trait being highly correlated with poor performance under pressure. Evidently, individuals high in A-trait are more likely to experience elevations in A-state and may also respond with increased S-A. Thus, it seems that high A-trait may lead to choking. The reader is referred to Chapter 2 for a more detailed discussion of A-trait and choking.

Coping Styles and Choking

Another potential predictor of choking that has received even less attention than the previous two predictors is coping style. Generally, approach and avoidance coping have been examined to determine whether coping styles potentially predict choking. Approach coping involves focusing on problem solving by using direct effort, whereas avoidance coping is typically used to direct activity away from the threat-related stimulus (Anshel & Weinberg, 1999). In a sport context, athletes who employ approach coping, actively attempt to understand the pressure, whereas athletes who use avoidance coping maintain attentional focus and address the next task (Anshel, 1996). In a recent study, Wang, Marchant, and Morris (2004) found approach coping to be associated with choking. Wang et al. explained that approach coping might increase perceived threat. Those who actively seek to reduce anxiety divert attention to irrelevant cues, decreasing task focus. Thus, low

S-C, low A-trait, and avoidance coping are predicted to be associated with choking-resistant (CR) athletes, whereas high S-C, high A-trait, and approach coping are likely to be related to choking-susceptible (CS) athletes.

Although Hanrahan (1996) suggested choking is not easily predicted, the primary purpose of the current study was to investigate whether choking and non-choking behaviour can be predicted using established psychological inventories. It was expected that participants categorised as CR would display non-choking behaviour, whereas participants categorised as CS would exhibit choking behaviour. A subsidiary purpose was to examine process issues in choking and non-choking behaviour, including coping strategies, cognitions, emotions, and behaviours. Identifying cognitions used in pressure situations by CR and CS athletes would assist in recognising and developing suitable choking interventions, for planned later studies.

Method

Participants

Forty-six experienced female netball players, between the ages of 17 and 26 (*M* = 19.53, *SD* = 1.90), completed three psychological inventories (see *Procedure* and *Design* section for more information) in order to purposively sample a small number of CS and CR participants (i.e., four in each group) for more intensive study (see Procedure section for more information about selected participants). Potential participants had a minimum of 5 years experience and had played as either a goal shooter or goal attack (the two shooting positions) for at least 3 years in the last 5 years. A demographic questionnaire was completed prior to testing to ensure participants met these requirements (see Appendix A).

Task

Participants attempted netball shots from a distance of 2.44 m (8 ft) from the inside edge of the goal post to shooting line. The distance was determined based on pilot data and consultation with an elite netball coach, and was deemed to be a reasonable shooting distance within the 4.90 m (16 ft) radius of the goal circle (Netball Victoria, 2003).

Equipment and Specifications

Standard netballs and goals were used according to Netball Australia specifications. Readers who are unfamiliar with netball are referred to Appendix B for further information. According to Netball Australia (n.d.), the recommended regulation full size netball has a circumference of approximately 0.69 to 0.71 m (27 to 28 in) and weighs approximately 400 to 450 g (14 to 16 oz). Full-size netballs are approximately three-quarters the size and slightly lighter than full-size basketballs. A goal post with a suspended steel ring measuring 0.38 m (14.96 in) in internal diameter from a height of 3.05 m (10 ft) from the floor to the bottom of the ring was used (Netball Victoria, 2003). During the pressure phase, a Sony video camera was used to record participants' shot attempts (see Appendix C for a diagram).

Measures

Four psychological inventories were used to measure self-consciousness (i.e., S-C), trait anxiety (i.e., A-trait), coping styles, and state anxiety (i.e., A-state). All of these measures have been used in choking research (e.g., Baumeister, 1984; Masters, 1992; Wang, 2002).

Self-consciousness. The Self-Consciousness Scale (SCS; Fenigstein et al., 1975; Appendix D) is a 23-item questionnaire used to measure three distinct subscales of S-C on a 4-point Likert scale, ranging from 1 (*extremely uncharacteristic*) to 4 (*extremely* *characteristic*). Ten items measure private S-C, "*I'm generally attentive to my inner feelings*", seven items measure public S-C, "*I usually worry about making a good impression*", and six items measure social anxiety, "*I get embarrassed very easily*." Total scores range from 23 to 92, with higher scores indicating higher S-C. Fenigstein et al. reported high reliability coefficients for the subscales, r = .84 for public S-C, r = .79 for private S-C, and r = .73 for social anxiety. A substantial body of evidence has supported the reliability and validity of the SCS (Buss, 1980; Carver & Glass, 1976; Carver & Scheier, 1981). Masters et al. (1993) suggested and Wang, Marchant, Morris, and Gibbs (2004) verified that S-C is a predictor of choking, thus, the private and public S-C components of the SCS were used and the social anxiety questions were excluded. Masters et al. also omitted the social anxiety questions to evaluate the effects of S-C on performance.

Trait anxiety. Trait anxiety was assessed with the Sport Anxiety Scale (SAS; Smith, Smoll, & Schutz, 1990). The SAS (Appendix E) was used to measure two cognitive factors, worry and concentration disruption, and one physiological factor, somatic anxiety. The SAS consists of 21 statements in which individuals describe how they usually feel prior to or during competition. Statements are based on a 4-point Likert scale, ranging from 1 (*not at all*) to 4 (*very much so*). Examples of statements from the questionnaire that correspond to the respective factors include: "*I have self-doubts*" (cognitive anxiety/ worry), "*My mind wanders during sport competition*" (concentration disruption), and "*My body feels tense*" (somatic anxiety). Total scores range from 21 to 84 with lower scores indicating low susceptibility to experiencing anxiety. The SAS has undergone rigorous validation procedures (e.g., Dunn, Causgrove-Dunn, Wilson, & Syrotuik, 2000; Smith et al., 1988, 1990), with Dunn et al. reporting internal consistency results with Cronbach's alphas being $\alpha = .87$ (cognitive anxiety), $\alpha = .88$ (somatic anxiety), and $\alpha = .69$ (concentration disruption). The SAS has also been extensively used in sport anxiety research. Dunn et al.'s exploratory and confirmatory factor analyses illustrated that two SAS questions, Question 14 - "*I have lapses in concentration because of nerves*" and Question 20 - "*I'm concerned I won't be able to concentrate*", did not load on the concentration disruption factor. Dunn et al. proposed that the "two items make particular reference to aspects of anxiety… Items 14 and 20 measure an athlete's susceptibility to lose concentration as a function of trait anxiety" (p. 191). Thus, during the current dissertation, Questions 14 and 20 were included within the cognitive anxiety subscale, rather than the concentration disruption subscale.

Coping style. The Coping Style Inventory for Athletes (CSIA; Anshel & Kaissidis, 1997) is a 16-item questionnaire used to measure participants' individual coping strategies on a 5-point Likert scale, ranging from 1 (*very untrue*) to 5 (*very true*). The CSIA (Appendix F) was used to measure participants' tendency to use approach or avoidance coping styles in pressure situations. Total scores range from 8 to 40 on each of the two subscales (i.e., approach and avoidance coping) with higher scores indicating a greater propensity to use that particular coping style. The two dimensions, comprised of eight questions each, were adapted from a previously-validated scale of approach and avoidance coping (Roth & Cohen, 1986). An example of an approach coping statement is "*I tried to analyse the reasons for the unpleasant experience*" and an example of avoidance coping is "*I immediately turned my attention to the next physical task at hand*." Kaissidis-Rodafinos, Anshel, and Porter (1997) reported that the CSIA has acceptable internal consistency, with Cronbach's alphas of $\alpha = .79$ and $\alpha = .84$ for the approach and avoidance scales, respectively.

State anxiety. The Directional Modification of the Competitive State Anxiety Inventory-2 (DM-CSAI-2; Jones & Swain, 1992) was also used in this study. The CSAI-2 (Martens et al., 1990) measures how anxious an individual feels at a given moment in time (i.e., intensity levels). The CSAI-2 (Appendix G) consists of 27 self-report statements designed to measure three components of A-state: cognitive anxiety, "*I am concerned about losing*", somatic anxiety, "*I feel jittery*", and self-confidence, "*I feel secure*." The focus of the current study is related to anxiety responses, thus, cognitive and somatic anxiety components were used and the self-confidence questions were excluded. Other researchers (e.g., Hanton & Jones, 1999; Krane, 1993; Woodman, Albinson, & Hardy, 1997) have also omitted the self-confidence questions in order to evaluate cognitive and somatic anxiety only. Each participant was instructed to respond to the 18 items in accordance with how they felt "at the present moment." Intensity level responses for each item were scored on a 4-point Likert scale, ranging from 1 (*not at all*) to 4 (*very much so*). The CSAI-2 has undergone rigorous validation procedures (Martens et al.) and has been extensively used in sport anxiety research. Martens et al. reported that Cronbach's alpha reliability coefficients ranged from $\alpha = .79$ to $\alpha = .83$ for cognitive A-state, and from $\alpha = .82$ to $\alpha = .83$ for somatic A-state.

Jones and Swain (1992) modified the CSAI-2 to add a directional component, that is, whether athletes perceived their anxiety level would assist (facilitative) or hinder (debilitative) their performance. The resultant DM-CSAI-2 includes a directional scale in addition to the traditional intensity scale. The DM-CSAI-2 allows psychologists to assess athletes' perceived anxiety as helpful (facilitative) or unhelpful (debilitative). The directional interpretation scale ranges from + 3 (*very helpful*) to – 3 (*very unhelpful*) for each question; thus, the possible directional scores on each subscale range from + 18 to –

18. Cronbach's alpha coefficients have demonstrated internal consistency for the direction scale yielding values from .80 to .89 for cognitive anxiety and .72 to .84 for somatic anxiety (Hanton, Jones, & Mullen, 2000; Jones & Hanton, 1996). In recent years, the DM-CSAI-2 has become the standard measure for state anxiety in sport research (Fletcher & Hanton, 2001; Jones & Hanton, 2001; Jones & Uphill, 2004).

Performance. The total number of successful shots (i.e., attempts in which the netball passed through the netball ring) out of 10 attempts represented the dependent variable for each trial block.

Design

Researchers (e.g., Baumeister, 1984; Beilock & Carr, 2001; Lewis & Linder, 1997; Masters, 1992; Wang, Marchant, & Morris, 2004; Wang, Marchant, Morris, & Gibbs, 2004) have primarily applied quantitative methodology to examine choking in sport. Quantitative designs, however, may not explain choking completely because the experience involves underlying cognitive processes that are not easily quantified. Researchers integrating alternative methodologies, such as qualitative inquiry, may explore, confirm, or explain the consistencies and contradictions related to choking research. Large-sample designs, although statistically powerful, pose special problems in applied research. Brustad (2002) has called for the use of multiple methods and acceptance of other paradigms in the research process. Combining quantitative methodology with qualitative inquiry in a "mixed-methods design" seems particularly apt in further exploring choking because choking appears to contain both objective and subjective elements.

With a "mixed-methods design," researchers apply a combination of quantitative and qualitative techniques during data collection and data analysis to answer a variety of research questions. For instance, by triangulating data, researchers employ a selection of methodological combinations to expose the research question to multiple data testing and collection strategies and thus enhance validity (Greene, Caracelli, & Graham, 1989). Triangulated studies involve combining methods, such as pencil and paper questionnaires, interviews, and behavioural observations, to study the same factor (Merriam, 1998). Triangulation is based on the assumption that any bias inherent in various data resources can be neutralised when those data sources are used in combination with other confirmatory data sources. The aim of triangulation is to test for consistency in the findings from different data sources (Patton, 2002). According to Denzin (1978), there are four types of triangulation including data triangulation, investigator triangulation, theory triangulation, and methodological triangulation. In the current study, data triangulation (i.e., use of multiple data sources) consisting of psychological inventories, observable performance measures (i.e., successful shot attempts), and in-depth interviews were used. Methodological triangulation (i.e., use of multiple methods to study a problem) was also used, combining a single-case design (SCD) with qualitative research. The "mixed-methods design" used in this study included a SCD with a reversal component (A_1-B-A_2 design; A_1 = pre-pressure baseline, B = pressure, A_2 = post-pressure baseline) as the quantitative component and in-depth semi-structured interviews as the qualitative component. In the context of the present study, the rationale for using a SCD with interviews in a "mixed-methods design" was to monitor closely individual experiences and trends in A-state in differing levels of pressure to determine whether a manipulation of pressure affected performance and then describe intra-individual accounts of participants' cognitions to more fully understand CR and CS athletes.

Single-case design. A SCD is a research design in which individual participants are exposed to specific and definable experimental conditions (Smith, 1988). Researchers using SCD's (e.g., A-B, A-B-A, A-B-A-B) apply direct control over the independent variable and, thus, precision in ruling out alternative hypotheses and arriving at causal interpretations of the data (Kazdin, 1982). Researchers in applied psychology and applied sport psychology often use SCD's, especially in the early stages of testing the efficacy of treatments and interventions (Pates, Cummings, & Maynard, 2002). SCD's allow participants to serve as their own control (Barlow & Hersen, 1984; Hrycaiko & Martin, 1996). Therefore, conclusions are usually made regarding the treatment effects by comparing the treatment and control conditions of each participant over time.

Qualitative component. Choking may not necessarily be fully understood by relying solely on quantitative methodology. Thus, after completion of the SCD phases, participants were interviewed about their experience in the study. Qualitative research is an inquiry process based on distinct methodological traditions that explore a social or human problem (Creswell, 1998). Researchers using qualitative methods may focus on the lives of athletes and gather information to understand meaning from the participants' perspective. Qualitative inquiry permits a more holistic understanding of an athlete's experience and may help to identify new variables and relationships by obtaining in-depth assessment of athletes' emotions and cognitions (Gould, Greenleaf, & Krane, 2002). Thus, supplementing the numerical data with a qualitative component enabled participants to provide a descriptive account of their cognitive processes, emotions, coping strategies, and behaviours, while participating in the testing phases.

A number of inherent benefits have led to a greater acceptance of qualitative methods. Peshkin (1993) suggested that the beneficial results of qualitative inquiry might be categorised as description, interpretation, verification, and evaluation. First, qualitative researchers seek “thick descriptions” to provide rich characterisations of the current phenomenon (Strean, 1998). A thick description may be necessary in order to understand the phenomenon completely. Second, interpretation involves the reader understanding the data and making generalisations about the phenomenon. In exploratory investigations of choking, descriptive information may be helpful in expanding and developing further research in the area. Third, qualitative investigations may verify assumptions within the construct being examined. For example, qualitative inquiry may help confirm, verify, or dispute current models of choking. Finally, qualitative research may help to evaluate treatment or intervention effects. That is, researchers may improve the evaluation of, and provide detailed feedback about, treatment effects by using qualitative designs. To more fully explain the strengths of integrating qualitative research, Jackson (1995) suggested:

> Some of the main strengths of qualitative research include: depth and richness of findings, potential to understand individual experience, holistic nature of findings, power in identifying new directions, and ability to identify individual differences as well as examine between-case consistencies. … Qualitative research may be the method of choice when the interest is in understanding subjective experience, when the individual matters, when depth and richness of data is a priority, and when understanding the total picture counts. (p. 590)

These strengths are essential to the current research because choking can be individualistic and a somewhat subjective experience. Thus, qualitative research seems well suited to the description and understanding of choking. To justify the decision to use a “mixed-methods design,” in this study, I refer to Culver, Gilbert, and Trudel (2003) who suggested, “When other sources of data relating to human behaviour are combined with interviews to study human activity, it is possible to capture a more complete picture of the processes involved" (p. 7). By combining quantitative research and exploratory qualitative inquiry, the current study may lead to investigations of other areas of choking research, as well as confirming or challenging current models of choking.

Procedure

Coaches were first contacted through a national level organisation to facilitate a briefing session with potential participants. After coordinating a meeting time, I addressed the athletes and explained that the purpose of the study was to examine feelings and reactions to competitive situations in netball. It was emphasised that participation was strictly voluntary and those that did volunteer would be free to withdraw at any time without penalty. To minimise coaches' pressure to participate, the coach was absent when I was addressing the athletes. Envelopes, containing an informed consent form (Appendix H), a demographic information sheet, and a series of paper-and-pencil tests (i.e., SCS, SAS, and CSIA) were then distributed to volunteer athletes. Participants were asked to read, complete, and then return all questionnaires in an envelope addressed to the researcher. The three paper-and-pencil questionnaires were used to identify a small number of CS and CR athletes to further participate in the study. Thus, 8 participants (i.e., 4 CS and 4 CR) who met the selection criterion (explained below) then took part in the A_1-B-A_2 phases of the study and the subsequent interview. Participants not selected were thanked, were given $20 for their efforts, but not invited to participate further.

Participant selection criteria. The purpose of the study was to determine whether choking and non-choking behaviour can be predicted. Thus, a criterion was necessary to purposively recruit the sample of CS and CR participants based on responses from paper-and-pencil questionnaires (i.e., SCS, SAS, and CSIA). The major dilemma, however, was finding a rigorous criterion that would produce a powerful and efficient sample, recruiting CR participants likely to exhibit non-choking behaviour and CS participants likely to display choking behaviour.

One possible solution for a stringent selection criterion was to purposively sample participants on opposite extremes of the proposed “choking continuum”, deliberately excluding participants in the middle. It was difficult to unequivocally determine a reasonable criterion for selection based on responses from questionnaires, but I wanted to establish a strict enough selection prerequisite to recruit highly CR and highly CS participants (i.e., power principle). I realise that researchers could debate my selection criteria, but the stringent criteria used to select participants seemed appropriate considering previous research and data (see Masters et al., [1993], Wang, Marchant, Morris, & Gibbs, [2004], and Wang, Marchant, & Morris, [2004] for further information regarding S-C, A-trait, and coping styles indicating choking-susceptibility, respectively). Criteria for selection of CS athletes were as follows:

1. Score on at least two out of the three psychological inventories needed to be located in the 75th to 100th percentile of scores surveyed, that is,
    a. High self-consciousness (SCS),
    b. High trait anxiety (SAS)
    c. Positive differential CSIA score (e.g., approach coping of 38 minus avoidance coping score of 21 = differential score + 17)
2. The remaining score was required to be in the 50th to 100th percentile of scores surveyed.

Conversely, the criteria for selection of CR athletes were as follows:

1. Score on at least two out of the three psychological inventories needed to be located in the 0 to 25th percentile of scores surveyed, that is,
    a. Low self-consciousness (SCS),
    b. Low trait anxiety (SAS)
    c. Negative differential CSIA score (e.g., approach 19 – avoidance 28 = differential score – 9)
2. The remaining score was required to be in the 0 to 50th percentile of scores surveyed.

Although the sampling criterion selected is potentially controversial, I propose that it improves on some methods used previously for sample selection in sport psychology. For example, Jones and Swain (1992; Jones, Swain, & Hardy, 1993) have used the median split technique to divide participants into high and low competitive (or elite and non-elite) categories after data collection. The median split technique, however, was not appropriate in the present research because participants were selected after administration of questionnaire and prior to quantitative, data collection. Also, a dichotomous split can result in misclassification of individuals as well as the loss of reliable information about individual differences within the groups (MacCallum, Zhang, Preacher, & Rucker, 2002). Because choking is a relatively extreme experience, it was important to select a sample that is relatively extreme to maximise sample efficiency. Using a median split and selecting participants in the middle of a choking susceptibility "continuum" may not result in a sample powerful enough to predict choking or non-choking behaviour.

All purposively sampled participants took part in the three phases (A_1-B- A_2) within the Victoria University indoor sports arena with the subsequent interview conducted in a reserved consultation room adjacent to the sports arena. Participants completed 18 trial blocks with each trial block consisting of 10 shots. The 18 trial blocks were divided into three phases with six (10 shot) trial blocks in each phase (see Figure 3.1). The three phases included a pre-pressure baseline phase, a pressure phase, and a post-pressure baseline phase, and were scheduled weekly over three consecutive weeks.

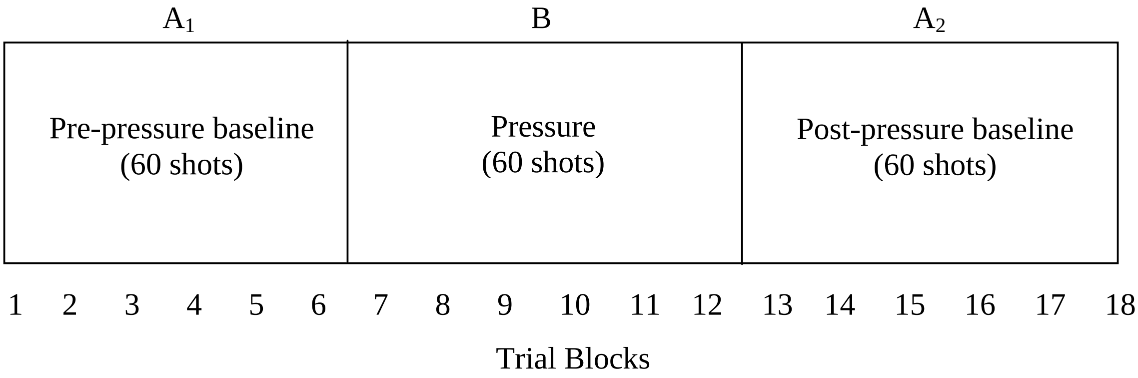

Figure 3.1. A_1-B-A_2 phases within the single-case design.

Pre-pressure baseline (A_1) phase. Prior to the A_1 phase, participants were briefed about the study, completed the DM-CSAI-2, and performed a 10-shot warm-up. The DM-CSAI-2 was used as a manipulation check of cognitive anxiety and somatic anxiety before each phase. To minimise variability, experimental procedures were narrated directly from prepared instructions (Appendix I). Participants were then given the opportunity to ask questions. Testing commenced as soon as the warm-up was completed. The A_1 phase consisted of six trial blocks (60 shots) with a 30-second rest period following each trial block. After completion of the initial A_1 testing, participants were informed when to return for the next phase.

Pressure (B) phase. Prior to the B phase, to reduce potential misunderstanding, the instructions for the B phase were again read verbatim (Appendix J). Participants then completed the DM-CSAI-2, and the 10-shot warm-up. The same procedures as pre-pressure baseline testing were used, with the addition of the pressure manipulation. The pressure manipulation consisted of a) videotaping all shot attempts, b) presence of an audience, and c) performance-contingent financial incentive. These pressure manipulations have been used previously (e.g., Baumeister, 1984; Butler & Baumeister, 1998; Lewis & Linder, 1997; Masters, 1992; Wang, 2002).

A video camera was placed adjacent to the end line of the court facing the participant, and was used throughout the B phase. Videotaping has been shown to heighten S-A (Lewis & Linder, 1997). The second manipulation consisted of a small audience, consisting of first-year (i.e., freshman) human movement students. Participants were informed that eight human movement students would watch them complete the B phase. The audience members were told not to interact, encourage, or discourage participants and simply observed, with interest, participants’ performance. The audience members were positioned to both sides of the participant just outside the goal circle. Two audience members were asked to take notes of participants’ reactions and were positioned behind the participant just outside the goal circle. The third manipulation was a performance-contingent financial incentive. Participants were paid for their participation, depending on the number of successful shots relative to their performance in the A_1 phase. Participants were advised that a $20 bonus would be earned for improving on their score from the A_1 phase with an additional $5 for each successful shot above the A_1 phase score to a maximum of $100. If the participant failed to reach the earlier baseline performance, the participant was told that no money would be earned. At the beginning of the B phase, participants were told the number of successful shots they had made in the earlier A_1 phase. After the B phase concluded, participants were informed of the exact amount of money they would receive.

Post-pressure baseline (A_2) phase. The A_2 phase was a return to the earlier baseline testing condition. During the A_2 phase, the same procedures as the A_1 testing were used (Appendix K), that is, six trial blocks (60 shots) were completed. Upon completion of the final A_2 phase, athletes were asked to participate in an individual interview about their experience.

Interview. In-depth, semi-structured interviews were conducted. In-depth interviewing is essentially a conversation with a specific purpose – a conversation between researcher and informant, focusing on the participant's perceptions of self, life, and experience, expressed in their own words (Minichiello, Aroni, Timewell, & Alexander, 1995). They consisted of open-ended questions based on a purpose-designed interview guide (see Appendix L). The interview guide was developed after familiarising myself with the relevant literature. Based on feedback from pilot testing and a sport psychology academic, modifications to the interview guide were finalised. During the interview, specific clarification and elaboration probes stimulated participant responses and provided the interviewer with a more in-depth understanding of the research question (Patton, 2002). The interview began with general information about participants' netball experience and then focused more on the emotions, coping strategies, and cognitions experienced during the SCD component of the study. Interviews ranged in duration from 35 to 75 minutes.

The quantitative data collection and in-depth qualitative interview were scheduled as close together as possible to capitalise on participants' recall and, thus, improve data reliability. After the interview, participants' were debriefed and informed about the specific rationale and purposes of the study (Appendix M). During debriefing, participants were thanked for their participation and paid the amount promised.

Analyses

Pressure analysis. Visual inspection (also known as visual analysis) of the DM-CSAI-2 data was used to identify the effects of the pressure manipulation. Visual inspection “refers to reaching a judgment about the reliability or consistency of intervention effects by visually examining graphed data” (Kazdin, 1982, p. 232).

Performance analysis. Bloom and Fischer (1982) contended, “Visual inspection of data should be considered a very useful beginning point. But, unless the patterns are clear, with sufficient numbers of observations and stable baseline data, other methods of analysis should also be employed” (p. 439). To further explore this contention, Ottenbacher (1990) conducted a study to challenge the reliability of visual inspection and found that depending on visual inspection exclusively can be unreliable and may lead to inconsistent interpretations. Thus, in the present study, the split-middle technique (White, 1971, 1972, 1974) was employed to detect changes in the number of successful shots within phases and resultant trend lines (Barlow & Hersen, 1984). Although the split-middle procedure remains primarily descriptive, performance analyses may be supported beyond mere description of the mean by providing additional methods of observing the data. By using the split-middle procedure, celeration lines (or trend lines) are constructed to characterise performance over time and predict direction and rate of change (Barlow & Hersen).

The calculation of White’s (1971, 1972, 1974) split-middle technique involved five steps for analysing each testing phase (the reader is referred to Figure 3.2 throughout this description). First, the number of data points in the phase being analysed were counted, then divided into two equal halves by inserting a vertical line midway. In the present study there was an even number of data points, therefore, the vertical line was inserted between the two middle data points, one to each side of the median (if there is an odd number of data points, the vertical line should be inserted directly on the median point). This is shown as the bold vertical line in Figure 3.2 and divides the points into two equal groups (i.e., Section 1 and Section 2). Second, each section was then divided into two equal halves again with a vertical line at the middle data point (see unbolded dashed vertical lines in Figure 3.2). In the present study there were an odd number of points, thus, I inserted the vertical line directly on the middle point (conversely, insert the vertical line between the two middle data points, one to each side of the median, for an even number of data points). Third, the median score of the three data points on the ordinate (i.e., y-axis) of Section 1 and Section 2 is determined and a horizontal line inserted at the median point for each section (displayed as the two horizontal dashed lines in Figure 3.2). There should now be one “intersection”, consisting of a vertical and a horizontal line, in each section. Fourth, a line connecting these two “intersections” is inserted. At this point, the “quarter-intersect” line is identified (displayed as the dotted line connecting the intersections in Figure 3.2) and normally splits all data points in half (i.e., 50% of the points above and 50% of the points below). In Figure 3.2, the data points are not evenly distributed around the quarter-intersect line (i.e., two data points were below and four data points were above the line). Consequently, the final step was to move the quarter-intersect line slightly up or down, while maintaining the same slope, until the data points were evenly distributed above and below the line. The final line is labelled the celeration (or trend) line (shown as the bolded dotted line connecting the intersections in Figure 3.2). Any subsequent analysis is then completed following similar procedures. With the split-middle technique, data can be analysed both within and between phases by extending the celeration line into the subsequent phase. Refer to White and Liberty (1976) for a more complete discussion of the split-middle technique.

After identifying the celeration line, White (1974) proposed that two descriptive analyses be calculated to contribute to conclusions using the split-middle technique, the slope and the level of the celeration line. First, constructing a celeration line enables the change in slope across phases to be calculated. Typically, to calculate the slope, a point on the celeration line is identified arbitrarily along with the point on the ordinate through which it passes (Kazdin, 1982). The ordinate value on the celeration line of another trial block is then identified. To compute the slope, the numerically larger value is divided by the smaller value. The computation is then expressed in a ratio with a multiplication sign (×) to signify an increasing trend (a positive slope) or a division sign (÷) to signify a decreasing trend (a negative slope). For example, using the scores from Figure 3.2, if Trial Block 2 yields a score of 7.75 and Trial Block 5 yields a score of 2.75, the slope of the celeration line equals ÷ 2.82 (i.e., 7.75 / 2.75 = 2.82). When separate phases are assessed (e.g., A_1 and B phases), calculation of the change in slope depends on whether the slope is the same or in opposite directions. For example, if the slope in the phases being analysed are in the same direction (e.g., a positive slope), the change in slope is calculated by dividing the larger trend by the smaller trend; the resultant trend is then presented. Applying these computations, if the slope of the celeration line in the A_1 phase is × 2.00 and the slope of the celeration line in the B phase is × 1.33, the resultant change in slope is ÷ 1.50 (i.e., × 2.00 divided by × 1.33 = ÷ 1.50). Alternatively, if there is a positive celeration line slope in the A_1 phase and a negative slope of the celeration line in the B phase, the two are multiplied together for the resultant change in slope. The direction of the change in slope is determined by identifying the direction in which the change occurred. For example, the change from a negative slope in the A_1 phase (e.g., ÷ 1.33) to a positive slope during the B phase (e.g., × 1.33) would equal an increasing trend in performance (e.g., ÷ 1.33 multiplied by × 1.33 = × 1.77). With the split-middle technique, there is an assumption that no ceiling effect exists to limit the slope of the performance trend. Thus, projected performance slopes may be potentially misleading when ceiling effects are evident.

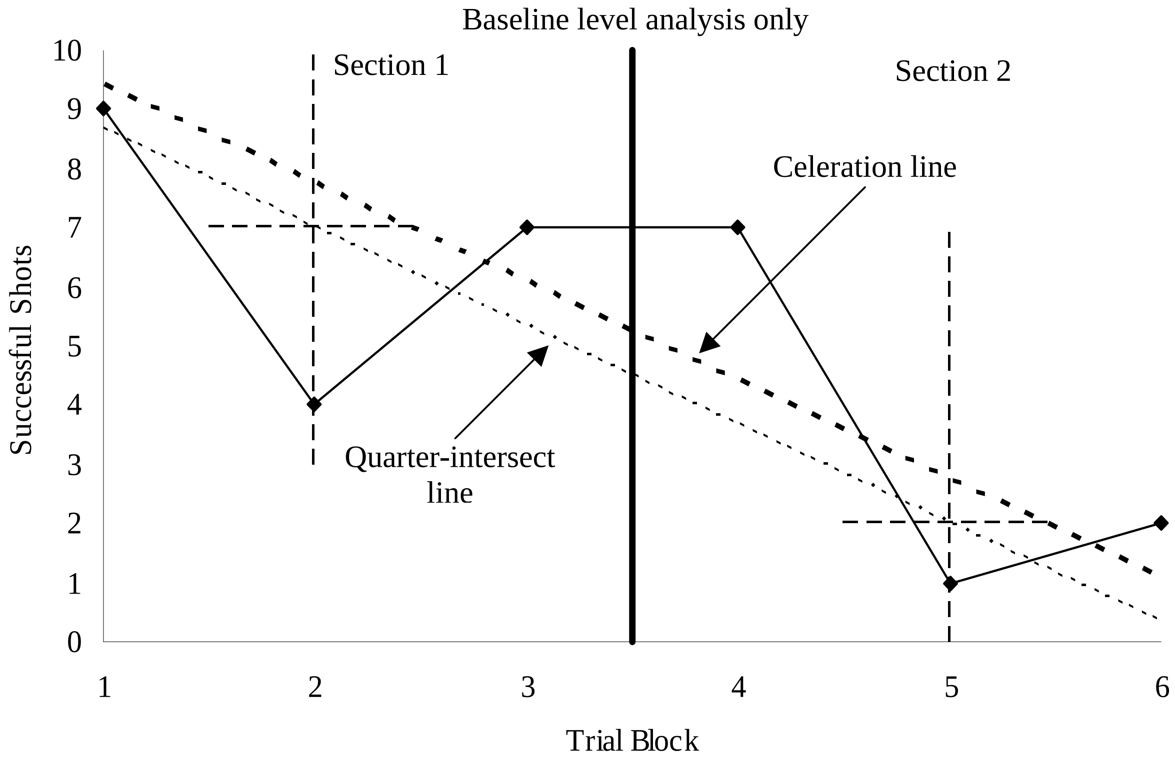

Figure 3.2. Example of performance analysis using the split-middle technique.

The second descriptive analysis computed with the split-middle technique is the level of the trend line. The level can be expressed by noting the value of the dependent variable where the trend line passes through the last data point in each phase. In the split-middle analysis example (Figure 3.2), the final level on the trend line in the A_1 phase is approximately 1.00. In a succeeding phase analysis, the level is expressed by noting the value of the dependent variable where the trend line passes through the first data point of the trend line in the B phase. The calculation of the level enables assessment of the change in performance from the last trial block of one phase to the first data point of another phase. To calculate the change in level, the larger value is divided by the smaller value. Hypothetically, if the level of the last data point on the trend line in the A_1 phase is 2.00 and the first data point on the trend line in the B phase is 4.00, then the change in level is 4.00 / 2.00 = × 2.00. The increasing (i.e., × 2.00) trend is the result of the level increasing from the A_1 phase to the B phase. This calculation provides a description of how quickly the subsequent phase (e.g., B phase) effects performance and is presented as a ratio. This ratio indicates the difference in the trend line intersection between the phases.

Changes in level of the celeration line between the A_1 and B phases and the B and A_2 phases, in relation to performance trend, are considered to determine how quickly the pressure affected performance. That is, the last point on the celeration line in the A_1 phase and the first point on the celeration line in the B phase are compared. Similarly, the last point in the B phase and the first point in the A_2 phase, on the respective celeration lines, are assessed. In SCD research, it is uncommon to analyse the first data point in the initial phase (e.g., A_1 phase) and the last data point in the final phase (e.g., A_2 phase). These two points alone do not enhance the analysis because the celeration line is based on all data points from a phase, so it would be erroneous to say that any of the comparisons are based on a single data point (O. R. White, personal communication, February 4, 2006). Celeration lines are used as simple descriptors of patterns to predict values beyond the immediate data set. There is no theoretical justification, however, for extrapolating beyond the data set. Experience and empirically demonstrated success is necessary in deciding whether the data are orderly enough to warrant predictions (White, 2005). Given that a point on the celeration line does not actually explain the performance level in these studies, it does not seem critical to the calculation for these studies. Thus, I have not included level calculations in participant's results, but I have presented these results for all participants separately in Appendix N for the readers' perusal.

Results of the split-middle analysis are discussed in relation to several features of each participant's performance. First, mean performance and comparisons of performance among the three phases are explicated. One benefit of using a SCD is that a comparison can be (and in this study may be) assessed between any two phases to determine participants' resultant performance change. Second, changes in slope of the celeration line across the three phases are considered. That is, a comparison of the change in slope of the celeration line from the A_1 phase to the B phase and a difference of change in slope of the celeration line from the B phase to A_2 phase are calculated. Finally, a summary of the participant's performance is offered. In all case studies, all data points are evaluated in all phases, allowing the assessment of not only overall effects, but also the processes through which the effects materialize (O. R. White, personal communication, January 17, 2006).

Interview analysis. Content analysis refers to the investigator searching text for recurring words and themes or analysing text, rather than observation-based field notes (Patton, 2002). This procedure allows the researcher to organise raw data (i.e., direct quotations from participants) into interpretable and meaningful themes and categories as the inquirer comes to understand patterns that exist (Hanton & Jones, 1999). Inductive content analysis is a fundamental part of grounded theory (Glaser & Strauss, 1967) and was used to analyse interviews in this study. In grounded theory, the emphasis is on becoming immersed in the data (i.e., being grounded) so that principal meanings can emerge. Grounded theory analysis often begins with specific observations and builds toward general patterns. Inductive content analysis involves discovering patterns, themes, and categories in one's data. This is often referred to as "open coding" (Patton). The open-coding technique allows for identification of themes from the raw data with the central purpose of opening inquiry widely (Strauss, 1987). In its entirety, grounded theory involves three aspects of inquiry (i.e., induction, deduction, and verification) to assess, develop, and verify a theory. Only inductive content analysis was used during this study because the secondary purpose was merely exploratory, rather than to develop a choking theory. Inductive content analysis has been widely used by sport psychology researchers (e.g., Gould, Eklund, & Jackson, 1992a, 1992b; Hanton & Jones; Scanlan, Stein, & Ravizza, 1989, 1991) and has also been used for sport psychology case study research (e.g., Jackson & Baker, 2001).

Interviews were conducted and audiotaped with participant consent and transcribed verbatim. After transcribing the interviews, for data checking purposes, I read the text while listening to the recorded interviews. The interview text was then returned to the respective participant for verification of accuracy (member checking) and then my principal supervisor and I read the transcripts numerous times to ensure familiarity with the content. Each interview was analysed separately to provide an understanding of each participant's experiences. In reading the interview, I wrote comments in the margin to create a participant profile and to assist in understanding cognitive processes and emotions involved in the SCD. In reading the transcript, I developed a preliminary list of issues (i.e., emotions and cognitions related to the experimental phases) into which I grouped personal notes and relevant text. It would be unrealistic to expect researchers to conduct studies without knowledge about the phenomena under investigation (Krane, Andersen, & Strean, 1997), thus, decisions regarding the classification of text were guided by the primary and secondary purposes of the study, my knowledge about choking, and the meanings made explicit by the participants (Merriam, 1998).

Using inductive content analysis outlined by Patton (2002), raw data (i.e., significant quotes and paraphrased quotes) were first organised into related groups by comparing tags (i.e., important pieces of information) with similar meanings and labels that best captured the substance of the topic (Côté, Salmela, Baria, & Russell, 1993). For the purposes of the content analysis, basic units were operationally defined as any comment by the participant about emotions, cognitive processes, coping strategies, or behaviours related to her experience. Assigning raw data to groups was not a linear process and I frequently reassigned raw data to different groups. After I was satisfied with the raw data compiled in each group, a list of theme names was created that reflected "the recurring regularities or patterns in the study" (Merriam, 1998, p. 181). Theme names were not solely derived from inductive analyses, but emerged from each participant's interview and the relevant literature. Themes emerged through either manifest content or latent content. Manifest content is information that is directly observable in the transcripts or "those elements that are physically present and countable" (Berg, 1995, p. 176). Latent content is "extended to an interpretive reading of the symbolism underlying the physically presented data… (and) is the deep structural meaning conveyed by the message" (Berg, p. 176). Latent content typically represents my interpretation of the interview material. In addition, I intended the selected themes to reflect all content and original wording of each participant to ensure all material, rather than only text related to my preferences, was analysed (Berg). Once I was satisfied with theme names, they were assigned to the list of related groups of raw data.

Trustworthiness. Member checking is the process by which the participant verifies the researcher's summary and conclusions of the interview to ensure the information gathered from the interview is authentic (Lincoln & Guba, 1985). Member checking allows participants to correct any misconceptions or perceived mistakes the researcher may have made (Flick, 1998). In the present study, two methods of member checking were used that served as a reliability check of the interview. First, each participant was sent a copy of the interview text and asked to comment on the accuracy (or inaccuracy) of the transcript. Second, after analysing each participant's interview data, my interview interpretation was offered to each participant for subsequent verification. In most cases, my analysis was discussed with the participant and minor adjustments made and included in the analysis. To enhance trustworthiness and reduce potential analyst bias, a consensus validation procedure was used whereby an independent investigator trained in inductive content analysis completed each stage of the analysis. The trained researcher randomly chose four interviews and verified that the themes were congruent with my interpretation and, thus, represented a second content analysis. After both content analyses were conducted, results of the separate analysis were then compared, investigators came to agreement on the specific themes, and differences were resolved through discussion.

Results

The purpose of Study 1 was to determine whether self-consciousness (S-C), trait anxiety (A-trait), and coping styles, as measured with psychological inventories, would predict non-choking and choking behaviour. Not only was the effectiveness of predicting choking investigated, but an attempt was also made to better understand the cognitive processes associated with choking-resistant (CR) and choking-susceptible (CS) athletes to help develop relevant choking interventions. In presenting the results, brief descriptive information related to participants' scores on the psychological inventories is presented first. Responses to these questionnaires were important because they were used to classify participants into CR and CS categories. The descriptive statistics included results from the

46 participants who completed the psychological inventories in this study and a comparison sample (Wang, 2002).

Eight case studies are then presented with quantitative and qualitative data for 4 CR and 4 CS participants. Each case study is introduced separately and commences with a participant profile consisting of background information about the participant's netball playing history. Next, visual analysis of the state anxiety (A-state) results and qualitative data related to the pressure manipulation are presented. Results from the DM-CSAI-2 and interview are presented collectively to reinforce the interpretation of anxiety experienced during the phases. Then, quantitative results related to the single-case design (SCD) are presented and a summary of the performance analysis included. Next, the corresponding interview data is presented. In reporting the findings, direct quotes are used throughout the results in order to preserve the voice of the participant. For efficiency purposes, results and discussion related to each participant's interview are presented simultaneously to circumvent backtracking. Finally, each case study is summarised, combining the quantitative and qualitative data analyses. Although not included for all participants, where appropriate, I have integrated a discussion of key field notes related to the relevant participant to enhance the case study.

Psychological Inventories

This section provides descriptive statistics of scores on the three psychological inventories (i.e., SCS, SAS, and CSIA) and the representative scores of the 46 participants collectively (Table 3.1).

Table 3.1

Descriptive Statistics for the Self-Consciousness Scale (SCS), Sport Anxiety Scale (SAS), and Coping Styles Inventory for Athletes (CSIA)

Inventory	Range	Mean	SD	25th percentile	50th percentile	75th percentile
SCS	30 to 59	43.74	6.72	39	44	49
SAS	21 to 49	32.74	7.15	27	32	39
CSIA	– 14 to + 17	– 0.46	6.48	– 6	0	+ 5

Participant scores from the SCS ranged from 30 to 59 with higher scores indicating high S-C. Scores on the SAS ranged from 21 to 49 with higher scores indicating high A-trait. Scores on the CSIA ranged from – 14 to + 17 with positive differential scores indicating a tendency toward approach coping. These results are similar to Wang's (2002) comparison sample (see Table 3.2).

Table 3.2

Wang's (2002) Descriptive Statistics for the SCS, SAS, and CSIA (N =80)

Inventory	Range	Mean	SD	25th percentile	50th percentile	75th percentile
SCS	28 to 57	42.73	6.37	38	42	47
SAS	17 to 61	33.95	9.87	26	33	39
CSIA	– 22 to + 14	+ 0.63	6.93	– 5	+ 1	+ 5

Choking-Resistant (CR) Participants

Four CR athletes' case studies are presented. I assured participant's anonymity would be maintained in any reports and publications. Thus, I used pseudonyms to identify CR participants. To decrease confusion, participants were organised in alphabetical order and named Amy, Beth, Carol, and Debbie.

CR Participant- Amy

Participant profile. Amy was 18 years old and had been playing competitive netball for 9 years. At the time of the study, Amy had been playing in a division (association) level team for the past 3 years and had been playing in a shooting position for 5 years. Amy attempted to make a state under age netball team once, but was unsuccessful. Amy was purposively sampled as a CR participant because she was moderately low in S-C, low in A-trait, and primarily used avoidance coping. Specifically, Amy's scores were 44 on the SCS (25th to 50th percentile), 27 on the SAS (1st to 25th percentile), and – 6 on the CSIA differential score (1st to 25th percentile).

Pressure analysis. The B phase was critically important for the purpose of the present study. Without a manipulation of pressure and an associated increase in A-state during the B phase, it would be difficult to conclude that participants' actually perceived a difference in pressure between the low-pressure (i.e., A_1 and A_2) and high-pressure (B) phases. In order to assess the effects of the pressure manipulation, A-state was measured prior to commencement of each phase, using the Directional Modification of the Competitive State Anxiety Inventory-2 (DM-CSAI-2). Scores on the DM-CSAI-2 were used to determine if a change in perceived A-state occurred during the B phase. The DM-CSAI-2 results will be discussed in terms of relative scores and absolute scores. Relative scores were those that increased or decreased in reference to other phases, whereas absolute scores are scores that are categorised as low (between 9 and 17), moderate (between 18 and 26), or high (between 27 and 36). The direction scores were not an essential component to the current research, and thus were not a focus of discussion for the case studies. The interested reader may refer to Appendix O for directional scores of the DM-CSAI-2.

Visual inspection of Figure 3.3 shows that Amy's intensity scores for cognitive anxiety prior to the pre-pressure baseline (A_1), pressure (B), and post-pressure baseline (A_2) phases were 18, 23, and 17, respectively. Intensity scores for somatic anxiety leading into the three phases were 13, 25, and 12. Clearly, Amy experienced a substantial and similar increase in cognitive and somatic anxiety intensity prior to the B phase. Amy's absolute anxiety increased from low levels prior to the A_1 and A_2 phases to moderate levels prior to the B phase.

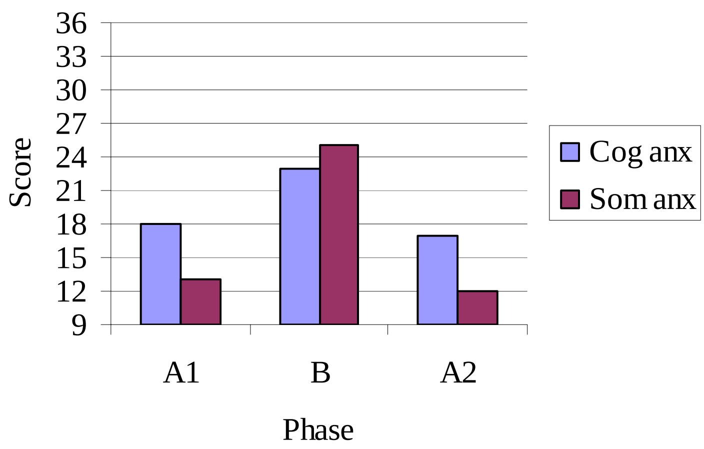

Figure 3.3. Cognitive and somatic anxiety intensity scores for Amy.

Interview analysis: Pressure manipulation. During the interview, as a further manipulation check, I asked participants to explain their perceived anxiety during the three phases to reinforce or contradict the reported DM-CSAI-2 results. During the interview, Amy explained that she experienced nervousness primarily through symptoms of somatic, rather than cognitive, anxiety. To further explicate her A-state, Amy stated,

> Session 1 (A_1 phase), I walked in and it was very professional and very formalised… that kind of made me a little nervous, not nerves as in shaking and that, I didn't really have butterflies, I wasn't *that* (Amy emphasises) nervous, but just a little nervous. Compare that to Session 2 (B phase), when we had the audience, had the camera, and that made me a lot more nervous than what Session 1 did. … I had butterflies. I was very nervous, I was very surprised. Session 3 (A_2 phase), I was just a lot more relaxed.

This excerpt confirms the reported results of the DM-CSAI-2, where Amy perceived an increase in intensity of somatic anxiety prior to the B phase, however, does not explain the drastic change in reported direction scores prior to the A_2 phase. To elaborate further on her anxiety level, Amy also explained that she experienced cognitive anxiety, albeit different types, during the three phases.

> I was worried (during the A_1 phase), I just wanted to do the best I could… I felt like I had a little bit of pressure on me because I was a goaler, I thought I've got to do well because otherwise you'll (the researcher) be like, what is this girl doing? … Session 2, I had a bit more pressure not only to do well, but to improve on what I got last time, and also having people around me, I was like what are they (the audience) going to think of me. … I wasn't really that worried (during the A_2 phase), because I was thinking, what else can he try?

This quote indicates that Amy's cognitive anxiety during the A_1 phase was primarily because of the expectations of another, possibly important, person (i.e., researcher), whereas pressure increased during the B phase because of the accumulated effect of the pressure manipulation, social expectations, and self-expectations. The previous quotes also reinforce the impression that the A_2 phase was the least anxiety-evoking phase. Collectively, Amy clearly increased A-state during the B phase, as indicated by the increase in intensity of anxiety on the DM-CSAI-2 and detailed explanations of nervousness during the interview.

Two themes that were apparent for Amy, related to the perceived pressure, were uncertainty and formality. Kagan (1972) defined uncertainty as the “inability to predict the future, especially if the doubt centres on the experience of potentially unpleasant events like punishment, physical harm, failure, or rejection” (p. 55). According to Martens et al. (1990) competitive anxiety theory, uncertainty may increase the perception of A-state. Amy expressed uncertainty during the A_1 phase as she stated, “The first one (phase), I was unfamiliar with what was going on. … I didn’t know what it (the study) was going to be about. I knew I was going to shoot goals, but I didn’t know what to think.” The A_1 and A_2 phases were allegedly both low-pressure phases, yet, Amy’s uncertainty and subsequent A-state decreased during the A_2 phase, “I was pretty relaxed. I figured it would be like the first session (phase). After having done a couple sessions, I kind of got into it… I got relaxed and wasn’t worried about it.” It appears that a decrease in uncertainty reduced A-state, thus supporting the contention of Martens et al. that uncertainty influences A-state.

Another theme that was evident, particularly during the A_1 phase, was formality. The professionalism of the A_1 phase possibly influenced Amy’s A-state,

> It was pretty formalised, there wasn’t you rock up and shoot some goals. You (the researcher) got the survey out and you went through it step by step, so it was a bit more structured than I thought it would be. … It felt like I had pressure on me. I

> wanted to get over this feeling and try to do the best that I could, but I was a bit intimidated by the guidelines. I didn't really realise how professional it would be.

Though the study was formal and professional, Amy explained that the structure of the A_1 phase was helpful, "It was good. I'd rather have it like that than just muck around and do whatever." It appears that Amy was slightly affected by the professionalism during the A_1 phase, but ultimately preferred the formal situation because she is, in her words, "an organised person" and was more comfortable in that situation.

Performance analysis. Mean performance for Amy, when expressed in number of successful shots out of 10 attempts, was 5.50 ± 1.05 during the A_1 phase and was 9.17 ± 0.75 during the B phase. This represented a large 67% improvement between the A_1 and B phase. Mean performance during the A_2 phase was 6.83 ± 1.17. This represented a 34% decline between the B and A_2 phase (see Figure 3.4). The change in mean performance between the low-pressure (i.e., A_1 and A_2) phases was also assessed to determine if A_2 phase performance level was similar to the earlier A_1 phase. Researchers (e.g., Barlow & Hersen, 1984; Kazdin, 1982) who frequently use SCD research suggest that if, in the context of this study, a similar mean performance occurs during both low-pressure (i.e., A_1 and A_2) phases with a decrease in performance during the high-pressure phase (i.e., B_1 phase), the pressure manipulation was effective in disrupting typical performance rates. For Amy, mean performance increased by 24% from the A_1 to the A_2 phase whereas the B_1 phase performance changed considerably, indicating the pressure manipulation was successful during the B_1 phase. As explained earlier, the reader is referred to Appendix N for a description of participants' celeration line level calculations.

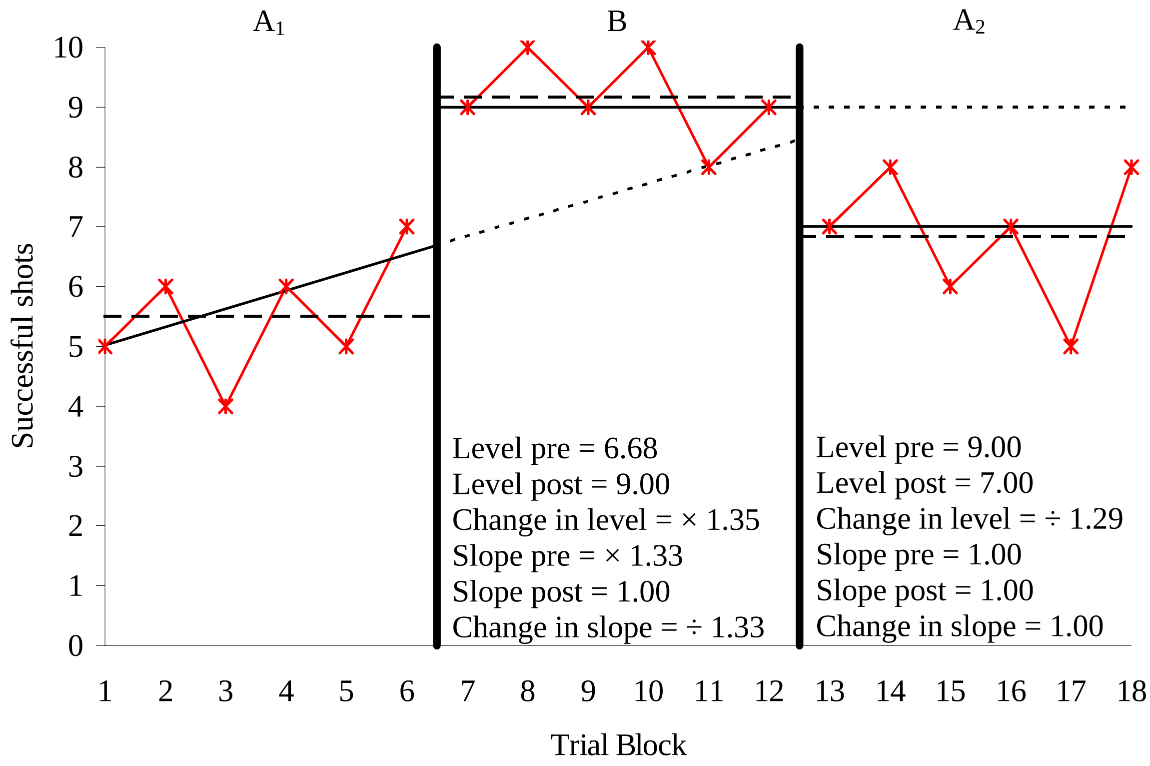

Figure 3.4. Split-middle analysis for Amy.

Note. In all performance figures, solid vertical lines represent the point of phase change, solid black lines for each phase indicate celeration lines, dotted lines signify projected celeration lines, and horizontal dashed lines in each phase indicate mean performance.

The slope represented the rate of performance change between consecutive trial blocks within the phases. In all slope analyses, a slope of 1.00 indicates an even, horizontal slope of the celeration line with no increasing or decreasing trends. The slope of the celeration line for Amy in the A_1 phase was × 1.33 and the slope for the B phase was 1.00. The resultant change in slope was ÷ 1.33, representing a decrease in rate of change between the A_1 and B phase. During the A_2 phase, the slope of the celeration line remained steady (i.e., slope of 1.00), reflecting no change in slope between B and A_2 phase. As a point of explanation, the decrease in rate of change for the B phase shows how the statistical analyses do not make sense alone and should be contextualised. That is, the decrease in rate of change occurred possibly because performance in the B phase was consistently excellent. Thus, decreasing rate of change may not necessarily provide a negative result.

Researchers who have conducted numerous SCD investigations recommend achieving a stable baseline before proceeding with subsequent interventions (Barlow & Hersen, 1984; Hrycaiko & Martin, 1996). A stable baseline, where the slope of the performance change is minimal, allows researchers to clearly identify robust performance trends regarding the effects of subsequent interventions. Pre-pressure baseline phase stability increases the capability to make a reasonable judgment on whether the pressure manipulation was successful in affecting performance during the B phase. Data points in the A_1 phase (Figure 3.4) show that Amy achieved a reasonably stable baseline in a positive direction. For experienced netball players, a relatively stable baseline would be expected. Experienced players, such as those used in the current study, will have literally honed their shooting technique with thousands of shot attempts.

From the DM-CSAI-2 and interview data, the pressure manipulation also seemed to increase perceived pressure prior to, and during, the B phase. Clearly, a noticeable performance increase between the A_1 and B phase was exhibited under pressure. A classic performance trend expected of a CR participant occurred. That is, Amy exhibited non-choking behaviour and performed with less variability during the B phase. Three performance variables may substantiate the evidence that Amy performed more successfully under pressure. First, Amy's performance indicated that there was a considerable difference, increasing performance by 67%, from the A_1 to the B phase. Second, all data points during the B phase are on or above the projected celeration line of the A_1 phase, indicating that performance improved by a sizeable amount during the B phase. Finally, the timing of the effect was immediate and sustained. That is, performance during the B phase changed without delay, indicating the pressure manipulation was effective in changing success rates. The interview analysis helped to explain Amy's experience during the three phases.

Interview analysis: Cognitive themes. During the interview, two themes that were evident were positive self-talk and avoidance coping. Positive self-talk was apparent when Amy explained her thoughts relating to the shot distance. During the A_1 phase, Amy was surprised about the shot distance, "I didn't think I would be shooting from that far… that surprised me, but after I put a few practice shots in, I was fine." Earlier pilot data had indicated that the shot distance of 2.44 m (8 ft) was a reasonable distance in comparison to the 4.90 m (16 ft) radius of the goal circle (Netball Victoria, 2003). In addition, Amy would have practiced shots from this distance regularly in training. Amy used positive self-talk to deal with the shot distance by saying, "I was telling myself I couldn't do anything about it, so I adjusted to it quickly." Generally speaking, Amy exhibited a high degree of adaptability during the A_1 phase by recovering from the initial surprise of the situation.

Positive self-talk was also evident in the B phase, however, Amy now used positive self-talk to cope with the pressure. For example, Amy stated, "I was very focused, I was just like 'c'mon, I can do this' and when I missed one, I was like, 'ok, let's get the next one in.'" Amy used positive and enthusiastic self-statements (e.g., "c'mon, I can do this") to explain her experience during the B phase. Amy also elaborated that, at least, two benefits of using positive self-talk were recovery from errors and task-focus. First, Amy recovered from errors quickly in order to prepare for the next attempt. When I asked Amy how she coped with missing shots, she stated, "I felt really positive about myself. Even if I missed one, I thought, 'that's alright, I'll just get the next one or I'll get the next one after that,' very positive thinking toward myself." Second, Amy used positive self-talk to maintain an intense level of task-focused attention. For example, Amy was explicit when explaining her cognitions during the B phase, "I concentrated more and I became more focused and I was getting them (the shots) in more… I was just saying 'c'mon, I can do this' and they kept going in." Amy's results relate with research on self-talk (e.g., Hardy, Gammage, & Hall, 2001; Landin & Hebert, 1999). In a descriptive qualitative investigation, for example, Hardy et al. found that one reason that athletes used self-talk was to maintain concentration on the task. As Amy discussed concentration, she also mentioned peak performance idioms, such as "in the zone" and "got into a rhythm." When asked how she dealt with the pressure, Amy stated, "I was in the zone, I was in the zone. I don't know what you call it. … Just getting in the zone, being able to concentrate, shooting well, doing well, and thinking positively." It appears that positive self-talk facilitated Amy's mental preparation and focus for each attempt. In addition, Amy elaborated on the meaning of "got into a rhythm" during the B phase,

> I just got into a rhythm and mode and I found it hard to miss. … I find it really hard, when I shoot, they (the attempts) just go in. I don't worry about them not going in. I say "'ok it'll go in, it'll go in," and it goes in and then when I don't get it in, I just say "ok, let's get the next one." I try to stay positive.

The idiom "got into a rhythm" perhaps meant that Amy experienced less cognitive interference related to performance because she prepared equally for each attempt. Using positive self-talk may have ensured that Amy established the proper mental readiness and focus before each attempt.

Another theme that emerged from the interview was avoidance coping. Avoidance coping is typically used to direct activity away from the threat-related stimulus (Anshel & Weinberg, 1999). When athletes use avoidance coping, they do not attempt to solve the problem, but try to maintain attentional focus and address the next task (Anshel, 1996). Three possible issues related to avoidance coping for Amy were blocking out distractions, imagining team support, and bouncing the ball. Amy coped with the pressure by ignoring the camera and audience,

> I was blocking out all the distractions. Half the time I didn't even know the video camera was there. I forgot about it and then, when we had to stop for 30 seconds, I thought, "oh, the video camera is there." That's how focused I was. I didn't even know they (the audience members) were sitting around me half the time. I didn't even know they were writing notes until I finished and then I saw they had paper and I said, "what are you doing?" (Amy chuckles)

Blocking out the camera and audience, whether consciously or unconsciously, represent a classic avoidance coping strategy enabling attention to remain on shooting.

Amy used other avoidance coping strategies during the B phase possibly as a habit in keeping with the team environment and support she normally experiences when playing. Team support was an essential part of dealing with the pressure as Amy imagined teammates during the B phase,

> In my team I have this girl that plays wing attack and she's always, "c'mon get it in," she's always so positive. There was a couple times when I went to put it (the shot) up, because I am so used to her (the teammate) saying "c'mon, lets get it in," I was waiting for her to say "c'mon you can get it in" and I imagined that she said it and that helped.

This quote could be interpreted in numerous ways. First, team support could work in the same way as avoidance coping strategies by helping Amy dissociate from the pressure and maintain focus on shooting. That is, Amy imagined team support to cope with the pressure and remain task-focused. Second, team support and encouragement may have evoked a type of positive, conditioned response of successful shooting. Finally, team support perhaps normalised the experimental situation into a more familiar environment, allowing Amy to effectively deal with the pressure. I suggest that, in all three interpretations, Amy attempted to decrease A-state by imagining team support.

Another coping strategy Amy used during the B phase was bouncing the netball. Apparently, bouncing the ball was also a strategy to help Amy relax, “I didn’t really bounce the ball a lot (in the A_1 phase). Compare that to Session 2, I did bounce it a lot… it was like a deep breath and relaxing thing before I took the shot.” Amy seemed to bounce the ball as an arousal regulation technique to control breathing and focus her attention on the task. After reviewing the videotape of performance during the B phase, I observed that Amy bounced the ball once before each shot. In a regulation netball game, however, bouncing the ball is prohibited, which makes this strategy very intriguing. Unfortunately, during the interview, I did not probe Amy about her rationale for bouncing the ball in relation to the legality of the action during a regulation game because, although Amy mentioned it during the interview, I only noticed the consistency of the action on the videotape after the interview was conducted.

General summary of Amy. As indicated by the DM-CSAI-2 and interview, Amy experienced a perceived elevation in pressure leading into the B phase. By triangulating data, a more robust validation of the pressure manipulation was obtained. During the B phase, Amy only missed 5 out of 60 attempts, an exceptional performance. Amy’s success under pressure was expected (although perhaps not to this large extent) because she was classified as a CR participant. Amy was able to perform at a very high level despite feeling relatively anxious prior to the B phase. Kazdin (1982) explained, “Latency of change refers to the period between onset or termination of one condition and changes in performance. The more closely in time the change occurs after the experimental conditions have been altered, the clearer the intervention effect” (p. 237). In Amy’s case, the latency of change was brief and performance changes coincided with the onset of the B phase, thus reinforcing the positive effect of pressure on performance. It appears that Amy’s answers to the psychological inventories were helpful in successfully predicting Amy’s likely resilience from choking effects.

During the interview, Amy expressed two main themes regarding her cognitions during the study, namely positive self-talk and avoidance coping. It appears that positive self-talk and avoidance coping strategies were employed in order to deal with the uncertainty and pressure manipulation experienced during the study. A number of avoidance coping strategies were utilised during the B phase, possibly to maintain focus on the task. Amy consistently mentioned strategies to avoid the pressure, such as “blocking out the audience” and “imagining my teammate” that helped her maintain attention on shooting. Amy’s use of avoidance coping strategies during the B phase supports her reported CSIA results indicating that she is typically an “avoidance coper.” Attending to task-relevant cognitions, rather than focusing on the pressure, as explained by Amy, helped her “get into a rhythm” and remain task-focused. Similar to Amy’s peak performance expressions, Jackson (1992; Jackson & Csikszentmihayli, 1999) have examined the “flow” experience often reported by athletes when performing extraordinarily well. Two variables that may indicate Amy was experiencing peak performance were the level of successful performance and phrases during the interview. First, a substantial increase in performance during the B phase occurred in comparison to the A_1 and A_2 phases. Second, it appeared that at least two (i.e., concentration on the task at hand and loss of self-consciousness) of the identified constituents of a “flow” experience (see Jackson & Csikszentmihayli) were in the forefront of Amy’s performance explanation. Concentration on the task at hand and loss of self-consciousness (S-C) were both discussed during the interview and are important elements of the flow experience. An absence of statements related to S-C may indicate that Amy was completely immersed in the task and not easily distracted by the pressure manipulation. Amy also explained performance in flow-like expressions, using terms such as “get into a rhythm” and “in the zone,” to describe her experience.

A drawback to this interview was that it was one of the initial interviews conducted. In retrospect, the initial interviews were probably less proficient in comparison to the later interviews because with each interview my knowledge about CR athletes expanded, helping me to focus on specific and meaningful questions and issues. For instance, during the interview, I missed the opportunity to investigate why Amy bounced the ball during the B phase, but not other phases. This may have provided more insight into the psychological mechanisms during the B phase. Regardless, Amy provided meaningful information regarding the cognitive processes of a CR participant.

CR Participant- Beth

Participant profile. Beth was 19 years old and had been playing netball in a division (association) level team for 7 years. During that time, she played in a shooting position for 4 years. Beth was purposively sampled as a CR participant because she was low in S-C, moderately low in A-trait, and predominantly used avoidance coping. Beth’s scores were

39 on the SCS (1st to 25th percentile), 32 on the SAS (25th to 50th percentile), and – 9 on the CSIA differential score (1st to 25th percentile).

Pressure analysis. Visual inspection of Figure 3.5 shows that Beth's intensity scores for cognitive anxiety were 12, 27, and 15 immediately before the A_1, B, and A_2 phases, respectively. Clearly, Beth experienced a substantial increase in intensity of cognitive anxiety prior to the B phase. Intensity scores for somatic anxiety were 11, 17, and 19 prior to the three phases, respectively. Beth, thus, exhibited a successive elevation of somatic anxiety prior to each of the three phases. For Beth, absolute cognitive anxiety increased from low levels prior to the A_1 and A_2 phases to moderate levels prior to the B phase. Absolute levels of somatic anxiety remained low prior to the A_1 and B phases, but increased to moderate levels prior to the A_2 phase.

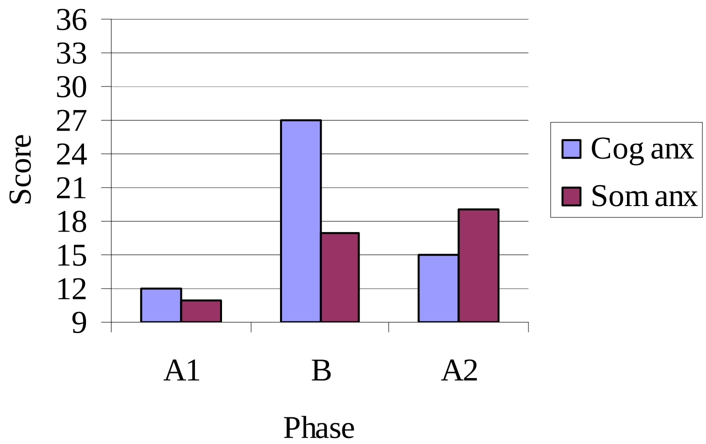

Figure 3.5. Cognitive and somatic anxiety intensity scores for Beth.

Interview analysis: Pressure manipulation. Before discussing the interview results, a statement should be made in relation to Beth's reported somatic anxiety scores. Beth's intensity scores showed a successive increase in somatic anxiety for the three phases. My field notes indicate that Beth arrived late for the A_2 phase and exhibited typical reactions to being rushed, such as rapid breathing and heart racing. Upon her arrival, Beth rested for approximately five minutes before completing the DM-CSAI-2. She may have misinterpreted her increase in arousal as an increase in somatic anxiety during the A_2 phase, or perhaps she was anxious due to her tardiness. In any case, reported DM-CSAI-2 results should be viewed with caution.

During the interview, Beth explained her nervousness through expressions of somatic anxiety. During the A_1 phase, she used idioms such as “heart racing a bit” and “muscles tense a bit,” to explain her experiences of A-state, which was possibly related to Beth experiencing uncertainty. For example, when asked to compare her A-state during the A_1 and A_2 phases, Beth suggested,

> During Session 1 (A_1 phase) I was a bit nervous, I didn’t really know what to expect, but then when I started shooting, I became more relaxed. … During Session 3 (A_2 phase) I wasn’t feeling much, I now knew what to expect and knew what to do and I just felt really relaxed. There wasn’t any real pressure and I wanted to do well.

The quote above supports the contention of Martens et al. (1990) that uncertainty increases A-state. It appears that uncertainty and A-state quickly dissipated as the A_1 phase became more familiar and Beth commenced her shot attempts. During the A_2 phase, Beth was more familiar with and certain about the procedures enabling her to remain relaxed and attempt shots in a state of relative calm.

As Beth explained her experience during the B phase, it quickly became clear that her experience was different to the other phases. For example, Beth explained, “My first reaction was that I was a bit excited, my heart was racing a bit, so that probably helped a lot. I was also pretty relaxed, which helped my shots go in.” Superficially, Beth’s use of “excited” and “relaxed” to describe A-state seems contradictory because one cannot be excited and relaxed simultaneously. In the context of Kerr’s (1990) Reversal Theory (RT) of arousal, however, it is logical that Beth experienced both excitement and relaxation during the B phase. Advocates of RT posit that individuals are capable of interpreting their arousal on a continuum of hedonic tones ranging from high (i.e., pleasant) to low (i.e., unpleasant). Four possible pairs of meta-motivational states are also postulated, where a meta-motivational state is a “phenomenological state, which is characterised by a certain way of interpreting some aspect(s) of one’s own motivation” (Kerr, 1990, p. 129). The telic-paratelic pair (see Apter 1982 for a discussion of other states) has received the most research attention in sport. In this pair, individuals in a telic state (e.g., goal-oriented and express purpose) are typically serious, preferring low arousal levels, whereas individuals in a paratelic state (e.g., oriented toward the sensations related to the behaviour) are naturally spontaneous, preferring high arousal levels. Depending on the hedonic tone, high arousal levels may be perceived as excitement (pleasant) or anxiety (unpleasant) and low arousal interpreted as relaxation (pleasant) or boredom (unpleasant). Within RT, performers can rapidly change (reverse) meta-motivational states (i.e., telic-paratelic) or interpretations of arousal (i.e., pleasant or unpleasant), however these changes are involuntary. The RT appears to provide a plausible explanation of Beth’s qualitative results because a shift in arousal or meta-motivational state occurred during the B phase. These shifts were possible because each phase continued for approximately 30 minutes, which included administering the DM-CSAI-2 and shot attempts with breaks, allowing sufficient time for Beth to switch from telic to paratelic states or decrease arousal. According to RT, excitement is a paratelic state characterised by high arousal and high hedonic tone (i.e., pleasure) and relaxation is a telic state characterised by low arousal and high hedonic tone. Considering excitement and relaxation are both characterised by pleasure, Beth possibly experienced a “reversal” of meta-motivational states during the B phase because she experienced excitement (a paratelic state) during the initial shots and then involuntarily shifted to relaxation (a telic state) as arousal decreased during the B phase. In a qualitative investigation related to RT, Males, Kerr, and Gerkovich (1998) conducted 50 post-event interviews with nine elite male slalom canoeists regarding meta-motivational states during competition and found support that athlete's experience "reversals" during competitions. Males et al. explained that the athletes involuntarily changed meta-motivational states at different stages of the competition (i.e., pre-race, during race, and post-race) in response to errors or other events. Beth's qualitative results may support Kerr's RT interpretation of arousal.

Performance analysis. Mean performance for Beth during the A_1 phase was 5.50 ± 1.05 and was 7.00 ± 1.41 during the B phase. This represented a 27% improvement from the A_1 to the B phase. During the A_2 phase, mean performance was 5.67 ± 1.03. This was a 24% performance decrease between the B and A_2 phase. For Beth, mean performance increased by only 3% from the A_1 to the A_2 phase whereas performance during the B_1 phase changed considerably, indicating the pressure manipulation was successful (see Figure 3.6).

The slope of the trend line for the A_1 phase was ÷ 1.33 and the slope of the trend line for the B phase was × 1.33. This represented a reverse change in slope of × 1.77 from the A_1 to the B phase. The slope of the trend line for the A_2 phase was 1.00, which was a change in slope of ÷ 1.33 across the B and A_2 phase.

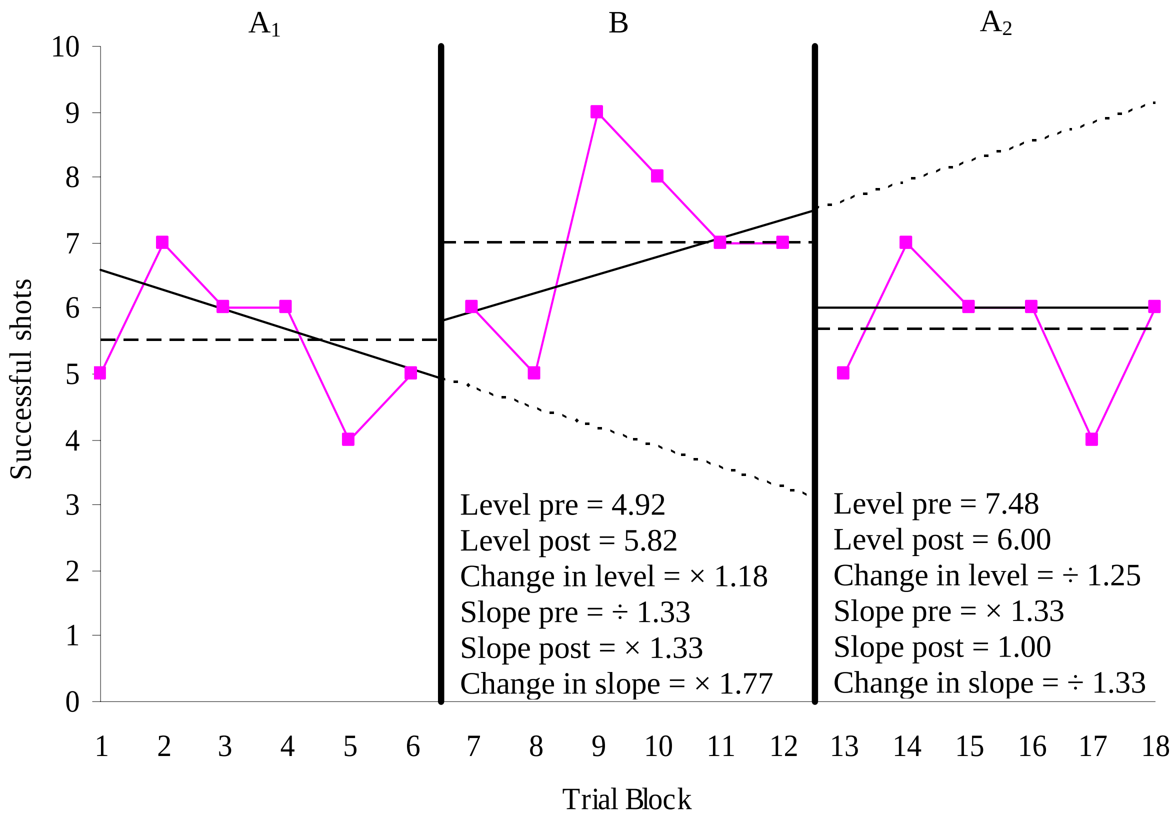

Figure 3.6. Split-middle analysis for Beth.

In summary, mean performance for Beth increased by 1.5 successful shots per trial block between the A_1 and B phase. Over the 60 shot attempts, this translates to an increase of nine successful shots during the B phase compared to the A_1 phase. A 27% increase in successful shots between these phases is a considerable improvement. Two concerns, however, should be discussed regarding the B phase. First, data variability increased in the B phase compared to the other phases. That is, Beth's performance consistency decreased, perhaps an indication that the pressure manipulation affected performance. Second, it appears the pressure negatively affected performance during the initial 20 shots (i.e., Trial Blocks 7 and 8). Barlow and Hersen (1984) explained, in reference to behaviour research, the immediacy of the performance effects is important in determining the interventions effectiveness. In Beth's case, delayed performance increase after the introduction of the pressure manipulation may limit interpretations of pressure effects. Perhaps Beth needed time to select coping strategies to deal with the pressure. Data variability and immediacy of the effects were perhaps a derivative of the pressure in the first two trial blocks (i.e., Trial Block 7 and 8), but less so thereafter. Performance data shows that Beth increased performance during the B phase, however, caution should be used when interpreting the performance changes. Perhaps the interview data may help explain the increased variability and delayed effects of the manipulation during the B phase.

Interview analysis: Cognitive themes. During the interview, two themes that were evident for Beth were positive interpretation and avoidance coping. Beth spoke about the audience and reward as the most distracting pressure manipulations. Thus, in the subsequent analysis, I explain how these pressure manipulations relate to each of the themes separately. For example, Beth used positive interpretation as a cognitive restructuring technique to cope with the audience's presence. When asked about the audience's affect performance, Beth stated, "By having them there… and by them watching me, there is this silent thing that they were encouraging me to do well." The audience was instructed not to interact with the participants. Yet, Beth perceived a positive impression from the audience that, for her, equated to motivation to perform in front of the audience. Beth could not completely explain why she felt the audience was helpful, but she commented, "I don't know, having people there watching, I was confident, it made me feel better when I got my shots in." This quote supports Zajonc's (1965) classic theory of social facilitation. According to Zajonc, the presence of others leads to performance increments in well-learned tasks because the enhanced arousal (or drive) increases the probability of a dominant, successful response. Perhaps as a result of being an experienced netball player and increase in confidence, the probability of the dominant outcome occurred with the audience presence. The positive interpretation of the audience was possibly a result of Beth's cognitive restructuring and positive self-talk, "(I) didn't really care about the expectations that they (the audience) had, I sort of said that I would try to do my best, said to myself I can do it, so I could keep my confidence up." This statement emphasised that Beth can cope well with external pressure, using positive self-talk to increase confidence. Beth also insinuated that others expectations may negatively affect her performance by stating, "(I) didn't really care about the expectation." Beth possibly understands that perceiving high expectations of others may hinder performance and dismissing the expectation helps her manage the pressure. It appears that Beth downplayed the significance of the audience, which had a positive effect on performance, "It made me relax a bit more, which would then help me concentrate… the fact that I didn't really need to meet anyone's expectations helped me relax and increase confidence." Thus, Beth countered high expectations from others by using cognitive restructuring to successfully decrease A-state.

Aspects of positive interpretation was also expressed when Beth discussed the financial reward. Offering a monetary incentive for successful performance may affect participants in one of two ways, depending on participants' interpretation. First, when the person interprets the situation as negative, possible rewards may hinder performance because the possibility of receiving the prize intensifies perceived importance and can consequently elevate perceived A-state (Baumeister, 1984; Masters, 1992). Second, when person interprets the situation as positive, possible monetary incentives may increase motivation and subsequent performance. Beth positively interpreted the reward as an incentive, "I was thinking I wanted to do better because the money was a motivator. I came into the experiment not expecting much, and if I get the chance to make money, then

I think that's good." Beth's interpretation linked with performance results provides support for the argument made by Jones and colleagues that an athlete's interpretation of anxiety may influence performance under pressure (Hanton & Cannoughton, 2002; Hanton & Jones, 1999; Hanton, Mellalieu, & Hall, 2004; Jones & Swain, 1992; Jones et al., 1993; Swain & Jones, 1996). In an initial investigation, Jones and Swain divided participants into high and low competitive groups from a number of sports (e.g., rugby union, basketball, soccer, and field hockey) to examine differences in anxiety intensity and anxiety direction. The high competitive group interpreted cognitive anxiety as significantly more facilitative than the low competitive group, who reported cognitive anxiety as more debilitative. When asked how the motivation of receiving the monetary reward helped, Beth stated, "It helped me think that I could do it, that I could get the shots in." It appears that the positive interpretation affected Beth's confidence, ultimately using additional positive self-talk to facilitate performance.

The second theme that was evident for Beth was avoidance coping. Avoidance coping may have helped Beth maintain focus on shooting during the B phase. Although Beth stated that the audience was helpful, perhaps in a psychologically encouraging way, she also explained that she blocked them out as well, "I pretended that they weren't there and really talked to myself. I knew they were there, I just didn't notice them." I interpreted this quote to mean that Beth was aware of the audience in between shot attempts perhaps for psychological support, but essentially disconnected from the pressure by blocking the audience out in order to maintain attention on the task. When asked how she increased concentration, she explained,

> I just went into my own little world, my own zone, I wasn't thinking about the audience… I was using self-talk, I was sort of just in my brain, like shooting well, and no real distracters were there and didn't really notice the audience after that.

From this quote, it appears that Beth can consciously buffer potential distractions when necessary. Beth seemed to use self-talk to stay in the present moment as a cocooning technique from other possible distractions. Self-talk may isolate Beth from the pressure in order to block out external factors.

During the interview, Beth suggested that the monetary incentive was a motivating factor, however, the impetus of the reward may have also distracted Beth during the B phase. For example, when asked about the reward, Beth stated, "The money helped a little but (pause)… the first 20 shots I was thinking about it too much and wasn't concentrating on my shots. After that, I didn't really think about it. I was concentrating on my shot and technique." This quote supports Baumeister and Showers (1986) contention that attending to possible rewards may distract the performer or may interfere with intrinsic motivation. I also asked Beth probing questions about how she recovered from her lapse of concentration, "I just went into my own little world, my own zone; I just wasn't thinking about the money, I didn't notice any real distractions." Due to the vagueness of the idiom "own zone", I probed further, "I wasn't thinking really about anything around me, happy with my thoughts and my performance… nothing really phased me, no interruptions or anything." Thus, Beth was initially distracted by the financial incentive, but later was able to psychologically distance herself (an avoidance coping strategy) from the pressure. These results support the finding of Wang, Marchant, and Morris (2004) that athletes who typically use an avoidance coping style perform better under pressure than athletes who typically use an approach coping style. Avoidance coping was a method of recovering from errors and performing in “my own zone,” which was interpreted as attention being task-focused and blocking out distractions. It seems that Beth was resilient under pressure and skilful in switching attention to task-relevant cues when necessary.

General summary of Beth. Scores on the DM-CSAI-2 indicated that cognitive anxiety increased during the B phase, however, consecutive increases in somatic anxiety occurred during the three phases. The cognitive anxiety results support the contention that the pressure manipulation succeeded in increasing pressure, however, the successive increases in somatic anxiety was unexpected. This trend possibly occurred because Beth arrived late and exhibited reactions to being rushed, potentially affecting her somatic anxiety results. The interview results related to the pressure also indicated, as discussed in relation to Kerr’s (1990) RT interpretation of arousal, that Beth experienced pressure initially and then adjusted during the B phase. Beth’s performance increased considerably during the B phase compared to the other phases. From the collective pressure and performance analyses, Beth experienced elevated pressure and increased performance during the B phase. Thus, it appears that the psychological inventories were helpful in predicting Beth’s likely resistance to choking effects, however, she needed some time to adjust and possibly select appropriate coping strategies to deal with the pressure.

During the interview, two themes that were evident were positive interpretation and avoidance coping. Throughout the entire interview, Beth explained the she managed the pressure manipulations by using positive interpretations and positive self-talk. The positive self-statements helped Beth to adjust to the pressure manipulations more easily. Perhaps Beth’s performance can be explained by combining the themes from the interview with information related to Kerr’s (1990) RT interpretation of arousal. From the qualitative results, Beth implied that A-state was highest at the commencement and possibly decreased in later trial blocks of the B phase. The excitement (characterised by high arousal and high hedonic tone) experienced possibly diverted attention to the money as Beth explained she was “thinking about it (the money) too much and wasn’t concentrating on my shots.” As a result, performance was likely affected negatively during the first 20 shots. Beth then used common avoidance coping strategies, such as blocking out the audience and positive self-talk, to psychologically distance herself from the pressure and perform more successfully during the later trial blocks.

CR Participant- Carol

Participant profile. Carol was 19 years old and had been playing netball for 9 years. She first played at division (association) level and then on a state league team for 2 years as goal shooter, before moving to another state. At the time of the study, Carol was playing on a division team and in a goal shooting position for 5 years. Carol was purposively sampled as a CR participant because she was low in S-C, low in A-trait, and typically used avoidance coping. Specifically, Carol’s scores were 39 on the SCS (1st to 25th percentile), 21 on the SAS (1st to 25th percentile), and – 11 on the CSIA differential score (1st to 25th percentile).

Pressure analysis. Visual inspection of Figure 3.7 demonstrates that Carol’s intensity scores for cognitive anxiety were 21, 11, and 10 before the A_1, B, and A_2 phases, respectively. Cognitive anxiety was highest prior to the A_1 phase and was relatively low in all phases. Intensity scores for somatic anxiety were 13, 13, and 12 for the three phases. Somatic anxiety was consistently low prior to all experimental phases. For Carol, absolute levels of cognitive anxiety decreased from moderate prior to the A_1 phase to low levels prior to the B and A_2 phases, whereas absolute levels of somatic anxiety remained low prior to all phases.

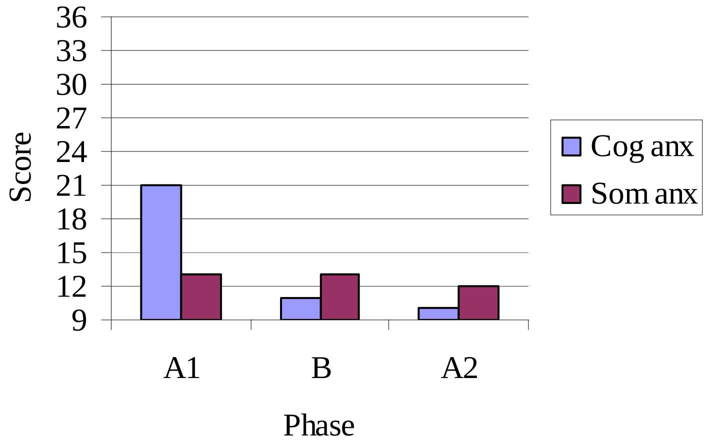

Figure 3.7. Cognitive and somatic anxiety intensity scores for Carol.

Interview analysis: Pressure manipulation. During the interview, Carol expressed her nervousness primarily through phrases relating to cognitive anxiety. For example, Carol explained her A-state after completing the DM-CSAI-2 and prior to commencement of the three phases by saying,

> I was starting to get worried about my shooting after completing the survey before the first one (A_1 phase) because I wasn't feeling confident. … (During the B phase) I was feeling the same as the first one until you (the researcher) mentioned the video camera. (Carol chuckled) I don't like video cameras. … I think that made me nervous… (I was thinking) I'm not going to improve… after I finished the survey, I was waiting and it started to worry me that I would not improve. … I wasn't nervous, I was fine during Session 3 (A_2 phase).

Two issues should be discussed in relation to the previous excerpt. First, it seems that Carol experienced similar nervousness prior to the A_1 and B phases compared to the A_2 phase. She acknowledged her nervousness prior to the A_1 and B phase, whereas she was relaxed during the A_2 phase. Second, Carol suggested that her A-state increased after completing the DM-CSAI-2 and prior to commencement of the A_1 and B phases.

Specifically, her cognitive anxiety increased due to a lack of confidence during the A_1 phase, and concern about the camera during the B phase. Perhaps Carol increased A-state after completing the DM-CSAI-2 because of uncertainty prior to commencing the A_1 and B phases. In fact, a theme evident for Carol, relating to the perceived pressure, was uncertainty. A number of environmental factors contributed to Carol experiencing uncertainty, including unfamiliar environment, unfamiliar procedure, and shot distance. The most prevalent, during the A_1 phase, was unfamiliarity with the environment.

> In netball, you know your corner is going to pass the ball to you, but in this situation (the study), there is nothing like that. I just had to shoot, so there was no defender to put on the pressure but there was pressure to get as many shots in as possible.

In a regulation netball game, players shift positions, pass the ball, and a defender attempts to prevent successful goal shooting. During the A_1 phase, however, Carol was without the usual game-related build-up to receiving the ball. Carol then spoke about familiarity with the procedures and shot distance during the A_2 phase, "By Session 3 (A_2 phase), I got used to the distance, it wasn't going to move and I knew that. I felt a lot better. I was fine because I had the last two weeks to settle in and get comfortable." This quote supports the contention of Martens et al. (1990) that uncertainty increases A-state because, unlike the A_1 and B phases, the procedures and shot distance were overt, resulting in slight pressure.

Performance analysis. Mean performance for Carol during the A_1 phase was 4.33 ± 1.03, whereas performance during the B phase was 6.00 ± 1.67. This represented a 39% improvement in performance. During the A_2 phase, mean performance was 5.00 ± 1.27, representing a 20% decrease between the B and A_2 phase. Mean performance from the A_1 to the A_2 phase increased by 16% whereas the B_1 phase performance changed substantially, indicating the pressure manipulation was effective (see Figure 3.8).

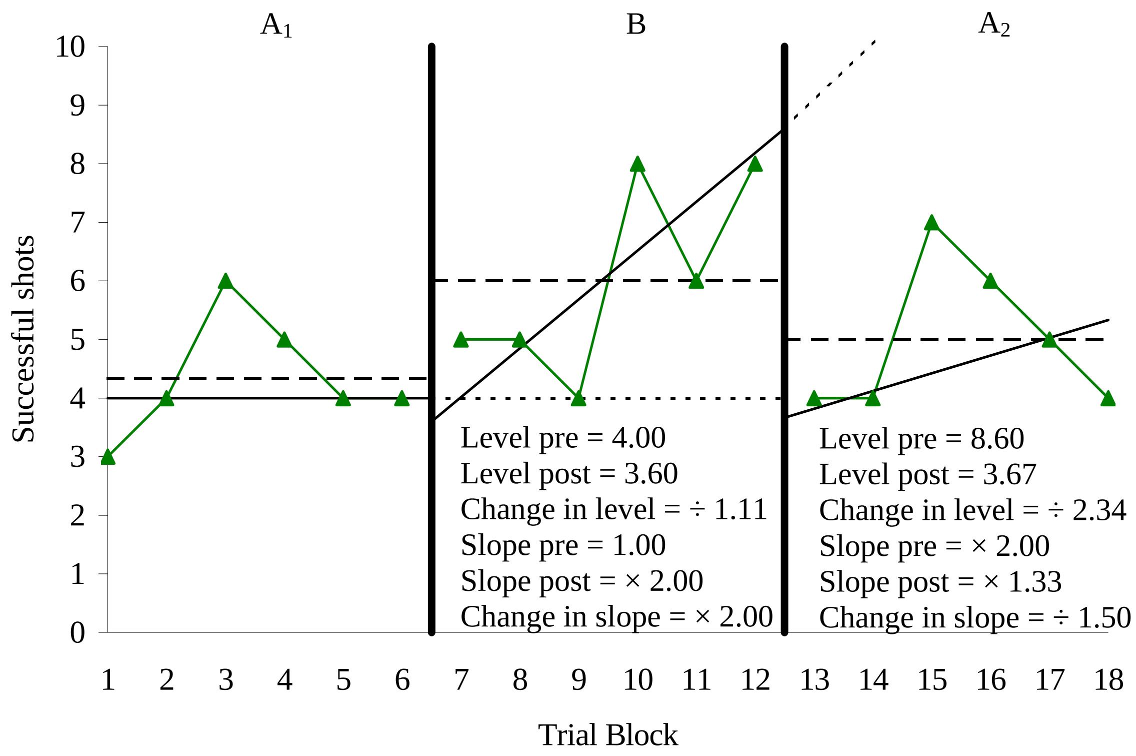

Figure 3.8. Split-middle analysis for Carol.

The slope of the celeration line for the A_1 phase was 1.00, whereas the slope of the celeration line for the B phase was × 2.00. This represented a change in slope of × 2.00 from the A_1 to the B phase. During the A_2 phase, the slope of the celeration line was × 1.33. This indicated a change in slope of ÷ 1.50 between the B and A_2 phase.

In summary, Carol's performance during the A_1 phase was the lowest of all participants. This seems incongruent in the context of her high skill level and previous state level representation, but perhaps related to the uncertainty experienced prior to and during the A_1 phase. As expected for a CR participant, Carol increased performance by 39% during the B phase, a considerable improvement. Two concerns, however, should be discussed regarding the B phase. First, the expected performance improvement was delayed, and thus caution should be used when interpreting the pressure effects (Barlow & Hersen, 1984). Second, inspection of the variability in data points indicates that Carol was more inconsistent during the B phase than the other phases. Carol's inaccuracy during the first 30 shots was perhaps due to an increase in nervousness during the B phase. These two performance indicators provide indirect support that the pressure manipulation was effective during the B phase. In the interview analysis, Carol provides an explanation of her focus of attention during the B phase.

Interview analysis: Cognitive themes. During the interview, three themes were evident for Carol including performance fluctuations, avoidance coping, and positive interpretation. Performance fluctuations were evident when Carol discussed her attention and shooting discrepancies during the B phase. It was obvious that she was uncomfortable with the video camera being nearby, as she explained several times, "I don't like video cameras." As a result, the video camera initially affected Carol's shooting.

> During the first 30 shots, my focus was more on the video camera than on shooting, but then I started focusing on the ring, and getting them in. … In between shots I saw the camera but during my shots, I just didn't think about it.

Researchers (e.g., Carver et al., 1985; Kurosawa & Harackiewicz, 1995; Wang, Marchant, Morris, & Gibbs, 2004) have found that a video camera might increase self-awareness (S-A) and interfere with processing of task-relevant information. The previous quotes support this finding as Carol explained her inattentiveness to shooting. When probed about the effects of the video camera on performance, Carol explained,

> In the second (phase), I started with my technique in my practice shots and the first 30 shots. I wasn't getting anywhere near the ring so I decided to just feel comfortable when I was shooting, whereas in the first 30 shots, I did a lot of technique. I was more focused on technique and I kept missing the goal. In the last part of the second one (phase), I was more relaxed and just shot the ball.

I asked Carol to clarify what she meant by “focused on technique.”

> I was focusing, you know, hands up high, bend knees, flick it with one of my hands and not both. It didn’t seem to be working… I thought it’s not working and I don’t feel comfortable, so I just changed to where I did feel comfortable.

This quote indicates that ‘technique’, for Carol, implied focusing on execution of the shooting task, whereas feeling ‘comfortable’ indicated an external focus of attention, and, in Carol’s words, “focusing on the ring.” Advocates of the self-focus model (e.g., Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992) of choking propose that performance pressure increases anxiety and S-A about performing correctly, and, in turn, enhances attention to skill processes and conscious control. Attention to automated performance is thought to disrupt proceduralised processes of high-level skills that normally run outside the scope of working memory during performance (Beilock & Carr, 2001). Carol’s quotes provide support for the self-focus model because the video camera may have increased S-A during the first 30 shot attempts, increasing Carol’s attention to explicit monitoring of skill execution, with a subsequent decrease in performance. Performance fluctuations occurred when Carol modified attentional focus to being more ‘comfortable’, rather than using ‘technique’ when shooting.

Performance fluctuations were possibly a direct result of a shift to avoidance coping strategies during the final 30 shots of the B phase. The theme avoidance coping was evident when Carol explained she was remaining in the present moment during the final 30 shots. Carol used descriptions, such as “forgot about the last shot”, to maintain concentration and minimise distractions. When asked whether the monetary incentive affected performance, Carol stated,

> I tried not to focus on that (the money). I just tried, especially during the last 30 shots, to focus on getting one ball in at a time. There was that lot of pressure because you had the camera and the audience and the money, so I just wanted to focus on each individual ball… focus on what I am doing right now.

Carol was task-focused and blocked out distractions during the final 30 shots of the B phase. It appears that Carol used imagery to help refocus attention, “While focusing on the ring, I thought about the ball going in. … I imagined the ball going up, over the ring and in.” Perhaps she used imagery to help stay in the present moment. That is, imagery was a method of remaining task-focused and decreasing distracting thoughts related to the pressure manipulations.

Positive interpretation was apparent when Carol discussed her cognitions about the audience during the B phase. Carol explained that the presence of the audience was a positive experience and she imagined them as teammates.

> The audience standing around the circle, that’s quite similar (to a game). I didn’t think of them as the audience, I thought of them as my team in their positions… everyone is watching me and it kind of seems like (the audience was saying) come on you can get it in, you can get it in, so I said that I can get it in.

Imagining her teammates around the circle may have increased the sense of familiarity and certainty of the situation. Similarly, imagining her teammates was possibly a coping response to decrease uncertainty and manage the pressure experienced in the B phase. The positive cognitive restructuring was again illustrated when Carol stated, “I’ve done it many times before and I can do it again.”

General summary of Carol. The DM-CSAI-2 data and interview indicated that pressure increased prior to the A_1 and B phases. The interview also indicated that Carol experienced an increase in A-state prior to commencing the initial two phases. It is, thus, difficult to state with certainty that the pressure manipulations operated as planned, for Carol, because of the similar A-state experienced during the A_1 and B phases.

One advantage of SCD research is being able to compare performance between phases. The A_2 phase was possibly a “true” baseline phase because Carol was more relaxed during this phase. Considering that Carol was equally affected by uncertainty and increased A-state during the initial two phases, a performance comparison between the high-pressure (B) phase and what can reasonably be argued as actually low-pressure (i.e., the A_2 phase) indicates that performance decreased by 20% during the A_2 phase. This was a considerable decrement in performance when less pressure was involved (see Figure 3.8). This provides support that Carol exhibited non-choking behaviour during the B phase because she performed worse during the “true” baseline (i.e., A_2) phase. From this performance analysis, it appears that the psychological inventories helped to predict Carol’s likely resistance to choking effects. Carol did, however, need time to adjust and select appropriate coping strategies during the B phase.

Based on the interview analysis, three key themes were performance fluctuations, avoidance coping, and positive interpretation. Performance fluctuations were evident when Carol performed poorly during the initial 30 shots of the B phase possibly because the video camera increased S-A. Carol consciously monitored technique to increase performance, which was paradoxical and debilitating to performance. These results provided support for the self-focus model of choking (Baumeister, 1984). Avoidance coping and positive interpretation were themes expressed in reference to the final 30 attempts during the B phase. Carol used various coping strategies, such as remaining in the present moment and imagery, perhaps as a method of being task-focused and blocking out distractions.

CR Participant- Debbie

Participant profile. Debbie was 19 years old and had been playing netball since age 11. She had played division (association) level for 8 years, had played on a state league team for the past 4 years, and had played in a shooting position for 6 years. Debbie was purposively sampled as a CR participant because she was low in S-C, low in A-trait, and typically used avoidance coping. Specifically, Debbie's scores were 33 on the SCS (1st to 25th percentile), 25 on the SAS (1st to 25th percentile), and 0 on the CSIA differential score (25th to 50th percentile).

Pressure analysis. Visual inspection of Figure 3.9 shows that Debbie's intensity scores for cognitive anxiety were 11, 14, and 11 prior to the A_1, B, and A_2 phases, whereas intensity scores for somatic anxiety were 12, 11, and 12 immediately before the three phases, respectively. The DM-CSAI-2 scores illustrate that Debbie experienced relatively low levels of, and minimal fluctuations in, A-state preceding the three phases.

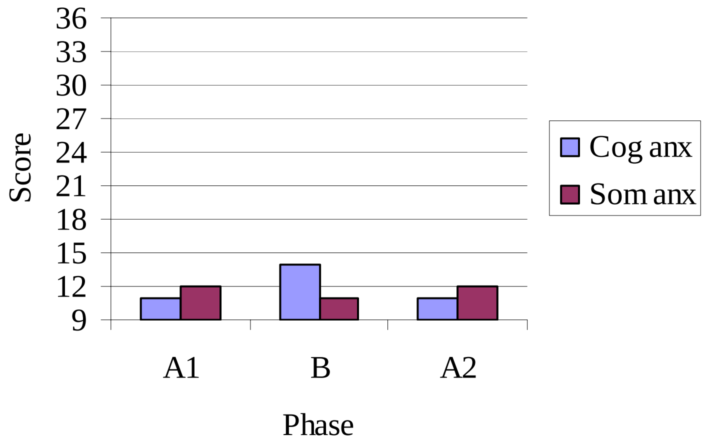

Figure 3.9. Cognitive and somatic anxiety intensity scores for Debbie.

Interview analysis: Pressure manipulation. During the interview, Debbie reported experiencing only minor changes in A-state during all phases, thus complementing the DM-CSAI-2 results. Debbie was apprehensive during the A_1 phase because she was unfamiliar with the procedures of the study. When asked to compare the different phases, Debbie stated,

> It was sort of a different nervousness. … The first session (phase) was not knowing what to expect and it was the first time I was doing it, whereas the second session (phase) I knew what I was going to be doing, but then there was the added camera and the people there. So the second session I was more worried about my performance in front of other people than being so much nervous. … I felt more relaxed today (A_2 phase) than all the other days.

This quote indicates that Debbie might have experienced multiple sources of anxiety, resulting in minimal differences in nervousness between the A_1 and B phase. Debbie was concerned about performing in front of people, but interpreted the audience as positive, "The audience was helpful… just having people there, it was similar to a normal game situation. Probably helped me to do better." This positive interpretation may indicate Debbie was able to interpret the situations in a positive manner. Debbie was characterised as a CR participant partially because of her low A-trait. For Debbie, perhaps the B phase was not a particularly threatening situation and thus she was resistant to the effects of the pressure manipulation.

Performance analysis. Mean performance for Debbie was 5.50 ± 1.52 in the A_1 phase and was 8.33 ± 1.37 during the B phase. This equated to a 51% improvement between the A_1 and B phase. During the A_2 phase, mean performance was 6.67 ± 1.37, which represented a 25% decrement between the B and A_2 phase. Mean performance increased by 21% from the A_1 to the A_2 phase whereas the B_1 phase changed substantially (see Figure 3.10). Mean performance results should be view with caution because the DM-CSAI-2 and interview results indicated the pressure manipulation was not effective.

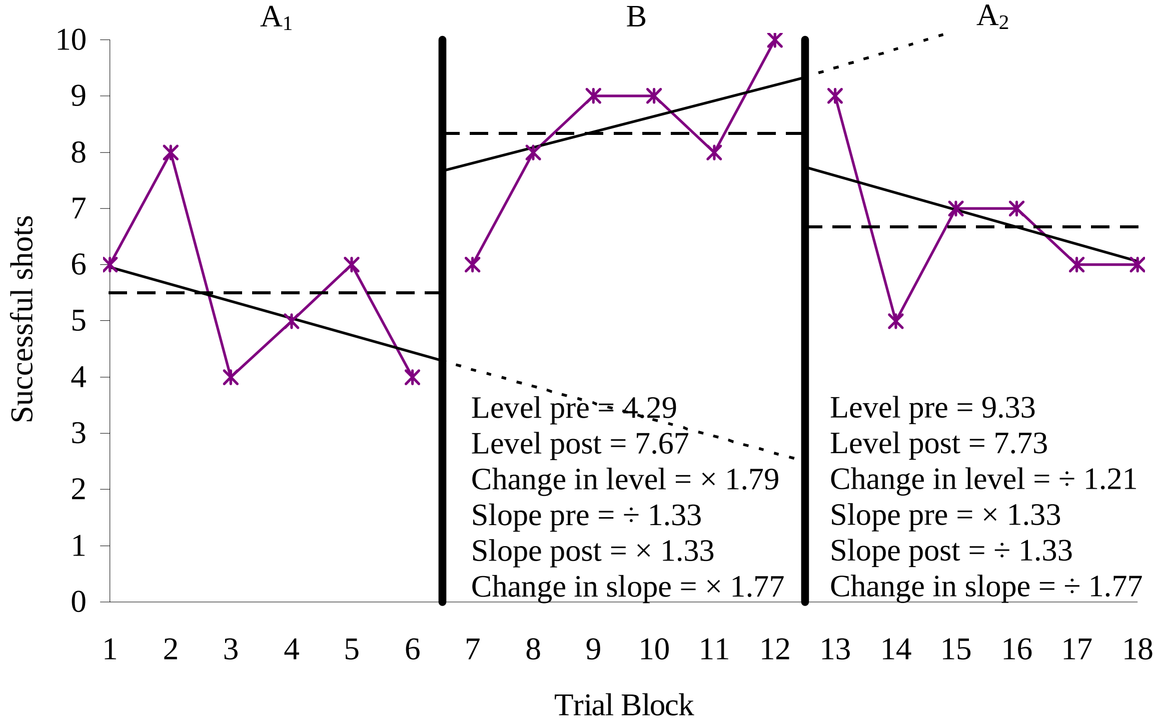

Figure 3.10. Split-middle analysis for Debbie.

The slope of the trend line during the A_1 phase was ÷ 1.33, whereas the slope of the trend line for the B phase was × 1.33. This signified a change in slope between the A_1 and B phase of × 1.77. The slope of the trend line for the A_2 phase was ÷ 1.33. The change in slope between the B and A_2 phase was ÷ 1.77.

In summary, shooting success rate for Debbie increased by a mean score of nearly three successful shots from the A_1 to the B phase, a considerable improvement in performance. It is difficult to conclusively determine the reason for Debbie's increase in performance because the A_1 phase scores were slightly unstable. A large amount of performance variability also occurred during the A_1 phase. Researchers have suggested that excessive variability in pre-pressure baseline phase data may interfere with conclusions about interventions and may lead to misinterpretation of the data (Kazdin, 1982). Considering the current design, however, it was difficult to justify modifications to the procedures for only one participant. Although one option could have been to extend the A_1 phase, a risk would have been a loss of participant motivation. In hindsight, it appears that the task was well chosen and the distance appropriate as reflected by the absence of ceiling and practice effects in relation to the participant's high skill level. That is, skill level was high enough to minimise practice effects that might occur with less experienced participants or with a novel task.

Interview analysis: Cognitive themes. During the interview, Debbie was relatively taciturn in explaining her specific cognitions during the phases. As a result, there were no obvious themes that emerged during the interview analysis. It is relevant, nevertheless, to discuss how the manipulation affected Debbie during the B phase. For example, the audience was beneficial to Debbie's performance, as she explained,

> I think it was helpful; you always have an audience at a netball game… although they weren't making any noise. I suppose a couple of times going through the shots, I was aware of them standing there watching, but it didn't really affect me too much.

The audience seemingly facilitated performance possibly because Debbie perceived that they helped to normalise the situation. This perception might have been expected of a person low in S-C; Debbie was not inclined to self-focus under pressure. Debbie's results support the contention that people low in S-C increase performance under pressure. It seems Debbie may have noticed the audience, but adjusted quickly and was task-focused.

Debbie's interview was one of the shortest (lasting approximately 30 minutes), yet, important information related to choking could still be obtained from the section of the interview focusing on past experiences. That is, I asked participants to "describe a past experience (outside of the study) that involved pressure and describe how they dealt with the situation." Debbie responded by describing a situation in which "I was in a grand final (championship game). I would get a few goals in but I wasn't getting very many and I got very down on myself." It appears that Debbie was experiencing the pressure of the grand final and performed poorly. On further probing, it seems that the pressure experienced was the social pressure from teammates.

> They (teammates) rely on you. They've worked hard to get the ball down into you in the circle, they've done there job so now it's up to me to do my job. Sometimes if it's a close game, the pressure is really on to get the goals in and that's when you start worrying about getting it in and concentrating too much. You feel that they've worked really hard to get the ball down to you and you just basically throw it away. … I'm a shooter, I feel that it comes down to me to get the goals in.

The perceived pressure from teammates appeared to have affected Debbie's cognitions and increased worry, "When there's more pressure on me to get shots in, sometimes I think about it too much. … But then I miss it anyway because I am so worried about it." When asked what she meant by "think about it too much," Debbie suggested,

> Just mainly, I've got to get this one in, and I try and concentrate really hard on getting the movement right but I think I can concentrate too hard and force it too much. … It doesn't allow me to relax properly and just let it happen and I just sort of control it too much.

The preceding quotes correspond with Eysenck and Calvo's (1992) Processing Efficiency Theory (PET) of anxiety. According to Eysenck and Calvo, worry causes a reduction in the storage and processing capacity of working memory available for a concurrent task, along with an increment of on-task effort. When individuals encounter an anxiety-inducing situation, increased effort and compensatory strategies are utilised. Performance may remain similar in high-pressure as compared to low-pressure circumstances, but the individual works harder in the high-pressure condition to maintain performance (Janelle, 2002). According to advocates of PET, a crucial distinction exists between performance effectiveness (quality of performance) and processing efficiency (performance effectiveness divided by effort); the major difference being that anxiety impairs efficiency more than effectiveness. As such, increases in anxiety typically result in decrements in processing efficiency due to extra effort invested in performance and reduced attentional resources. Performance effectiveness, however, could be maintained or improved with extra effort, or could be impaired despite the extra effort. In Debbie's case, when explaining her past experience, there may be a threshold where an excessive amount of effort is detrimental to performance. Another key point is that Debbie provided excellent insight into previous unsuccessful performance, and learned from the experience. That is, Debbie was invested in the team during her experience, but, after the performance decrease, made the connection between her cognitions and performance, illustrating constant self-learning.

General summary of Debbie. Debbie's performance improved by 51% between the A_1 and B phase, a considerable increase in performance. Debbie did not experience a substantial increase in pressure during the B phase and was not affected by the pressure manipulation. It seems that Debbie's answers to the psychological inventories were helpful in successfully predicting Debbie's likely resistance to choking effects. That is, Debbie was relatively impervious to the pressure manipulation, providing support that the psychological inventories helped to select Debbie as a highly CR participant. Perhaps

Debbie had experienced greater pressure during “real-world” competitions and the pressure experienced in the study was minimal in comparison, “If you’re in a game and it’s like a draw and there’s a few seconds left, and you’ve got to shoot the goal, you get more nervous because there’s something to play for.” Competitive situations may be more pressure inducing because of team pressure. Netball is a team sport where only two of the seven members are permitted to shoot. Debbie explained that the pressure to shoot successfully was greater in competitions because other teammates were dependant on her shooting to score goals.

Choking-Susceptible (CS) Participants

Four CS participants are now presented followed by a discussion related to a cross-case analysis among those athletes. The CS participants were named Emma, Felicity, Grace, and Helen.

CS Participant- Emma

Participant profile. Emma was 18 years old and had been playing netball for 8 years. She started playing netball at club level and then progressed into division (association) level, where she played for 3 years before having a 2-year break due to injury. At the time of data collection, Emma was playing at club level and had been playing as a shooter for 5 years. Emma met the strict selection criteria and was purposively sampled as a CS participant because she was high in S-C, high in A-trait, and primarily used approach coping. Specifically, Emma scored 51 on the SCS (75th to 100th percentile), 39 on the SAS (75th to 100th percentile), and + 17 on the CSIA differential score (75th to 100th percentile).

Pressure analysis. Visual inspection of Figure 3.11 illustrates Emma’s reported A-state prior to completing the netball-shooting task in each of the three phases. Specifically, Emma's intensity scores for cognitive anxiety were 20, 32, and 22 prior to the respective A_1, B, and A_2 phases. Intensity scores for somatic anxiety were 14, 20, and 13 before the three phases. The reported DM-CSAI-2 scores show that Emma experienced a sizeable increase in perceived pressure prior to the B phase in comparison to the A_1 and A_2 phases. For Emma, absolute levels of cognitive anxiety increased from moderate prior to the A_1 and A_2 phases to high anxiety prior to the B phase. Absolute levels of somatic anxiety increased from low preceding the A_1 and A_2 phases to moderate preceding the B phase.

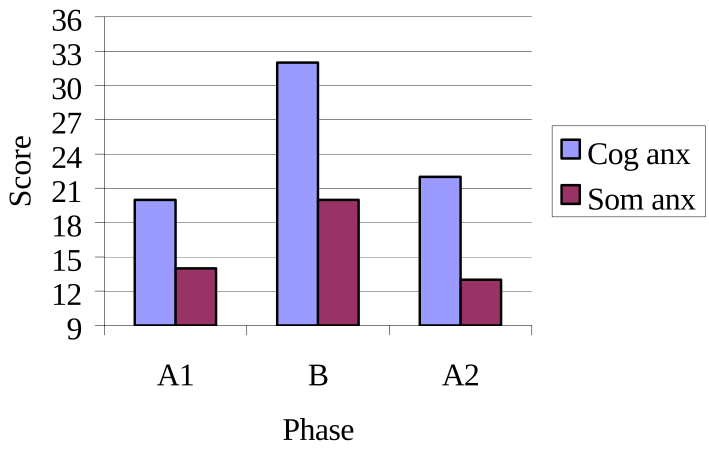

Figure 3.11. Cognitive and somatic anxiety intensity scores for Emma.

Interview analysis: Pressure manipulation. During the interview, Emma explained that she experienced an increase in pressure during the B phase and similar lower levels of pressure during the A_1 and A_2 phases,

> In the first (A_1 phase) and third (A_2 phase), there was no pressure pretty much and in the second (B phase) there was heaps of pressure… they were so opposite that from how I was feeling, having the people there (in the B phase) was really horrible, I would have thought I'd done about 15 or 20 shots less in the second (phase).

This quote indicates that Emma perceived the audience as a source of threat and she was aware of the pressure during the B phase. Threat refers to the perception of danger arising from the objective competitive situation (Martens et al., 1990). Apparently, the threat of the audience altered the intensity of A-state and, as a result, Emma exaggerated her subjective interpretation,

> Having that dropped on you, that everyone was going to be watching, that they were going to be writing down our movements, that we were going to be videotaped, going from one person watching you to 20, that was a big thing.

The perceived threat and A-state experienced was overwhelming and Emma magnified the situation's significance to "20", as opposed to the actual number of eight audience members. Scheier and Carver (1977) and Buss (1980) have suggested that individuals high in private S-C might exaggerate the intensity of an emotional experience because of their inherent self-focus. From this quote, it appears that Emma's propensity to self-focus led to magnification of the situational pressure. Another explanation is that perhaps Emma exhibited underdeveloped coping strategies and limited defence mechanisms in terms of decreasing the threat. According to Weiten (2001), defence mechanisms tend to distort reality so that a situation appears less threatening. Emma's exaggeration of the number of audience members may indicate her inability to use, or lack of, defence mechanisms or coping strategies to effectively decrease, as Emma stated, "the horrible, nervous, nervous feeling" of the B phase.

One theme that was evident for Emma and related to the pressure manipulation was fear of evaluation. Passer (1983) defined fear of evaluation as "expectations of receiving negative evaluation in the event of poor performance" (p. 178). The A_1 and A_2 phases were designed as low-pressure phases, but Emma reported that she experienced some apprehension during the A_1 phase, perhaps because of a fear of evaluation, "I wasn't really nervous, I was just thinking, I probably won't make that many shots and it would be embarrassing.” Emma then explained, in more detail, the source of the threat, “I was being monitored. You (the researcher) were counting what I was doing. You were going to know an exact number (of successful shots), so you would know if I screwed up.” Thus, the threat of the researcher knowing “an exact number” of successful shots increased fear of evaluation, perhaps in anticipation of receiving a negative evaluation.

The audience was a major source of perceived threat. The threat was possibly because if Emma were unsuccessful, audience members could formulate negative judgments and criticisms. Fear of evaluation was explained when Emma suggested, “I was really nervous because they could make a judgment on me and my performance.” Emma then discussed an attempt to reduce A-state and fear of evaluation,

> I felt that I was in this awkward situation (during the B phase). I just wanted to go home. … It’s like giving an oral presentation, I’m standing up in front, they’re watching me for information. … It’s better when they have to do the same thing. In that situation, I’d always say to myself, they’re going to ‘suck’ too, you have to watch them, they’ll get just as nervous as you. …They could lay judgment on me and my performance, but I didn’t get to do it (lay judgment) to them. That’s one of my main things that I use to calm myself down and I couldn’t use it.

During the experimental phases, Emma felt exposed and was at risk of being negatively evaluated by the audience. In social comparison situations, Emma projects negative thoughts (i.e., “they’re going to ‘suck’ too”) and feelings (i.e., “they’ll get just as nervous as you”) in an attempt to diminish fear of evaluation and A-state. It seems Emma lacked appropriate coping strategies to deal effectively with the threat and she defaulted to defence mechanism (i.e., projection) that has been shown to have anxiolytic effects (Bennett & Holmes, 1975). The situation, however, did not allow her to use projection effectively. The desire to use projection may indicate that judgments about others serve as the anchors for criticisms about the self (Krueger, 2000). Emma's fear of evaluation may originate directly from self-criticisms, for example, "They could just say, she's crap and not have to prove that they were crap as well." Evaluating oneself unfavourably may lead to the expectation that others will evaluate negatively as well (Leary & Kowalski, 1995). The negative evaluation Emma believed others would make (i.e., "she's crap") perhaps indicated that Emma was very self-critical, and as a result, wanted to avoid the situation (i.e., "I just wanted to go home").

Performance analysis. Mean performance for Emma decreased from 5.00 ± 0.89 in the A_1 phase to 3.83 ± 0.75 during the B phase. This demonstrated a 31% decrease between the A_1 and B phase. During the A_2 phase, mean performance was 5.17 ± 0.75 and represented a 35% performance increase between the B and A_2 phase. For Emma, mean performance increased by only 3% from the A_1 to the A_2 phase whereas performance for the B_1 phase changed considerably, indicating the pressure manipulation was successful (see Figure 3.12).

The slope of the trend line for the A_1 phase was × 1.33 and the slope of the trend line for the B phase was ÷ 1.33. This demonstrated a change in slope between the A_1 and B phase of ÷ 1.77. The slope of the trend line in the A_2 phase was × 1.33. The change in slope between the B phase and A_2 phase was × 1.77.

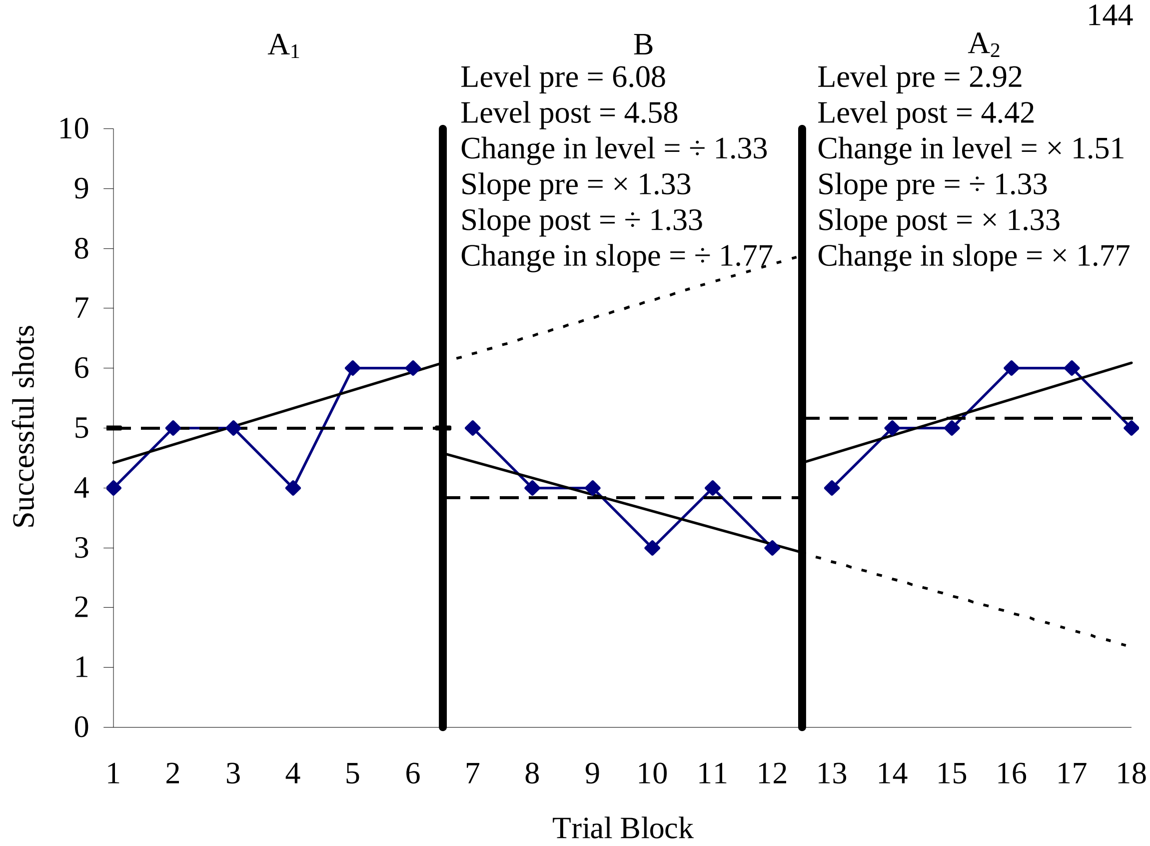

Figure 3.12. Split-middle analysis for Emma.

Clearly, the pressure manipulation negatively affected Emma's performance as exhibited by the decrease in performance from the A_1 to the B phase, as well as the subsequent increase in performance during the A_2 phase. The mean performance decrease of 31% from the A_1 to the B phase is a considerable performance decrement. The declining slope direction of the B phase in comparison to the rising slope directions of the A_1 and A_2 phases also indicated the pressure negatively influenced performance.

Interview analysis: Cognitive themes. Two persistent themes, related to Emma's cognitions during the B phase, were public self-awareness (S-A) and social comparison. Before explaining the themes, a review regarding the use of the terms self-consciousness (S-C) and S-A is needed. Self-consciousness is the tendency to direct attention either inward or outward, whereas S-A is the existence of self-directed attention, as a result of transient situational variables, chronic dispositions, or both (Fenigstein et al., 1975). The fundamental difference between S-C and S-A is that S-C is a predisposition to direct attention to self or others, whereas S-A is a state of attentional focus reflected inwardly during a specific event. Thus, public S-A is the ephemeral state of an inward focus due to the perception of self as a social object, whereas public S-C is the trait or disposition to be publicly S-A (Buss, 1980).

During the interview, public S-A was evident when Emma expressed phrases related to the audience, as she "hated the feeling of being watched." The audience was a prevalent source of Emma's increase in public S-A.

> In Session 2 (B phase), I just wanted it to be over because I didn't want everyone (the audience) to concentrate on me anymore. They couldn't do anything except watch me and even if they weren't looking at me, they weren't doing anything else. They could hear the ball miss the ring or smack into the back wall. There was no other distractions, there was pretty much only me to watch, so I knew they had (Emma chuckles) to have been concentrating on me.

Buss (1980) defined social anxiety as "being upset or disturbed by others' scrutiny or remarks, or merely because others are present" (p. 204). Social anxiety is a typical characteristic associated with individuals high in public S-C. Fenigstein et al. (1975) provided a modest correlation ($r = .21$) between social anxiety and public S-C. Schlenker and Leary (1982) explained that there must be a sense of apprehension about evaluation from others in a social context, or doubt about creating adequate self-presentations (i.e., behaviour aimed at conveying an image of self to others [Schlenker, 1980]), to produce social anxiety. Social anxiety, then, would seem to derive from public S-C in that the subjective anxiety experience presupposes a focus on the public self. The relationship between public S-A and social anxiety was expressed when Emma stated,

> People were sitting watching my every move. People not having anything else to do but watch and make judgments on me… (I was) thinking about the people and what they were thinking. I was just worrying, “I missed that shot, they are thinking I’m a loser.” I was thinking, it wasn’t positive, it was I better get this in because otherwise, I’ll look like a fool.

This quote corresponds with Woody’s (1996) supposition that self-focused attention reliably increases negative cognitions. According to Woody, excessive self-focusing directs attentional resources to the tasks of monitoring arousal, assessing ongoing performance, appraising others’ perceptions, and anticipating evaluation consequences. Emma was excessively self-focused due to her preoccupation with the audience’s covert judgments and fear of negative evaluation. In this context, it is logical that Emma performed poorly under pressure. Emma’s interview data included a plethora of negative self-talk examples. Other qualitative studies (e.g., Gould et al., 1993; Scanlan et al., 1991) have identified social evaluative concerns and “worry about what others think” as a source of stress among elite figure skaters.

Fenigstein (1979; Woody, 1996) have suggested that self-conscious individuals believe themselves to be the target of others’ observations. This heightened sensitivity to social evaluation may have led Emma into being hypersensitive to the audience’s anticipated reactions,

> I tried to just focus on the ring, but then as soon as I dropped my eyes, I could just see everyone or also they would make a noise or drop a pen or turn a page or move their foot and I would go “oh, there they are” (Emma chuckled). So I couldn’t pretend they weren’t there because they very clearly were to me.

Audience members were instructed not to interact with and simply observe, with interest, participants' performance. Emma was acutely sensitive to the audience's movements and reactions, often hearing minute noises or seeing insignificant movements, during the B phase. Emma's high predisposition to S-C possibly promoted her hypersensitivity to the audience.

Emma's constant self-focused attention may have negatively affected her ability to process task-related information. For example, Emma explained that it was difficult to maintain concentration (i.e., a task-relevant focus) because her attention was constantly diverted to the audience, "I was thinking more about the people and what they were thinking than what I needed to do." The following quote illustrates how Emma's attention was divided:

> I could not concentrate on that (the task), they (audience) were sticking out way too much in my head for me to concentrate properly, and for that period of time. I could concentrate for one or two shots, but they would always just stick their heads back in the picture. … I tried to focus on the ring, but then as soon as I dropped my eyes (from watching the ring), I could see everyone.

Masters et al. (1993) have suggested that a predisposition to be self-conscious promotes the likelihood of being self-aware during pressure situations. Emma's propensity to experience public S-C may have increased public S-A during the B phase. Related to the inability to concentrate, Emma provided an example, in a dance context, that may explain her cognitive approach when in a pressure situation.

> I don't like being in the spotlight, I just get really nervous, because that's happened to me in dancing. In ballet, there's a part where… they tell you to do this move by yourself and I would always just go (showing a frozen position), and my mind

> would go blank and I would just go (showing frozen position again and chuckling). … Being put on the spot knowing they were testing me is what really gets to me. … In my head I'm going, crap, what if I get it wrong? I don't give my head space to think about what I was supposed to be doing.

Although Emma did not discuss the performance outcome, she implied that poor performance was related to her inability to free up attentional space. Emma discussed how anxiety (i.e., "nerves") induced a response under pressure whereby she was unable to process information related to the dance. It appears that Emma's results substantiate aspects of Nideffer's (1992) distraction model of choking. Specifically, Emma's preoccupation with the audience along with an increase in arousal may have distracted her from a task-relevant focus. This finding also supports the contention by Drinan et al. (2000) that choking may be a combined anxiety and attention problem.

During the interview, another theme that emerged was social comparison. Festinger's (1954) social comparison theory posits that people have a drive to evaluate their opinions and abilities. Social comparison theory is related to self-evaluation and individuals make stable evaluations by comparing their opinions and abilities to others. In regard to social comparison theory, Singer (1966) explained,

> People do not compare with others in order to evaluate only one opinion or ability. Implicitly they are also evaluating their opinions of themselves. In the general case, they are evaluating their self-esteem. When a person asks "How much X do I have?" he is also asking "What kind of person am I for possessing that much X?" (p. 105)

Emma was using social comparison throughout the B phase. For example, when asked about her cognitions, she explained, "One of the girls played at the same level as Amy (CR participant) and she was watching me. She was probably saying 'holy shoot, I can't believe I'm watching her, I should be in this study, not her.'" This response indicated that Emma's performance was possibly affected by low self-efficacy. Emma implied that she should not participate in the study because of low ability level and speculated about the audience members' cognitions. To further support this contention, she expressed negative self-expectations prior to commencing, "I was thinking, I'm probably not going to do as well as I want to." Likewise, Emma expressed a lack of confidence prior to the A_2 phase, "I didn't have great expectations for my results, I thought I'd be disappointed." Perhaps the lack of self-confidence and self-efficacy was a residual effect of her experience during the experimental phases. That is, low self-efficacy possibly resulted because Emma performed poorly during the study.

Schlenker, Weigold, and Hallam (1990) suggested that people with low self-esteem aim for self-protection, that is, they focus on trying to minimise their weaknesses rather than enhance their strengths. Emma provided a number of examples that indicated she was in a process of self-protection. For example, when asked about how the shot distance affected performance, Emma responded,

> The shot distance was fine, I don't like shooting in too close and I don't know why. I've always liked shooting from further out (from the goal). I've been more successful from out there, or maybe it's not successful, but I get a better reaction. When I was younger, I tried to take shots as far out as I could and if I got them in, all the mums and dads would go, WOOW!, and they would come congratulate me after the game for that top shot. I was younger and not everyone can take a shot (and make it) from that far out (Emma chuckles).

Emma may typically choose to shoot from longer distances, during a game situation, in order to minimise her apparent weaknesses. According to Baumeister et al. (1985, Experiment 1), performance is worse when the performer privately expects failure (e.g., low self-efficacy), but knows that the audience expects success. For Emma, low self-efficacy combined with the perception that the audience expected success might increase pressure and result in shots taken from longer distances in game situations in case she was unsuccessful. If Emma performed from a shorter distance and was unsuccessful, she may experience embarrassment and possible negative evaluation from others. Conversely, if she performed from farther away and was unsuccessful, consequences would not be as severe because of others' low expectations. Performing from a considerable distance from the goal may obscure her imperfections and preserve her already low self-esteem.

General summary of Emma. As expected for a CS participant, Emma's mean performance decreased by a considerable 31% from the A_1 to the B phase. The results of the DM-CSAI-2 indicated that she experienced a substantial increase in perceived pressure during the B phase, reaching a particularly high level of cognitive A-state. Emma also confirmed this increase in A-state during the interview. From the interview analysis, a theme related to the pressure manipulation was fear of evaluation. Apparently, the audience was a potential threat and Emma indicated on a number of occasions that she was concerned with the audience's judgments. It seems that the psychological inventories helped to predict Emma's likely susceptibility to choking effects.

During the interview, it was evident that Emma was particularly focused on social evaluation. To this end, two obvious themes were public S-A and social comparison. Public S-A was expressed as Emma conversed about attention being constantly drawn to the audience leading to processing issues related to concentration. That is, the inability to concentrate on task-relevant cues may have negatively affected performance. Emma's results provide support for Nideffer's (1992) distraction model of choking. Specifically, as arousal increased, Emma's attention was diverted to irrelevant thoughts (i.e., the audience) that may have distracted her from a task-relevant focus. Thus, it appears that during the B phase, Emma's decrease in performance was particularly related to social and public aspects of the self.

CS Participant- Felicity

Participant profile. Felicity was 22 years of age and had been playing netball since the age of 14. She played on a division level team for 2 years, and also played in an underage state league team. In her 6 years of representing her state in national competitions and an international tournament, Felicity played in a goal shooting position for 4 years. Felicity was purposively sampled as a CS participant because she was high in S-C, moderately high in A-trait, and predominantly used approach coping. Felicity's scores were 50 on the SCS (75th to 100th percentile), 36 on the SAS (50th to 75th percentile), and + 8 on the CSIA differential score (75th to 100th percentile).

Pressure analysis. Visual inspection of Figure 3.13 shows that Felicity's intensity scores for cognitive anxiety before the A_1, B, and A_2 phases were 17, 20, and 15, and intensity scores for somatic anxiety were 17, 20, and 13, respectively. Scores on the DM-CSAI-2 illustrate that Felicity experienced a similar, but minimal, increase in intensity of cognitive and somatic anxiety during the B phase. For Felicity, absolute levels of cognitive and somatic anxiety increased from low levels prior to the A_1 and A_2 phases to moderate levels prior to the B phase.

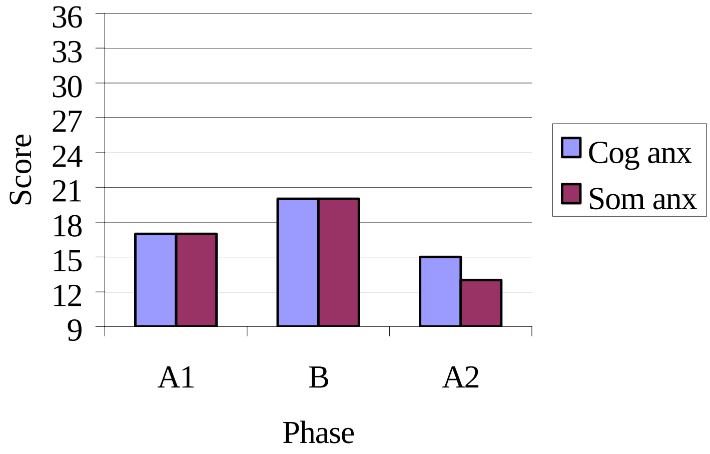

Figure 3.13. Cognitive and somatic anxiety intensity scores for Felicity.

Interview analysis: Pressure manipulation. Felicity explained that she perceived more pressure during the B phase. When asked to compare the pressure involved in the three phases, Felicity stated,

> I was more nervous during Session 2 (B phase) than Session 1 (A_1 phase). Just that extra bit of pressure (with people) watching, I sort of felt a bit more jittery. … I was not nervous at all during Session 3 (A_2 phase). I think because I remember the last session (B phase), I was a bit relieved in Session 3.

This quote fits with her reported DM-CSAI-2, where Felicity perceived an increase in both cognitive and somatic anxiety during the B phase. Felicity also confirmed the A_2 phase was the least anxiety-evoking phase.

Felicity's reaction to the pressure manipulation led to an increase in perceived pressure, as she stated, "I put more expectation on myself to shoot a bit better. I didn't want to miss every shot with more people watching, therefore, that made me more nervous and I started to stress out." This quote denotes how Felicity perceived the audience as a potential threat and explains the source of the increased A-state. Threat, in Felicity's case, was the potential for receiving an unfavourable evaluation from the audience. The presence of the audience may have resulted in a fear of evaluation. Support for this fear about potential criticism was evident when Felicity stated,

> I just thought with this many people, I didn't want to look like a dickhead (Felicity laughs). … It's like anything, I'm standing there, I'm the subject and everyone is staring at me, you worry about what they are looking at, what criticisms do they have.

For Felicity, performing in front of others is partly about avoiding unpleasant feelings and embarrassment.

A theme that was evident for Felicity was uncertainty. Uncertainty was evident in the A_1 phase, when Felicity suggested she was unsure about the requirements of the study, "When I don't know what is going on, it's something new, I am always hesitant until I actually start it… but once I started shooting, I was fine." The A_1 and A_2 phases were both purported to be low-pressure situations, however, Felicity explained the anxiolytic effects of the A_2 phase, "I think because I've done it and I knew what was there, I was pretty good. Not nervous at all (during the A_2 phase). … I knew the drill (the task), so that was good." The difference in pressure of the two phases was possibly because of the elevated perceived uncertainty during the A_1 phase.

The theme of uncertainty was still evident in the B phase. Now, however, the uncertainty centred on the introduction of new elements, comprising the pressure manipulation. Kagan (1972) explained that when uncertainty occurs, a primary motive is resolution and if no appropriate responses are immediately available, A-state, distress, or fear may result. In an attempt to reconcile the uncertainty, Felicity used information seeking to understand the situation and reduce perceived threat,

> I kept thinking, what are they (the audience) watching me for? I kept thinking, are they here to distract me or are they actually here for themselves? Do they have to take notes? Are they here as a ploy to distract me to miss goals?

One reason for selecting Felicity as a CS participant was because of her approach coping predisposition. As perceived anxiety increased, Felicity used approach coping in the form of information seeking to decrease uncertainty. By obtaining additional information about the situation, uncertainty can be transformed into certainty and a concomitant reduction in A-state occurs (Kagan). From the quote, Felicity's questions about the pressure manipulation may not have fully transformed the uncertainty into certainty because answers to the proposed questions could not be readily obtained during the B phase.

Performance analysis. Mean performance for Felicity during the A_1 phase was 4.67 ± 1.21 and was 3.50 ± 2.07 during the B phase. This represented a decrease of 33% from the A_1 and B phase. Mean performance for the A_2 phase was 5.17 ± 0.98, representing a 48% increase in performance between the B and A_2 phase. Mean performance increased by 11% from the A_1 to the A_2 phase whereas the B_1 phase performance decreased substantially, indicating the pressure manipulation was effective (see Figure 3.14).

The slope of the celeration line for the A_1 phase was × 1.67 and the slope of the celeration line for the B phase was ÷ 1.33. This represented a change in slope between the A_1 and B phase of ÷ 2.22. During the A_2 phase, the slope of the celeration line was × 1.33. Thus, the change in slope between the B and A_2 phase was × 1.77.

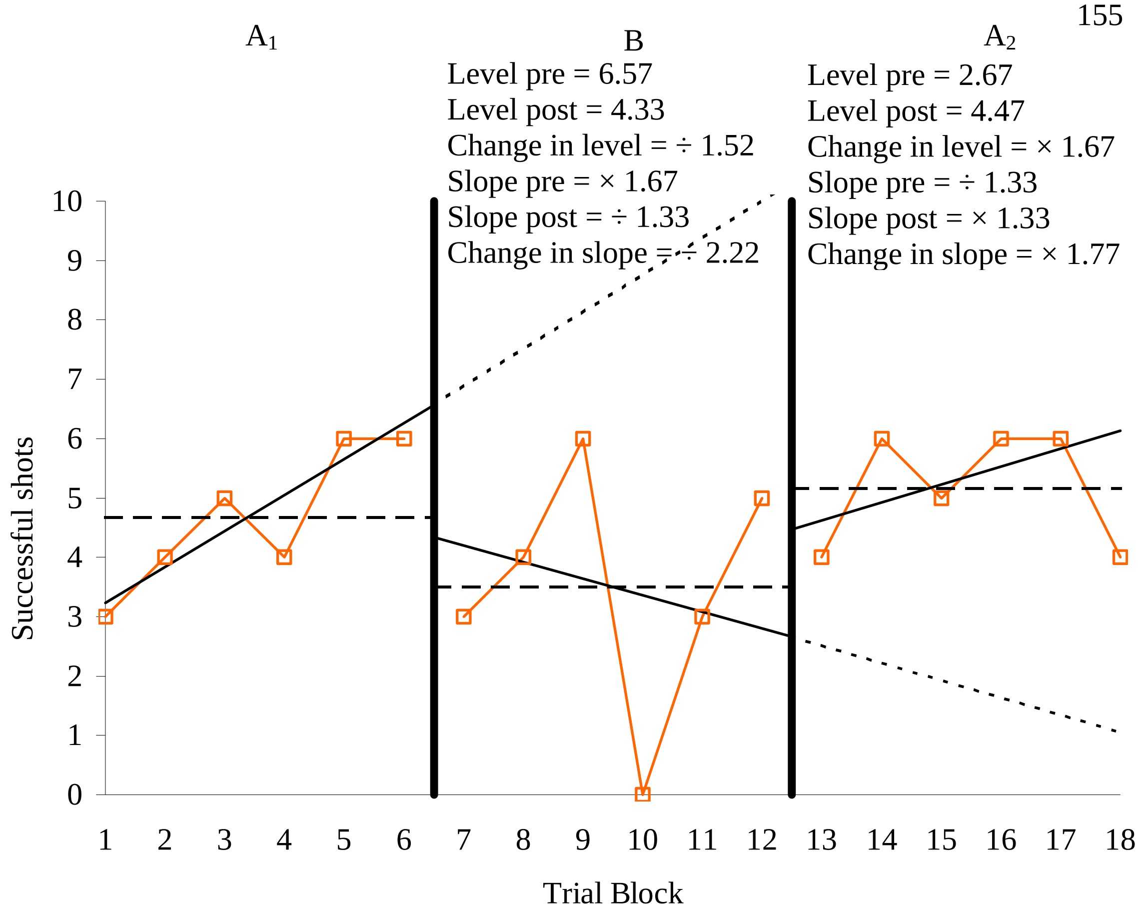

Figure 3.14. Split-middle analysis for Felicity.

In summary, I will discuss four performance-related issues that indicate Felicity was negatively affected by the pressure manipulation. First, Felicity's data shows that performance was unstable during the A_1 phase. A positive trend of the baseline may indicate the link between the baseline performance and the success of the pressure manipulation. Generally, the projected celeration line of the A_1 phase indicates the expected performance during the B phase. A substantial performance decrease, however, was apparent during the B phase in comparison to the projected celeration of the A_1 phase. Second, Felicity's mean performance was virtually equal during the A_1 and A_2 phases, but decreased somewhat in the B phase. The mean performance decrease of 33% from the A_1 to B phase is a considerable decrement in performance. The pressure particularly affected Felicity, a very experienced and high-level netball shooter. For example, in Trial Block 10 (see Figure 3.14), she was unsuccessful in all 10 shooting attempts. Performance in the phases followed the expected high-low-high pattern for a CS participant. Third, Felicity was less consistent during the B phase compared to the A_1 and A_2 phases. Finally, the slope of the celeration line changed from an initial upward trend in the A_1 phase to a downward trend in the B phase. This change in slope indicates that the pressure manipulation had a robust, negative influence on performance. The unstable baseline during the A_1 phase, decrease in mean performance, concomitant increase in variability, and change in slope provide further support for the claim that the pressure manipulation negatively affected performance.

Interview analysis: Cognitive themes. In describing her cognitions during the interview, an approach-avoidance conflict was evident for Felicity. Reber (1995) in the Dictionary of Psychology defines approach-avoidance conflict as,

> A conflict resulting from being both drawn and repelled by the same goal. This type of conflict is particularly difficult to resolve in that with distance the goal appears more desirable than fearful whereas with proximity its aversive qualities tend to dominate, causing withdrawal which, of course, leads to an increase in the goal's perceived positive features relative to the negative ones. (p. 151)

It appears that, during the B phase, an internal struggle developed within Felicity between remaining positive about her ability and attending to the consequences of unsuccessful performance. This conflict was possibly because of the increase in perceived pressure and was discussed when Felicity explained how she coped with unsuccessful performance, "I could keep going and tell myself, 'I'm going to keep missing, who cares.' But I tried to turn it around and say 'ok, I didn't even take any (shots) and let's start from scratch.'" The psychological conflict was between Felicity's motivation to perform successfully and the pressure effect to deter her from achieving success during the B phase. The psychological conflict was possibly because Felicity experienced an imbalance between perceived ability and expected outcomes. That is, Felicity was experiencing low self-confidence (i.e., “I’m going to keep missing”) and struggled to remain positive and perform successfully (i.e., “I tried to turn it around”).

Lack of self-confidence was discussed, by Felicity, only during the B phase and was perhaps a product of the elevated pressure. Low self-confidence was evident when Felicity explained and compared her experience during all three phases. She constantly used words such as “tried” and “pretended” during the B phase, for example, “I just tried to imagine that they (the audience) weren’t there.” I interpreted quotes that began with phrases like “I tried…” or “I pretended…” as expressions that Felicity was attempting, but was not successfully in completing. During the A_1 and A_2 phases, Felicity used positive and assertive self-talk, for example, “I would tell myself all right, I’m going to get this one in.” The modification of responses from using active voice and clear, confident intentions during the A_1 and A_2 phases to internal dialogue that reflected a lack of confidence and conviction during the B phase indicates that the pressure affected self-confidence.

Felicity demonstrated a dearth of self-confidence when she explained her cognitions by switching between first and second person descriptions during the different phases. For example, during the A_1 phase she primarily explained cognitions in the first person (e.g., “*I* would tell myself ‘all right, *I’m* going to get this one in’”), whereas during the B phase, she used the second person (e.g., “*You* get really down and then *you* just think ‘oh, *you* just keep missing and missing’”). For example, when I asked her to explain the meaning of “worrying about the audience”, she explained, “If you worry about people, then I would have missed everything because you get nervous and then you start stuffing up and then I have to try and stay relaxed.” Felicity’s inconsistent use of first (i.e., I) and second person (i.e., you) can arguably be interpreted as a need to psychologically “distance” from the pressure situation. Martens et al. (1990) suggested, “It appears that as individuals perceive they cannot affect the outcome of their behaviour, they psychologically dissociate themselves with the outcome as a means to cope with the inevitable failure they anticipate” (p. 226). In general psychology research, Folkman, Lazarus, Dunkel-Schetter, DeLongis, and Gruen (1986) explained that individuals use psychological distancing in situations that must be accepted. This form of coping allows the participant to focus less on the pressure situation. In this instance, distancing was an adaptive response to an outcome that is seen as negative and unalterable (Collins, Baum, & Singer, 1983). That is, the inability to change the B phase result may have led Felicity to use a subconscious defence mechanism (i.e., psychological distancing) to establish a division between herself and performance. Perhaps she depersonalised cognitions to preserve self-confidence, essentially, not “owning” or wanting to be linked to negative performance.

Another possible explanation for the psychological conflict was an increase in public S-A. Felicity’s increase in public S-A was evident through expressions related to the audience’s judgments and motives for attending. Felicity explained her acute awareness of the audience, “I sat there and worried too much about what they were thinking, what are they looking at, it puts you off (i.e., is distracting).” Apparently, ruminations about the audience’s judgments occupied attention and Felicity became concerned with public evaluation, ultimately affecting her ability to maintain a task-relevant focus. This comment exemplifies the tendency for individuals high in S-C to use attentional space to process possible audience reactions.

Felicity's elevated A-state also influenced her shooting technique during the B phase. For example, Felicity explained, "I felt a bit more jittery, and I didn't push the ball as well as I wanted to." Felicity's increase in somatic anxiety (i.e., "more jittery") possibly caused a physical reaction that disrupted the ability to perform typical of an experienced athlete. When asked how she recovered from unsuccessful shots, Felicity stated,

> I took a breath and tried to feel the ball a bit better and position my hand slightly different because when I missed I always had my hands wrong. Just took my time and (felt) how heavy the ball was and tried to watch the back of the ring and know exactly how to get it in. I tried to block them (the audience) out again.

Felicity's quote supports the Carver and Scheier (1987) belief that the presence of a video camera or audience may encourage a degree of evaluation related to public S-C because the audience influenced Felicity's attentional focus. Public S-A may have resulted in an attempt to consciously process shooting technique. This provides qualitative support for the self-focus model of choking (e.g., Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992). Advocates of the self-focus model suggest that an increase in pressure may promote S-A and can lead to individuals' explicit monitoring information related to the mechanics of the skill. This increase in explicit monitoring is paradoxical to performance effects and is likely to cause decrements in performance. Felicity's adjustment of the ball position and her reaction to the ball's heaviness may be indicative of conscious processing under pressure.

Public S-A may have also affected Felicity's performance, resulting in divided attention between the audience and the task, ultimately distracting her from shooting. For instance, Felicity explained,

> I think because you are worrying about blocking them (the audience) out, it is sort of like you are not concentrating 100% on the shooting. But when it was just you (the researcher) there, I was just concentrating on the shooting and not worrying about you watching me. But with six people, it's a bit different. You are worrying more about that (the people) than shooting.

According to Nideffer's (1992) distraction model of choking, as arousal increases, attention is diverted internally to task-irrelevant thoughts (e.g., worry) because of elevated physiological sensations resulting in failure to attend to important cues. In accordance with Nideffer's distraction model, it appears that worrying about the audience affected Felicity's ability to perform successfully, subsequently distracting her from task performance and leading to decreased performance. Thus, from the previous qualitative results, when athletes experience choking, self-focusing and distraction may overlap to produce detrimental effects on performance. Baumeister and Showers (1986) first suggested that the distraction and self-focus model of choking might overlap somewhat, however, no research to date has provided support for the argument. This overlapping effect is discussed in more detail in the *General Discussion* of this dissertation.

As Felicity experienced an increase in pressure and public S-A, she also "attempted" to cope by using an approach coping strategy (i.e., cognitive restructuring) to relax. When asked about her cognitions, Felicity explained, "I was trying to relax myself, I was sort of saying to myself it's not a big deal, who cares." Approach coping involves actively dealing with a perceived problem (Krohne, 1993). Another internal conflict, between the realisation that the situation was important (i.e., the need to relax) and an attempt to decrease the situation's importance (i.e., not a big deal, who cares), was evident. In this quote, I have interpreted cognitive restructuring as approach coping because Felicity attempted to actively decrease A-state (i.e., “it’s not a big deal, who cares”) and manage the pressure. Felicity was also cynical about receiving the monetary reward, “I thought, I won’t probably beat them (score during the A_1 phase shots) anyway so don’t even worry about the money, don’t keep that as an incentive in case you get disappointed.” This attempt at cognitive restructuring was possibly a defence mechanism to deal with likely failure (Martens et al., 1990). Apparently, Felicity was learning as she reflected on the cognitive restructuring process during this study, “I do my best when I don’t place too much importance on what other people think. I know I do my best when I am not worrying about doing my best.”

General summary of Felicity. As expected for a CS participant, Felicity decreased performance by a considerable 33% from the A_1 to the B phase. The results of the DM-CSAI-2 and interview indicate that Felicity experienced an increase in perceived pressure that contributed to the performance decrement. During the interview analysis, a theme that was again evident was uncertainty. Felicity explained that she experienced some nervousness during the A_1 phase because she was uncertain about the procedures, whereas she was “not nervous at all” during the A_2 phase. In line with the competitive anxiety theory by Martens et al., Felicity’s increase in perceived uncertainty and perception of the situation’s importance might have increased perceived threat and subsequent A-state during the A_1 phase. Performance during the A_2 phase may have represented a “true” baseline phase. That is, Felicity’s DM-CSAI-2 and interview data indicated she experienced less pressure and was more relaxed during the A_2 phase.

During the B phase, Felicity decreased performance compared to the A_1 phase. Was this performance decrement evidence of choking? As discussed earlier, to conclude an athlete has “choked,” a number of elements must be represented (i.e., increased anxiety under pressure, and critical deterioration in skilled performance under pressure). During the B phase, Felicity's perceived anxiety increased, performance decreased by a total of seven shots, and Felicity was a skilled netball player. In response to the question of whether Felicity succumbed to choking, I believe Felicity's results meet even a strict definition of choking. Thus, it appears that the psychological inventories predicted Felicity's susceptibility to choking.

During the B phase, at least two approach coping strategies were used to manage the pressure, including cognitive restructuring and information seeking. Generally, these approach coping strategies were emotion-focused. According to Endler and Parker (1990), emotion-oriented strategies involve a focus on the person rather than the task and, although they are employed to reduce stress, they can sometimes exacerbate the stress response. Felicity's attempt to actively seek information was probably used in an effort to reduce A-state, however, the information seeking may have had paradoxical effects. For example, Miller (1987) provided support that participants using active information seeking were more aroused and anxious than participants avoiding the same anxiety-inducing information. In some sport situations, information seeking may not be an effective coping strategy because of the limited time available to make decisions. Information seeking reduces task-focused attention and when task performance is imminent, there may not be enough time to reduce A-state. Conversely, avoidance coping helps to distract from the situation and can increase the capacity to relax. This supports results from Wang, Marchant, and Morris (2004) expectation that approach coping is a predictor of choking. Related to Miller's results, Felicity's approach coping mechanisms were perhaps counterproductive because approach coping increased A-state and also reduced attention to task-relevant information, leading to a decrease in performance. The performance decrement, in turn, further increased anxiety, potentially creating a vicious cycle.

CS Participant- Grace

Participant profile. Grace was 19 years old at the time of data collection and had been playing netball for 13 years. She initially played at a club level for 6 years and progressed to division (association) level, where she played for 7 years. Grace had played in a shooting position for the past 4 years. Grace was purposively sampled as a CS participant because she was high in S-C, high in A-trait, and predominantly used approach coping. Grace’s scores were 54 on the SCS (75th to 100th percentile), 49 on the SAS (75th to 100th percentile), and + 8 on the CSIA differential score (75th to 100th percentile).

Pressure analysis. Visual inspection of Figure 3.15 shows that Grace’s intensity scores for cognitive anxiety leading into the A_1, B, and A_2 phases were 21, 27, and 20, respectively. Grace’s intensity scores for somatic anxiety prior to the three respective phases were 15, 23, and 11. Scores on the DM-CSAI-2 show that Grace experienced a parallel elevation of intensity for cognitive and somatic anxiety during the B phase. Absolute levels of cognitive anxiety, for Grace, increased from moderate prior to the A_1 and A_2 phases to high levels prior to the B phase. Absolute levels of somatic anxiety increased from low immediately before the A_1 and A_2 phases, but increased to moderate levels directly before the B phase.

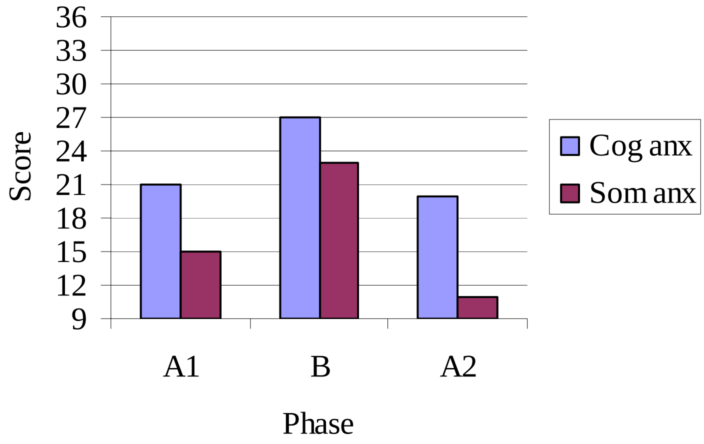

Figure 3.15. Cognitive and somatic anxiety intensity scores for Grace.

Interview analysis: Pressure manipulation. During the interview, Grace explained that she perceived the A_1 and B phases similarly threatening, however, differentiated between the two types of threats. That is, the threat during the A_1 phase was because of the unfamiliar procedures, whereas the pressure manipulation was threatening during the B phase. Grace elaborated by comparing her A-state during the three phases,

> Session 1 (A_1 phase), I felt a little bit uncomfortable because I didn't know you (the researcher) and I was uncomfortable with the procedure. When I first started I was like, hmmm, this is a bit different, being observed and watched (by the researcher). ... But then compared to Session 2 (B phase), I was more uncomfortable with the environment. I knew the procedures because I'd done it before, but with all the people (audience members) being there, that sort of made it intimidating. … I was pretty good in Session 3 (A_2 phase). I was very relaxed, like I felt pretty comfortable, I was familiar with the surroundings and the procedure and felt a bit cruisy (i.e., easy, not overly extended), because I was used to it a bit more.

In this quote, Grace suggests that the intended low-pressure (A_1) phase actually induced pressure because of the heightened uncertainty. Grace also felt the least anxiety-inducing phase was the A_2 phase because of the reduction in uncertainty. Similar to other participants, uncertainty increased A-state for Grace, providing additional support for Martens et al. (1990).

During the B phase, Grace explained that the environment was intimidating. As a result, I interpreted the strong language she used when explaining the B phase as awareness of elevated pressure. For example, Grace used graphic and seemingly exaggerated language to explain her experience during the B phase.

> I always have this pressure and it increases when times are intimidating or stressful. … I was scared (during the B phase), it was weird, being watched shoot and the centre of attention. I don't like that, I was even more intimidated (than the A_1 phase) because not only did I not really know the people, but I had to perform in front of them. So I was edgy and scared.

Grace perceived the B phase as a relatively serious threat and reacted with a response that perhaps originated from a fear of evaluation. The fear possibly derived from the researcher having evidence of unsuccessful performance and the possibility of criticism.

> When I walked in I saw it (the camera). …So I was pretty scared. Normally I hate being on camera because you (the researcher) would have a record of what I would do and look like and perform like… so it did affect my performance. I thought I'd have to perform well for myself because if I go real bad you'll have it on video.

Apparently, Grace perceived the camera as a threat because, if she performed unsuccessfully, the researcher could scrutinise and evaluate her physical appearance and poor performance.

Performance analysis. Mean performance for Grace during the A_1 phase was 6.00 ± 1.27 and 6.67 ± 2.16 in the B phase, an increase of 11% between the A_1 and B phase.

Mean performance for the A_2 phase was 7.67 ± 1.63, representing a 15% increase in performance between the B and A_2 phase. For Grace, mean performance increased by 28% from the A_1 to the A_2 phase (see Figure 3.16). The successive increase in performance during the three phases will be explained in more detail briefly.

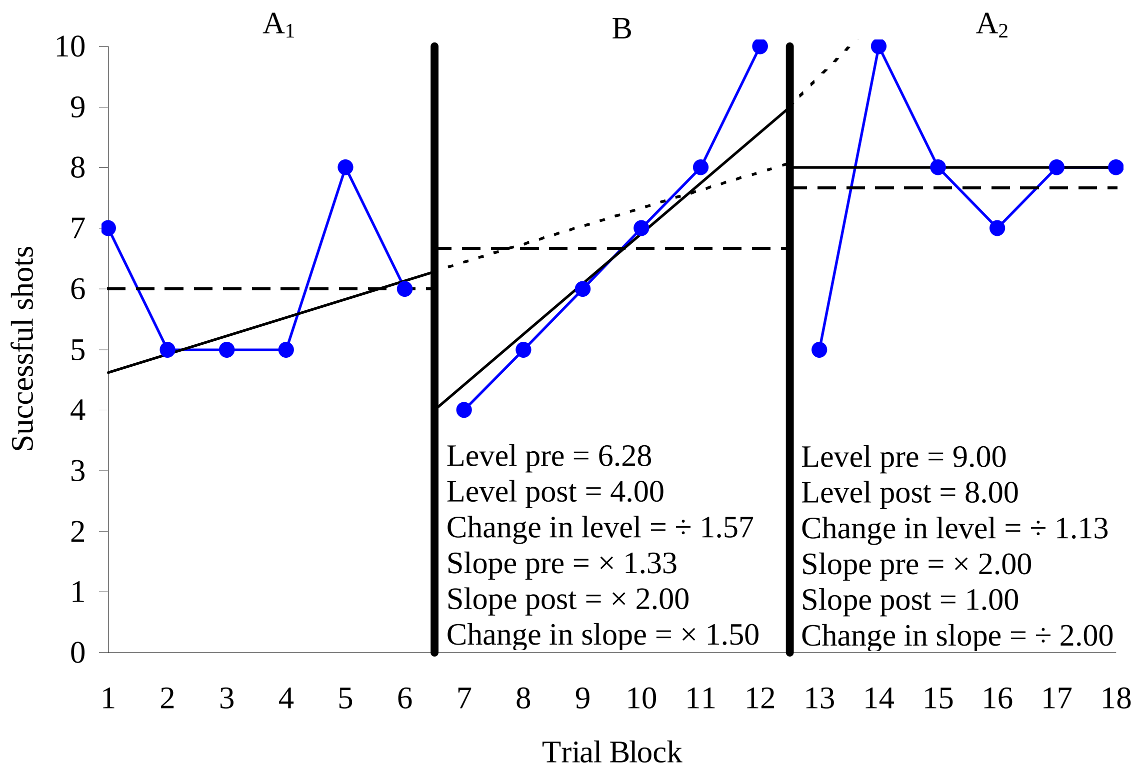

Figure 3.16. Split-middle analysis for Grace.

The slope of the trend line for the A_1 phase was × 1.33, whereas the slope of the trend line for the B phase was × 2.00. This represented a change in slope between the A_1 and B phase of × 1.50. The slope of trend line for the A_2 phase was 1.00. This demonstrated a decreasing change in slope between the B and A_2 phase of 2.00.

In summary, it seems that Grace's performance was initially affected by the pressure manipulation during the B phase. Grace, however, seems to become acclimatised to the pressure as her performance level progressively increased during the final three trial blocks. This was evident, during the interview, as she explained, "I still don't know why, but the ‘surprise factor’ was something I got out of. I got into a state where I could maintain that pressure for an amount of time and then I’d get shots in.” This acclimatisation effect may be a potential problem to researchers investigating choking because participants’ A-state can diminish to a point that pressure does not affect performance.

For Grace, mean performance also increased in succession across the three phases. SCD researchers (e.g., Barlow & Hersen, 1984; Kazdin, 1982) suggest that a progressive increase in performance is typically due to an ineffective intervention. Translated in the context of the present study, the pressure manipulation was not effective in disrupting typical performance rates. A tentative explanation for the successive increase in performance was that Grace was feeling “uncomfortable” during the A_1 phase and performance was not indicative of a “true” baseline phase. For Grace, A-state was somewhat elevated during the A_1 phase, which may have negatively affected shooting performance. Nevertheless, performance data indicates that Grace increased performance from the A_1 to the B phase, indicating that Grace did not experience choking during the B phase.

Interview analysis: Cognitive themes. During the interview, two themes that were evident from Grace were public S-A and emotion-focused coping. She provided a number of quotes that supported the contention that the audience affected her S-A. For example, when asked about her anxiety during the B phase, Grace stated, “Being in front of a lot of people, like giving talks, I hate it. So doing something like this is not my ideal environment.” The threat was clearly associated with uncertainty about the audience’s judgments,

> They (the audience) intimidated me. … I am always judging myself, but it is more intimidating to think and not know what other people are thinking of me. … They made me more nervous because I didn't know what they were thinking and I was trying to interpret what they might have been thinking.

Thus, perceptions of audience judgments increased A-state possibly because Grace feared the audience would negatively evaluate her performance. Grace then explained how the audience affected her thinking from what could be described as a S-A perspective, "Everyone judges, so they were inclined to think in their head about how my performance went, so I was constantly worried about that. …You know, (the audience saying) she shoots weird or she's not that good." This quote indirectly indicate that public S-A affected Grace. That is, perceived negative evaluation from others was promoted by constant self-evaluation. Leary and Kowalski (1995) argued that evaluating oneself unfavourably may lead to the expectation that others will evaluate negatively as well. This was apparent when Grace stated that the audience affected her cognitions, "When people were looking at me, I felt like I might be getting judged. … I wondered what they thought, you know, 'she's crap', stuff like that. I didn't really have that much confidence." Grace's performance was perhaps contingent on the audience's perceptions, which was a reflection of individual negative self-talk.

Another theme that was evident from Grace's interview was emotion-focused coping. According to Endler and Parker (1990), emotion-oriented coping involves a focus on the person, rather than the task, and are typically employed to reduce stress. Emotion-focused coping can be functional in the early stages of dealing with uncontrollable stressors (Suls & Fletcher, 1985), but can also be dysfunctional because focusing on emotion sometimes delays or inhibits active (task-focused) coping (Carver, Scheier, &

Weintraub, 1989). Endler and Parker found that A-trait was positively correlated with the use of emotion-oriented coping. Perhaps CS participants are likely to use emotion-focused coping under pressure because of their tendency to be high in A-trait. Grace provided numerous statements that indicated she frequently uses emotion-focused strategies, for example,

> I sort of tried to relax myself, I don't know whether it was more of relaxing myself or psyching myself up. Like when I sort of stand, I sort of move or shake my hands or bounce up and down on the spot a bit, I don't know if that calms me or motivates me or makes me determined to do well. It's a weird thing, yeah.

From this quote, it seems that using emotion-focused coping may be an ineffective means of maintaining a task-relevant focus. Grace's focus on "calming" or "psyching up" may have reduced attention to shooting and increased focus on emotions, resulting in an initial decline in performance during the B phase. Holahan and Moos (1987) found that the combination of high self-focus and low confidence might generate a pattern of coping that substitutes emotion-focused for task-focused coping, even in situations affording opportunities for external action. Perhaps an elevation in self-attention also increased Grace's likelihood of emotion-focused coping, an ineffective coping strategy to increase performance.

Two specific issues related to emotion-focused coping were self-handicapping and use of humour. Self-handicapping has been characterised as a coping strategy (Baumgardner & Arkin, 1987) designed to deflect the negative implications of contaminated self- and social-esteem (Shepperd & Arkin, 1989a). According to Jones and Berglas (1978), "Self-handicapping involves any action or choice of performance setting that enhances the opportunity to externalise (or excuse) failure and to internalise (reasonably accept credit for) success” (p. 406). That is, self-handicapping is a process of proactively protecting self-esteem in the face of potential threat. Researchers have found that individuals high in public S-C (Shepperd & Arkin, 1989a), individuals low in self-esteem (e.g., Harris & Snyder, 1986; Rhodewalt, 1990), and individuals who perceive a situation as important (Self, 1990; Shepperd & Arkin, 1989b) are increasingly likely to use self-handicapping. Self, for example, argued that the tendency to self-handicap must be viewed in a social context because self-handicapping strategies are only used when there are potential threats to self-esteem. It appears that Grace is at high risk for self-handicapping because she perceived an elevation in public S-A, perceived the B phase as important, and experienced low self-confidence. Grace illustrated her tendency to self-handicap by stating,

> When I missed I would get totally frustrated, but then I would make up an excuse to make myself feel better. I’m like, “Yeah, there are people around me that I don’t really know and there is the camera there, so that’s ok to be a little bit off peak performance.”

By making “an excuse,” Grace used self-handicapping in an attempt to reduce A-state during the B phase. Snyder and Higgins (1988) suggested that affect management is one of the primary goals of excuse making, whereby excuse making is defined as,

> The motivated process of shifting causal attributions for negative personal outcomes from sources that are relatively more central to the person’s sense of self to sources that are relatively less central, thereby resulting in perceived benefits to the person’s image and sense of control. (p. 23)

An alternative sport-specific explanation, adopted from Prapavessis, Grove, Maddison, and Zillman (2003), was that self-handicapping provides an opportunity for either self-protection or self-enhancement, depending on the subsequent outcome. In this situation, if Grace were unsuccessful, then self-esteem would be protected because failure could be externally attributed (i.e., audience). Conversely, if Grace were successful despite the presence of the audience, then self-esteem would be enhanced because perceived difficulties were overcome. The generation of situation-specific excuses may be effective in the short-term, but may be ineffective for long-term coping.

Another strategy related to emotion-focused coping was use of humour. When asked about her cognitions during the B phase, Grace stated,

> I was thinking about the camera, audience, performance, and the money. I was wondering how I am going. What did I do last time? Then when I started and I went real bad I said, “I’m sooooo not getting the money” (Grace laughed). No I didn’t say that, but it was a motivation and it was extra pressure.

Overt sarcasm is frequently used and prevalent in terms of Australian humour. In the above quote, Grace used sarcasm to downplay the pressure of the situation. In analysing the stress-reducing effects of humour, Dixon (1980) found that understanding a humorous aspect of a stressful situation redefines the situation in a less threatening way.

General summary of Grace. The pressure manipulation seemed to be effective in elevating pressure during the B phase. A consecutive performance increase, however, was displayed during the three phases. A performance comparison between the A_1 and B phases indicated that Grace increased performance by 11% during the B phase. In considering the pressure manipulation and performance analyses collectively, Grace increased performance under pressure, uncharacteristic of a CS athlete, and also indicates that the psychological inventories did not necessarily help to predict Grace’s choking susceptibility effectively.

During the interview, two themes that were evident from Grace were public S-A and emotion-focused coping. It appears that S-A led to emotion-focused coping to manage the increase in perceived pressure during the B phase. Grace was predisposed to self-focusing, typical of a person high in S-C, and environmental factors (e.g., the audience) led her to direct attention to self during the B phase. Elevated attention to self subsequently increased the likelihood to use emotion-focused coping possibly because she noticed a discrepancy between her typical A-state and unusually high A-state during the B phase. Grace used emotion-focused coping, in the form of self-handicapping and humour, possibly to reduce A-state. From the interview results, it appears that Grace experienced cognitions associated with CS participants (e.g., increased S-A, self-handicapping) during the B phase.

CS Participant- Helen

Participant profile. Helen was 22 years old and had played competitive netball for 11 years. Helen had played on a division (association) level team for 6 years, in a state league team for 2 years, and in a shooting position for the past 4 years. Helen was purposively sampled as a CS participant because she was moderately high in S-C, high in A-trait, and primarily used approach coping. Helen’s scores were 46 on the SCS (50th to 75th percentile), 39 on the SAS (75th to 100th percentile), and + 6 on the CSIA differential score (75th to 100th percentile).

Pressure analysis. Visual inspection of Figure 3.17 shows that Helen’s intensity scores for cognitive anxiety were 14, 20, and 13 prior to the A_1, B, and A_2 phases, respectively. Helen’s intensity scores for somatic anxiety were 16, 13, and 14 for the three respective phases. Helen increased intensity of cognitive anxiety during the B phase, but decreased intensity of somatic anxiety from the A_1 to the other phases. For Helen, absolute levels of cognitive anxiety increased from low prior to the A_1 and A_2 phases to moderate anxiety levels prior to the B phase, whereas absolute levels of somatic anxiety remained low throughout the three phases.

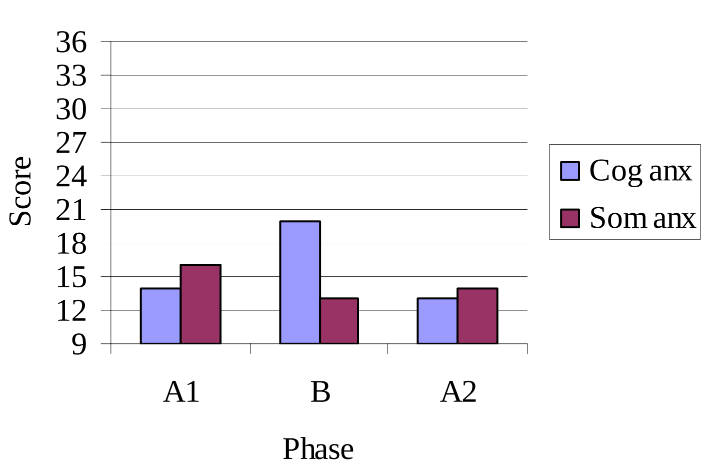

Figure 3.17. Cognitive and somatic anxiety intensity scores for Helen.

Interview analysis: Pressure manipulation. During the interview, Helen explained that she experienced similar pressure during the A_1 and B phases, whereas the A_2 phase was perceived as low-pressure. Apparently, being a participant in the study was, according to Helen, “a bit of a privilege,” leading to an increase in pressure during the intended low-pressure (A_1) phase. Helen justified this statement by saying, “A bit nervous about it was the main feeling from the start. … It was because of you (the researcher) that I was there and my performance brings out the outcome, so you (the researcher) being there definitely has an affect on me.” Helen then explained the difference in intensity of pressure among the three phases.

> I think in a way, there’s a slight difference (between the A_1 and B phases), but it still has the same effect on you. The nervousness in the first session (A_1 phase), having someone (the researcher) new there and everything was unfamiliar, compared to the second session (B phase), where it was a lot quicker to get used to because the

> netball part was familiar. I was just adapting to having the people (audience) there, so that nervousness was just the people, it wasn't so much the netball. … I was very relaxed today (A_2 phase) compared to the last two (A_1 and B phases), I felt more confident, more relaxed.

It appears that Helen experienced similar A-state because the A_1 phase was an unfamiliar situation, whereas she was concerned with the audience during the B phase.

Like a number of other participants, a theme that was apparent during the A_1 was uncertainty. In discussing the A_1 phase, it appears that Helen reacted to the uncertainty with an increase in information seeking,

> First thing was probably curiosity. Trying to work out what they (the researchers) are looking for. A bit nervous about it because I was not sure what I was doing, what they are looking for, whether I was going to succeed at what they want.

As perceived A-state increased, Helen may have attempted to decrease uncertainty by seeking additional information about the situation. By obtaining additional information about the situation, uncertainty is transformed into certainty and may lead to a concomitant reduction in A-state (Kagan, 1972). Helen perceived minimal uncertainty during the A_2 phase, "I think knowing you (the researcher) now more, made it easier. … I knew when I was coming today what I was going to do, so I was a bit more relaxed." The A_1 and A_2 phases were planned as low-pressure situations, however, Helen explained that reduced uncertainty during the A_2 phase might have led to an associated reduction in A-state. This supports the suggestion that uncertainty can increase A-state (Martens et al. 1990). Apparently, the uncertainty, information seeking, and the presence of the researcher occupied attention, "During the first session, it is a bit off-putting (i.e., distracting). Things go through your head like, is that looked at badly, it's got more of a negative impact because I was worried about my performance in front of someone." Wankel (1984) suggested that size of an audience has little systematic effect on performance, however, Helen explained that even one person observing performance can affect her.

Performance analysis. Mean performance for Helen during the A_1 phase was 5.50 ± 1.52, whereas mean performance during the B phase was 6.33 ± 1.51. This represented an increase of 15% between the A_1 and B phase. During the A_2 phase, mean performance was 7.00 ± 1.27, indicating an 11% increase between the B and A_2 phase. Mean performance improved by 27% from the A_1 to the A_2 phase (see Figure 3.18). Similar to Grace, Helen experienced a successive performance increase for the three phases and a possible explanation is provided shortly.

The slope of the celeration line for the A_1 phase was × 1.33 and the slope of the celeration line for the B phase was × 2.00. This represented a change in slope between the A_1 and B phase of × 1.50. During the A_2 phase, the slope of the celeration line was × 1.67. This reflected a change in slope between the B and A_2 phase of ÷ 1.20.

In summary, similar to Grace's performance results, Helen's performance increased in a stepwise manner. This was possibly because of the similarity in perceived pressure, for Helen, during the A_1 and B phases. Data variability was equivalent in the A_1 and B phase, whereas variability decreased during the A_2 phase. Helen's performance results indicated that she experienced a 15% increase in performance from the A_1 to the B phase. It appears that Helen did not experience choking in the B phase in comparison to the A_1 phase.

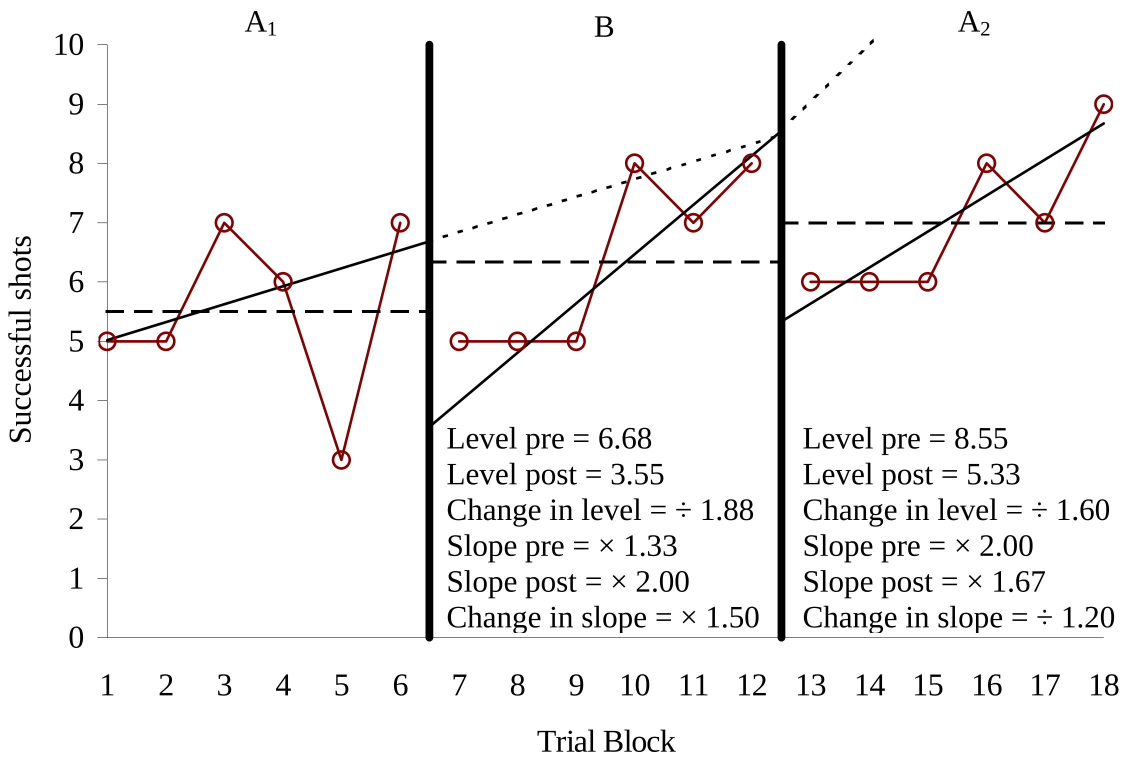

Figure 3.18. Split-middle analysis for Helen.

Interview analysis: Cognitive themes. During the interview, two themes for Helen were self-evaluation (SE) and on-going learning. Helen predominantly discussed SE during the A_2 phase but also made comparisons to the other phases, explaining SE was used after performing unsuccessfully.

> If I am shooting well, I am confident. As soon as I start shooting bad, I almost step out and look at myself and go, ok, I feel myself not bending my knees as much, don't feel as relaxed in the wrists, so I can step back and change that.

During the A_2 phase, Helen reported evaluating performance prior to shot attempts, diagnosing any problems with mechanics, and changing technique where necessary. When asked whether SE was beneficial, Helen stated, "Self-evaluation can be good as long as I don't rely on it too much. Something like today (A_2 phase), in the right state, self-evaluation meant I shot better, I was just focusing on the target, so it helped."

Apparently, Helen was reluctant to self-evaluate during the high-pressure (i.e., A_1 and B) phases, as she stated,

> I think I was too scared to go there (i.e., use self-evaluation). Again, taking it seriously, and putting expectation on myself, everything, the new people (audience) being there, just doing the whole study, everything is new, just do what you know, just do what you know.

It appears that Helen was unable to use SE as a coping mechanism to process task-relevant information during the A_1 and B phases. This supposition fits with Kahneman's (1973) central resource theory. In Helen's circumstance, an excessive amount of arousal may have initially reduced attentional capacity to a point where she was unable to self-evaluate. Helen explained the effects of increased A-state on cognitive functioning by saying, "When I get nervous, I don't think as clearly, so in the first two sessions when I was not shooting so well, I stressed more and I didn't stop to think." This also supports Kahneman's argument that attention is a limited capacity and that arousal diminishes attentional resources. If the majority of attentional resources are dedicated to processing one particular set of information, fewer resources are available to process other data (Kahneman). To further explain her difficulty in using SE during the high-pressure phases, Helen suggested,

> When I was relaxed and still wasn't shooting too well during Session 3, I was looking for more reasons why I wasn't shooting well and changing that, whether it be focus on my point or whatever… I can look at it all and go, "ok, can I change my technique? Can I focus more on my (focal) point?" When I was nervous and not shooting well during the first two sessions, I didn't stop and think about how to

> change that. … So although being relaxed I still miss shots, every now and then, I am able to change it up a bit and correct it.

It appears that Helen's attentional focus narrowed under pressure and she was unable to select appropriate cues for proper adjustments quickly proceeding to the next attempt. This indirectly supports Easterbrook's (1959) cue utilisation theory where at high arousal levels (e.g., A_1 and B phases), discrimination among selection of relevant cues due to narrowed attention, decreases efficiency of cue selection. Helen focused her attention on emotional and environmental factors rather than task-relevant cues, which diminished her capability to select appropriate information. Helen explained the ramifications of the pressure,

> I just wanted to shoot, I didn't let myself step back and look at different ways of making the shot, and give myself those options. … I didn't take it back to basics. I tried to get that (the pressure) out of my head and focus on the basics of shooting, but I was still taking everything else in and I lost sight of what comes naturally. Whereas Session 3, being a bit more relaxed, I am more open-minded. I miss and I go, ok, I can change that.

It appears that Helen's capability to use selective attention appropriately was affected by the pressure. Summers and Ford (1995) explained that selective attention involves the ability to focus attention without being overloaded (i.e., exhausting attentional capacity) and the ability to direct that focus to the most important stimuli for successful task completion. When attentional resources are overloaded, there may be a general impairment of coping in the self-focused person (Wells & Matthews, 1994). It seemed that Helen was cognitively overloaded by several factors (e.g., self-expectations, audience) during the A_1 and B phases, thus, limiting her ability to effectively cope with the situation. Coping successfully in sport involves regaining one's composure, establishing the proper psychological readiness to respond to subsequent stimuli, and maintaining optimal arousal and concentration (Singer, 1982).

Another theme that was evident from Helen was on-going learning. Helen alluded to a number of learning experiences during the study and from past competitions that provided useful self-knowledge in terms of being more successful under pressure. For example, Helen explained, “When I’m relaxed, I play better… I think I learned a lot in Session 3. When things aren’t working, I can change it and I can pull myself out of it. I now know I have that ability.” A number of researchers (e.g., Orlick, 2000; Singer, 1986) have suggested that ongoing learning is an essential component in the pursuit of performance excellence. For example, Orlick proposed that ongoing learning is necessary for quicker skill development. Learning from past mistakes also helps athletes develop coping mechanisms to deal with adversity. Helen often used self-reflection in order to develop knowledge about herself. Self-reflection represents a non-anxious, healthy form of private S-C, a genuine curiosity about the self, where the person is intrigued and interested in learning more about his or her emotions, values, thought processes, and attitudes (Morin, 2005). Helen frequently self-reflected about past experiences and what she had learned from participating in the current study.

> Just how much the mental side affects my game. I think I’ve always known that I’m hard on myself, I’ve always known I’ve had high expectations on myself, but just what goes through my head mentally and how I feel before I actually take any shots, how much a difference that makes. … When I’m relaxed, I end up playing better… I think I learned a lot in Session 3, about when things aren’t working, you can change it and you can pull yourself out of it. I now know I have that ability to do that. … A little bit of nerves or something unfamiliar can have a fair affect on me.

Helen has learned through experience that an increase in self-expectations may affect her negatively and relaxation generally improves her performance. To illustrate, Helen stated, “Things (affect me) like, don’t have too high expectations because that was a big thing growing up for me, putting too much pressure on myself.” Helen then elaborated that sometimes her mindset interferes with her mechanics when under pressure.

> I just don’t play to my full potential (when under pressure)… I don’t give myself every chance to play to the best I could on that day. I sometimes let what goes on in my head affect the physical side and that I’ve been working on for a couple years.

Buss (1980) suggested, “Private self-conscious people regularly inspect their bodily processes and moods, reflect about their motives and goals. … As a result of repeated self-reflection, they know themselves very well” (p. 20). In an attempt to more effectively deal with pressure, Helen had previously worked with a sport psychologist, as she explained, “It (the pressure) throws you around a bit more. I’ve seen a sport psychologist before and I need to get those things (negative effects of pressure) out of my head to do well.”

Helen understood the importance of decreasing self-expectations during the study, but her inability to use appropriate coping strategies hindered performance under pressure. For instance, Helen explained that during the A_1 and B phases, she used a form of avoidance coping,

> During my experience, when things aren’t working, walk away and come back. I think I did it out of habit more than anything, just knowing that nothing was working. That second session, having people there. That first session being all new, different things going on, walk away, try and clear your head and then come back.

Helen has learned that avoidance coping strategy (i.e., walking away) can help decrease the cognitive load and help maintain task focus. It was unclear, however, whether Helen perceived this as helpful.

General summary of Helen. In conclusion, Helen experienced similar pressure during the A_1 and B phases. Helen exhibited a 15% improvement in mean performance from the A_1 to the B phase. It appears that the psychological inventories were helpful in predicting Helen's tendency toward heightened A-state during the initial two phases. Helen's results may indicate that the psychological inventories are helpful in predicting her choking susceptibility, but the similar perception of pressure limits the conclusions to be extracted from the performance data.

During the interview, self-evaluation (SE) and on-going learning were evident. Apparently, Helen uses SE during performances to modify unsuccessful shots. This strategy was helpful during the A_2 phase because Helen was relaxed and she had enough attentional resources available to process information. During the A_1 and B phases, however, the pressure seemingly reduced attentional capacity and Helen was unable to self-evaluate to the same extent. This provides support for Kahneman's (1973) central resource theory where problems in attention occur because of the limited amount of processing resources distributed when arousal increases.

Cross-Case Analysis of CS Participants

The primary focus of this dissertation is on CS participants, thus, a cross-case analysis of 3 CS participants was completed to develop an understanding of the cognitive processes and coping strategies used by CS athletes as a whole. Helen experienced similar pressure during the A_1 and B phases and, therefore, was not included in the cross-case analysis. Using the themes identified in the within-case analysis as a basis for the cross-case analysis, I attempted to make connections across CS participants. By interpreting across interviews, the intention was to compile an integrated summary of the similarities in participants' experiences. To this end, I elaborate on cognitions used during the B phase, explaining emergent categories from the interview results. These findings should only be interpreted as an indication of typical cognitions associated with CS athletes, rather than generalising to all athletes.

In the cross-case analysis, cognitive processes are separated into three categories: public S-A, low self-confidence, and fear of evaluation/ failure. The CS participants reported an increase in public S-A during the B phase. Participants explained that performance was affected by awareness of the audience during the B phase. Emma and Felicity (the 2 participants who experienced choking), for example, were both preoccupied and disliked the audience being present. The increase in public S-A differentially affected each participant's performance, with Emma experiencing an increase in negative cognitions and Felicity experiencing elevations in worry regarding perceptions of audience criticism. Grace, conversely, increased public S-A and negative self-talk initially, however, she maintained composure and was able to increase performance during the B phase.

Another category that was evident from the CS participants was low self-confidence. These CS participants explained, during the B phase, that they experienced self-confidence or self-efficacy issues. Felicity, for example, discussed her experiences through negative tones, and passive voice, which I interpreted as a lack of self-confidence. Emma and Grace described incidents of self-protection when they explained their cognitions during the B phase. Schlenker et al. (1990) suggested that people with low self-esteem might use self-protection to minimise their weaknesses, rather than enhance their strengths. Emma, for example, used social comparison as a means of self-protection, comparing herself to others and minimising her apparent weaknesses. Grace, likewise, used self-handicapping as a means of self-protection or self-enhancement. By using self-handicapping, self-esteem is protected when unsuccessful because failure can be externally attributed. The use of self-protective cognitions provides indirect support that the CS participants experienced low self-confidence, either prior to or during performance of the B phase.

A final category that was evident from the CS participants' interviews was fear of evaluation/ failure. The CS participants were all, at least to some extent, concerned with thoughts of negative audience evaluations and, as a result, increased anxiety. The CS participants' results provide evidence for the evaluation apprehension hypothesis of social facilitation (Henchy & Glass, 1968; Weiss & Miller, 1971), whereby activation of drive (e.g., anxiety) increases when audience members represent a threat or performers fear a negative evaluation, constituting an aversive state associated with fear. Geen (1991) has supported the evaluation apprehension hypothesis in a review, arguing that social facilitation effects are related to social anxiety that occurs when individuals fear that a potential failure in the presence of others will have negative consequences (e.g., negative feedback, loss of face, or embarrassment). With CS participants, the presence of an audience increased their public S-A, leading participants to fear the evaluation of others or the consequences of failure. Distinct from most perspectives on choking, Loehr (1995) described choking as performing poorly because of fear (of failure or evaluation). Loehr suggested that fear distances the athlete from the goal by initiating negative cognitions and leads to cautious performance. Wallace et al. (2005) argued that cautious performance might lead to choking. The comments by Loehr and Wallace et al. may indirectly indicate the connection between fear (of failure or evaluation) and choking. The results from this cross-case analysis of CS participants support the contentions that fear of evaluation or the consequences of unsuccessful performance are, at least, a part of the choking experience.

Discussion and Conclusion

The purpose of the current study was to investigate whether non-choking and choking behaviour may be predicted using established psychological inventories. All 4 CR participants performed as anticipated, increasing performance under pressure. Only 2 CS participants, however, decreased performance under pressure, providing partial support that the established inventories assist in predicting choking and non-choking behaviour. A secondary purpose was to investigate cognitions associated with CS and CR athletes. Thoughts associated with CS participants included emotion-focused attention and approach coping strategies, whereas cognitions associated with CR participants were task-focused attention and avoidance coping strategies. Findings are discussed separately regarding the primary and secondary purposes.

Predicting Choking

The pressure manipulation was effective in elevating perceived A-state for 7 out of 8 participants, supporting the contention that performance differences between phases were closely related to the pressure manipulation. The pressure manipulation was not successful in increasing pressure for one CR participant (Debbie) and one CS participant (Helen) also experienced similar pressure during the initial two phases. Findings indicated that the established psychological inventories helped to reasonably predict non-choking behaviour and, to a lesser extent, predicted choking behaviour.

The current findings, along with results of other studies (e.g., Masters et al., 1993; Wang, Marchant, Morris, & Gibbs, 2004), indicated that individuals high in S-C are more likely to experience choking than those low in S-C. These results are consistent with Wang et al., who found that the best predictors of choking were private S-C and somatic A-trait that together accounted for 35% of the explained variance, a relatively large amount. The combined influences of high S-C, high A-trait, and approach coping partially predicted choking, however, other factors may also influence choking susceptibility. Anshel (1997), for example, suggested that introverts perform more effectively during less arousing situations, whereas extroverts generally prefer more arousal-inducing situations for optimal performance. It may be expected, then, that introverts perform poorly under pressure, considering their predisposition to be influenced more negatively by arousal-inducing situations. Additional research on predictors of choking is required to identify other CS factors in order to increase the likelihood of predicting choking.

Qualitative Investigation

One psychological characteristic that was evident among all participants was uncertainty. Uncertainty was normally experienced during the A_1 phase, where participants were concerned about the procedures of the study. Most participants explained that they required time to acclimatise to the unfamiliar procedures. As uncertainty increased, participants reported an elevation in A-state and performance generally decreased. During the B phase, some participants further increased anxiety, in part, because of additional uncertainty. Thus, as explained more thoroughly in the case studies, all participants provided qualitative support for the contention by Martens et al. (1990) that uncertainty increases the perception of A-state.

Several differences between the CR and CS participants were also evident. For example, CR participants used a broader range of coping strategies to manage the pressure of the B phase, whereas some CS participants were almost devoid of effective coping strategies. With the exception of Debbie, who did not experience anxiety, thus provided limited information, CR participants discussed examples of both approach and avoidance coping strategies they employed to effectively manage the pressure of the B phase. For example, whereas Amy used a number of avoidance coping strategies throughout the B phase, Carol initially and unsuccessfully utilised approach coping before switching to an avoidance coping strategy to deal with the pressure.

CS participants seemed to have less coping strategies in their repertoire to choose from than CR participants. For example, instead of using active coping strategies to deal with the pressure, Emma "unsuccessfully" attempted to use defence mechanisms (i.e., projection) to reduce anxiety. She possibly had not acquired the necessary coping skills to manage the pressure of the B phase. Perhaps, partly because of her high S-C predisposition, Emma had a magnified appraisal of the pressure situation compared to other participants. Within the CS participants, there were also differences in the coping strategies implemented. For example, Grace and Helen (the 2 CS participants who improved their performance during the B phase) seemed to have a more developed coping skills compared to Emma and Felicity. The coping strategy that Grace used (i.e., self-handicapping) was possibly maladaptive in one sense, but also adaptive from the perspective of decreasing anxiety.

Methodological Issues

Many participants seemed apprehensive about participating in the A_1 phase; one limitation of the current research was the lack of a "true" baseline during the A_1 phase. The level of pressure during the A_1 phase may have negatively affected participants' performance. CS participants were perhaps more negatively influenced because of their predisposition to being highly trait anxious. That is, the participants' shooting capability was negatively influenced because of the pressure of the A_1 phase. Helen was affected particularly by the pressure of the A_1 phase, perceiving similar pressure intensity for the A_1 and B phases, respectively. To overcome this limitation, researchers could consider providing a pre-test phase in which participants become accustomed to the research environment to ensure a true baseline phase.

Although perceived pressure was increased for a number of participants, another limitation was the inadequate amount of pressure induced in comparison to “real” competitive situations. The potential pressure experienced by elite athletes is much greater considering the situational factors (e.g., audience size, monetary incentive) associated with competition. With ethical guideline criteria, however, it may be difficult to experimentally exceed the amount of pressure induced during this study.

Future Research

During the current study, qualitative results indicated that choking was largely due to higher levels of public S-C, whereas Wang, Marchant, Morris, and Gibbs (2004) suggested that choking was due to higher levels of private S-C. Considering these findings, perhaps the self-focus model and the distraction model of choking may be expanded to separately include increases in either public S-C or private S-C. That is, individuals high in private S-C may be more inclined to increase private S-C under pressure and focus attention on personal aspects of self, possibly leading to choking due to self-focused attention. Individuals high in public S-C may be more predisposed to increase public S-C under pressure and focus attention on audience judgments and perceptions. This task-irrelevant focus of attention may cause the individual to experience choking due to distraction. Future research should investigate whether private S-C and public S-C may lead to different methods of choking.

Findings in the current study indicate that choking was partially due to emotion-focused attention. A closer examination of Masters (1992) study (see Chapter 2 of this dissertation for a more detailed discussion) provides some evidence that performance is likely to decrease due to emotion-focused attention under pressure. For example, the stress control (SC) group in Masters' study may have applied emotion-focused attention during the stress session. Similar to the explicit motor learning (EL) group, the SC group decreased performance during the B phase, however, identified fewer explicit rules than the EL group. Perhaps due to the lack of explicit knowledge, more attentional space was available to process information related to emotion, resulting in a performance decrement. Future research should explore whether emotion-focused attention may be a possible rationale for choking.

Study 1 indicated that CS participants who performed poorly under pressure became concerned with their emotion and also used approach coping to deal with pressure. CR participants who increased performance used a task-focused approach and avoidance coping strategies to deal with the pressure. It appears that interventions to inoculate choking should be adapted to increase focus on the task or decrease emotion-focused attention. Although many suggestions have been proposed regarding choking interventions (e.g., Anshel, 1995; Hall, 2004; Nideffer & Sagal, 2001), it seems appropriate, based on the current findings, that choking interventions should apply either a task-focused or avoidance coping approach to alleviate choking. Using interventions that promote a task-focus may help the athlete maintain task-relevant attention and help eliminate emotion-focused attention. Similarly, applying avoidance coping strategies seems to decrease emotion-focused attention, ultimately alleviating choking.

CHAPTER 4

STUDY 2: ALLEVIATING CHOKING USING A PRE-SHOT ROUTINE

Introduction

To assist athletes in reducing the occurrence of choking, sport psychologists (e.g., Anshel 1995; Hall, 2004; Nideffer & Sagal, 2001) have offered a number of possible suggestions about interventions that might alleviate choking. Hall investigated potential choking interventions by conducting an investigation in which sport and social psychology researchers, with a published record of having conducted studies in choking, were interviewed. A number of suggested interventions were linked to the distraction model (Beilock, Kulp, et al., 2004; Nideffer, 1992) and the self-focus model (Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992), including pre-performance routines, self-talk regulation, simulation training, relaxation techniques, and thought stoppage. Although various interventions were recommended to alleviate choking, to date, sport psychologists have not empirically examined the efficacy of these interventions.

The limited research testing interventions is possibly because of the unresolved debate about whether the distraction model or the self-focus model provides the best explanation of choking. Baumeister and Showers (1986) suggested, “The development of therapeutic techniques for ameliorating choking must wait until this debate is resolved” (p. 377). Recently, a number of researchers (e.g., Beilock & Carr, 2001; Beilock et al., 2002; Lewis & Linder, 1997; Masters, 1992; Wang, 2002) have provided additional support for the self-focus model as the best explanation of choking, however, both explanations may still be germane. For example, the results from Study 1 of the current dissertation indicate that Nideffer’s (1992) distraction model of choking has explanatory value because negative performance effects were often related to a diversion of attention to the audience especially with choking-susceptible (CS) participants. Although differences of opinion among researchers still remain about which model best explains choking, efforts to pursue tests of theory-matched interventions are needed. In Chapter 4, I report on a study designed to investigate whether a pre-shot routine (PSR) can inoculate, or at least assuage, the effects of choking, using tenets from Nideffer's distraction model. I specifically used a PSR to increase focus on task-relevant cues to alleviate choking.

Boutcher (1990; Boutcher & Crews, 1987) have suggested that a personalised PSR can be used to minimise attention to irrelevant information and direct attention to task-relevant cues. Moran (1996) explained that a PSR is a sequence of task-relevant thoughts and actions an athlete systematically engages in prior to performance of a sport skill. Cognitive and behavioural components assist in producing correct mental and physical organisation prior to performance execution to assist the athlete in maintaining task-relevant attention and performance consistency. A PSR may be applied to closed-skill (i.e., sports performed in a stable, unchanging environment) or open-skill sports (i.e., sports performed in an unstable, changing environment), but PSR's are widely used by sport psychologists to assist athletes in preparing for self-paced skills.

Researchers have found that athletes derive a number of benefits from using a PSR, including lowered arousal levels (Boutcher & Crews, 1987), increased intrinsic motivation, reduced negative introspection (Beauchamp et al., 1996), and increased attention to the task (Cohn et al., 1990). Furthermore, Boutcher (1990) posited that a PSR might help athletes maintain appropriate attentional control. According to Nideffer (1976), the objective when performing closed skills is to efficiently focus attention on task-relevant cues, while ignoring irrelevant cues. Thus, adherence to a PSR may assist in processing task-relevant information prior to execution, while disregarding irrelevant cues.

Using a PSR can also be beneficial in performing self-paced tasks, such as putting in golf, free throw shooting in basketball, and ten-pin bowling, in part because there is time available prior to each attempt to prepare for these closed skills.

Empirical support for using PSR's to increase performance for experienced athletes, however, has been unclear (e.g., Boutcher & Crews, 1987; Cohn et al., 1990; Kingston & Hardy, 2001; Lobmeyer & Wasserman, 1986; Marlow et al., 1998). Cohn et al. examined the effects of a cognitive-behavioural intervention on three male collegiate golfers during competition. The intervention was designed to increase adherence to a PSR. A multiple-baseline design was used in conjunction with interviewing participants. Cohn et al. reported that the intervention increased PSR adherence and subjective improvements in unobservable mental skills, such as concentration and confidence, but had no immediate positive performance effect. Cohn et al. suggested participants possibly required additional time to become accustomed to the PSR. A 4 -month follow-up found an improvement in the three players' performances. Unlike Cohn et al., Marlow et al. found immediate performance support for employing a PSR prior to a water polo penalty shot. Three experienced water polo players completed three trial blocks of five penalty shots over an 8-week period in a multiple-baseline design. After the PSR was implemented, an increase in accuracy between 21% and 28% was demonstrated for the 3 participants.

A potential benefit of using a PSR may be improved performance under pressure. Only one study (Gayton, Cielinski, Francis-Keniston, & Hearns, 1989), to date, has investigated the effectiveness of a PSR under competitive pressure. A rigorous experimental design, however, was not used in the Gayton et al. study. Some limitations included, absence of random assignment, lack of a control group, and absence of a comparison non-competitive group. In recognition of the potential benefits of a PSR, sport psychologists (e.g., Anshel, 1995; Bartholomew, 2003; Dale, 2004) have conjectured that a PSR may be a suitable intervention for pressure situations. For example, Dale proposed that athletes might perceive (and experience) more control over situations and, thus, manage pressure more effectively when using a PSR. In addition, Dale postulated that regular PSR modification might be important to reduce the likelihood of the PSR becoming automatic. When a PSR becomes automatic, attentional resources may become available to process irrelevant information, diminishing performance, and making the PSR counterproductive.

In the current study, I investigated whether a PSR would alleviate the likelihood of choking, using the principles of Nideffer’s (1992) distraction model of choking. I hypothesised that the PSR would increase performance under pressure. A secondary purpose was to investigate choking more completely and examine cognitions associated with the effects of the PSR, using a qualitative research design.

Method

Participants

Eighty-eight tenpin bowlers (69 males, 19 females), between the ages of 16 and 61 (*M* = 33.27, *SD* = 12.25), completed three psychological inventories in order to purposively sample a small number of CS participants for more intensive study. Participants currently bowled in a Tenpin Bowling Australia (TBA) sanctioned league and had a minimum league average of 180 for at least 24 games. Participants’ averages ranged from 170 to 219 (*M* = 188.42, *SD* = 10.91). Tenpin bowling was chosen as the experimental task because bowling is a closed skill and experienced bowlers typically use some form of a PSR, thus sport specific relevance is enhanced. Both male and female participants were recruited because a large sample of participants was needed. Without a large number of participants, a robust sample of CS athletes would be difficult to obtain and the majority of participants would not fit the highly stringent CS criteria. A demographic questionnaire was completed prior to testing as a screening device for background information and to ensure participants met the bowling experience requirements (Appendix P).

Equipment and Specifications

Bowling balls, shoes, and lane. All participants used regulation bowling balls and bowling shoes. Bowling balls weighed 3.63 to 7.26 kg (8 to 16 lb). The bowling task was conducted on the same bowling lane for all participants. The bowling lane was TBA sanctioned, with the front part of the lane (the approach) measuring 4.57 m (15 ft) long by 1.29 m (50.75 in) wide from the back of the approach to the foul line, which begins the bowling surface. The length of the bowling surface from foul line to the first (head) pin was 18.29 m (60 ft) with “gutters” on both sides. Standard targets in the shape of triangles (arrows) were located between 3.66 to 4.88 m (12 to 14 ft) from the foul line.

Bowling ball track and target. As a bowling ball rolls down the lane, only a small portion contacts the lane surface (known as the ball track). The ball track measures 1 cm (0.39 in) and was used to determine accuracy in the present study. For the purpose of measuring accuracy, a laminated rectangular target, 8.30 cm (3.25 in) long by 24.29 cm (9.57 in) wide (Appendix Q), was placed on the lane 3.96 m (13 ft) past the foul line (near the arrows) and in the participant’s “comfort zone” (area from gutter to gutter the participant was comfortable throwing the ball). Essentially, the comfort zone is dependent on personal style and amount of risk of throwing the ball in the gutter (i.e., the closer the ball is thrown to the gutter, the higher the risk of receiving a lower, undesirable score in a regular bowling game). The bottom of the target (white portion) was taped to the lane and rested on a cushion that was 1 cm (0.39 in) high, so the target was more easily distinguishable to the participant. Oil was placed in a straight line across the width and bottom, white portion of the target and a consistent application of coloured (blue) powder covered the oil to determine where the ball rolled over the target. The powder was wiped off each time the ball crossed the target. Thus, after performance accuracy was measured, the powder was replaced before the next attempt.

Measures

The same measures as Study 1 were used, with the exception that the performance was modified to accommodate the new task and the PSR consistency measure was included. The Self-Consciousness Scale (SCS; Fenigstein et al., 1975), Sport Anxiety Scale (SAS; Smith et al., 1990), Coping Styles Inventory for Athletes (CSIA; Anshel & Kaissidis, 1997), and Directional Modification of the Competitive State Anxiety Inventory-2 (DM-CSAI-2; Jones & Swain, 1992) were used to measure tendencies toward self-consciousness (S-C), trait anxiety (A-trait), coping styles, and state anxiety (A-state), respectively (see Study 1 for a description of these scales).

Performance. Participants were instructed to be as accurate as possible by aiming to bowl the ball over the centre of the target. Absolute error (measured in cm) from centre of the target to centre of the ball track was measured on each attempt. Mean absolute error (MAE) was the dependent variable for all trial blocks. A larger MAE represented poorer accuracy performance. Mean variable error (VE) was also assessed for all trial blocks.

Pre-performance routine completion time and variability. During the pressure phase and the intervention phase, a Sony video camera was used as a manipulation check to verify PSR consistency and to increase pressure. The video recordings helped distinguish whether the PSR was adhered to consistently. A comparison of each participant’s completion time (measured in seconds) and variability during the pressure and the intervention phases was used as a manipulation check to determine whether the PSR was performed as planned.

Design

This study was a single-case A-B-A-B design (see Figure 4.1). The aim of the study was to examine whether a PSR intervention would facilitate performance for CS athletes under pressure. Single-case designs provide a test for treatment-produced effects that is essential in examination of applied sport psychology techniques (Bryan, 1987; Silva & Parkhouse, 1982). The A-B-A-B design provided a test of the intervention effect and a comparison of this effect with two pressure (B) phases and two baseline (A) phases (Silva & Parkhouse). Thus, the rationale for the single-case A-B-A-B design (see *Procedure* for details about the phases) in this context was that, if performance declines during the pressure (B_1) phase in comparison to the pre-pressure baseline (A_1) phase, and then, during the post-pressure baseline (A_2) phase, performance returns to approximately the same level as A_1 phase performance, the pressure manipulation was effective in reducing the participants' performance level. During the intervention with pressure (B_2) phase, if after the establishment of the PSR, accuracy is improved compared to the B_1 phase, then the intervention was considered to be successful.

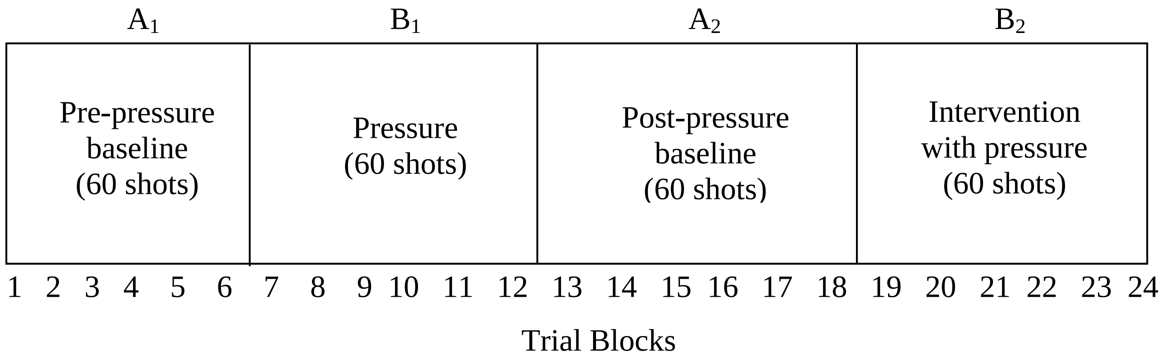

Figure 4.1. Phases within the single-case A-B-A-B design.

Procedure

Participants were recruited from various tenpin-bowling leagues in Melbourne, Australia. Bowling centre managers and league officials were approached and asked to assist in the recruitment of participants. All managers and league officials provided full support for the study. Volunteer league bowlers were then addressed prior to bowling in their league and invited to participate. Envelopes, containing an informed consent form (see Appendix R), the demographic information sheet, and a series of paper-and-pencil tests (i.e., SCS, SAS, and CSIA), were then distributed. Participants were asked to read, complete, and then return all the questionnaires in an envelope addressed to the researcher. Of the 88 participants that completed questionnaires, only a small number of CS athletes were required to participate further in the test of a planned choking intervention (i.e., the PSR). Researchers that use single-case design (SCD) methodology generally recruit 3 to 5 participants. Thus, 5 participants who met the CS selection criterion (identical to Study 1) took part in the experimental phases of the study. These 5 participants were purposively chosen in anticipation that at least some participants would experience choking. Participants not purposively selected were thanked for completing the questionnaires, thus ending their involvement. The experimental testing phase involved 240 total shot attempts, consisting of four phases (i.e., A_1-B_1-A_2-B_2) of 60 shots each.

Pre-pressure baseline (A_1), pressure (B_1), post-pressure baseline (A_2). Procedures for the initial three (A_1-B_1-A_2) phases (see Appendices S, T, & U for instructions) were similar to Study 1 with the following exceptions: a) the task was tenpin bowling and conducted on a standard bowling lane, b) participants were asked to indicate their “comfort zone” preceding practice shots to set up the target, c) breaks between shot attempts were dictated by the normal time it took for the bowling ball to return, approximately 30 seconds, d) one-minute breaks were provided between trial blocks, e) participants were required to throw their normal strike shot delivery (e.g., hook), f) after each attempt, the dependent variable was measured and powder replaced so the ball track could be accurately measured again, g) monetary incentive instructions of the B_1 phase were changed slightly (see Appendix T), and h) only participants who failed to achieve pre-pressure baseline measures during the B_1 phase participated in the B_2 phase. That is, by not achieving the A_1 phase performance levels, participants were said to have succumbed to choking, based on my current definition, and continued participation in the planned intervention. Of the 5 participants in the B_1 phase, those that did not experience choking terminated participation and were debriefed after the A_2 phase.

Intervention (B_2). Four components were involved in the B_2 phase: pre-intervention, education, establishment, and pressure (see Appendix V). The three preliminary components (i.e., pre-intervention, education, and establishment) involved participants modifying a pre-existing routine prior to beginning the pressure component of the intervention. The final, pressure component involved performing 60 shot attempts under the same conditions as the B_1 phase.

During the pre-intervention period, I determined the PSR modification procedures through extensive annotations taken during the initial three experimental phases (i.e., pre-pressure baseline, pressure, and post-pressure baseline phases) and by reviewing the videotape of the first 10 shots of the B_1 phase. I am a USA Bowling certified instructor, thus, I understand the correct mechanics of bowling technique. In viewing the videotape, I observed and recorded elements, such as total time for each shot, consistency of routine, and self-regulatory strategies for potential PSR modification procedures. Cohn (1990) suggested that individual preferences, such as dominant style of learning and speed of athletes' preparation, should be considered when teaching preparatory routines. Thus, while educating each participant about the PSR, I addressed individual preferences by explaining, developing, and individualising the routine. To assist with modification procedures, the education component also involved defining, providing background information for, and demonstrating a typical PSR related to bowling (see Appendix V for an example). Boutcher (1990) advised that PSR's involve a series of physiological, psychological, and behavioural steps. Thus, in this study, optimal arousal levels, behavioural steps to setting up the shot attempt, attention control (e.g., focusing on a target), and cue words (when needed) were considered for inclusion into the PSR.

During the establishment component, the routine was practiced and developed to the satisfaction of both the participant and myself. All participants were using an inconsistent pre-existing routine (based on completion time and consistency of components used), hence, time frame for PSR development was dependent on the details of the participant's pre-existing routine. Time taken for PSR development ranged from 20 to 35 minutes. The establishment component was concluded when the participant performed five consecutive observably repeatable "shadow shots" (i.e., shots without the ball) using the PSR. Shadow shots were performed to neutralise practice effects that could potentially confound the results. Each participant verbally acknowledged understanding of the PSR sequence prior to commencement of the pressure component. The pressure period commenced once the PSR was understood and the routine had been clearly established, rehearsed, and demonstrated. After pressure instructions were read to the participant, the DM-CSAI-2 was administered, prior to pressure period commencement. The participant was instructed to perform the PSR during warm-up shots to reiterate that the routine was sufficiently understood. The pressure component was identical to the B_1 phase except that I observed each shot to verify PSR adherence. To maintain PSR adherence, I reminded each participant about using the PSR, if they observably appeared to not employ the PSR on two consecutive occasions. All participants adhered to the PSR, so I reminded each participant only once, prior to the 31st attempt, about proper execution of the PSR.

Interview. The interview procedure was identical to Study 1, with the exception that the interview was conducted following the completion of the B_2 phase to determine each participant's attitude toward the intervention and assessment of its effectiveness (see Appendix W for interview guide). After the interview, each participant was debriefed and informed about the purpose of the study (Appendix X).

Analyses

Pressure analysis. Similar to Study 1, visual inspection of the DM-CSAI-2 data was used to identify the effects of the pressure manipulation.

Performance analysis. White's (1971, 1972, 1974) split-middle technique was the analysis used to determine performance differences during the phases. The analysis was similar to Study 1, with the exception that the B_2 phase was also analysed.

Pre-performance routine completion time and variability. After completion of the study, two observers (i.e., a research assistant and I) viewed the videotapes from the high-pressure (i.e., B_1 and B_2) phases and independently recorded the completion time and behavioural steps of each participant's routine. A stopwatch was used to determine the time from when the participant lifted the bowling ball to when they took the first step of the delivery. The largest discrepancy between observers' time analysis was 0.26 seconds and the average difference between observers' recorded times was 0.14 seconds. The participants' mean completion times during the current study ranged from 7.71 to 20.61 seconds. In the context of the quickest routine time, the 0.26-second discrepancy equates to only 3% of the overall time taken to complete the routine. Due to the minimal discrepancy in time recordings, inter-observer agreement was considered adequate and the analysis was conducted using the mean recorded time of the two observers for each trial. Mean completion time was used as an assessment for each trial block. The standard deviation of the completion time was also calculated to evaluate the effect of the intervention on the temporal consistency between the B_1 and B_2 phases.

Adherence to the PSR during the B_2 phase was essential, so a behavioural analysis was conducted. Prior to analysing each participant's videotape, I documented a checklist of behavioural steps related to each participant's personalised PSR during the B_2 phase. The research assistant was then provided with the list and trained to identify each observable step associated with the personalised PSR. During training, I described and demonstrated behavioural components of each participant's personalised PSR before the behavioural analysis was conducted. Both observers recorded all steps independently and compared them to the identified behavioural checklist to assess adherence to the PSR.

After the two observers recorded the behavioural steps of the PSR, a point-by-point agreement ratio (PBPAR; Kazdin, 1982) was calculated to determine inter-observer reliability. The PBPAR is calculated by comparing observers' responses to PSR adherence on a point-by-point (i.e., trial-by-trial) basis. The formula for computing the PBPAR consists of dividing the number of observers' agreements on each trial by the number of agreements plus disagreements and multiplying that ratio by 100 to form a percentage (i.e., (Agreements ÷ (Agreements + Disagreements)) × 100). In the context of this study, agreements were defined as *both* observers recording the PSR as performed entirely or incompletely in relation to the checklist. Disagreements were defined as one observer noting the PSR was complete and the other observer recording the PSR was incomplete.

The PBPAR was calculated over all participants' trials and the inter-observer agreement was .99, indicating strong observer agreement on participants' adherence to the behavioural steps of the PSR.

Interview analysis. Similar to Study 1, inductive content analysis was used to determine interview results with the exception that a cross-case analysis was not conducted.

Results

The results of Study 2 are organised in a similar manner to the results of Study 1 with the exception that analyses are included for pre-performance routine completion time and performance during the B_2 phase.

Psychological Inventories

This section provides representative scores and descriptive statistics for the psychological inventories with the 88 participants included (see Table 4.1).

Table 4.1

Descriptive Statistics for the SCS, SAS, and CSIA

Inventory	Range	Mean	SD	50th percentile	75th percentile
SCS	21 to 58	40.61	7.14	42	44
SAS	18 to 58	32.83	8.77	32	38
CSIA	– 17 to + 16	– 1.41	6.85	– 1	+ 3

Participant scores on the SCS ranged from 21 to 58 with higher scores indicating high self-consciousness (S-C). The scores were similar to scores in Study 1 (*M* = 43.74, *SD* = 6.72). Scores for the SAS ranged from 18 to 58 with greater scores indicating high

A-trait. The scores were comparable to participants' scores in Study 1 (*M* = 32.74, *SD* = 7.15). Differential scores for the CSIA ranged from – 17 to + 16 with positive differential scores indicating a tendency toward approach coping. These scores were also similar to those in Study 1 (*M* = – 0.46, *SD* = 6.48).

Purposively Sampled Participants- PSR Intervention

Five (four male and one female) CS athletes' were purposively sampled, however, only 3 participants experienced a performance deterioration (i.e., indicative of choking) during the B_1 phase. The 2 participants that improved performance were not asked to participate in the planned intervention during the B_1 phase and their results are presented in Appendix Y for the reader's perusal. The results of the 3 participants that experienced choking are presented similarly to Study 1, with the performance of the B_2 phase and pre-performance routine completion time and variability also analysed. I assured participants' anonymity, thus, I used pseudonyms to identify the 3 participants that experienced choking as Jason, Karl, and Linda.

CS Participant- Jason

Participant profile. Jason was a 21-year-old male, who had been bowling for 6 years. He had bowled two 300 games (a perfect score), had represented the region and state, and had a current league average of 186. Jason was purposively sampled because he was high in S-C, high in A-trait, and primarily used approach coping. Jason's scores were 44 on the SCS (75th to 100th percentile), 45 on the SAS (75th to 100th percentile), and + 7 on the CSIA differential score (75th to 100th percentile).

Pressure manipulation. Similar to Study 1, the high-pressure (i.e., B_1 and B_2) phases were integral for the purpose of the present study. It would be difficult to conclude that participants perceived a difference between the low-pressure (i.e., A_1 and A_2) and high-pressure phases without an associated increase in A-state during the high-pressure phases. Scores on the DM-CSAI-2 were used to determine if a change in perceived A-state occurred during the high-pressure phases. Although the direction scores of the DM-CSAI-2 are not included, the reader is referred to Appendix O for the direction scores of all participants.

Intensity scores for cognitive and somatic anxiety were used to ascertain whether a change in perceived A-state occurred prior to each phase of the study. Visual inspection of Figure 4.2 shows that Jason's intensity scores for cognitive anxiety preceding the A_1, B_1, A_2, and B_2 phases were 13, 21, 13, and 22, whereas intensity scores for somatic anxiety prior to the four phases were 15, 24, 12, and 19, respectively. Thus, Jason experienced a similar substantial increase in intensity of cognitive and somatic anxiety before each high-pressure phase. For Jason, absolute levels of anxiety increased from low prior to the A_1 and A_2 phases to moderate levels prior to the B_1 and B_2 phases.

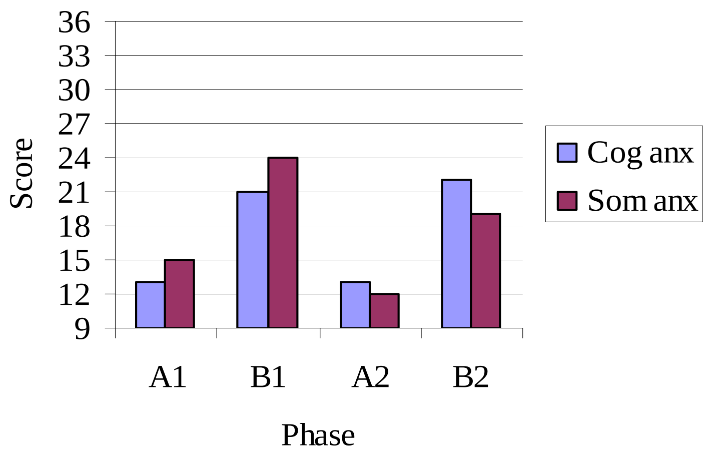

Figure 4.2. Cognitive and somatic anxiety intensity scores for Jason.

Interview analysis: Pressure manipulation. During the interview, Jason explained his nervousness primarily through symptoms of somatic anxiety. For example, when asked about his A-state during the B_1 phase, Jason explained,

> When I get up on the approach my body goes into automatic, so the conscious side of my brain… goes to sleep and my subconscious kicks in. My subconscious took notice of the people, what was on my mind, the money, the video camera. … I just tensed up, stomach started to sink, started to feel jittery and nervous. … I wasn't playing as free (i.e., relaxed) a shot as I could movement wise… I just crumbled.

This quote indicates that Jason experienced classic somatic anxiety symptoms, such as increased tension and feelings of stomach sinking, during the B_1 phase. The pressure may have influenced his cognitions and impinged on his ability to relax his swing (i.e. "I wasn't playing as free a shot").

To understand the variation in his nervousness during the phases, I asked Jason to compare his anxiety levels during the initial three phases. He began by explaining his anxiety in the A_2 phase,

> Feeling wise, it (anxiety in the A_2 phase) wasn't as bad as Session 2 (B_1 phase), but it wasn't as good as the first session (A_1 phase). That first session, I didn't know what was going to happen… once you explained what the session was going to entail, it was get up there, throw the shots. … On the third session (A_2 phase), there were some nerves there. (I was) not as confident (during the A_2 phase) as the first session, but more confident than Session 2. There wasn't that pressure of people, but there was the pressure of having to throw 60 shots and improving after Session 2.

From the previous quote, it seems that uncertainty was related to an increase in A-state during the A_1 phase, but Jason adapted quickly (e.g., "once you explained what the session was going to entail, it was get up there, throw the shots). Jason's perceived anxiety level was different, perhaps more elevated, during the A_2 phase compared to the A_1 phase possibly because of his perception that there was an expectation that he would perform more accurately than the B_1 phase. It seems that Jason's qualitative account of his anxiety levels during the initial three phases are analogous to his reported DM-CSAI-2 results.

When asked to compare his anxiety levels during the B_1 and B_2 phases, Jason explained that his anxiety intensity diminished during the B_2 phase.

> When I didn't know everyone (i.e., eight audience members) was going to be there I was fine, as soon as everyone swamped up the back of the lane, you came up with the video camera, it was like, "oh my god, we're going through this again." Knowing the pressure from Session 2, it (the pressure) wasn't as severe (during the B_2 phase). The stomach didn't sink as much, but I was still a little jittery.

It appears that the pressure may have caused Jason to experience a feeling of being ambushed during both phases, but Jason experienced greater intensity of anxiety during the B_1 phase. Jason explained that using the PSR during the B_2 phase helped him manage the pressure, "I think working on that pre-shot routine beforehand helped me focus on the task. … It just basically erased everything else." From the previous quote, two potential benefits of using a PSR may be a reduction in anxiety and an increase in task-focused attention prior to performance.

Performance analysis. In the current study, mean absolute error (MAE) was the dependent variable, with reduced MAE indicating high levels of bowling accuracy. Mean variable error (VE) is also provided as a measure of performance consistency during the phases. For Jason, MAE, measured in centimetres, increased from 2.79 ± 0.56 in the A_1 phase to 3.26 ± 0.79 during the B_1 phase, indicating a 17% decrease in accuracy between the A_1 and B_1 phase. During the A_2 phase, MAE was 2.83 ± 0.55, representing a 15% increase in accuracy between the B_1 and A_2 phase. During the B_2 phase, MAE was 2.64 ± 0.16, indicating a 14% increase in accuracy from the A_2 to the B_2 phase. The change in MAE between the low-pressure (i.e., A_1 and A_2) phases was assessed to determine if the A_2 phase performance level was similar to the earlier pre-pressure baseline testing condition. Researchers who frequently use single case design (SCD) research suggest that if a similar MAE occurs during both low-pressure phases with a subsequent decrease in performance during the high-pressure phase (i.e., B_1 phase), the pressure manipulation was effective in disrupting typical performance rates. The MAE increased by only 1% from the A_1 to the A_2 phase whereas the B_1 phase changed considerably, indicating that the pressure manipulation was successful during the B_1 phase. The change in MAE between the high-pressure (i.e., B_1 and B_2) phases was also assessed to determine the effectiveness of the pressure manipulation. Results indicated that MAE decreased by 24% from the B_1 to the B_2 phase, a substantial accuracy increase (see Figure 4.3). Similar to Study 1, the reader is referred to Appendix N for participants' celeration line level calculations.

The slope of the celeration line during the A_1 phase was ÷ 1.27, whereas the slope of the celeration line for the B_1 phase was × 1.13. This signified a reverse change in slope of × 1.44 between the A_1 and B_1 phase. During the A_2 phase, the slope of the celeration line was ÷ 1.08, indicating another reverse change in slope of ÷ 1.22. During the B_2 phase, the slope of the celeration line was × 1.03, representing a reverse change in slope of × 1.11.

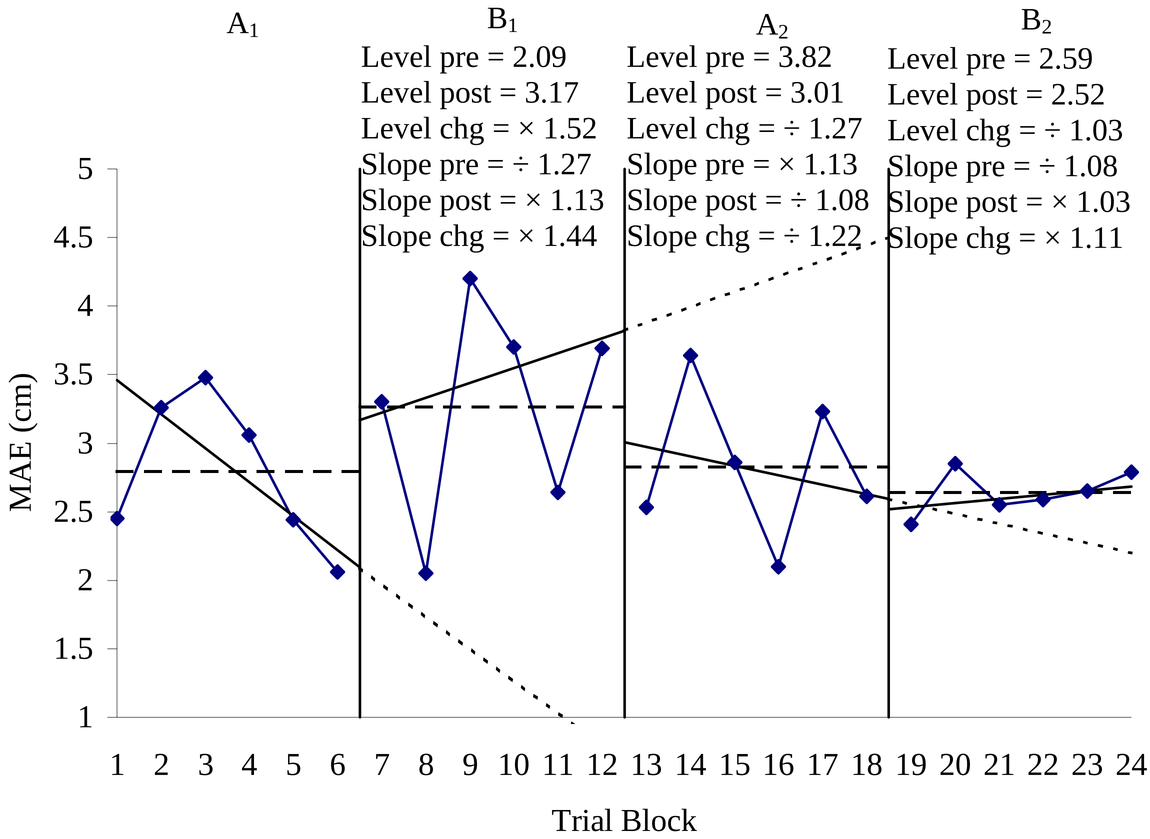

Figure 4.3. Split-middle analysis for Jason.

Note. In all performance figures, solid vertical lines represent the point of phase change, solid black lines for each phase indicate celeration lines, dotted lines signify projected celeration lines, and horizontal dashed lines in each phase indicate mean performance.

In summary, Jason's performance results show that accuracy was similar during the A_1, A_2, and B_2 phases, however, Jason's accuracy decreased during the B_1 phase. A comparison of the high-pressure phases indicated that Jason was considerably more accurate during the B_2 phase (i.e., when using the personalised PSR) than the B_1 phase, indicating the personalised PSR facilitated performance. Jason's VE scores also decreased during the B_2 phase in comparison to all phases, indicating Jason's performance was more consistent during the B_2 phase than the other phases (see Figure 4.3). The decrease in VE from a range of 0.55 to 0.79 in the initial three phases to a 0.16 during the B_2 phase, was a substantial VE decrease. In ten-pin bowling, where hitting a target approximately 1-inch wide (an arrow) is essential to success, this improvement in performance consistency was a major factor in Jason's success during the B_2 phase.

Pre-performance routine completion time and variability. The completion time of the PSR was possibly a factor that contributed to the increase in performance consistency during the B_2 phase. During the B_1 phase, mean completion time of Jason's routine ranged from 8.91 to 9.92 seconds (SD range of 0.44 to 1.19). During the B_2 phase, mean completion time for the personalised PSR preceding shot attempts ranged from 16.54 to 20.38 seconds (SD range of 0.57 to 0.95). Clearly, Jason spent considerably more time in the behavioural aspects of the PSR because Jason performed the set-up and routine slower during the B_2 phase (see Table 4.2). Researchers (e.g., Crews & Boutcher, 1986a; Boutcher & Crews, 1987; Jackson & Baker, 2001; Mack, 2001; Wrisberg & Pein, 1992) have found that more successful athletes are more temporally consistent with their PSR. Thus, variability of completion time during the high-pressure phases was also assessed. The range in SD during the B_1 phase was 0.75, whereas the range in SD during the B_2 phase was 0.38. This indicated Jason performed the personalised PSR more consistently during the B_2 than the B_1 phase.

Table 4.2

Mean (and SD) Completion Time (in seconds) for Jason during the B_1 and B_2 Phases

	Trial Block					
	1	2	3	4	5	6
B_1 phase	9.92 (0.73)	9.43 (1.06)	8.94 (1.19)	8.91 (0.68)	9.53 (0.99)	9.52 (0.44)
B_2 phase	20.38 (0.78)	18.36 (0.75)	18.05 (0.57)	17.05 (0.95)	17.20 (0.91)	16.54 (0.89)

Interview analysis: Cognitive themes. Two themes that were evident during the interview were negative self-talk and benefits of the PSR. As Jason discussed his experience during the study, he clearly expressed varying degrees of self-criticism during the phases. Jason explained that negative self-talk was more prominent during the B_1 phase than the low-pressure (i.e., A_1 and A_2) phases,

> I was more lenient on myself if I missed my target during the first (A_1 phase) and third (A_2 phase) sessions in comparison to the second. … In the second session (B_1 phase), I was much harder on myself. It wasn't just a slap in the face and "what are you doing," it was multiple slaps back and forth. Basically, "you're an idiot, you can't do this, you can't do that, you can't hit your target," just dug the hole and couldn't get out.

Self-denigrating statements increased during the B_1 phase, leading Jason into a myriad of negative cognitions. It seems that the emotion variance and ramifications between the phases may have contributed to these negative cognitions. That is, Jason's increase in anxiety level may have intensified the consequences if unsuccessful. As a result, Jason was self-critical and used dramatic language in his self-talk during the B_1 phase.

Public self-awareness (S-A) and increased anxiety were two factors that may have intensified negative self-talk. For example, Jason explained that the video camera and audience increased his level of S-A,

> When I saw the video camera, it was exactly the same as having someone stare straight at me when I am trying to bowl… it's hard to ignore it. … I think that (video camera) started the bad performance on that second session, but once I got used to that, when I turned around to walk back off the approach, it was, "ok there are

people here" and that was coming into my mind. … It was like I couldn't get away from either one.

Carver and Scheier (1987) argued that the presence of a video camera or audience might encourage a more external, overt degree of evaluation related to public S-A. Jason's interpretation (i.e., "having someone stare straight at me") was typical of an individual high in S-C. The constant mental engagement with the audience indicates he was somewhat distracted from the primary, bowling task. The previous quote also supports the suggestion by Masters et al. (1993) that a predisposition to S-C promotes the tendency to become self-aware under pressure. Fenigstein (1979) also found that S-A was associated with an increase in negative cognitions during social-evaluative tasks. Thus, constant reflection during a social situation may increase the likelihood of negative cognitions.

Jason's pattern of negative self-statements may be related to his constant self-focusing. Perhaps an explanation of Jason's negative self-statements is that self-directed attention creates a different attributional style and viewpoint when in high-pressure than in low-pressure situations. This explanation was adopted from Woody's (1996) hypothesis about individuals with generalised social phobia. Individuals high in S-C believe themselves to be the target of others' observations, even in explicitly random situations (Fenigstein, 1984). This oversensitivity leads to further self-focusing and promotes fear of negative evaluation as the individual monitors behaviour in an attempt to favourably influence others' perceptions. In general, people tend to take credit for success and blame others for failure, known as a self-serving attribution bias (Miller & Ross, 1975; Zuckerman, 1979). Thus, as explained in the context of social phobia, socially anxious or self-conscious individuals tend to blame themselves for social failure (Fenigstein, 1979; Hope & Heimberg, 1988), which may be a function of self-attention and is the opposite attributional style that most people usually display. Self-focusing leads to an internal attribution for failure by rendering individuals acutely aware of their flaws, which ensures that the self and its imperfections are the most prominent sources for attribution of causality (Taylor & Fiske, 1975). Woody found that a manipulation in self-focus can increase anxiety and may also exacerbate negative affect. Attributions of failure combined with an increase in S-A assure an available supply of self-criticism. In Jason's case, public S-A and increased anxiety possibly exacerbated internal attribution for failure, which promoted an intense awareness of errors and magnified imperfections, ultimately decreasing the ability to select attentional resources appropriately.

Clearly, the pressure manipulation affected Jason, however, it is unclear whether he perceived the distraction as debilitative to performance. Hence, I asked Jason whether the inability to escape the pressure affected performance,

> I think it (pressure) would have (an effect) and did. Just knowing that you've got the audience there and a video camera that is actually recording when you are trying to bowl did add more pressure. It definitely played a major part in my performance and I performed badly because of it. … I missed more shots than I hit… I dug the hole deeper and couldn't focus on hitting the target properly and couldn't get out of the hole.

Jason, thus, provides a clear indication that two of the three manipulations negatively affected performance during the B_1 phase. Jason then elaborated about the psychological affect the video camera had on his performance,

> It's like I've got the camera there and I've got my target there, I can still see that bastard (the camera). It's still playing that mental part, it's like having someone just standing there watching you. I couldn't focus on hitting the target properly. … I

wasn't used to having something in front when I was bowling, so when I was wiping my ball down I was eyeing the camera, when I was setting up my shot I was eyeing the camera, before I was setting my target, I was eyeing the camera. More often than not, while I was actually walking up to the foul line to release my shot, I was eyeing the camera.

In this quote, I took Jason's division of attention between the target and video camera when attempting shots to mean that Jason oscillated between an external, task-related focus of attention (i.e., focus on the target) and an internal, task-unrelated focus of attention (i.e., S-A produced by the video camera) during the B_1 phase. In his central resource theory of attention, Kahneman (1973) stated that problems in attention occur because of the limited amount of processing capacity that can be allocated. As explained in Chapter 2, several conditions (e.g., flexible attention capacity and attention requirements of the task) affect the individual's allocation policy and three features influence distribution of attention. In Jason's case, distribution of attention was predominantly affected by his predisposition to S-C. Thus, for Jason, a conflict existed between shifts in attention from being self-aware (produced by the camera) to focus on the target.

Jason also explained that the distraction of the video camera affected his physical and technical performance. For example, he expressed excessive concern over accuracy during the B_1 phase, which led to a physical reaction. For example, Jason stated,

When I started the shots on the second session, the thoughts were "I've got to hit the target, got to hit the target, got to hit the target." … It (video camera) played a mental part in the shot process that caused a physical reaction. In that, "ok, that's

> there, I'm going to try and hit the target," I was tightening up and that was causing me to be inaccurate.

Moore and Stevenson (1991, 1994) defined trust as letting go of conscious controlling tendencies and allowing automatic processes to develop through training, in order to execute the motor skill. Breakdowns in trust occur at two main levels: during selection of movement sequences or during program execution. It appears that a breakdown in trust occurred, perhaps as a result of the predisposition to be high in S-C, resulting in excessive "aiming" at the target during the B_1 phase. Aiming is an example of breakdown during program execution and is defined as excessive concern with the target. When aiming occurs, fear of missing the target increases, and, in turn, may lead to tension (Moore & Stevenson, 1991). Jason's predominant concern with accuracy perhaps caused a physical reaction of "tightening up," resulting in a breakdown in trust and performance decrement.

A second theme evident from the interview was benefits of the PSR. Jason explained a variety of benefits associated with performing the personalised PSR during the B_2 phase, including decreased negative self-talk, reduced S-A, and increased ability to trust execution. Jason observed that "there was a heap of difference" during the B_2 phase compared to the other three phases. For example, he explicitly stated that one benefit of the PSR during the B_2 phase was a decrease in negative self-talk.

> I was nowhere near as severe on myself (during the B_2 phase) as I was the second session. Even if I missed my target by a large margin, it was, "oh well that's a shot, it happens, go back and start again. Go through the routine and throw the next shot, block that other one out and don't worry about it." I felt a mental improvement (in the B_2 phase) compared to the other three sessions.

The personalised PSR militated against the use of self-controlling, harsh introjection and helped Jason maintain an external, task-related focus of attention. According to Deci, Eghrari, Patrick, and Leone (1994), introjection is a coercive self-regulation in which individuals adopt a regulatory process, but do not identify with it. It seems that the decrease in negative introjection was a result of a reduction in public S-A during the B_2 phase compared to the B_1 phase. Jason illustrated the reduction in S-A by stating,

> I think working on that pre-shot routine beforehand helped me focus on what I had to do. … It helped me focus on getting the ball where I had to put it, putting it down in the right spot, and forgetting everyone that was behind me, forgetting the video camera, not focusing on what was around me, just doing the routine… setting the shot up (doing his set up) and going… it just basically erased everything else.

The PSR seemed to provide an initiation point of focus enabling Jason to reorganise attention for each attempt. The personalised PSR helped to lessen involuntary attention shifts to S-A by maintaining conscious attention to the step-by-step procedures prior to execution of each shot. To this end, the personalised PSR also decreased the tendency to attribute failure to the self and provided Jason with predetermined, external, relevant cues related to the task. These results are in accordance with other studies identifying reduced negative introspection (Beauchamp et al., 1996) and increased attention to task (Cohn et al., 1990) as possible benefits of a PSR.

The high-level bowlers recruited for the current study had inconsistent, pre-existing routines. Jason's routine during the B_1 phase seemed to be ineffective in reducing pressure. This was possibly because Jason's PSR during the B_1 phase was autonomous,

> My routine in the second session, which was automatic, helped somewhat in eliminating the added pressure, but it didn't totally eliminate the pressure. …

> Concentrating on that pre-shot routine in the fourth session (B_2 phase) and going through the process, played a key role in improving the mental side and not noticing the camera. … I was thinking about the pre-shot routine more than hitting the target, I wasn't getting up there saying "I've got to hit it, I've got to hit it." It was "go through the routine and (hitting) the target will come naturally."

I interpreted this quote in two ways. First, Jason used a pre-existing routine during the B_1 phase that was automatic. Automatic processes require less attentional capacity or resources (Shiffrin & Schneider, 1977) and permit the allocation of attentional resources to process other information related to skill completion or irrelevant information. In Jason's case, a breakdown in processing relevant information was evident because he became involved and distracted by S-A and perceived pressure that interfered with task performance during the B_1 phase. Thus, the potential benefit of a PSR in focusing attention on task-relevant cues prior to performance was not successfully achieved by the pre-existing routine during the B_1 phase. During the B_2 phase, attention was largely allocated to the personalised PSR, thus, occupying attentional space and decreasing the attention available to process the pressure manipulations. Thus, a systematic process of setting up each shot facilitated Jason's ability to eliminate distracting thoughts and increase task-focus. This result is in line with Dale's (2004) suggestion that a PSR should be regularly modified to reduce the likelihood of the PSR becoming automatic.

Second, the personalised PSR facilitated performance by reducing Jason's preoccupation with performance accuracy. The PSR helped to increase the capacity to trust performance execution by decreasing excessive "aiming." The following quote shows Jason trusted his execution during the B_2 phase:

> The second session, I wasn't throwing as free (i.e., relaxed) a shot as what I was throwing today (B_2 phase). Today was basically just getting up there and letting the ball roll off the hand and pointing straight at the target… the second session was muscle, muscle, muscle (i.e., tense swing), it wasn't a free shot at all.

During the B_2 phase, Jason had a relaxed swing possibly because the PSR helped him focus on the performance process, rather than the performance outcome. Instead of thinking about the target, Jason's cognitions were focused on performing the PSR correctly for each independent delivery, which allowed the accuracy to "come naturally."

General summary of Jason. Scores on the DM-CSAI-2 indicated that Jason perceived an increase in pressure prior to the high-pressure (i.e., B_1 and B_2) phases in comparison to the low-pressure (i.e., A_1 and A_2) phases. During the interview, Jason corroborated the DM-CSAI-2 results by reporting that his nervousness increased during the high-pressure phases compared to the low-pressure phases. Jason also explained that the pressure prior to the B_2 phase was not as severe as the B_1 phase. By using data triangulation with the DM-CSAI-2 and interview, the pressure manipulation results are more robust because of the consistency in the findings from different data sources. The interview also provided an explanation, from Jason's viewpoint, about the pressure differences during the study.

Based on Hall and Wang independent definitions, choking is defined as a critical deterioration in the execution of habitual processes as a result of an elevation in anxiety levels under perceived pressure. Thus, to conclude an athlete has experienced choking, a number of elements must be present (i.e., increased anxiety under pressure, and critical deterioration in skilled performance under pressure). During the B_1 phase, Jason experienced a considerable 17% decrease in accuracy compared to the low-pressure phases. Jason's experience, during the B_1 phase, appears to be a classic case of choking even using a strict definition of choking. When using the personalised PSR during the B_2 phase, Jason was more accurate and more consistent than all other phases. He experienced similar, but less intense, pressure during the B_2 phase possibly because the PSR provided anxiety-reducing effects. Jason was 24% more accurate during the B_2 phase than the B_1 phase. Kazdin (1982) explained that the more variability in the data, the more caution is necessary in interpreting changes. During the B_2 phase, the variability in the data was minimal, providing additional support for the conclusion that the personalised PSR was the catalyst to the performance improvement under pressure.

Completion time of the PSR was lengthy during the B_2 phase, but more consistent than the earlier B_1 phase. The increase in completion time of the routine during the B_2 phase was most likely a derivative of the elements introduced into the personalised PSR, rather than a pressure effect. Some researchers (e.g., Beauchamp et al., 1996; Boutcher & Crews, 1987; Cohn et al., 1990; Kingston & Hardy, 2001) have argued that an initial consequence of PSR training is a reduction in the time variability to complete the routine. The brief PSR training period may have contributed to the successive reduction in completion time during the B_2 phase. That Jason was more consistent and more accurate, even with a much longer PSR, attests to the effectiveness of adhering to a PSR under pressure.

During the interview, two apparent themes were negative self-talk and benefits of the PSR. Negative self-talk was expressed during the B_1 phase and was possibly a product of the increase in S-A. That is, perhaps the increase in S-A directed Jason to change his self-talk when performing, exacerbating negative thoughts and leading to Jason being acutely aware of his flaws (Taylor & Fiske, 1975). One benefit of the personalised PSR during the B_2 phase was a decline in S-A. It appears that the personalised PSR occupied attentional capacity, limiting the amount of attentional space available to process irrelevant information. Attention to the PSR also helped Jason decrease negative self-talk and increase the ability to trust execution possibly because the PSR made it difficult for Jason to become self-focused during the B_2 phase. Thus, the PSR was effective in decreasing the likelihood of Jason choking during the B_2 phase.

CS Participant- Karl

Participant profile. Karl was a 41-year-old male, who started bowling at the age of 19, but only recently returned to the sport after a 10-year break. Karl had been bowling for 10 years, had bowled in a league for the past 5 years, and had a league average of 189. Karl was purposively sampled as a CS participant because he was moderately high in S-C, high in A-trait, and typically used approach coping. Karl's scores were 43 on the SCS (50th to 75th percentile), 49 on the SAS (75th to 100th percentile), and + 7 on the CSIA differential score (75th to 100th percentile).

Pressure manipulation. Visual inspection of Figure 4.4 illustrates that Karl's intensity scores for cognitive anxiety were 17, 23, 11, and 18 prior to the A_1, B_1, A_2, and B_2 phases, and his intensity scores for somatic anxiety were 11, 22, 11, and 16, respectively. The DM-CSAI-2 results indicate that Karl perceived a similar elevation in A-state preceding the B_1 and the B_2 phase, but intensity was not as high during the B_2 phase. For Karl, absolute levels of cognitive anxiety increased from low preceding the A_1 and A_2 phases to moderate levels preceding the B_1 and B_2 phases. Absolute levels of somatic anxiety increased from low levels prior to the A_1, A_2, and B_2 phases to moderate levels prior to the B_1 phase.

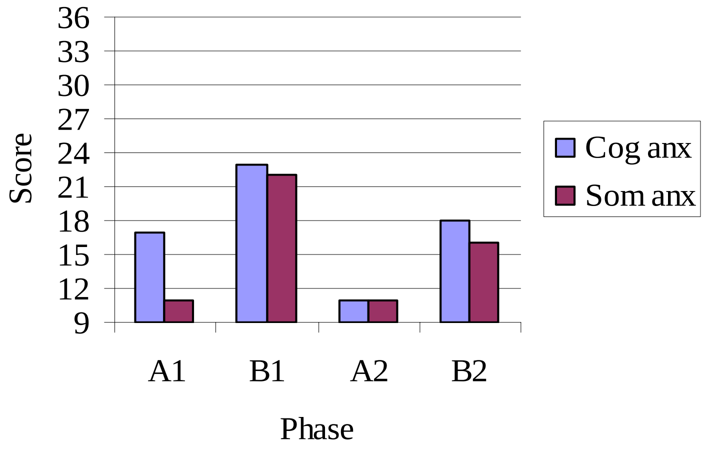

Figure 4.4. Cognitive and somatic anxiety intensity scores for Karl.

Interview analysis: Pressure manipulation. During the interview, Karl discussed his nervousness essentially through symptoms of somatic anxiety. When asked about his anxiety during the B_1 phase, Karl referred to the subjective experience with expressions related to tension and pressure. The increase in nervousness was possibly because the audience was present, as Karl explained,

> (During the A_1 phase) I was feeling ok. I don't think I put any pressure on myself. … (During the B_1 phase) When they (the audience) walked in, that changed the way I felt. It certainly made me tense up a bit. … I think I was a bit stressed about everything. … (During the A_2 phase) With the people not there, the pressure was gone… I knew people weren't going to be there so I relaxed totally in the third session (A_2 phase) compared to the first (A_1 phase). … I actually thought the third session was easier than the first because I knew what to expect.

Two key points should be reiterated in relation to the preceding quote. First, Karl described how tension increased during the B_1 phase compared to the A_1 and A_2 phases, providing qualitative support that he perceived an increase in pressure during the B_1 phase. Second, Karl's perceived anxiety during the A_1 and A_2 phases were similar, however, he perceived the A_2 phase as the least anxiety-inducing phase because uncertainty diminished during that phase. It appears that, during the A_2 phase, Karl's perceived A-state decreased because he was familiar with the procedures of the study. Karl further explained that anxiety diminished because, "I knew what was coming up."

It was important to determine whether Karl experienced an increase in perceived pressure during the B_2 phase so a comparison could be made between the high-pressure phases. Thus, I asked Karl to discuss his anxiety level relative to each phase. He commenced by explaining his perceived A-state during the B_2 phase,

> (During the B_2 phase) I tensed up a bit again. Bugger, I was expecting to go through the motions like I did last week (A_2 phase), so I tensed up a bit. I didn't think that they (the audience) would be here, but because of what we discussed (the PSR), first thing I thought was "well this would be a good test to see how this works." … I was nervous in Session 4 (B_2 phase), but a lot more confident that I could bowl better than I did during Session 2 (B_1 phase).

Similar to the B_1 phase, Karl was surprised about the presence of the audience, nevertheless, he explained that the modification and use of the PSR increased his confidence to perform under pressure. Karl's subjective perception was similar to the findings by Cohn et al. (1990), who found that collegiate golfers expressed immediate subjective improvements in confidence and concentration after a cognitive-behavioural PSR was learned. Perhaps the increase in confidence was a result of Karl more effectively dealing with the pressure. An alternative explanation was that the reported increase in confidence was a residual effect of the successful performance during the B_2 phase. That is, perhaps confidence improved because the interview was conducted directly following successful performance of the B_2 phase. Thus, it is unclear whether the increase in confidence was an antecedent or consequence of adherence to the PSR.

A dominant theme for Karl, relating to the pressure manipulation, was fear of evaluation. Passer (1983) defined fear of evaluation as “expectations of receiving negative evaluation in the event of poor performance” (p. 178). Karl clarified that the audience was the main concern and a source of perceived threat during the B_1 phase when he stated, “I said (to myself), ‘don’t miss the target and don’t give them (the audience) a chance to give you a bit of a heckle and a bit of a laugh.’” Karl was, thus, fearful of being embarrassed in front of the audience, if he was unsuccessful. In fact, it seems that he expected something disastrous to occur during the B_1 phase,

> Dread that they would see me do silly things and bad shots. … Wondering if they would snicker if I’ve done a bad shot. The feeling I guess is the tenseness, I won’t say of impending doom because that is pretty strong, but I guess the dread word is coming out again. The dread of mucking (i.e., messing) up.

According to Butterfield (2001) in the Collins English Dictionary, the definition of dread is, “To anticipate with apprehension or terror” (p. 226). Karl conjured up images of embarrassment, relating to the audience’s reactions (e.g., “snicker if I’ve done a bad shot”), and the “dread” of being negatively evaluated. It appears that perceived public S-A increased because of the audience’s presence. The possibility of scrutiny from the audience may create public S-A because Karl anticipated unsuccessful performance during the B_1 phase. The experience of being the centre of attention may be an immediate cause of embarrassment possibly because individuals fear the public self will be discredited (Goffman, 1967). Sattler (1965) grouped immediate causes of embarrassment into three clusters: impropriety (e.g., improper dress or dirty talk), lack of competence (e.g., slips of speech, public clumsiness, or forgetting someone's name), and conspicuousness (e.g., being looked at by the opposite sex or displaying excessive emotion in public). For Karl, perhaps the conspicuousness of performing in front of an audience alone induced an intense awareness of self as a social object. Increased public S-A, in turn, increased pressure and further S-A because others could observe Karl's poor performance. The uncomfortable state of embarrassment motivates attempts to escape from the aversive situation (Buss, 1980). Karl explained the need to escape the pressure situation during the B_1 phase by stating, "During Session 2, I rushed more. I wanted to get it over because of the people, so I didn't take my time with the shots." Possible embarrassment may have prompted Karl to accelerate the pace of shot attempts and performance.

Performance analysis. For Karl, MAE increased from 2.75 ± 0.27 in the A_1 phase to 3.57 ± 0.33 during the B_1 phase, a 30% decrease in accuracy between the A_1 and B_1 phase. During the A_2 phase, MAE was 3.08 ± 0.32, a 16% increase in accuracy between the B_1 and A_2 phase. During the B_2 phase, MAE was 2.47 ± 0.26, a 25% increase in accuracy from the A_2 to B_2 phase. From the performance analysis, MAE increased by 12% from the A_1 to the A_2 phase with the B_1 phase changing considerably, the minimal increase in performance between two low-pressure phases may provide support that the pressure manipulation was successful during the B_1 phase. The MAE decreased by 45% between the B_1 and B_2 phase, indicating a substantial accuracy improvement when adhering to the steps of the personalised PSR under pressure (see Figure 4.5).

The slope of the trend line during the A_1 phase was ÷ 1.03, and the slope of the trend line during the B_1 phase was × 1.08. This indicated a change in slope of × 1.11 between the A_1 and B_1 phase. The slope of the trend line was ÷ 1.05 during the A_2 phase, denoting a reverse change in slope of ÷ 1.13. During the B_2 phase, the slope of the trend line was ÷ 1.10, a change in slope of ÷ 1.05.

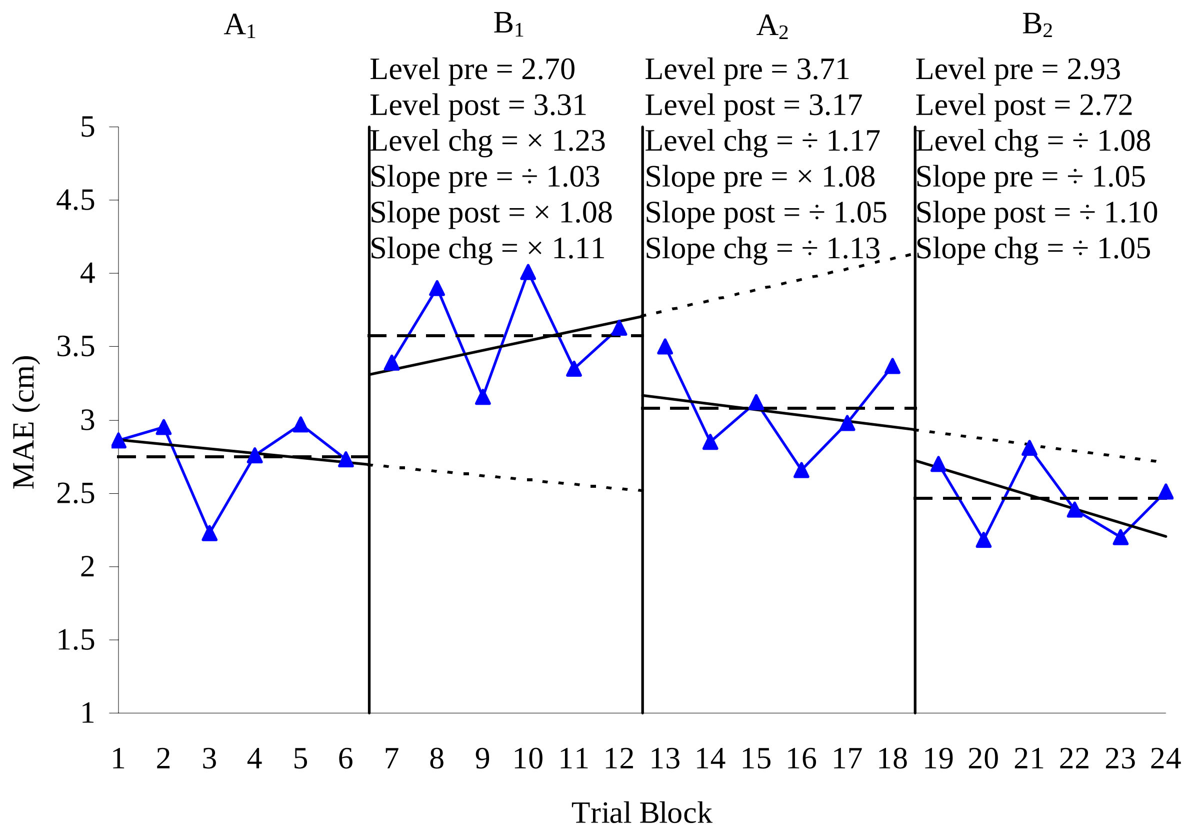

Figure 4.5. Split-middle analysis for Karl.

In summary, MAE for Karl was expected to increase during the B_1 phase and then decrease below the mean level of the low-pressure phases during the B_2 phase. Karl was 45% more accurate during the B_2 phase than the B_1 phase. This considerable performance improvement indicated that the PSR had a positive performance effect. The slopes of the celeration lines during the B_2 phase and low-pressure phases were negative (a positive effect on MAE), whereas the slope of the celeration line during the B_1 phase was positive (a negative effect on MAE). The distinctive changes in slope among the phases provide additional support that manipulated pressure was the primary cause of Karl's inferior performance during the B_1 phase.

Pre-performance routine completion time and variability. During the B_1 phase, Karl's mean completion time for his usual routine ranged from 12.52 to 14.64 seconds (SD range of 0.91 to 1.96), whereas mean completion time for the personalised PSR during the B_2 phase ranged from 19.33 to 20.61 seconds (SD range of 0.33 to 0.77). Karl performed the personalised PSR during the B_2 phase slower than his usual routine during the B_1 phase. The range in SD during the B_1 phase was 1.05, whereas the range in SD during the B_2 phase was 0.44, indicating that Karl also performed the personalised PSR more consistently during the B_2 phase than during the B_1 phase (see Table 4.3).

Table 4.3

Mean (and SD) Completion Time (in seconds) for Karl during the B_1 and B_2 Phases

	Trial Block					
	1	2	3	4	5	6
B_1 phase	14.03 (1.79)	14.64 (1.34)	14.13 (1.67)	14.46 (1.96)	13.35 (1.96)	12.52 (0.91)
B_2 phase	20.46 (0.33)	20.39 (0.42)	20.61 (0.60)	19.33 (0.34)	20.00 (0.77)	20.05 (0.57)

Interview analysis: Cognitive themes. For Karl, two themes that were evident from the interview were public S-A and benefits of the PSR. Public S-A was first mentioned during the A_1 phase when Karl explained his predisposition to being self-conscious. He stated, "I am one of these people, if I'm going to bowl, I at least want to look like I can bowl." Individuals high in S-C are often concerned with their physical appearance and social acceptance. Even though I was the only person observing performance during the A_1 phase, Karl was still self-aware and concerned with personal appearance. He then elaborated about what he meant in relation to golf, "I play golf as well. As long as I've done all my swing and I've heard may mate say 'good swing, mate,' then it felt better to me for him to say that than to laugh at me." During the B_1 phase, Karl became more concerned about pubic S-A as he increased the responses related to the audience, saying phrases such as, "they (the audience) were only focused on me" and "all I was worried about was those people watching me bowl." Karl explained how attention was also affected, "I was worrying more about what they (the audience) were thinking than what I should have been doing in the first place." As the number of observers increased from one (i.e., the researcher) during the A_1 phase to eight (i.e., audience members) during the B_1 phase, Karl's concern over public appearance and social approval intensified, diverting attention to self-focused, rather than a task-focus.

An additional effect of the increase in public S-A was that Karl reported more negative self-talk. To illustrate the connection between public S-A and negative, self-degrading statements during the B_1 phase, Karl explained, "As soon as I hit some bad shots, I started having negative thoughts because there was people watching me do it. The (negative) thoughts were much more intense (than in the A_1 phase)." Fenigstein (1979) found that S-A is associated with an increase in negative cognitions in a social-evaluative situation. To elaborate, when I asked Karl to explain his increase in negative and demeaning self-statements during the B_1 phase, he stated, "They (the audience) saw me do that silly shot, and then instead of dropping it before the next shot, I thought about it again on the next shot." Leary (1992) argued that sport fosters the creation of a variety of negative images when athletes are worried about evaluation by others, such as images of being unskilled, incompetent, unprepared, unfit, or unable to handle pressure. Similar to Jason, the increased S-A suggested perhaps increased negative self-talk causing the individuals to be acutely aware of their flaws, magnifying imperfections and ensuring the self is the most prominent source for attribution of causality (Taylor & Fiske, 1975).

Another result of the increase in public S-A was that Karl did more explicit monitoring of execution. Advocates of explicit monitoring theories of choking (e.g., Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992) have suggested that performance pressure prompts attention to skill processes and their step-by-step control. The attention to performance execution disrupts the automated processes of high-level skills that are normally processed without explicit attention (Baumeister; Beilock & Carr; Masters). It appears that, even with Karl's advanced skill level, explicit monitoring was a function of public S-A during the B_1 phase. That is, Karl was likely to consciously process performance because he was concerned about audience evaluation. Karl explained this further by suggesting, "I said, 'don't miss the target, go through everything you are supposed to do to throw the ball right.' … I wanted to make sure I got that swing right. At least that way someone can say 'nice shot.'" Perceived public approval was apparently more important than successful performance, leading Karl to consciously process execution in an attempt to impress the audience. An alternative explanation is that Karl perceived that if he ensured the process of performing correctly by monitoring performance, the successful performance outcome would follow. It appears that the first explanation was correct, because Karl explained that monitoring task-execution was ineffective for performance, "I guess if I was honest, I did worse during the second day (B_1 phase), so it's not really helping my shot at all. It's helping me just deal with the people being there." For Karl, explicit monitoring was used to decrease fear of evaluation by providing a sense of control over shot execution. Perhaps the explicit monitoring provided Karl with a perception of control, reducing his fear of embarrassment and decreasing A-state during the B_1 phase. If Karl appeared reasonably capable of performing well, even when unsuccessful, then he could believe that he earned the audience's respect and diminished their negative evaluation.

A theme that was evident from the interview related to the B_2 phase was benefits of the PSR. This theme was evident when Karl responded to direct questions about the benefits of the PSR. One potential benefit of using a PSR was a decrease in negative self-talk. When asked to compare his self-talk during the high-pressure phases, Karl responded,

> It (negative thoughts) was less intense (during the B_2 phase). I could focus straight away. Maybe because I had a focus point, but it felt like I had something else to focus on, rather than worrying about them (the audience) seeing my bad shot. … So it was a lot different from the second week (B_1 phase).

This result supports the finding reported by Beauchamp et al. (1996) that a PSR reduced negative introspection, albeit in novice golfers. The reduction in negative self-denigrating statements possibly occurred because Karl's attentional capacity was devoted to properly executing the PSR, which provided a method of alternative replacement strategies for negative self-talk. Karl had a "focus point" in which he could reset and compose himself decreasing attention to the audience and minimising the necessity for internal, self-degrading statements.

One implicit psychological benefit experienced when Karl used the personalised PSR during the B_2 phase was decreased S-A. The PSR reduced the tendency for Karl to become self-aware during the B_2 phase, as he explained, "Thinking about the routine and having to do each step, it took my mind off the fact that they (the audience) were there." Apparently, the personalised PSR provided a method for Karl to adhere to task-relevant cues prior to each attempt especially after an unsuccessful shot. This was emphasised when Karl compared his cognitions during the high-pressure phases,

> I remember thinking I did a couple really bad ones in Session 4. I didn't do something right in my set-up, and I didn't even worry about the fact that they (the audience) thought I had done a dumb shot. … I remembered that I said the cue word too quick and then went. I thought of that instead of thinking, gees, they (the audience) saw me do a bad shot, which is what I was thinking in Session 2. That made me think about it on the next shot and bang I did another bad one, whereas in Session 4, it was easier to refocus.

Carver and Scheier (1987) argued that the presence of an audience might encourage a more external, overt degree of evaluation related to public S-C. Masters et al. (1993) found that a predisposition to be self-conscious also promoted the likelihood of being self-aware during pressure situations. As a result, when the audience was present during the B_1 phase, Karl's high S-C predisposition possibly led to involuntary shifts in attention to S-A, ultimately leading him to struggle to stay in the present moment. During the B_2 phase, however, Karl's adherence to the personalised PSR helped him maintain task-focused attention. This is similar to results by Cohn et al. (1990), who found that participants expressed immediate subjective improvements in concentration skills while adhering to the PSR.

General summary of Karl. Scores on the DM-CSAI-2 indicated that Karl perceived an increase in pressure prior to the high-pressure phases in comparison to the low-pressure phases. During the interview, Karl reported that his nervousness increased during the B_1 phase compared to the low-pressure phases. Karl was surprised about the presence of the audience during the B_2 phase, however, he managed the pressure relatively well possibly because of the PSR. The DM-CSAI-2 results and the interview results helped to establish that the manipulation was successful prior to and during the B_1 phase, and perceived pressure intensity was not as severe preceding and during the B_2 phase.

During the B_1 phase, Karl decreased performance by a considerable 30% compared to the A_1 phase. From a strict definition of choking, it appears that Karl succumbed to choking during the B_1 phase. When using the specialised PSR during the B_2 phase, Karl was more accurate than in all other phases. Specifically, Karl was 45% more accurate during the B_2 phase than the B_1 phase. Thus, Karl's results indicate that a personalised PSR was effective in improving accuracy under pressure.

Completion time of the PSR was longer during the B_2 than the B_1 phase. It is difficult to ascertain whether the longer period of time to execute shots, PSR variability, other potential factors (e.g., mental preparation, components of the PSR), or a combination of those factors, were the primary reason for the improved performance in the B_2 phase. One effect of the PSR was that Karl was more consistent with his preparation, as demonstrated from the reduced SD range in preparation time during the B_2 phase. A comparison of the completion time variability indicated that Karl was more consistent in completing the personalised PSR during the B_2 phase than his usual routine during the B_1 phase.

The interview data indicated that two key themes were public S-A and benefits of the PSR. First, related to the B_1 phase, Karl explained that the increase in pressure was because he felt the audience members might judge his performance. A constant fixation on public S-A possibly led Karl to increase explicit monitoring of performance and negative self-talk. The combination of these factors decreased attention to the task and performance declined during the B_1 phase. Second, Karl explained a number of benefits of using the

PSR during the B_2 phase. Karl was focused on performing the PSR, and as a result, explicitly stated and implied benefits included decreased S-A and decreased negative self-talk.

CS Participant- Linda

Participant profile. Linda was a 28-year-old, female who had been bowling for 14 years and had a current league average of 193. Linda had been unsuccessful twice in her attempts to make the state team, but was a state team representative the last 2 years. Linda was purposively sampled as a CS participant because she was high in S-C, high in A-trait, and predominantly used approach coping. Linda's scores were 44 on the SCS (75th to 100th percentile), 47 on the SAS (75th to 100th percentile), and + 10 on the CSIA differential score (75th to 100th percentile).

Pressure manipulation. Visual analysis of Figure 4.6 shows that Linda's intensity scores for cognitive anxiety prior to the A_1, B_1, A_2, and B_2 phases were 16, 16, 10, and 15**,** respectively. For Linda, perceived intensity of cognitive anxiety was similar preceding all phases with a decrease in cognitive anxiety prior to the A_2 phase. Intensity scores for somatic anxiety preceding the four phases were 13, 14, 12, and 14, respectively. Linda perceived similar intensity in somatic anxiety prior to the four phases. The DM-CSAI-2 scores illustrate that Linda experienced a fairly low absolute level of, and only minimal differences in, A-state prior to the four phases.

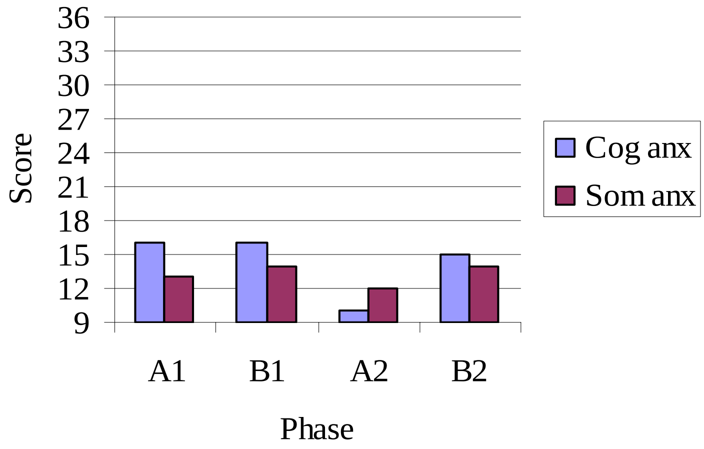

Figure 4.6. Cognitive and somatic anxiety intensity scores for Linda.

Interview analysis: Pressure manipulation. During the interview, Linda explained her anxiety through common, colloquial expressions such as "I was nervous" or "I was relaxed" without alluding directly to symptoms of cognitive or somatic anxiety. For example, when asked to compare her nervousness during the initial three phases, Linda reported,

> During Session 1 (A_1 phase), I wasn't nervous, I knew that I wanted to do well and hit my target… it was just more of a practice thing for me. … During Session 2 (B_1 phase), I was a little nervous. I don't mind people watching me, but I was caught off guard. Session 3 (A_2 phase), I was much more relaxed compared to Session 2. I was feeling the same as I was in Session 1 (A_1 phase).

It appears that Linda's interpretation is at odds with scores on the cognitive anxiety component of the DM-CSAI-2 prior to the A_1 phase. Perhaps the increase in cognitive anxiety prior to the B_1 phase was due to uncertainty. Although speculative, this proposition seems logical considering the similarity in cognitive anxiety results from other participants in the current study and Study 1 of this dissertation. During the interview, I asked Linda to compare her nervousness during the high-pressure (i.e., B_1 and B_2) phases.

She responded by saying, "During Session 4 (B_2 phase), I was more relaxed compared to Session 2 (B_1 phase). … I sort of laughed, considering that you didn't tell me that they (the audience) were coming back." It appears that Linda adapted quickly to the audience during the B_2 phase. Linda then elaborated by suggesting that the PSR helped her relax,

> I think the routine definitely helped. … Sometimes I just get up and bowl similar to Session 2 (B_1 phase). … That was sort of a more rushed shot compared to the Session 4, when I was more relaxed. I think it's good to take that deep breath. The deep breath definitely made me relax and just get ready for the shot. … It definitely did help.

It seems that Linda rushed and did not fully prepare for shots during the B_1 phase. Apparently, the increased arousal and awareness of the audience affected Linda's normal concentration pattern. To illustrate this, Linda stated that she did not perform her normal routine and her setup was more abbreviated during the B_1 phase because of the pressure, "I didn't use the towel, I didn't dry my hand on the vent… I wasn't thinking about my usual routine, it was just getting up there and bowling. It was more of a rushed shot because of the pressure." One component included in Linda's personalised PSR during the B_2 phase was a deep breath that perhaps helped her adjust to the pressure. Linda experienced a sense of relaxation and adjusted to the audience more quickly because the deep breath helped decrease perceived pressure (see Linda's *Interview analysis: Cognitive themes* section for additional perceived benefits of the PSR). Boutcher and Crews (1987) also found that a positive result of using a PSR is lower arousal levels.

Performance analysis. For Linda, MAE increased from 2.90 ± 0.36 in the A_1 phase to 3.20 ± 0.70 during the B_1 phase. This indicated a decrease in accuracy of 10%. During the A_2 phase, performance was 2.90 ± 0.68, representing an increase in accuracy of 10%

between the B_1 and A_2 phase. During the B_2 phase, MAE was 1.97 ± 0.62. This was a 47% increase in accuracy from the A_2 to B_2 phase. A comparison of the low-pressure phases indicated that MAE was equal during the low-pressure phases whereas the B_1 phase changed increased by a large amount, indicating the pressure manipulation was successful. Performance increased by 62% from the B_1 to the B_2 phase, indicating Linda was 62% more accurate when using the personalised PSR under pressure than during the B_1 phase (see Figure 4.7).

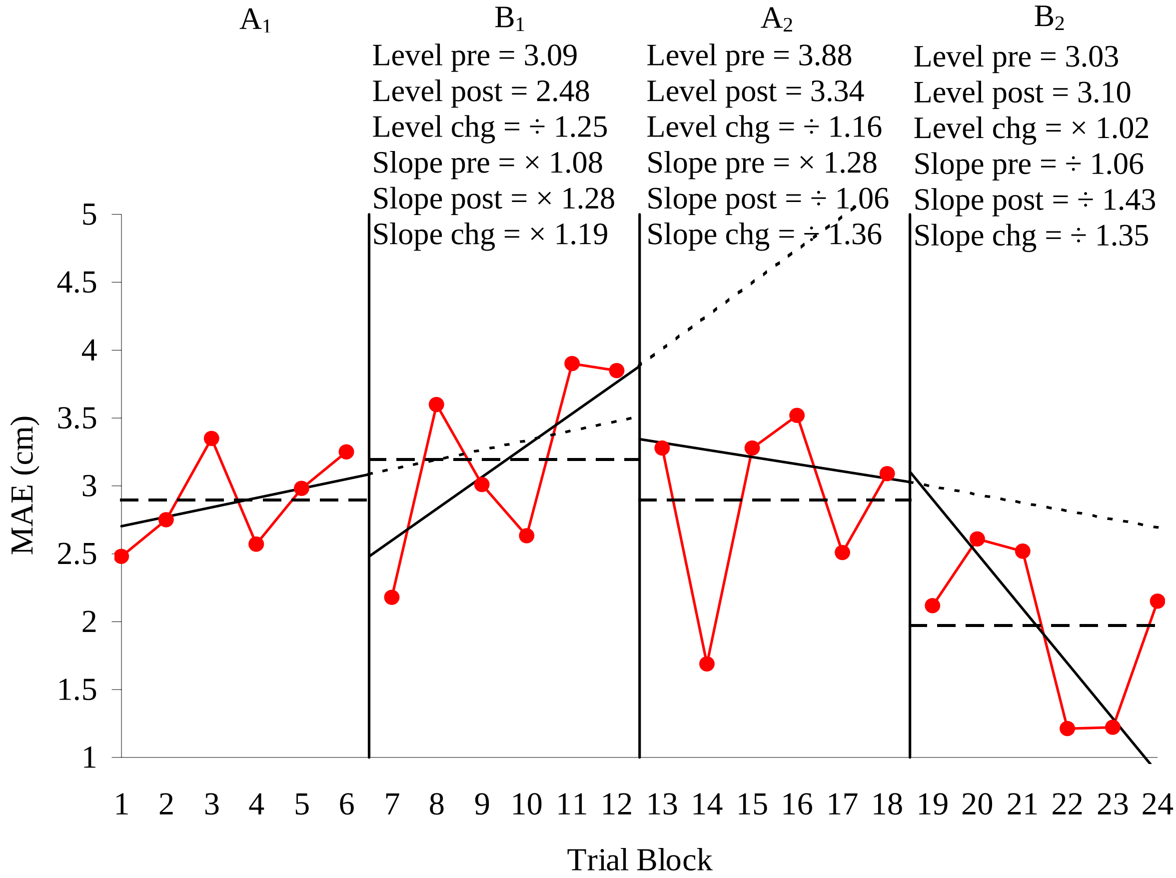

Figure 4.7. Split-middle analysis for Linda.

The slope of the celeration line during the A_1 phase was × 1.08, and the slope of the celeration line in the B_1 phase was × 1.28, which signified a change in slope of × 1.19 during the A_1 and B_1 phase. The slope of the celeration line was ÷ 1.06 during the A_2

phase, indicating a change in slope of ÷ 1.36. During the B_2 phase, the slope of the celeration line was ÷ 1.43. This illustrated a change in slope of ÷ 1.35.

In summary, MAE for Linda increased by 10% during the B_1 phase in comparison to the A_1 phase, representing a 10% decrease in accuracy. Although not a substantial difference, the difference was enough for Linda to proceed to the next phase of the study. During the B_2 phase, Linda was more accurate than she was in the other three phases. Her performance represented a considerable 62% improvement in accuracy from the B_1 to the B_2 phase. The slope of the celeration line changed minimally during the low-pressure phases, whereas the slope changed markedly during the high-pressure phases. Taken collectively, the pressure and performance results provide support that the pressure manipulation negatively influenced performance and that the PSR facilitated performance.

Table 4.4

Mean (and SD) Completion Time (in seconds) for Linda during the B_1 and B_2 Phases

	Trial Block					
	1	2	3	4	5	6
B_1 phase	8.98 (1.40)	7.71 (0.46)	8.69 (1.52)	8.37 (0.78)	9.22 (1.73)	8.36 (0.86)
B_2 phase	14.32 (0.50)	14.46 (0.43)	14.45 (0.53)	14.44 (0.48)	14.49 (0.39)	14.69 (0.67)

Pre-performance routine completion time and variability. During the B_1 phase, mean completion time for Linda's usual routine varied from 7.71 to 9.22 seconds (SD range of 0.46 to 1.73). During the B_2 phase, mean completion time for the personalised PSR ranged from 14.32 to 14.69 seconds (SD range of 0.39 to 0.67). Linda, thus, performed the personalised PSR during the B_2 phase more slowly than her usual routine during the B_1 phase. Linda also performed the personalised PSR during the B_2 phase more consistently than her routine during the B_1 phase (see Table 4.4).

Interview analysis: Cognitive themes. Similar to Karl, two themes that were evident for Linda during the interview were public S-A and benefits of the PSR. Public S-A was primarily evident, during the B_1 phase, when Linda described her reactions to the audience. For example, Linda explained, “During Session 2… I was a bit self-conscious of what they were watching more than what I was doing.” This quote supports the suggestion by Masters et al. (1993) that a predisposition to S-C promotes the tendency to be self-aware under pressure. That is, Linda was predisposed to high S-C, thus, the presence of the audience increased S-A during the B_1 phase. Linda’s increase in S-A was possibly because she was concerned with social appearance and social acceptance by the audience. To illustrate her concern over social acceptance, Linda discussed her reaction to the audience, “I was self-conscious because they (the audience) were looking at me. … I suppose I was worried about whether they were judging me by how I am bowling and the way I bowl.” Linda explained that she was constantly processing information related to the audience’s judgments and reactions during the B_1 phase. Linda’s self-focus may have negatively affected her ability to process task-related information as she explained,

> I’m very self-conscious and I think that was in the back of my mind instead of thinking that they weren’t there and just bowling as if no one was watching me. … My concentration wasn’t all there because I was thinking more of them than watching my target and concentrating on my bowling.

Linda clearly understood what was necessary to perform well, however, she was unable to execute effectively because of her constant self-attention. As discussed throughout this dissertation, Kahneman (1973) stated that problems in attention occur because of limited processing capacity. A conflict existed between the predisposition to being self-conscious (exhibited when Linda explained her attention to the audience), and focus to the task. To illustrate the effect this had on performance, Linda stated, “I think I didn’t do as good as I did the first session, so it (the audience) affected my performance negatively.”

During the B_1 phase, it seems that Linda attempted to consciously process execution possibly as a result of the increase in S-A and anticipated negative performance effects. To illustrate this, Linda began by discussing the pressure,

> I was trying to do better than I was because I had people watching me. It (the B_1 phase) was more pressure. … I think I did a little bit too much thinking. When I wasn’t throwing a good shot or I was missing my target, I was going back thinking, “what am I doing wrong” or “should I be doing this or that?” I started to try and work myself through the shots in my head. I was thinking about how I was releasing the shot, where I was putting the ball, just too many things that are going through my head that are making me not bowl as well as I should.

Linda explained that she experienced pressure possibly because the audience increased S-A. Thus, Linda’s previous quote may be explained in two ways, the self-focus model of choking and approach coping strategies. First, advocates of the self-focus model of choking (e.g., Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992) have proposed that performance pressure increases anxiety and S-A and, in turn, increases attention to skill processes and conscious control in hopes that careful attention to execution may increase the chance of success. One construct that Linda implicitly suggests may be important to, but not hypothesised in, current self-focus models of choking is self-confidence. That is, perhaps a decrease in self-confidence during a pressure situation potentially leads to an increase in conscious processing. Second, approach coping involves focusing on problem solving by using direct effort (Crocker & Graham, 1995). Krohne (1993) suggested approach coping is the process of actively dealing with a perceived problem. It appears that Linda actively diagnosed the problem with performance and then attempted to devise a solution to improve performance, paradoxically leading to unsuccessful performance.

As with other participants, a theme that was apparent during the interview and the B_2 phase were the benefits of the PSR. Linda explained a number of benefits related to performing the personalised PSR during the B_2 phase, including decreased S-A and reduced conscious processing. It appears that, for Linda, S-A decreased during the B_2 phase in comparison to the B_1 phases,

> The first time they were there (during the B_1 phase), I didn't know what they were thinking or doing. This time (during the B_2 phase), I knew that they were watching, but I sort of blocked it out. I didn't think, self-consciously that they were there.

Linda was able to use avoidance coping, in the form of blocking out the audience, thus, reducing S-A during the B_2 phase. Essentially, the PSR was an effective replacement strategy to combat the increased S-A. To illustrate that the PSR was an effective type of avoidance coping, Linda explained,

> I think the PSR helped my performance because it helped me block out everything and made me concentrate on preparing for my shot. … I wasn't self-conscious of them (the audience) watching what I was doing, I was just concentrating on my own routine and not worrying about what they were thinking.

Apparently, the personalised PSR enabled Linda to remain focused on task-relevant cues prior to each attempt, focusing attention on the steps of the PSR and minimising the involuntary shifts to S-A.

Another benefit Linda experienced, when using the personalised PSR during the B_2 phase, was a decrease in conscious processing of performance. To illustrate the reduction in explicit monitoring of execution, Linda explained,

> I think the routine helped me not think (about execution) because I was in the routine of getting up, getting ready, and bowling. I think that helped me to not think as much. … I wasn't thinking, nothing was sort of ticking over in my mind. I think the deep breath and shutting everything off helped also. My mind was completely blank when taking shots.

This quote indicates that Linda experienced an increase in her ability to use automatic processing from the B_1 to the B_2 phase. Focusing on the PSR during the B_2 phase enabled Linda to process task-relevant information prior to performance, rather than during performance execution. The personalised PSR provided a replacement strategy for Linda's attention instead of explicit monitoring of execution.

General summary of Linda. By triangulating the DM-CSAI-2 and interview results, it appears that Linda increased anxiety minimally during the B_1 and B_2 phases. Linda also explained that during the interview that the audience distracted her and this resulted in an increase in public S-A. The audience distraction may indicate that Linda's performance fluctuation was possibly because of the pressure manipulation during the B_1 phase. It was difficult to determine whether Linda's nervousness was different during the high-pressure phases because the PSR apparently helped Linda manage the pressure. Thus, Linda's results should be viewed with caution, as the pressure manipulation was perhaps not as effective as with other participants.

Compared to the A_1 phase, Linda's performance decreased by 10% during the B_1 phase. One problem with current definitions of choking is that a level of performance decrement may be needed to indicate whether choking has occurred. In Linda's case, for example, is a 10% decrease in performance enough to indicate choking has occurred? My decision for Linda to remain and complete the entire study was based on her performance outcome during the A_2 phase. In the context of this study, if performance is similar in the A_1 and A_2 phases and a change occurs during the B_1 phase, the pressure manipulation (i.e., B_1 phase intervention) can be viewed as effective in disrupting typical performance rates. Thus, Linda continued participation because performance was similar during the low-pressure phases indicating that the pressure manipulation was the reason for the change in performance. Linda was 62% more accurate when using the personalised PSR during the B_2 phase than when using her usual routine during the B_1 phase. Thus, Linda was considerably more accurate when using the personalised PSR than when under pressure during the B_1 phase.

Linda took more time to complete the personalised PSR during the B_2 phase than previous routine used in the B_1 phase. Linda was provided with a relaxation technique (i.e., deep breath) and a cue word during the PSR. These strategies definitively increased the preparation time for shot attempts. As with other participants, Linda was more consistent when using the PSR during the B_2 phase than her usual routine in the B_1 phase.

Increased public S-A was one theme associated with Linda's interview results for the B_1 phase. A comparison of cognitive processes indicated that the improvement in performance was possibly due to a decrease in S-A and conscious processing during the B_2 phase compared to the B_1 phase. As explained by Linda, the PSR helped her to become better prepared for shots during the B_2 phase, whereas during the B_1 phase she was more rushed. Rushing may have been an artefact of the increase in pressure associated with the B_1 phase.

Discussion and Conclusions

The primary purpose of the current study was to investigate whether a PSR can facilitate performance under pressure. All participants improved performance and decreased variability of completion time when using the personalised PSR during the B_2 phase, and thus supported the contention that a personalised PSR can facilitate performance under pressure. Secondary purposes were to use interviews to more comprehensively understand choking and to investigate the psychological benefits of using a PSR. During the B_1 phase, participants expressed choking-related cognitions, including increased public S-A, increased conscious processing, and increased negative self-talk. Conversely, during the B_2 phase, cognitions were related to coping strategies and included decreased S-A, decreased conscious processing, and decreased negative self-talk.

Pressure Manipulation

Based on the DM-CSAI-2 results, the pressure manipulation was clearly effective for 2 of the 5 participants (i.e., Jason and Karl). These 2 participants decreased performance during the B_1 phase and were used for the planned intervention. According to the results of the pressure evaluation (i.e., DM-CSAI-2 and interview), a third participant that was included for the planned intervention (i.e., Linda) was not obviously affected by the manipulation during the B_1 and B_2 phases. Linda only experienced an indirect and minor change in intensity of anxiety. I did, however, include her results because of her decrease in performance during the B_1 phase. Through this inclusion, additional information may be identified relating to the cognitive processes associated with choking experiences.

Performance Results

In the current study, the inclusion of the PSR improved performance under pressure. These results are consistent with other PSR studies where experienced athletes have increased performance after implementation of a PSR (e.g., Boutcher & Crews, 1987; Lobmeyer & Wasserman, 1986; Marlow et al., 1998). In the current study, participants increased performance by an average of 43.7%, when using the personalised PSR under pressure, compared to when they used their own routine during the B_1 phase. Although a performance improvement was expected, the relative size of the improvement was surprising. In another SCD study, Marlow et al. tested whether employing a PSR prior to a water polo penalty shot and found that participants increased performance ranged from 21% to 28%. Within the current study, the increase in performance between the B_1 and B_2 phases ranged from 24% to 62%, indicating an even larger improvement when both the PSR performance and comparison performance were evaluated under pressure. Cohn et al. (1990) rationalised that the time needed to adjust to the new PSR is often needed. In the present study, however, the 3 participants that used the PSR improved performance under pressure, despite a limited timeframe used to develop the personalised PSR (i.e., 20 to 35 min). It appears that a newly acquired PSR can still facilitate performance under pressure even when limited time is available to develop the routine. Although not specifically related to PSR research, Beilock, Bertenthal, et al. (2004) found that providing speed constraints in a sensorimotor task might enhance performance for experts. Experts' proceduralised performances do not require unlimited execution time possibly because time provides the paradoxical opportunity to explicitly attend to and monitor automated execution processes. A newly acquired PSR may help participants avoid the debilitative processes of reinvestment of explicit knowledge under pressure (Masters, 1992) due to attentional space occupied by the PSR.

Completion Time Duration and Variability

The results of the completion time analysis indicated that the 3 participants that used the PSR completed their routines faster during the B_1 phase (pre-existing routine) than the B_2 phase (newly acquired routine). The longer completion time during the B_2 phase was essentially because the behavioural elements (e.g., deep breath and cue word) were added to the participants' pre-existing routine. Perhaps the longer completion time during the B_2 phase helped to decrease somatic anxiety symptoms (e.g., increased heart rate) and improve concentration. Southard and Miracle (1993) suggested that speeding up or slowing down a PSR does not influence performance, providing that the relative timing of the behavioural components remain constant. Although completion time was longer for the B_2 phase, the 3 participants reduced the variability in completion time compared to the B_1 phase. These results are similar to other researchers' findings that decreased variability of a PSR is associated with superior performance (e.g., Crews & Boutcher, 1986a; Jackson & Baker, 2001; Wrisberg & Pein, 1992). For example, Wrisberg and Pein found that basketball players were more accurate during basketball free-throws when a more consistent PSR was used. Athletes' PSR interval for the free-throws in Wrisberg and Pein study was approximately 0.6 seconds, and were similar to the results of the current study with the standard deviation ranging from 0.33 to 0.95 for any trial block during the B_2 phase.

Qualitative Results

Results from the interviews indicated that the 3 participants that used the PSR experienced an increase in public S-A during the B_1 phase. The current findings, in addition to results of other studies (e.g., Masters et al., 1993; Wang, Marchant, Morris, & Gibbs, 2004), indicated that individuals high in S-C are more likely to "choke" than those low in S-C. These results are consistent with Wang et al., who found that the best predictors of choking were private S-C and somatic A-trait. Unlike Wang et al., however, participants in the current study increased public S-A, rather than private S-A, during the B_1 phase. This is understandable considering Fenigstein et al. (1975) found that private S-C and public S-C are moderately correlated. An increase in S-A preceded the experience of increased negative self-talk or increased conscious processing for the bowlers in this study. Thus, the qualitative results from the B_1 phase provide partial support for both the self-focus model (Baumeister, 1984) and the distraction model (Nideffer, 1992) of choking with the common denominator being an increase in S-A under pressure.

Results from the interview also indicated that there were a number of psychological benefits of using the PSR during the B_2 phase. One positive psychological outcome for the participants who used the personalised PSR was a decrease in S-A. During the current study, additional psychological outcomes were evident when using the PSR, such as decreased negative self-talk, improved concentration, and increased confidence. The current research supports contentions that a PSR produces psychological positive, such as reduced negative introspection (Beauchamp et al., 1996), increased attention to task (Cohn et al., 1990), and increased confidence (Cohn et al., 1990).

The qualitative results and subsequent discussion were primarily focused on a reduction in S-A when using the PSR, however, an alternative explanation may be that participants decreased anxiety, which contributed to performance improvements under pressure. Although I am unable to determine the precise cause of the performance improvement, I argue that reduced anxiety and decreased S-A both played a role in the performance improvement. Perhaps performance was affected only by anxiety level and other variables could be outcomes of the anxiety elevation. In either case, increased pressure and S-A during the B_1 phase and decreased pressure and S-A when using the PSR during the B_2 phase provides additional, indirect support for the contention that choking is a combined anxiety and attention problem. That is, as anxiety increased during the B_1 phase, attention shifted to public S-A and other distractions (e.g., negative cognitions and explicit monitoring), resulting in poor performance. Conversely, a reduction in anxiety during the B_2 phase resulted in less attentional shifts to S-A, and subsequent performance improvements.

Methodological Issues

One methodological limitation was that participant's could have experienced pressure desensitisation during B_2 phase, as a result of receiving the pressure manipulation twice during the study, contributing to the performance improvement. In referring to the CSAI-2 results, it appears that 2 out of 3 participants increased anxiety levels during the B_2 phase in comparison to the "low-pressure" phases. These results support the contention that, although a lower level of anxiety was experienced during the B_2 phase than the B_1 phase (perhaps a result of the intervention), the amount of pressure was sufficient to experience differences in anxiety levels from the B_2 phase in comparison to the low-pressure phases. It is difficult to control for the familiarisation of pressure when given more than once to participants. In large-sample quantitative studies, counterbalancing could be used to control for confounding variables (e.g., practice effects). In the current research, however, counterbalancing may lead to other potential confounding variables (e.g., intervention usage in both, rather than one, phase) and was deemed unsuitable for the current design.

Another methodological limitation of this study was testing an intervention without prior knowledge of the source of the problem. Choking is an idiosyncratic phenomenon that participants experience by different means. Although choking models have been developed, participants in Studies 1 and 2, for example, provided a number of reasons for decrements in their performance. Theory-based explanations of choking were used as a basis for testing the PSR during the current study. Since a number of "distractions" may cause choking, it would be beneficial to ascertain whether the distraction or the self-focus model of choking more accurately explains choking for each participant. One method to overcome this weakness is to design an experiment where interviews are conducted after the "choking episode." By analysing the interview and developing theory-based, participant-matched interventions prior to the B_2 phase, researchers can determine the most accurate intervention for each CS athlete.

One asset to the current study was the inclusion of interviews. The interviews provided a method of data triangulation to illustrate the extent of the pressure manipulations effectiveness and also provided insight into explanations about poor performance under pressure. Triangulation is based on the assumption that any bias inherent in various data resources can be neutralised when data sources are used in combination with other confirmatory data sources. By triangulating data, I employed different methodologies to elucidate the research question, enhancing validity by convergence of results from multiple methods (Greene et al., 1989). One benefit of using the DM-CSAI-2 and interview was to test for consistency in participants' responses. I could also closely monitor individual experiences and also ascertain descriptive information from participants about performance related to the B_1 and B_2 phase. Thus, data triangulation combines evidence from different sources to support the generated findings.

Future Directions

In the current study, a number of variables (e.g., decrease in S-A, consistency of the routine, deep breath, and the longer PSR duration during B_2 phase) could account for the performance improvement during the B_2 phase. The performance increase was possibly due to at least one (if not most) element of the PSR. Perhaps the reduction in public S-A helped participants decrease variability in completion time because of the preoccupation with the PSR, rather than audience judgments. The completion time consistency could have also been related to improved concentration on the task. Future research, therefore, should be used to explore which elements of the PSR are the most beneficial for performance under pressure.

The results of Study 2 indicate that an increase in S-A may be the underlying factor contributing to the decreases in performance under pressure. It seems that methods of alleviating choking should focus on reductions in S-A under pressure, which may ultimately decrease the need for conscious processing (Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992) or attention to irrelevant cues (Nideffer, 1992). The current study clearly indicates that the PSR helped to improve performance because it reduced S-A and allowed participants to maintain a task-relevant focus.

CHAPTER 5

STUDY 3: MUSIC: AN INTERVENTION TO ALLEVIATE CHOKING

Introduction

The debate about whether the self-focus model (Baumeister, 1984) or the distraction model (Nideffer, 1992) best explains choking has led researchers to use various methodological approaches. One method used to examine mechanisms of choking is the dual-task (DT) paradigm. Lewis and Linder (1997) first introduced DT methods into choking research by using a distraction task while participants also performed a golf-putting task. Counting backwards from 100 by 2's was used to divert attention away from golf putting under pressure. Lewis and Linder hypothesised that, if choking was due to distraction, the addition of a DT would inhibit performance and consequently support the distraction model of choking. If choking results from self-focusing, however, then the addition of the distraction would prevent the performer from explicitly monitoring performance and subsequently increase performance. Lewis and Linder found support for the self-focus model and explained that choking is more likely to occur when self-awareness (S-A) is heightened. Other researchers (e.g., Beilock et al., 2002; Masters) have also found that providing athletes with a DT, while performing, reduces self-focusing and improves performance under pressure. Although not originally introduced as a choking intervention, the DT paradigm may be a fruitful intervention method for alleviating choking in "real" sport environments. Common DT's that have been used include counting backwards from 100 by 2's (Lewis & Linder), an articulatory suppression task (Masters), listening for a "target tone" (Beilock et al.), and articulating high or low sound frequency (Gray, 2004). The focus of Chapter 5 is to report on a study designed to investigate the effects of a different type of DT (i.e., listening to the lyrics of music) as a possible choking intervention to reduce S-A under pressure.

A theoretical explanation of how various distracters may help prevent choking can be linked to Kahneman's (1973) central resource theory of attention (discussed previously). Attentional capacity is subdivided into various tasks and several conditions determine the attention available. First, arousal level may increase or decrease the amount of attentional resources available. Kahneman suggested that moderate levels of arousal increase the available attentional capacity, whereas high and low levels of arousal result in diminished attentional resources. Second, attention requirements, such as evaluation of demand and estimation of task difficulty, are necessary to determine the appropriate attention allocation required. The proportion of available attentional capacity is also dependent on performers' skill level. Current theories of skill acquisition indicate that high-level performance is automated and operates largely outside of working memory (Anderson, 1982; Fitts & Posner, 1967; Kimble & Perlmuter, 1970). When skilled performance is controlled by automatic mechanisms, additional attentional space becomes available and consequently permits increased attention to other information. Finally, three features influence the individual's distribution of attention, allocation to predispositions, allocation to ensure completion of the activity, and allocation to momentary intentions (Kahneman). Kahneman's model of attention is most relevant to choking, in part, because the theory incorporates the effects of arousal and attentional predispositions. In the context of superimposing Kahneman's theory of attention, choking may result because of the performer's inability to allocate attention appropriately. When attentional resources are "freed up," adverse affects may result for highly self-conscious and skilled individuals because automatic skill production means attention is available and is easily diverted to unrelated information (Baumeister, 1984; Masters, 1992).

In Study 1 and Study 2 of this dissertation, participants high in S-C may have involuntarily allocated attention to S-A under pressure. Thus, a snippet of music is introduced in the current study as a DT during performance to potentially divert attention away from S-A under pressure. If participants are directed toward listening to the lyrics (i.e., a second attention-demanding resource) during performance and attention is allocated to the secondary task, then less attentional space is available for involuntary, predispositional shifts to S-A. With less attentional space, the athlete may decrease involuntary tendencies to shift attention to S-C predispositions, leading to enhanced performance. Listening to the words could replace S-A as an attention-demanding resource, allowing automaticity to self-organise.

I understand that listening to the lyrics of music is not necessarily a DT per se, rather more a distraction exercise that occupies attention. When participants' perform a genuine DT, they are asked to monitor and articulate, for example, the frequency of a tone, so that the researcher can identify the DT is being completed. The words "dual task" are used in a broad sense and I understand listening to the words of the music could be placed in a "grey area" between the DT paradigm and no DT used. Despite this, I have labelled this as a DT because if participants diligently adhere to the DT during performance, then, similar to other DT's used in choking research, the music will allow automaticity to develop. That is, attention to the song's lyrics may reduce S-A tendencies and increase performance.

The rationale for using music as an intervention goes beyond the attention diverting aspect. Terry (2004) provided examples of many athletes using music within a pre-competition routine to regulate mood and arousal. Music was particularly helpful in maintaining pre-competition focus, positive mood, and appropriate arousal level. Boutcher and Trenske (1990) have also found that well-chosen asynchronous (background) music has the potential to lead to significant mood improvements. Benefits of music in athletic performance are sometimes thought to be confined as a component of pre-competition routines, yet, researchers have generally overlooked the other potential advantages of using music during sport performance. For example, potential benefits of using music interventions during performance include reductions in arousal levels and decreases in self-focused attention that may both facilitate performance under pressure. As described in Chapter 2, Greg Louganis, one of the most decorated Olympic divers in U.S. history, consistently and successfully used music before and during dives to focus attention on the rhythm of the dive and divert attention away from distracting thoughts.

Experimentally, Pates et al. (2003) examined the effects of a music intervention on the perception of flow states and shooting performance in netball. Before and during performance of an intervention phase, participants listened to music to promote feelings of flow. Pates et al. found the music intervention enhanced shooting accuracy and also triggered positive emotions and cognitions related to flow. With some researchers suggesting music positively affects emotions and initiates aspects of flow and other researchers using the DT methodology to examine the mechanisms of choking, listening to the lyrics of music during performance may be a therapeutic means to assist athletes during performance under pressure.

The aim of the current study was to examine whether music can alleviate symptoms of choking. It was expected that music would assist performance by either increasing, or at least maintaining, performance under pressure. A secondary purpose was to investigate choking in more detail and examine cognitions associated with the effects of the music using a qualitative paradigm.

Method

Participants

Forty-one participants (24 males, 17 females), between the ages of 17 and 31 (*M* = 20.20, *SD* = 2.82), completed three psychological inventories in order to purposively sample a small number of participants for more intensive study. Eligible participants were those who had played in a competitive basketball league for a minimum of 5 years and who reported no prior experience with the use of music in the context of basketball shooting. Both male and female participants were surveyed for the reasons specified in Study 2 and were selected because they satisfactorily met the stringent criteria for participation. A demographic questionnaire was completed prior to testing to ensure participants met the requirements (see Appendix Z).

Equipment and Specifications

Basket, free throw line, and basketball dimensions. Standard basketball equipment and facilities were used, according to Basketball Victoria specifications. The basket included the backboard, ring, and net. The backboard was a flat rectangle measuring 1.83 m (6 ft) horizontally and 1.07 m (3.50 ft) vertically. The backboard was positioned 1.20 m (3.94 ft) from the end line. The ring was 3.05 m (10 ft) above and parallel to the floor and attached to the backboard (Basketball Victoria, n.d.). Participants in the present study attempted shots from behind a standard free-throw line. The free-throw line was located 5.80 m (19 ft) away from and parallel to the end line, and 4.40 m (14.44 ft) away from the backboard (Basketball Victoria, n.d.). Recommended regulation full-size basketballs with a circumference of approximately 0.75 to 0.78 mm (29.49 to 30.71 in) and weight between 567 to 650 g (20 to 22.93 oz) were used.

Audiocassette player and music. A Sony Walkman radio and cassette player with headphones were used to play a portion of the song “Always Look on the Bright Side of Life” from *Monty Python’s Life of Brian* (Hitman, 1979). The Sony Walkman was a “clip-on”, so it could be easily attached to participants’ shorts in a non-intrusive manner. All participants acknowledged that the audiocassette player did not inhibit performance.

Measures

The same measures as Study 2 were used, with the exception that the pre-shot routine consistency measure was not included and the performance measure was modified to accommodate the new task. The Self-Consciousness Scale (SCS; Fenigstein et al., 1975), Sport Anxiety Scale (SAS; Smith et al., 1990), Coping Styles Inventory for Athletes (CSIA; Anshel & Kaissidis, 1997), and Directional Modification of the Competitive State Anxiety Inventory-2 (DM-CSAI-2; Jones & Swain, 1992) were used to measure tendencies toward self-consciousness (S-C), trait anxiety (A-trait), coping styles, and state anxiety (A-state), respectively (see Study 1 for a description of these scales).

Performance. The total number of successful shots during each trial block represented the dependent variable for performance.

Design

The same design (i.e., A_1-B_1-A_2-B_2) as Study 2 was used, with the exception that the intervention was music, provided during the B_2 phase. The interview was conducted after the B_2 phase was completed (see Appendix AA for interview guide).

Procedure

Similar to Study 1, participants were recruited through a national or elite level organisation and coaches contacted to allow me to address the athletes directly. The coach was not in attendance when I addressed the athletes, and participants were advised that the purpose of the study was to examine feelings and reactions to competitive situations in basketball. Of the 41 participants who completed the psychological inventories and questionnaires, only a small number of CS participants were required to participate further in testing the music intervention. Similar to the rationale in Study 2 regarding the number of participants to purposively sample, 5 CS basketball players who met the CS selection criterion (identical to Study 1) then participated in the experimental phases of the study. The procedures for Study 3 (see Appendices BB, J, & K for instructions of the A_1-B_1-A_2 phases, respectively) replicated Study 2 with the exception that the experimental task was basketball free throw shooting and some audience members during the B_1 and B_2 phases were participants' teammates. Unlike Studies 1 and 2 of this dissertation, I was unable to use a disinterested audience because of organisation problems. Thus, using teammates who had participated in the initial sampling procedures was unavoidable, potentially adding a confounding variable.

Intervention (B_2). Before commencing the B_2 phase, participants' were told that, in conjunction with examining feelings and reactions to competitive situations in basketball, the effect of music on sport performance was also being assessed (see Appendix CC for instructions). Participants' were asked to listen to a portion (described soon) of the song "Always Look on the Bright Side of Life" from *Monty Python's Life of Brian* and focus on the words of the song as they completed each shot. The song was played twice before commencement of the B_2 phase to familiarise the participant to the song's content. The song "Always Look on the Bright Side of Life" was used because it has lyrics that directly relate to sport psychology performance enhancement strategies (e.g., relaxation, humour, positive self-talk, and cognitive restructuring). Only a portion of the song was used (and was repeated until the completion of the B_2 phase) in order for participants to establish a shooting rhythm and to more easily understand the song's content. The segment of the song used was:

> Always look on the bright side of life (whistle),
> Always look on the light side of life (whistle),
> If life seems jolly rotten,
> There's something you've forgotten,
> And that's to laugh and smile and dance and sing,
> When you're feeling in the dumps,
> Don't be silly chumps,
> Just purse your lips and whistle, that's the thing… (repeat)

During the B_2 phase, the music was played as participants performed the warm-up shots to become familiar with shooting while listening to music. Intensity (i.e., volume) may influence reactivity to music (Karageorghis & Terry, 1997); therefore, participants determined their own comfortable music intensity by adjusting the volume prior to the warm-up attempts. Headphones were used so audience members could not hear the song and participants could more easily distinguish the song's content. During each of the six trial blocks, music commenced when participants began the trial block and was played throughout the 10 shots; the music was not played during the 30-second rest period because, during that time, the tape was rewound to maintain consistency. During pilot testing and upon reflection on Study 2 of this dissertation, it was obvious that participants had a difficult time in maintaining focus on the (pre-shot routine) intervention for the 60 shot attempts. Thus, I decided (similar to Study 2) to remind participants once to use the intervention to maintain constant experimental and intervention conditions. To ensure adherence to the music intervention, at the halfway point (prior to the 31st attempt), I reminded all participants to listen attentively to the words of the music throughout the entire B_2 phase. During the interview, I asked participants about their attention to the words of the music during the B_2 phase as a manipulation check to ascertain whether participants listened to the words (see *Interview analysis: Cognitive themes* of Michelle for more details).

Analyses

Pressure analysis. Similar to Study 1, visual inspection of the DM-CSAI-2 data was used to examine the effects of the pressure manipulation.

Performance analysis. White's (1971, 1972, 1974) split-middle technique was the analysis used to determine performance differences during the phases. All performance analysis was identical to Study 2 performance analyses.

Interview analysis. Similar to Study 1, inductive content analysis was used to interpret the results of the interview.

Results

The results of Study 3 are organised similarly to the results of Study 2, with the exception that the pre-shot routine completion time and variability analysis were not included.

Psychological Inventories

This section provides descriptive statistics of scores for the three psychological inventories (i.e., SCS, SAS, and CSIA) and the representative scores of the 41 participants collectively (Table 5.1).

Table 5.1

Descriptive Statistics for the SCS, SAS, and CSIA

Inventory	Range	Mean	SD	50th percentile	75th percentile
SCS	17 to 56	39.15	8.18	40	44
SAS	18 to 69	35.27	11.38	33	42
CSIA	– 16 to + 13	– 1.61	6.81	– 1	+ 2

Participant scores on the SCS ranged from 17 to 56 with higher scores indicating high S-C. Scores were similar to participant scores in Study 1 (M = 43.74, SD = 6.72) and Study 2 (M = 40.61, SD = 7.14). Scores for the SAS ranged from 18 to 69 with higher scores indicating high A-trait. These scores were similar to participant scores during Study 1 (M = 32.74, SD = 7.15) and Study 2 (M = 32.83, SD = 8.77). Differential scores for the CSIA ranged from – 16 to + 13 with positive differential scores indicating a slight tendency toward approach coping. These scores were also similar to participants' scores during Study 1 (M = – 0.46, SD = 6.48) and Study 2 (M = – 1.41, SD = 6.85).

Purposively Sampled Participants- Music Intervention

Similar to Study 2, five (four female and one male) CS athletes' were purposively sampled, however, only 3 participants illustrated a decrement in performance (i.e., experienced choking) during the B_1 phase. Thus, the 3 participants that experienced choking during the B_1 phase are presented here (see Appendix Y for results of the 2 participants that increased performance). Pseudonyms were used to identify the 3 participants that experienced choking as Michelle, Nicole, and Olivia.

CS Participant- Michelle

Participant profile. Michelle was 18 years old and had been playing basketball for 7 years. She began playing in a domestic (club) league and, at the time of the study, had been playing in a state division team for the past 5 years. Michelle was purposively sampled as a CS participant because she was high in S-C, high in A-trait, and typically used approach coping. Specifically, Michelle's scores were 44 on the SCS (75th to 100th percentile), 61 on the SAS (75th to 100th percentile), and + 8 on the CSIA differential score (75th to 100th percentile).

Pressure manipulation. Similar to Study 1 and Study 2 in this dissertation, the high-pressure (i.e., B_1 and B_2) phases were critical for the purpose of the present study. Drawing conclusions regarding participants' performance differences between the low-pressure (i.e., A_1 and A_2) and high-pressure phases is difficult without an associated increase in perceived A-state during the high-pressure phases. Thus, scores on the DM-CSAI-2 were used to decide whether a change in A-state occurred during the high-pressure phases. Similar to Studies 1 and 2, direction scores of the DM-CSAI-2 are included Appendix O for the reader's perusal.

Visual inspection of Figure 5.1 shows that Michelle's intensity scores for cognitive anxiety immediately prior to the A_1, B_1, A_2, and B_2 phases were 25, 33, 22, and 28, respectively. Intensity scores for somatic anxiety preceding the four phases were 17, 20, 14, and 18. Michelle clearly experienced an elevation in intensity of multidimensional A-state immediately before the high-pressure phases. For Michelle, cognitive anxiety increased from moderate absolute levels prior to the A_1 and A_2 phases to high levels prior to the B_1 and B_2 phases. In addition, somatic anxiety intensified from low absolute levels prior to the A_1 and A_2 phases to moderate levels prior to the B_1 and B_2 phases.

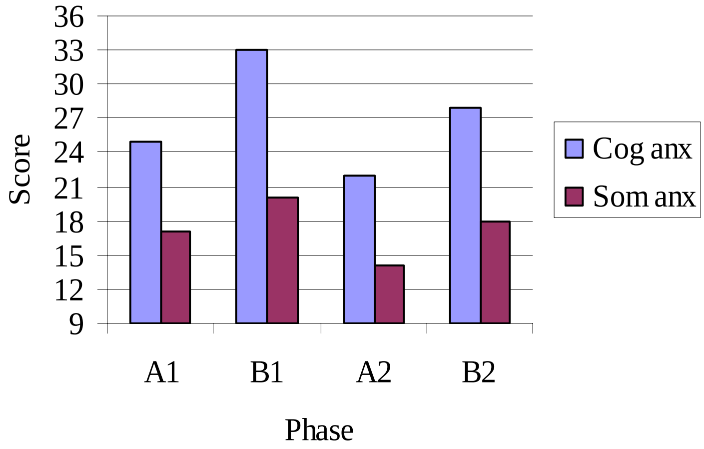

Figure 5.1. Cognitive and somatic anxiety intensity scores for Michelle.

Interview analysis: Pressure manipulation. Michelle commenced the interview by explaining that she is a young player on a team that her father coaches. This may have combined to create pressure to perform well.

> I was slightly nervous… Some people may have thought I got into the team because my father is the coach, so all this time I am trying to prove myself. Although it was just a small shooting thing, I wanted to prove to them (teammates) that I could perform (well). It was like sometimes I felt if I didn't do well, my teammates and father may say, "she's not up to it."

Michelle perceived the A_1 phase as somewhat pressure-inducing because it was an opportunity to prove something to her teammates. I interpreted this to mean that Michelle is sensitive to others' expectations and also desires social acceptance. Being sensitive to others' expectations and desiring social acceptance are both characteristics consistent with a person high in S-C, leading to some nervousness during the A_1 phase.

Michelle's nervousness intensified during the B_1 phase, as she explained the difference between the initial three phases.

> The second session (B_1 phase) was more nerve-racking because I thought of the people watching me. There was more pressure, but when you put it into perspective, the first session (A_1 phase) didn't seem as bad (as the B_1 phase). … I was nowhere near as stressed during the third session (A_2 phase) … it didn't bother me as much as the first time (A_1 phase).

The above excerpt indicates that Michelle's anxiety levels were elevated during the B_1 phase compared to the A_1 phase. The audience was a major source of threat that increased Michelle's perceived A-state.

Michelle previously described how the pressure experienced during the B_1 phase escalated in comparison to the low-pressure phases. It seems important to establish whether Michelle experienced an elevation in perceived pressure during the B_2 phase. Thus, I asked her to explain her anxiety level during the B_2 phase.

> I was nervous (during the B_2 phase), but not as much as the second time (B_1 phase). … I suppose if I didn't have the music, where I was just repeating Session 2 (B_1 phase), it would have been a little bit less than the pressure of the initial one (B_1 phase)… because I was a little more used to it and I knew what I had to do.

Clearly, Michelle was not as nervous during the B_2 phase compared to the B_1 phase. At least three explanations may account for the reduction in anxiety during the B_2 phase. First, and similar to participants in previous studies, Michelle's anxiety could have diminished because of the familiarity with the procedures of the study. Second, the music may have “successfully” distracted Michelle from ruminating about the pressure, and thus reduced anxiety levels. Third, given that there were lyrics in the music directly related to performance enhancement strategies (e.g., relaxation and cognitive restructuring), cognitive restructuring may have occurred and helped to reduce anxiety (see *Interview analysis: Cognitive themes* about benefits of the music). Collectively, the interview data confirmed Michelle’s reported results of the DM-CSAI-2, where anxiety levels were heightened during the high-pressure phases and the A_2 phase was the least anxiety-invoking phase.

Two themes that were apparent for Michelle, related to perceived pressure, were uncertainty and fear of failure. Michelle’s perceived uncertainty resulted in some anxiety during the A_1 phase, as she explained, “It was new, I didn’t really know what was going on, I knew what I had to do, but I didn’t know what was to come.” Similar to other participants in Studies 1 and 2, unfamiliarity with the procedures triggered some apprehension for Michelle during the A_1 phase. To further illustrate her perceived uncertainty during the A_1 phase, Michelle acknowledged that uncertainty diminished during the A_2 phase, “It’s not that I didn’t care, it was that I’d been through it before, it wasn’t new to me and I knew what I was doing. There was no one else watching me so I didn’t really have pressure.” From the previous quotes, Michelle implies the two low-pressure phases were different, possibly because of the discrepancy in uncertainty during the separate phases. The reduction in uncertainty during the A_2 phase may have, in turn, reduced anxiety, substantiating the contention by Martens et al. (1990) that uncertainty affects A-state.

Another theme related to perceived pressure during the interview was fear of failure (FF). Atkinson (1966) defined FF as a “predisposition to avoid failure and/or a capacity for experiencing shame or humiliation as a consequence of failure" (p. 13). Fear of failure represents a dispositional tendency to experience apprehension and anxiety in evaluative situations because individuals have learned failure is associated with aversive consequences (Conroy & Elliot, 2004). It is common to operationalise FF as a form of performance anxiety (Atkinson & Litwin, 1973; Smith & Smoll, 1990) and Michelle expressed a tendency toward FF during this study. Conroy, Poczwardowski, and Henschen (2001) recently used inductive content analysis to define aversive consequences of failure pertaining specifically to FF. Five consequences of failing were identified, including devaluing one's self-estimate, upsetting important others, important others losing interest, experiencing shame and embarrassment, and having an uncertain future. According to Birney, Burdick, and Teevan (1969), a performer's perception of the likelihood of these consequences will be directly related to FF. Thus, these five aspects of FF will be used to link Michelle's case study. If Michelle provided quotes that were representative of the aforementioned five consequences of failing, she may associate failure with existing threats, and subsequently experience FF.

During the interview, Michelle provided statements that were related to FF effects. Michelle used descriptions about herself that indicated a lack of self-confidence and a fear of devaluing one's self-estimate. Conroy et al. (2001) explained that fear of devaluing one's self-estimate involves the threat of having to change one's beliefs about the self. Typically, modifying self-estimate involves cognitive restructuring of one's abilities or beliefs in a downward (or negative) direction and may affect self-confidence. For example, when discussing her performance during the B_1 phase, Michelle stated, "When missing, I kind of ruin my self-confidence, not that I have much of it, but I start to think I'm never going to get one in." Michelle expressed tendencies toward fear of devaluing one's self-estimate by implying that her performance is generally unsuccessful and what little confidence she has is tenuous. It seemed that fear of devaluing one's self-estimate might have been associated with social aspects of the self. For instance, when Michelle discussed her experience during the A_1 phase, she stated,

> (I was) Afraid of disappointing my teammates and my dad. … Although they don't expect as much out of me because I am young, there is a couple of other young ones who are performing better and it's kind of like I'm struggling to keep up.

I interpreted the previous quote to be related to two possible FF consequences, fear of upsetting others and important others losing interest. First, Michelle was concerned about others' perceptions of her performance and impressing others. I interpreted this as fear of upsetting others because if she was unsuccessful, disappointing significant others may likely occur. Second, fear of important others losing interest may occur because, in this context, Michelle may feel that a result of failure is a decline in social acceptance because important others may perceive the performer as a failure (Conroy et al.). As Michelle continued discussing performance during the study, she explained the increased pressure during the B_1 phase, "When other people are watching me, it's like there's a pressure not to stuff up, but that kind of makes me stuff up a little bit." Michelle was concerned about embarrassment and shame, a common consequence of FF, as a result of potential poor performance. As McGregor and Elliot (2005) stated, "For individuals high in FF, achievement events are not simply opportunities to learn, and compete against others. Instead, they are threatening, judgment-oriented experiences that put one's entire self on the line. … In short, they are potentially shameful events" (p. 229). Thus, the embarrassment of being unsuccessful was a potential threat to Michelle's already degenerating self-efficacy and social acceptance.

Michelle provided additional evidence substantiating her FF tendency when she elaborated on an experience outside the current study. Michelle described an important school examination that she recently had completed in which she possibly failed. Michelle began by discussing expectations of herself and others, “I’ve always done well in school so my parents expect it and my school expects it and I expect it from myself. Because of that, it all lies on me and I know people don’t mean to be that way.” Baumeister and Steinhilber (1984) suggested that an increase in expectations from others causes pressure and can lead to inferior performance. Michelle acknowledged that self and others’ expectations were high, ultimately increasing pressure and resulting in an inability to remember critical answers to the exam. After Michelle did not perform well on the school examination, her response was quite dramatic, as she stated,

> I just kept getting more flustered and I was trying to calm myself down, but I couldn’t and I burst out into tears and had to leave the classroom. … if we hadn’t been allowed another lesson to do it I would have failed, which scares me a little, just because I had a chance to fail. … I went home that Friday night and I just cried and cried. I stepped into the shower and I couldn’t get out of the shower for 45 minutes, I was just sitting under the water in the shower.

Failing an important exam, for Michelle, created the shame and embarrassment she fears the most. The potential shame and embarrassment Michelle experienced from the exam caused her to avoid uncomfortable questions from family by escaping to a safe haven. I then asked Michelle the reason for her adverse reaction to the exam, “Because there is so much pressure. Because the lead up about how, if you don’t do well in school, you won’t get anywhere in life for me, (my future) depends on school.” This quote expresses the consequence fear of having an uncertain future and the potentially detrimental future consequences. Michelle's quotes associated with her exam, as well as previous qualitative information, provide further support that FF may be a feature of Michelle's cognitive processing under pressure.

Performance analysis. Mean performance for Michelle, when expressed in successful shots from 10 attempts, was 6.00 ± 1.26 during the A_1 phase and 5.00 ± 1.79 during the B_1 phase. This represented a 20% decrease between the A_1 and B_1 phases. During the A_2 phase, mean performance was 6.17 ± 1.17, indicating a 23% improvement between the B_1 and A_2 phases. Mean performance was 6.83 ± 0.98 during the B_2 phase, signifying an 11% increase between the A_2 and B_2 phases. Researchers (e.g., Barlow & Hersen, 1984; Kazdin, 1982) who use SCD's have suggested that if, in this context, a similar mean performance during the low-pressure phases and a subsequent decrease in performance during the high-pressure phase (i.e., B_1 phase) occurs, the intervention was effective in disrupting usual performance. Mean performance increased by only 3% from the A_1 to the A_2 phase, whereas the B_1 phase changed considerably. Thus, the pressure manipulation was effective in disrupting the usual performance pattern. The change in mean performance during the high-pressure phases was also calculated to determine the effectiveness of the intervention. Mean performance increased by 36% between the B_1 and B_2 phase when using the music intervention during the B_2 phase (see Figure 5.2). Similar to Studies 1 and 2, the reader is referred to Appendix N for calculations of participants' celeration line level.

The slope of the celeration line during the A_1 phase was × 1.33 and the slope of the celeration line for the B_1 phase was ÷ 1.33. The resultant reverse change in slope was ÷ 1.77, a decreasing rate of change between the A_1 and B_1 phases. During the A_2 phase, the slope of the celeration line was × 1.33. This reflected an increasing change in slope of

1.77 across the B_1 and A_2 phases. During the B_2 phase, the slope of the celeration line was steady, representing a slope of 1.00. This was a decreasing change in slope of 1.33 between the final two phases.

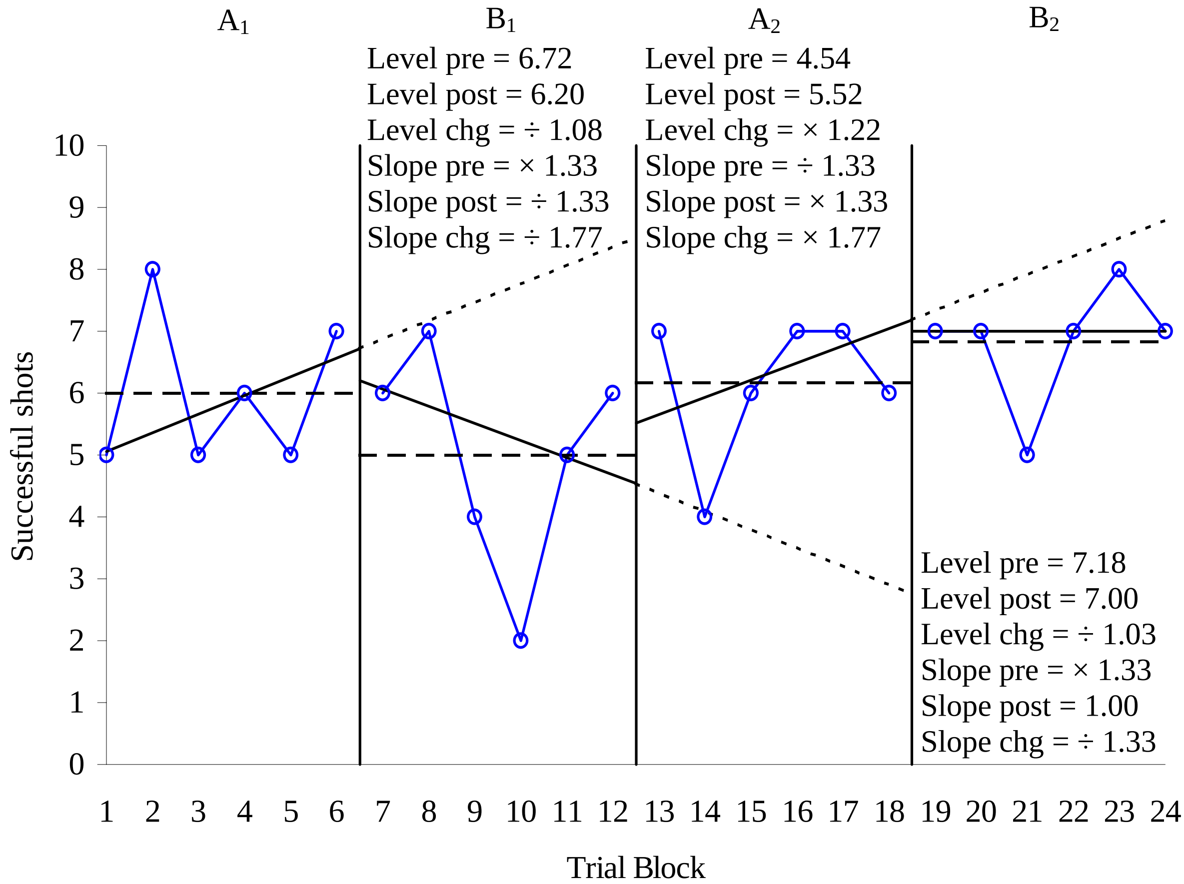

Figure 5.2. Split-middle analysis for Michelle.

Note. In all performance figures, solid vertical lines represent the point of phase change, solid black lines for each phase indicate celeration lines, dotted lines signify projected celeration lines, and horizontal dashed lines in each phase indicate mean performance.

In review, the pressure manipulation clearly affected Michelle's performance. This was evident from three performance indicators: mean performance, slope direction, and variability. First, a comparison of mean performance indicated that the expected high-low-high performance pattern for a CS participant was obtained during the initial three phases. Performance levels were similar during the A_1 and A_2 phases and were both above the B_1

phase, thus, indicating the pressure manipulation was effective. Second, a reverse change in slope from the rising slope directions of the A_1 and A_2 phases to a declining slope direction during the B_1 phase also indicated the pressure manipulation negatively influenced performance. Finally, the increase in variability during the B_1 phase in comparison to the other phases further indicates the success of the pressure manipulation. Mean performance increased by 36% from the B_1 to the B_2 phase, indicating a considerable performance improvement when listening to the music intervention under pressure. Thus, Michelle's performance results in addition to the DM-CSAI-2 results indicate that listening to the lyrics of music under pressure, as a choking intervention, may be beneficial to performance.

Interview analysis: Cognitive themes. Two themes that were evident during the interview were attention to irrelevant information, and perceived benefits of the music. During the B_1 phase, it seems that Michelle's attention was occupied by irrelevant information (at least from a performance perspective), such as presence of the audience, social comparison, outcome focus, and explicit monitoring of execution. The audience was a prevalent source of pressure for Michelle,

> The most pressure was the people watching me. … I didn't do as well in that one (B_1 phase) because I lost my head because everyone was watching me. … When I miss a few, I start to think, "Oh, my god, I'm going to miss them all, everyone is going to be looking at me going, 'oh my god she's not shooting well.'"

It appears that Michelle's tendency toward a results-oriented focus resulted in social comparisons during the B_1 phase, for example,

> I was thinking about the people watching me and the pressure, but also I was just thinking that I don't know if my teammates would have handled that sort of pressure

> like me. I know some of ours (teammates) would bomb out (decrease performance) a little bit. If they missed shot after shot, they would just lose their head.

Duval and Wicklund (1972) have suggested that increased comparisons of self to other standards might increase the likelihood of S-A. For Michelle, social comparison may help to verify her ability, or justify her performance response under pressure.

It seems that Michelle increased effort as a result of perceived pressure and motivation to avoid failure. For example, Michelle stated that she was working hard to perform well during the B_1 phase,

> If they (the shots) are not (going in), which was the case in Session 2. … I try and just focus more and do what I am supposed to do and that kind of pushes me to work hard, but then I *am* working harder and it is *still* not working.

This quote supports findings by Carver and Scheier (1981), who suggested that self-focusing can result in increased efforts when the desired goal appears to be attainable. The increase in public S-A may have contributed to Michelle increasing effort to perform more accurately. In the final portion of the previous quote, Michelle emphasised her effort by accentuating the words “am” and “still.” In fact, when asked what she meant by “do what I am supposed to do,” she explained,

> Just focus on what I’m doing, like how I am shooting, where’s my feet, not using too much left hand as my dad says all the time, things like that. … When I miss a few, I’d think, “ok, settle down and just try and go back to basics,” but when I go back to basics and still missing, it’s like even if I do that, I am going to miss.

Apparently, Michelle’s increased effort may have led to increased explicit monitoring of execution. In fact, in a recent article, Wallace et al. (2005) described the process of choking by incorporated effort and conscious processing,

> Performance pressure normally increases the performer's motivation to achieve his or her desired goal. … Therefore, pressure should generally cause an increase in effort. … Performers who care deeply about the outcome of their performance naturally try to do everything in their power to ensure that they execute each element of their task as well as possible. Unfortunately for them, their efforts to ensure success can ironically cause them to fail. When individuals attempt to consciously control aspects of their performance that they normally execute automatically, this change in their performance routine often results in sub-par performance. (p. 430-431)

Michelle's interview results provide further evidence in favour of the self-focus model of choking (e.g., Baumeister, 1984). For Michelle, it seems that performance pressure elevated S-A, which, in turn, increased the need to perform correctly. In an attempt to ensure proper execution of performance, Michelle increased effort and attention to skill processes and conscious control. As the mechanics of skill-based tasks become well developed, increases in effort and motivation are unlikely to directly affect performance, except in interfering with automaticity of execution (Baumeister et al., 1990). The combination of an increase in effort, S-A, and conscious control may have paradoxically affected performance under pressure.

Before discussing information related to the potential benefits of the music, I include qualifying details regarding Michelle's attentiveness to the music during the B_2 phase. During the interview, I asked participants to recall and recite the words of the song used in the B_2 phase. This was essentially a manipulation check to determine whether participants listened to the words assiduously. If participants could not remember the exact words of the song, I asked them to provide the meaning of the song. Explicit, retrospective retrieval of information from memory is dependent on attention at encoding (Craik, Govini, Naveh-Benjamin, & Anderson, 1996). Attention to the song's content would enable working memory to process information, allowing the song's meaning to transfer into long-term memory. Retrieval and articulation of the song's content could then be assessed. When discussing the song's content, Michelle stated, "I remember, always look on the bright side of life, always look on the light side of life. If there's something you forgot, and then it kind of bagged you. I can't remember the words exactly." It appears that Michelle only partially remembered the words of the song, therefore, I asked her to recall the song's meaning.

> It was saying that there (are) always things that are going to go wrong and you just focus on the bright side of life (Michelle chuckled). Then even if you forget things or things don't go your way, if you just kind of poke fun at yourself or, just get over it, you'll be fine.

Michelle was unable to recall the exact words, however, she did provide a close interpretation of the meaning of the song. In fact, the song was so meaningful to Michelle that she apparently incorporated the song into a situation outside the study.

> It's funny, I was playing Around the World (a basketball game) with this girl, she kind of intimidates me, but I had that song in my head and I beat her (chuckled). I thought of the song and then I laughed because the words are so funny, and then I just thought, who cares.

Michelle used the song to cognitively restructure a situation that was anxiety evoking with positive results. It was encouraging that Michelle could readily apply the song's essential meaning to help her in a situation outside the study.

A second, and related, theme evident from the interview was benefits of the music. Michelle readily discussed a number of benefits associated with listening to the words of the music during the B_2 phase, including reduced S-A, cognitive restructuring, and decreased pressure. She stated that one benefit was the ability to block out the audience,

> Listening to the music while doing the shooting was less to think about and less to notice and be distracted by. If I didn't have the music I'd be listening to other people around me or looking around me thinking, "oh my god, they are looking at me." I mean, with the music I hardly ever looked at other people.

I interpreted this to mean that the music helped to reduce S-A and effectively replaced the potentially negative effects of being observed under pressure. As discussed in Chapter 2, attention is a limited resource in which all activities compete (Kahneman, 1973). The proportion of available attentional capacity may be dependent on how well the skill is learned, with experienced performers having more attentional space available due to movement automaticity (Shiffrin & Schneider, 1977). Thus, replacing the potentially negative distractions of public S-A with, as Michelle stated, the "good distraction" of music helped to distract attention from the self.

It appears that Michelle also decreased her focus on results during the B_2 phase, as she compared her cognitions during the high-pressure phases.

> The first one (B_1 phase), I was really focused on not missing… compare that with Session 4 (B_2 phase) and it wasn't that I didn't care, it was just a lighter note. I kind of said to myself, "if I get them in, I get them in. If I get them in, I get a bit of money (Michelle chuckled), if not, I haven't lost anything."

One benefit of listening to the words of the music was that Michelle used cognitive restructuring to reduce her focus on results by stating, "If I get them in, I get them in." It was interesting that the song had an implied message to cognitive restructuring (i.e., always look on the bright side of life). Performance results were not such a prominent factor in determining Michelle's success during the B_2 phase. In fact, as a direct result of her being less results focused, using cognitive restructuring, and being more relaxed, Michelle stated, "I think it increased my accuracy. … It just gave me something else to think about." When experienced CS athletes, such as Michelle, listen to music under pressure, accuracy can improve because the music acts as a replacement strategy for irrelevant cognitions and re-establishes automaticity.

General summary of Michelle. As illustrated from the DM-CSAI-2 and interview results, Michelle perceived an increase in anxiety prior to and during the high-pressure phases in comparison to the low-pressure phases. The DM-CSAI-2 results indicated that Michelle increased cognitive anxiety and somatic anxiety prior to the high-pressure phases. During the initial three phases, Michelle's mean performance was typical of a CS participant illustrated by the high-low-high performance pattern. During the B_1 phase, Michelle experienced a considerable 20% decrease in mean performance compared to the A_1 phase. This decrement in performance in the B_1 phase indicates that Michelle experienced choking. Once the music intervention was included in the B_2 phase, Michelle was more accurate than the three other phases. Similar to most participants in Study 2, Michelle experienced comparable levels of pressure prior to the B_2 phase commencing, yet, mean performance improved by a considerable 36% during the B_2 phase in comparison to the B_1 phase. This substantial increase in performance during the B_2 phase provides support for the contention that music was a suitable (i.e., successful) intervention to buffer likely choking effects.

During the interview, a number of themes were apparent that were associated with the pressure and also Michelle's cognitive processes, including uncertainty, fear of failure (FF), attention to irrelevant information, and benefits of the music. It seems that FF related to the pressure manipulation may have influenced Michelle's cognitions associated with the B_1 phase, causing her to increase effort and leading to a subsequent increase in explicit monitoring in order to ensure proper execution. Paradoxically, the increase in explicit monitoring disrupted automaticity at Michelle's experienced level, resulting in deleterious performance effects during the B_1 phase. A number of self-reported benefits of the music included reduced S-A, increased cognitive restructuring, and decreased pressure. From the interview, Michelle reported decreased S-A and concomitantly reduced her results-oriented attitude during the B_2 phase. The music also enabled Michelle to cognitively restructure the pressure.

CS Participant- Nicole

Participant profile. Nicole was 19 years old with 8 years of basketball playing experience. She had played for a domestic (club) team for 5 years before advancing to a state division team, where she had played for the past 3 years. Nicole was purposively sampled as a CS participant because she was high in S-C, high in A-trait, and primarily used approach coping. Nicole's scores were 56 on the SCS (75th to 100th percentile), 69 on the SAS (75th to 100th percentile), and + 13 on the CSIA differential score (75th to 100th percentile).

Pressure manipulation. Visual inspection of Figure 5.3 shows that Nicole's intensity scores for cognitive anxiety leading into the A_1, B_1, A_2, and B_2 phases were 23, 28, 19, and 25 and intensity scores for somatic anxiety prior to the four phases were 13, 19, 14, and 16, respectively. Nicole, thus, experienced a modest increase in intensity of cognitive and somatic anxiety prior to the high-pressure phases. For Nicole, cognitive anxiety increased from moderate absolute levels prior to the A_1, A_2, and B_2 phases to high levels prior to the B_1 phase. Similarly, somatic anxiety increased from low absolute levels preceding the A_1, A_2, and B_2 phases to moderate levels preceding the B_1 phase.

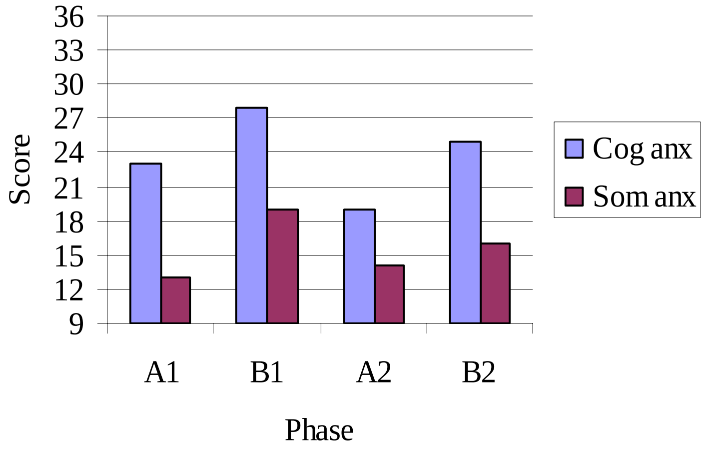

Figure 5.3. Cognitive and somatic anxiety intensity scores for Nicole.

Interview analysis: Pressure manipulation. From the interview, it appears that Nicole experienced relatively low, but perceptible, levels of pressure during the A_1 and A_2 phases, as she stated,

> I suppose (I was) a little bit nervous (in the A_1 phase). I didn't want to perform badly in front of another person (researcher) and I also didn't know what to expect. … Session 3 (A_2 phase) was like Session 1 (A_1 phase), but I knew more about what to expect and it wasn't such a big thing. I was less nervous (A_2 phase) than Session 1.

Similar to most participants who took part in the current studies, the low-pressure phases were designed to elicit comparably, minimal pressure, yet, the A_1 phase was perceived as more anxiety inducing because of the uncertainty component. Reminiscent of a number of other participants in these studies, Nicole's results support the assertion by Martens et al. (1990) that uncertainty increases the perception of A-state.

As Nicole explained the pressure associated with the other phases, it was clear that perceived pressure intensified during the B_1 phase.

> Session 2 (B_1 phase), I was a lot more nervous because my whole team was around me (eight audience members). When I am waiting to do a shot, I look around, so I felt like they'd be watching. I could always see them out of the corner of my eye. I just knew they were there the whole time and it just made me feel really uneasy.

Individuals high in S-C believe themselves to be the target of others' observations (e.g., Fenigstein, 1979; Woody, 1996). Audience members were instructed not to interact with the participant (or other audience members) and simply observed with interest the participant's performance. Nicole's predisposition to S-C was reflected in her sensitivity to the audience's perceived reactions. From Nicole's previous excerpt, the higher level of anxiety during the B_1 phase was primarily because she perceived the audience as a potential threat. The threat was probably because she feared a negative evaluation from the audience. Passer (1983) explained that fear of evaluation is related to the expectation of receiving negative evaluation in the event of poor performance. Apparently, Nicole's fear of evaluation during the B_1 phase may have developed from perceptions of a negative team climate,

> I think the negativity of this team, they criticise you and judge you. If you do something wrong, they are "come on" in a bad way, rather than "oh, it's alright, you can do it again next time" and positive. … Even their attitude at training, they would rather you stuff up to make themselves look better than to tell you what you are doing wrong, so you won't do that in a game. … That made me feel a little uneasy and that made me sort of not take as long as I should have and not concentrate on the shot and just get it over, so they wouldn't criticise.

Nicole's fear of evaluation perhaps originated from negative perceptions of the audience's judgments, perceiving her teammates to almost prefer (i.e., saying "come on" in a bad way) other teammates to make mistakes. This was exacerbated because of constant public S-A during the B_1 phase. The apprehension related to her teammates' potential negative judgments led Nicole to accelerate her shot attempts to escape the aversive situation. At the time of the study, Nicole stated that her team's win-loss record was 0 – 6, indirectly indicating a lack of team cohesion.

It seems that the pressure was different in the B_2 phase, as Nicole compared her anxiety levels in the high-pressure phases.

> In Session 4 (B_2 phase), when I saw that there was going to be people watching… it sort of made me feel uneasy. I had a lot of pressure, I was thinking I have to get these shots in. It (pressure during the B_2 phase) wasn't as bad (as the B_1 phase) because I was listening to the music and I didn't focus on them (audience), but I was still nervous because they were watching me again.

Nicole discusses how the music helped reduce negative distractions during the B_2 phase. Thus, the qualitative results and reported DM-CSAI-2 complement one another, indicating that Nicole experienced the expected increases in perceived pressure prior to and during the B_1 and B_2 phases. Combining both pressure manipulation measures provides additional support for the contention that the pressure manipulation was effective.

Performance analysis. Mean performance for Nicole was 5.50 ± 1.05 in the A_1 phase and was 3.67 ± 1.37 during the B_1 phase. This represented a 50% performance decrement between the A_1 and B_1 phase. During the A_2 phase, performance increased to 5.67 ± 1.03, representing a 55% increase from the B_1 to A_2 phase. During the B_2 phase, mean performance was 5.83 ± 1.60, a 4% improvement from the A_2 to B_2 phase. Mean performance increased by only 3% from the A_1 to the A_2 phase, indicating the pressure manipulation was effective because mean performance of the B_1 phase was different in comparison to the A_1 and A_2 phases. Performance improved by 59% from the B_1 to the B_2 phase, a substantial increase when the music intervention was introduced (see Figure 5.4).

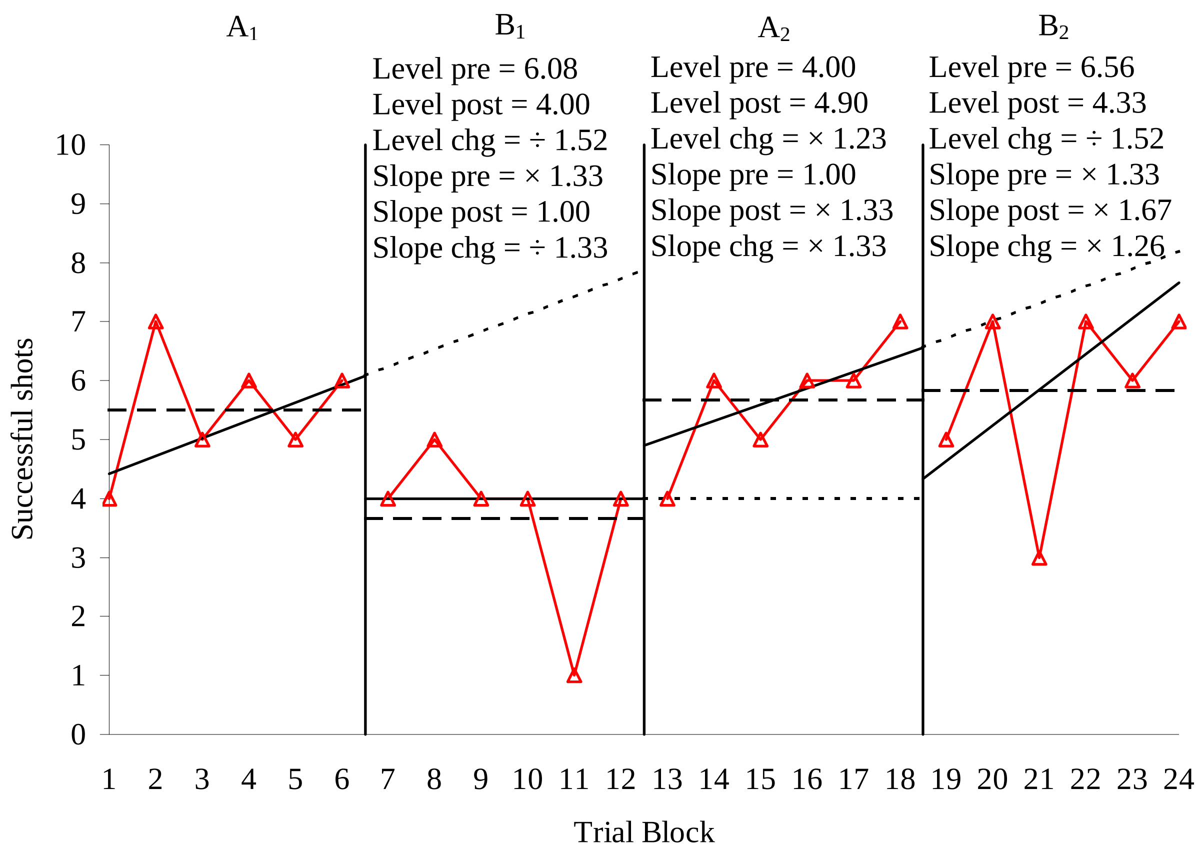

Figure 5.4. Split-middle analysis for Nicole.

The slope of the trend line during the A_1 phase was × 1.33, whereas the slope of the trend line was steady at 1.00 during the B_1 phase. This signified a decreasing change in slope of 1.33 between the A_1 and B_1 phase. During the A_2 phase, the slope of the trend line was × 1.33, indicating an increasing change in slope of 1.33 between the B_1 and A_2 phase. The slope of the trend line during the B_2 phase was × 1.67, demonstrating an increasing change in slope of 1.26 from the A_2 to the B_2 phase.

In summary, the pressure manipulation clearly affected Nicole's performance, illustrated by the 50% decrement in performance from the A_1 to B_1 phase, the similar mean performance in the A_1 and A_2 phases, and the reported DM-CSAI-2 and interview results. For Nicole, mean performance improved a substantial 59% from the B_1 to the B_2 phase, indicating a substantial performance improvement when the music intervention was introduced under pressure. Nicole's performance results combined with the pressure manipulation results indicate that listening to music under pressure, as an intervention, may reduce the likelihood of choking.

Interview analysis: Cognitive themes. During the interview, Nicole was not as forthcoming and descriptive about the experience as some other participants. Two apparent themes were negative cognitions and avoidance coping. The theme negative cognitions was mainly associated with reported experiences during the B_1 phase. Apparently, the audience members' private judgments led Nicole to experience negative cognitions,

> In Session 2, just because I knew they (audience members) were looking at me or I felt like they were, even though they weren't saying anything about me, I could feel they were criticising me. So, they made me feel like crap while I was shooting and then I wasn't getting them in, so it was just all negative.

An increase in public S-A was evident as a result of Nicole's constant attention to the audience (see also *Interview analysis: Pressure manipulation*). The previous quote supports Woody's (1996) point that self-focused attention increases negative cognitions for some individuals. According to Woody, excessive self-focusing directs attentional resources to the tasks of monitoring arousal, assessing ongoing performance, appraising others' perceptions, and anticipating evaluation consequences. Thus, the performer becomes “busy” monitoring a range of responses. For Nicole, frequent surveillance of the audience reduced her capacity to attend to the shooting task. To further elaborate, Nicole compared her concentration between the A_1 and B_1 phases,

> (During the B_1 phase) I was thinking about everything else but the ball going through the hoop, (I was) thinking about all the outside interferences and people around me and that I was doing crap and everything, but actually concentrating about the ball going in. Whereas, in Session 1 (A_1 phase), I was trying to get it in and concentrate on the shots and there wasn’t all the interferences around me.

Choosing relevant information is one fundamental principle to selective performance concentration and a determinant of optimal performance. As Abernethy (2001) suggested, “Selective attention is the general term used to describe this process by which certain information is preferentially selected for detailed processing while other information is ignored” (p. 67). Selective attention involves two major factors: the ability to focus attention without being overloaded or distracted and the ability to direct that focus to the most important stimuli for successfully performing the task (Summers & Ford, 1995). It appears that, during the B_1 phase, Nicole found it difficult to select relevant information, and was preoccupied by irrelevant information indicative of S-A, as she stated, “I didn’t do well at all. I just can’t concentrate when I’m in that train of thought. … If one bad thing happens, I tend to drop my head, I can’t keep on going with it.” This statement reflects a lack of resiliency when experiencing poor performance. This seems somewhat indicative of Nicole’s response to pressure, as she frankly, self-confessed, “I was thinking about how I know that outside pressure can get to me as a player, I know it does.”

Similar to Michelle, before discussing themes related to the avoidance coping, it was essential to determine whether Nicole was listening to the words of the music during the

B_2 phase. During the interview, Nicole attempted to recite the words of the song, “I can only remember the chorus (Nicole seemed embarrassed to say the words here). The chorus was always look on the bright side of life and it repeated again before going on to the rest.” Nicole did not recite the song’s content in its entirety, but did provide a short description of the song’s meaning, “Even if things don’t go well in your life, keep your head up and keep smiling and they might come good.” It seems that Nicole was listening to the words of the song while shooting.

A second theme evident from the interview, mainly expressed during the B_2 phase, was avoidance coping. For Nicole, it seems that the intention of the prescribed music to operate as an avoidance coping mechanism helped minimise distraction. For example, Nicole stated, “I found that when I really listened to the music and I started singing it, that’s when I did better because I was concentrating on only that and not people watching.” The DT was effective, perhaps paradoxically, when intense primary concentration was allocated to listening to the words of the music. Apparently, the music promoted a decrease in nervousness during the B_2 phase, as Nicole stated, “It (music) probably made me not so nervous because I was sort of in another place. I was only thinking about shooting and the music and I wasn’t thinking about outside things.” When I asked her to elaborate on what “in another place” meant, she stated,

> You know how you’re just thinking about the ball going in the hoop and the music? That is all I was thinking about. I wasn’t thinking, I was sort of in my own little world with the basketball (Nicole chuckled). … I didn’t really look at the people that were watching me today (B_2 phase). It was all about the music and the basketball.

Nicole mentioned the separation she felt between the audience and her shooting performance during the B_2 phase. I interpreted this distancing between her and the audience as a decrease in public S-A and an ability to concentrate more effectively during the B_2 phase.

> Well, I only listened to that (the music), that's all I could hear, I couldn't hear people talking or anything around me, so I sort of could forget that they (audience members) were around me, whereas in Session 2 (B_1 phase), I could hear them talking and that was a constant reminder that they were there.

Nicole's comparison between the high-pressure phases indicates that the music provided a cocooning effect when she listened to it. That is, the music created a type of isolation from the audience, shielding out external factors and allowing her to maintain concentration. For Nicole, high-quality concentration involved attention to the shooting task, as Nicole described how the music facilitated performance.

> I was able to concentrate on the basket more, I could just focus on that (the basket) and no outside noises could take my concentration away to anything, like if I had heard a voice, I would have known that person was there. Even if I think about it for a second, it takes concentration away from the basket and my shot.

This quote illustrates that the music provided a means of channelling attention away from the distracting audience members. When asked whether she noticed the audience during the B_2 phase, she stated, "In Session 2, I was looking at them (the audience) a lot, but I can't even remember what they (the audience) were doing or anything today (B_2 phase). I really wasn't concentrating on them." Arguably, music being irrelevant may divert attention away from task-relevant information. It was beneficial to performance in this instance possibly because the music narrowed attention, and helped to block out the audience.

General summary of Nicole. The DM-CSAI-2 and interview results indicated that Nicole increased anxiety prior to and during the high-pressure phases in comparison to the low-pressure phases. In the interview, Nicole explained that perceived pressure was heightened during the A_1 and B_1 phases because they were the novel experiences. Similar to other athletes who participated in these studies, Nicole found the A_1 and B_1 phases to be more anxiety inducing possibly because of the uncertainty of the procedures and because of the pressure, respectively. The perceived pressure in the B_2 phase, however, was not as acute because the music diverted attention from the audience. Generally, the DM-CSAI-2 and interview results provide support that the pressure manipulation was effective in increasing pressure during the high-pressure phases.

During the B_1 phase, Nicole's mean performance decreased by 20% compared to the A_1 phase. The considerable decrease in performance during the B_1 phase along with a successful pressure manipulation indicated that Nicole succumbed to choking. During the B_2 phase, conversely, Nicole was more successful, using the music intervention under pressure. In comparing the high-pressure phases, she increased mean performance by a large 59% during the B_2 phase compared to the B_1 phase. Nicole's performance results during the B_2 phase were similar to performance levels of the low-pressure phases, providing additional support for music as a suitable intervention for choking.

During the interview, two apparent themes were negative cognitions and avoidance coping. The theme negative cognitions was evident during the B_1 phase and was related to Nicole's predisposition to S-C. It seems that as anxiety increased, attention was diverted to irrelevant information, such as S-A and negative cognitions. A second theme that was evident, related to the B_2 phase, was avoidance coping. The theme avoidance coping was related to Nicole's use of the prescribed music intervention. Listening to the words of the music helped Nicole decrease S-A and, in turn, diminished nervousness during the B_2 phase. In reality, the prescribed music provided Nicole with a method to psychologically distance herself from the audience. I interpreted this distancing as a decrease in S-A that resulted in improved selective attention strategies and hence more accurate performance.

CS Participant- Olivia

Participant profile. Olivia was 20 years old and had played basketball for 8 years. She had played in a high school team for 5 years and then advanced to a state division team, where she had played for 3 years. Olivia was purposively sampled as a CS participant because she was high in S-C, high in A-trait, and typically used approach coping. Specifically, Olivia's scores were 51 on the SCS (75th to 100th percentile), 47 on the SAS (75th to 100th percentile), and 0 on the CSIA differential score (50th to 75th percentile).

Pressure manipulation. Visual inspection of Figure 5.5 shows that Olivia's intensity scores for cognitive anxiety prior to the A_1, B_1, A_2, and B_2 phases were 18, 27, 21, and 30, and intensity scores for somatic anxiety just before the four phases were 14, 24, 12, and 24, respectively. Clearly, Olivia experienced a substantial elevation in intensity of multidimensional A-state preceding the high-pressure phases in comparison to the low-pressure phases. For Olivia, cognitive anxiety increased from moderate absolute levels prior to the A_1 and A_2 phases to high levels prior to the B_1 and B_2 phases. In addition, somatic anxiety intensified from low absolute levels prior to the A_1 and A_2 phases to moderate levels prior to the B_1 and B_2 phases.

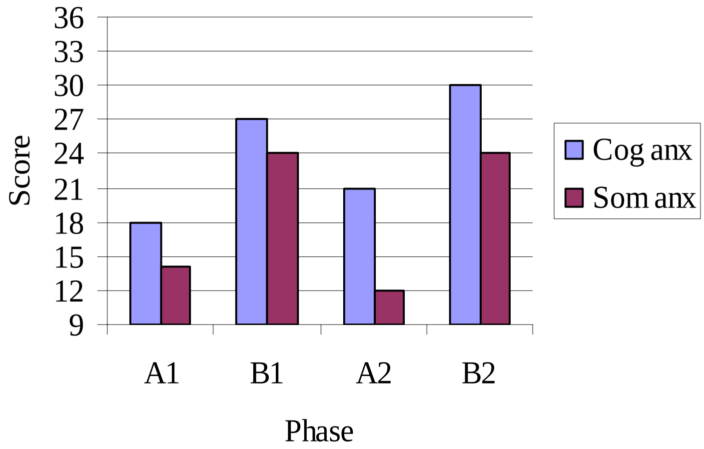

Figure 5.5. Cognitive and somatic anxiety intensity scores for Olivia.

Interview analysis: Pressure manipulation. Olivia explained her anxiety by using expressions such as “I was nervous” or “I was relaxed” during the low-pressure phases, yet both cognitive and somatic anxiety were prevalent when explaining experiences during the high-pressure phases. For example, when asked to compare her anxiety during the initial three phases, Olivia stated,

> (During the A_1 phase) I was a little bit nervous mainly because I didn’t know you or really what was expected until I actually had to do it. … During the second session (B_1 phase), I was relaxed inside, like I wasn’t jittery or nervous or my stomach wasn’t turning or anything, but I was more worried about what people were going to think of me. … Session 3 (A_2 phase) I knew more about it, so I wasn’t as nervous as the first session (A_1 phase).

Similar to other participants in these three studies, Olivia experienced some anxiety during the A_1 phase because she was unacquainted with me and uncertain about the procedures of the study. Thus, similar to most participants, Olivia experienced uncertainty in the A_1 phase. She also anticipated that other participants would be concurrently involved in the study and experienced some surprise when she realised this would not be the case. Also, like other participants in the three studies, the A_2 phase was the least anxiety provoking for Olivia. Unlike other participants, however, Olivia perceived the B_2 phase as more anxiety inducing than the B_1 phase. When I asked Olivia to compare her anxiety levels during the high-pressure phases, she explained,

> When I first got into the gym in Session 4 (B_2 phase), I was really nervous and didn't really want to do it in front of people because of my last session (her perception of performing poorly in A_2 phase), (I had) clammy palms and I was really worried about what people were going to think. Then when I was getting into the music in the last 30 shots, I was just relaxed and I ended up smiling at the end because I was so relaxed and having fun (Olivia chuckles). … Session 2 (B_1 phase), I was worried about what people thought, but I'd also come off a pretty good session, so there was a bit of confidence. I wasn't as nervous or butterflies or anything like that.

It appears that A-state possibly increased during the B_2 phase because Olivia had difficulty disregarding her previous poor performance. That is, she was carrying a residual effect associated with the A_2 phase. Unlike previous explanations of her anxiety, Olivia also associated nervousness during the B_2 phase with a combination of cognitive and somatic anxiety expressions (e.g., clammy palms and worried about what people were going to think), rather than exclusively to cognitive anxiety symptoms. Nevertheless, Olivia reported that her anxiety decreased after listening to the lyrics of the music during the final 30 shots of the B_2 phase (see *Interview analysis: Cognitive themes*). Olivia's interview corresponds with reported DM-CSAI-2 results, confirming that she increased anxiety prior to and during the high-pressure phases with the greatest anxiety levels occurring prior to the B_2 phase commencing.

Performance analysis. Mean performance for Olivia decreased from 4.83 ± 0.98 in the A_1 phase to 4.00 ± 1.26 during the B_1 phase, representing a 21% performance decrease from the A_1 to the B_1 phase. During the A_2 phase, mean performance was 5.50 ± 1.52, a 38% performance improvement between the B_1 and A_2 phase. During the B_2 phase, mean performance was 5.83 ± 2.64, which was a 6% performance increase from the A_2 to the B_2 phase. Mean performance increased by 14% from the A_1 to the A_2 phase. Although mean performance was slightly higher in the A_2 phase (perhaps due to uncertainty in the A_1 phase), a classic pattern occurred, with similar performances in the low-pressure phases and a performance decrease during the B_1 phase, indicating the pressure manipulation was effective. Mean performance increased by 46% from the B_1 to the B_2 phase, indicating Olivia was 46% more successful under pressure when listening to music (see Figure 5.6).

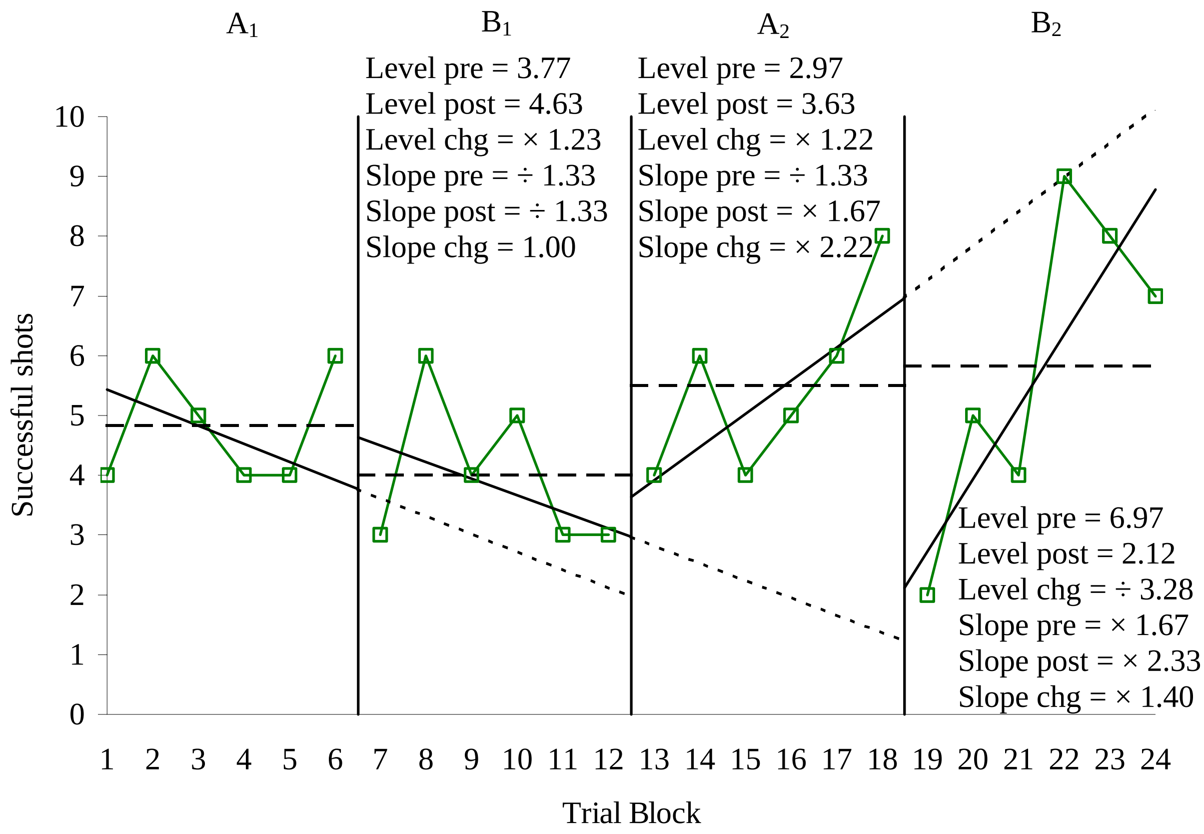

Figure 5.6. Split-middle analysis for Olivia.

The slope of the celeration line in the A_1 phase was ÷ 1.33 and the slope of the celeration line in the B_1 phase was ÷ 1.33, signifying the slope remained steady (slope of 1.00) between the A_1 and B_1 phase. During the A_2 phase, the slope of the celeration line was × 1.67, representing an increasing change in slope of 2.22. The slope of the celeration line during the B_2 phase was × 2.33, an increasing change in slope of 1.40.

In summary, two effects provide evidence that the pressure manipulation affected Olivia's performance. First, the mean performance change from similar performance during the low-pressure phases to a 21% performance decrease during the B_1 phase may indicate that the pressure manipulation was effective (e.g., Barlow & Hersen, 1984; Kazdin, 1982). Second, the reported DM-CSAI-2 combined with the interview results relating to the B_1 phase provide evidence the pressure manipulation negatively affected performance. Mean performance increased by 46% from the B_1 to the B_2 phase, indicating a considerable performance improvement under pressure when the music was introduced. The increase in performance, however, was perhaps suppressed by Olivia's performance during the initial 30 shots of the B_2 phase. It appears that the pressure manipulation may have initially affected Olivia's performance in the first half of the B_2 phase.

Interview analysis: Cognitive themes. During the interview, three themes were evident for Olivia, including public S-A, approach coping, and performance fluctuations. Similar to most CS participants in this series of studies, public S-A was evident during the B_1 phase based on Olivia's explanation of her cognitions about the audience's presence. When asked about her experience, Olivia stated, "I was pretty self-conscious and worrying about what other people were thinking, like if they were criticising me or not… having the people watching affected me. It was a distraction." Public S-A, thus, led to negative cognitions related to the audience and diverted attention away from the shooting task.

Borkovec, Ray, and Stöber (1998) explained, "Worry involves a predominance of negative verbal thought activity. When we worry, we are talking to ourselves about negative events that we are afraid might happen in the future" (p. 562). It seems that Olivia feared the negative evaluation and social criticism associated with her ineffective efforts. As Borkovec et al. further stated, "It is not so much another's negative evaluation that is feared but rather what might happen because of that evaluation" (p. 567). For Olivia, the deeper meaning associated with public evaluation was possibly social isolation or public humiliation, as she stated,

> I was worried about what everyone else thought, if I didn't get my shots in. … I was anticipating what was going to happen and not focusing on the actual shots. … I was worried about them being disappointed in me.

As a result, her increase in worry extended to other aspects of performance, such as performance outcome, "I was worried about what score I was going to get and that was really affecting the way I was shooting."

Olivia was purposively selected for this study, in part, because she predominantly uses approach coping. As the interview proceeded, Olivia explained that she used approach coping strategies during the B_1 phase in an attempt to manage the worrisome thoughts related to performance outcome and to deal with the audience during the B_1 phase.

> Knowing some of the people, I knew that, after taking my shots, I would be able to go up to them and say, "Yeah I felt like this, I felt like that, and that's why I didn't get my shots in." … I like to be able to rectify why I didn't get any shots in.

Olivia's method of coping, in this pressure situation, was the desire, but the inability to actively confront the perceived problem explaining to the audience what had happened; this is indicative of typical approach coping.

According to Hass and Eisenstadt (1991), situations that promote S-A, such as the presence of audiences and video cameras, normally produce a comparison of the person's belief about self and the person's ideal self. For Olivia, the increase in being publicly scrutinised perhaps increased S-A and concerns about technical mistakes, leading to an increase in cognitions about explicit monitoring of execution. Explicit monitoring was evident as she compared her thought processes during the A_1 and B_1 phases,

> I was just more focused on my technique, rather than actually getting the ball in during Session 2 (B_1 phase)… so trying to use the same technique and just hoping that it would go in, whereas in the first session (A_1 phase), I was more focused on getting the ball in, aiming for my spot over and over because I knew that's how to get the shot in, rather than finding the right technique.

It seems that worry was the cause of "finding the right technique," as Olivia stated, "I was worried about what people were going to think of me and how I took my shots." Possibly because of her inherent focus on the audience's perception, Olivia also became concerned technique from a public appearance perspective. Worrying about the audience's perception possibly led Olivia to try and perform the skill properly, rather than focusing externally. I interpreted this as Olivia using an external focus of attention (FOA) during the A_1 phase (i.e., "aiming for my spot over and over") and an internal FOA during the B_1 phase (i.e., "finding the right technique"). A number of studies (e.g., Perkins-Ceccato et al., 2003; Wülf et al., 1998; Wülf et al., 1999; Wülf, et al., 2000) have provided support that participants are more successful when an external FOA compared to an internal FOA.

Perkins-Ceccato et al. found that the effect of FOA on performance is dependent on skill level, with an external FOA more beneficial to performance for experienced performers. For Olivia, it appears that an internal FOA, in the form of explicit processing of execution, was detrimental to performance under pressure.

Similar to other participants in this study, I asked Olivia about the content of the song to determine her knowledge and associated memory. When asked what the song meant, Olivia stated, “Always look on the bright side of life, and that even when you are down, it is just ridiculous to get down, it is just easier to be happy again and to whistle while you sing.” Olivia did not recite the words of the song, however, she clearly understood the song’s content. Again, this illustrates how the song “Always Look on the Bright Side of Life” is not just a distraction device, but also implies a positive method of cognitive restructuring. She also provided an interesting reflection about her attention during the final 30 shots by saying, “I just started learning the words and I started singing it during the last 30 shots.” Apparently, singing the words helped her to understand the meaning of the lyrics, helping her to implicitly use cognitive restructuring.

During the B_2 phase, the theme performance fluctuations was apparent. Similar to Carol in Study 1, Olivia experienced performance fluctuations because of the difficulty in maintaining attention on the task during the B_2 phase. I had (as with all participants) requested that Olivia attentively listen to the music, however, she stated that attention was initially diverted away from the music.

> During the first 30 shots, I wasn’t really listening to the music at all, it was just there, but then when I had another 30 shots, I stopped thinking about my technique and I was just going with the flow and focusing on the words and the music.

Clearly, Olivia was in a similar psychological state at the commencement of the B_2 phase as she was during the B_1 phase, “I know at the start, the first 30 shots I didn’t do as well. That’s because I kept looking at the people and wondering what they were thinking and… (thinking) I’m going to look like a loser or something (Olivia chuckled).” Evidently, previous performance may have affected Olivia’s focus of attention and, as a result, the public S-A she experienced superseded my explicit instructions to attend to the words of the music. It appears that, similar to the B_1 phase cognitions, heightened S-A increased Olivia’s worry and focus on a perception of the audience’s judgments and criticisms. When I asked Olivia the reason she did not attend to the music, she explained, “I originally thought it would be a negative distraction, so I blocked it (the music) out during the first 30 shots.” This quote also indicates, like other participants in this study and Study 2, the effectiveness of the intervention was dependent on Olivia’s commitment to follow the planned intervention. Intuitively, athletes may suspect that the music is a distraction from task relevant attention and, thus, ignore it. Lewis and Linder (1997; Beilock & Carr, 2001; Masters, 1992) have provided support, however, that a DT can increase performance for experienced participants under pressure.

Similar to the B_1 phase, Olivia increased explicit monitoring during the initial 30 shots of the B_2 phase.

> In the first 30 (shots), I tried to change my stance and also tried to get my technique right and the way I was shooting the ball, but that wasn’t working. It frustrated me mainly because I wasn’t really getting any shots in, and I knew that there was something wrong with my technique, so I tried to work out what was wrong.

Similar to the B_1 phase, a discrepancy existed between Olivia’s ideal and actual technique during the initial three trial blocks (i.e., 30 shots) of the B_2 phase. This discrepancy led to explicit monitoring and technical adjustments in an attempt to perform more successfully. Olivia's quotes associated with the B_1 phase and the initial 30 shot attempts of the B_2 phase appear to be reflective of explanations typifying the self-focus model (Baumeister, 1984) of choking.

The performance fluctuations during the B_2 phase was perhaps a direct result of Olivia's shift in attention from S-A and explicit monitoring during the initial 30 shots to listening attentively to the music during the final 30 shots. Apparently, the music provided a method of avoidance coping to enable attention to shift away from the disruptive experiences of S-A, as Olivia explained,

> It wasn't so much the music, it was the words and the words were like a distraction… I just started learning the words and I started singing it and I was getting shots in maybe because I wasn't focusing on getting the basketball in, I was focusing on the song and just relaxing. … It was actually helpful, so it became a positive distraction because it took my mind off the actual task at hand and it gave me something else to focus on.

The phrase "took my mind off the actual task at hand" could possibly signify either the shooting task or the audience, thus, I asked Olivia to clarify, "It took my mind off the people that were there, and it took my mind off the money side of it, I didn't even think or worry about those things." As a result, Olivia explained that she decreased explicit monitoring of execution,

> I wasn't really focusing on the technique during the second 30 shots, I had a rhythm going and I was keeping my stance and every time I got the ball, I would bounce it, hold it, look and shoot and I just kept on doing that over and over again.

It seems that the music helped Olivia follow a performance routine during the final 30 shot attempts. This finding is similar to research by Pates et al. (2003), who found that participants increased their rhythm of shooting and concentration when using a music intervention to increase perception of flow states and shooting performance in netball. One participant in the Pates et al. study also provided evidence that a decrease in thoughts related to technique occurred as a result of the music intervention. These results provide additional support for the Wang, Marchant, and Morris (2004) finding that athletes who typically use avoidance coping perform better under pressure than athletes who typically use approach coping. Olivia further discussed other positive aspects of the music intervention, relating to her level of anxiety and modification of mood to a more positive, fun type state.

> I started getting into the music and just listening to the words and singing it and enjoying it, and the last 30 shots I really relaxed and then I thought every time I got a shot in, it was like a boost of confidence and I just found that rhythm and I just kept on going. … It was pretty fun having the music.

Olivia's performance may have improved during the final 30 shot attempts because the music prompted positive emotions and cognitions.

General summary of Olivia. From the pressure manipulation results, it seems that Olivia increased perceived pressure during the high-pressure phases. Specifically, Olivia's DM-CSAI-2 results indicated that perceived pressure escalated prior to the high-pressure phases with the B_2 phase the most anxiety provoking. From the interview, Olivia also reported a similar increase in pressure by referring to both cognitive and somatic anxiety symptoms during the high-pressure phases, while referring only to somatic anxiety symptoms, by saying "I was nervous" or "I was relaxed," when discussing the low-pressure phases. Thus, from the DM-CSAI-2 and interview results, it seems that, for Olivia, the pressure manipulation was effective. Based on the performance results, Olivia experienced a 21% decrement in mean performance during the B_1 phase compared to the A_1 phase. This considerable decrease in performance, along with an increase in perceived pressure indicates that Olivia experienced choking during the B_1 phase. Olivia's mean performance improved by a substantial 46%, when the music was introduced in the B_2 phase.

During the interview, three themes were evident, including public S-A, approach coping, and performance fluctuations. The themes public S-A and approach coping were associated with the B_1 phase and affected her cognitions differently. I interpreted Olivia's statements about public S-A to mean an increase in negative cognitions, in the form of worry, and a decrease in attention to the shooting task. Olivia's tendency to use approach coping was reflected in her use of explicit monitoring of execution when performing. Thus, Olivia's results during the B_1 phase and the initial 30 attempts of the B_2 phase support the self-focus model of choking. Performance fluctuations were apparent in the B_2 phase, as Olivia's performance changed markedly. As a result of inattentiveness to the music during the initial 30 shots of the B_2 phase, Olivia was publicly self-aware, worried, and explicitly monitored task execution. Apparently, initial successful performance, while listening to the lyrics reassured her that the music might facilitate performance, so she then continued to attend to the music. For Olivia, the music acted as a type of avoidance coping strategy, decreasing S-A and reducing explicit monitoring of execution.

Discussion and Conclusions

The primary purpose of the current study was to investigate whether listening to music lyrics could facilitate performance under pressure. All participants improved (or maintained) performance when the music intervention was introduced during the B_2 phase. Therefore, the results provide support for the supposition that music may be an appropriate method of alleviating choking. A secondary purpose was to use qualitative methodology to more completely understand choking and to examine the psychological benefits of music as an intervention under pressure. During the B_1 phase, participants expressed choking-related cognitions, such as increased public S-A, attention to irrelevant cognitions, and approach coping. Conversely, themes related to the B_2 phase were avoidance coping and benefits of the music. Typical benefits of the music included decreased S-A and reduced conscious processing under pressure.

Pressure Manipulation

The pressure manipulation was clearly effective for the 3 participants who experienced choking in the current study. The increase in perceived pressure during the high-pressure phases strengthens the contention that performance differences among the four phases were pressure-related. By using methodological triangulation (with the DM-CSAI-2 and interview), I further substantiated the manipulation and its effects prior to and during the phases. Specifically, Michelle and Nicole experienced additional pressure during the B_1 phase compared to the B_2 phase, whereas Olivia was the opposite, experiencing added pressure during the B_2 phase. There were some differences in anxiety levels, however, an elevation in pressure during the high-pressure, compared to the low-pressure, phase was clearly experienced for all participants who experienced choking.

Performance Results

The performance results in the current study indicated that using music (at least the music used here), as a DT, was an effective intervention for improving performance under pressure. In the current study, participants increased performance by an average of 47%

when the music intervention was introduced under pressure compared to performance under pressure without music. To date, no studies have investigated the effects of music as an intervention to improve performance under pressure. These results are consistent with findings by Pates et al. (2003), who found that participants increased shooting performance in netball when listening to music in low-pressure conditions. A performance improvement was expected, however, the substantial increase was surprising.

Qualitative Results

Results from the interview indicated that all participants experienced an increase in public S-A during the B_1 phase and concomitant poor performances under pressure. The current findings are in keeping with a number of other studies (e.g., Masters et al., 1993; Wang, Marchant, Morris, & Gibbs, 2004). The predisposition to be self-conscious promotes the likelihood of being self-aware during pressure situations (Masters et al.). The increased S-A, however, affected participants differently during the study. For instance, Michelle and Olivia both reported an increase in S-A during the B_1 phase and as a result, subsequently increased explicit monitoring of execution to ensure proper skill execution and possible success. When S-A increases, extra effort is paradoxical and some approach coping strategies prove to be futile and detrimental to performance. Particularly, increasing effort and trying hard to perform well may exacerbate, rather than alleviate, choking. Nicole, however, reported an increase in S-A, resulting in a rise in negative cognitions during the B_1 phase. Apparently, the combined elevated S-A and negative cognitions increased Nicole's distractibility.

During the B_2 phase, there were a number of psychological benefits suggested (e.g., reduced S-A, increased cognitive restructuring, diminished pressure) when listening to the words of the music under pressure. It is unclear, however, whether only one, or a combination of benefits was the reason for the performance increase under pressure. One benefit reported in the participant interviews was a decrease in S-A. Similar to Study 2 in this dissertation, a reduction in S-A enabled participants to focus on the song's lyrics or perhaps the song lyric's provided a methods of cognitive restructuring in order to improve performance under pressure. Nicole and Olivia specifically used the music and, in so doing, permitted performance to self-organise. These results indirectly support the finding by Wang, Marchant, and Morris (2004) that athletes who typically use avoidance coping perform more accurately under pressure than athletes who typically use approach coping. In this study, the music was used as a replacement strategy, and was successful in decreasing the negative effects of S-A under pressure. From the current methodology, however, uncertainty still exists about whether one benefit was used more than another or the benefits of the music interacted to improved performance.

It seems that researchers advocating the distraction model (Nideffer, 1992) or self-focus model (Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992) both argue that choking is largely distraction related, however, it is the manner in which the distraction affects performance that distinguishes the models. For example, Nideffer argues that performance decrements occur because attention is diverted to task-irrelevant cues as a result of internal or external distractions, whereas Baumeister and Masters contend that performance decreases because attention is on the "self," especially performance execution. It seems that the qualitative results of the three independent case studies provide support for the self-focus model of choking in two distinct ways. First, the reports of the B_1 phase confirm that, when under pressure, participants increased S-A especially by attempting to adjust performance execution. Second, the information from the B_2 phase indicated that participants were distracted by task-irrelevant cues (i.e., the music) and subsequently performed at a higher level than the B_1 phase. Similar to the results of Lewis and Linder (1997), choking resulted from self-focusing, however, the addition of the music (in this study) prevented explicit monitoring and subsequently performance improved.

Methodological Issues

Similar to Study 2, one methodological limitation was that participant's could have become familiar with the pressure experience during B_2 phase, contributing to the performance improvement. The CSAI-2 results indicate that all three participants increased anxiety levels during the B_2 phase in comparison to the "low-pressure" phases, which indicates that the amount of pressure was sufficient experience differences in performance due to difference in anxiety levels. I acknowledge this as a methodological limitation, however, the nature of the current design may not allow for other methods of collecting this data unless a large-sample quantitative study was used.

Another limitation in the current study was that it was impossible to determine how intently participants listened to the words of the music during every shot attempt. I believed the initial instructions were clear, I reminded participants to listen to the words prior to the 31st shot attempt, and I also queried the meaning of the song's content during the interview as a manipulation check. Yet, unlike the pre-shot routine during Study 2 that was largely verifiable through observable behaviours, I was still unable to confirm in-vivo that participants were, in fact, listening to the lyrics while performing. Even with this limitation, however, it appears that Michelle and Olivia (to a different degree) used cognitive restructuring (an element associated with the music) during the B_2 phase and Nicole used the music to shut out other noises associated with the audience, indicating the participants listened to the music or the words of the song assiduously. Though this may indicate that participants cognitively processed the words of the music, it does not necessarily mean they attended to it during performance execution.

Some of the audience members in this study were participants' teammates. This was another potential limitation because of the published literature in choking research about whether supportive or unsupportive audiences adversely affect performance under pressure the most. For example, Butler and Baumeister (1998) conducted a series of experiments investigating the performance effects of supportive audiences (see Chapter 2 for an in-depth discussion) and found that a supportive audience creates "friendly faces" to performers, but paradoxically may also be debilitative to performance. Unlike Studies 1 and 2 of this dissertation, it was not logistically viable to use a "neutral" audience in this study because of organisation issues. Thus, using teammates who had participated in the initial sampling procedures was essential and unavoidable, adding a potential confounding variable. Selecting teammates as audience members may have affected performance differently to Studies 1 and 2, but was a practical device that helped logistically and illustrated that teammates may add additional pressure. This result was valuable for two other reasons. First, performance increased when the intervention was introduced in spite of participants reporting experiencing additional pressure from teammates as the audience. Second, this result is of practical value especially in team sports because teammates represent an audience and are often more prominent than a "faceless" crowd of spectators. Thus, examining teammates influences are important for practical and ecological validity reasons.

Future Research

Unlike many of the previous DT's, listening to music lyrics may be a more practical method of decreasing S-A in actual pressure circumstances. The DT's previously used (e.g., counting backwards from 100 by 2’s) may not be a practical method of diverting attention under pressure because the performer is instructed to listen for and verbalise a target tone (Beilock et al., 2002) or numbers (Lewis & Linder, 1997) during performance. Rather than neutral tasks like counting numbers, athletes possibly perceive “catchy” and amusing tunes as more interesting. Athletes participating in closed skills, such as basketball free throw shooting and ten-pin bowling, may find listening to music as practical during performance to minimise S-A under pressure. Given modern music technology, such as mp3 players and iPods, it may be practical to use music during performance now because the equipment is less intrusive. As a result, researchers may further investigate the viability of listening to music to avoid choking effects during “real-world” competitions.

There are at least two additional areas for future research regarding the music. First, the lyrics had two effects on participants; it was distracting (e.g., catchy and humorous) and also positive and meaningful. Participants listening to the words of the music during performance seem to use it as a distraction or as a form of cognitive restructuring to deal with the pressure. Most participants explained that they thought differently during the B_2 phase perhaps because the words, “Always look on the bright side of life,” helped with positive cognitive restructuring, yet, it was difficult to distinguish whether the increase in performance was because of lyrics themselves or simply the distraction of listening to the words. Second, at least two factors from the music intervention could have influenced performance, such as the music (e.g., rhythm, melody, tune) or the words (i.e., meaning of the song). Again, it is difficult to differentiate whether the rhythm and accompaniment or the meaning of the lyrics influenced performance. A potential area of further research might be to compare performance under pressure when using “catchy” music versus spoken words to ascertain whether the accompaniment or the words were more influential on performance under pressure.

Similar to the results of Study 2, the current study indicated that a major factor contributing to choking is increased S-A under pressure. Participants in this study reacted differently to elevated S-A when experiencing choking by first using unsuccessful strategies (e.g., increasing explicit monitoring of execution, increasing worry, increasing effort). When listening to the music lyrics was introduced during the B_2 phase, participants decreased self-attention, which helped to increase performance.

CHAPTER 6

GENERAL DISCUSSION

The present dissertation comprised three studies investigating choking susceptibility and choking resistance, and perceptions of performance under pressure for choking-susceptible (CS) and choking-resistant (CR) athletes. A central aspect of this dissertation was testing two interventions designed to alleviate choking. Study 1 established that the psychological inventories were useful in predicting choking, however, choking behaviour was less predictable than non-choking behaviour. The interview results indicated that participants who experienced choking also increased self-awareness (S-A) and generally used approach coping strategies under pressure. Studies 2 and 3 were designed to propose and evaluate strategies to alleviate athletes against choking. The results of Study 2 provided support that incorporating a pre-shot routine (PSR) in pressure situations decreases the likelihood of choking. In Study 3, music was successfully used as an intervention to ameliorate choking. Issues that extend choking research and elucidate the basis for the performance improvement in Studies 2 and 3 were also discussed. This chapter provides general findings from the three interrelated studies and elaborates on information related to the pressure manipulations, performance trends, predicting choking, choking-related cognitions, and intervention-related (i.e., pre-shot routine and music) cognitions. In addition, a particular focus is placed on implications for theory, practitioners, and future research.

General Findings

There were a number of similarities and differences among participants’ cognitions, emotions, and coping strategies that may help researchers understand the choking experience more completely. I will elaborate on these issues in this section. Although the focus of this dissertation was generally on choking experiences and CS athletes, some information relating to CR participants in Study 1 is included to illustrate key issues.

Pressure Manipulation

Participants in the three studies were generally affected by the pressure manipulations (i.e., video camera, audience, and money). Only one participant (i.e., Debbie – Study 1) reported that the pressure manipulation was not effective in elevating anxiety. Debbie was characterised as a CR athlete, thus, she may have required a higher intensity of pressure to elevate her A-state. In theory, CS participants should report higher intensity of pressure than CR participants in the high-pressure phases because of their higher level of dispositional A-trait. Test anxiety researchers have confirmed that individuals high in A-trait react to pressure situations with greater levels of A-state than individuals low in A-trait (Spielberger et al., 1976). Sport anxiety researchers have also documented that A-trait is a strong predictor of A-state (e.g., Marchant et al., 1998; Williams & Krane, 1992). As expected, CS participants reported higher levels of anxiety in comparison to CR participants. This also provides support for the efficacy of using psychological inventories to predict a sample of CS participants. That is, A-trait (e.g., SAS) was a strong predictor of A-state, especially for CS participants in the current studies.

In the current dissertation, I chose to apply traditional pressure manipulations (i.e., video camera, audience, and monetary incentive) used in previous choking research. Clearly, the presence of the audience was universally salient and induced the substantial increases in participants' anxiety levels during the high-pressure phases. All CS participants discussed the effects of the audience relative to their performance decrement under pressure. Participants who experienced choking explained that the audience distracted them from a task-relevant focus of attention. Some participants even clarified that they were constantly speculating about the audience’s judgments and criticisms. The video camera and monetary incentive only affected certain participants, with Carol (Study 1) and Jason (Study 2) being distracted by the video camera. When participants discussed the monetary incentive, generally in a nonchalant manner, they explained that receiving the monetary reward was immaterial. Based on the results in the current studies, I propose that the video camera and monetary rewards were not major factors in increasing perceived pressure. How then do researchers, such as Beilock and Carr (2001) and Masters (1992), find significant pressure manipulation differences when using only small monetary incentives (e.g., $5)? Perhaps, similar to the audience involvement in this dissertation, the significant differences occurred because researchers include a public evaluation or social acceptance aspect to their pressure manipulations. For example, Beilock and Carr explained to each participant in their study that receiving the monetary reward was a “team effort” and that he/she was paired with another person (unknown to the participant) who had already achieved a 20% improvement. Consequently, receiving the monetary incentive was tied to a comparative aspect and participants might feel they were disappointing others if unsuccessful, thus, emphasising the need for social acceptance. Similarly, Masters included a monetary incentive, but also involved a “golf professional” to evaluate participant performance during the “stress” session. Participants were informed that the professional would be analysing their performance, highlighting public aspects of the self. That is, knowledge that the golf professional would analyse their performance would potentially increase participants’ perceived pressure, similar to the results of the current studies. I argue that the significant increase in pressure reported in Beilock and Carr and Masters’ studies was primarily because of the public evaluation aspect, rather than the monetary reward, during the “stress” session. From the current findings and other choking research, investigators examining choking should consider whether small financial rewards, if used alone, are unlikely to induce the necessary increase in performance pressure. To this end, I propose that the presence of the audience is consistently a more salient pressure manipulation.

Baumeister (1984) and Baumeister and Showers (1986) systematically reviewed a number of manipulations that may increase pressure, including presence of an audience, explicit competition, punishment contingency, and ego relevance. Baumeister and Showers’ review of pressure manipulations has provided researchers with a basis to successfully investigate performance effects under pressure. Perhaps researchers should also consider appropriate pressure manipulation options to employ in experimental settings to induce additional pressure, while also considering the well-being of participants and ethical standards? Evidence from the current dissertation indicates that either social- or self-evaluative situations are effective in increasing pressure. For example, explicit competition, presence of an audience, and, perhaps, the use of a video camera (when the participant is informed about likely evaluation by others) may be effective pressure manipulations because they elicit social comparison and public evaluation. Results of Study 3 provide support that teammates, as audience members, may promote additional pressure. Similarly, ego relevance and mirrors may create pressure and also increase S-A because these manipulations induce participant reflection on features of the self during task performance. Evidence from these three studies indicates that S-A is a key antecedent of choking. Researchers in general psychology have used mirrors to induce S-A (e.g., Carver et al., 1985; Cheek & Briggs, 1982; Kurosawa & Harackiewicz, 1995). Carver and Scheier (1987) argued that the presence of a mirror might emphasise more personal, covert attention associated with private S-C**,** whereas a video camera or audience may encourage a more external, overt degree of evaluation related to public S-C. In choking-related research, Liao and Masters (Study 2; 2002) successfully used a mirror to induce S-A during a learning phase, however, the mirror was not used during the test phase (i.e., "stress" session) of the study. Speculatively, using a mirror to increase anxiety or S-A may be an effective strategy for researchers investigating choking. Moreover, pressure manipulations that induce social comparison, public evaluation, or self-evaluation would likely be successful in maximising pressure in choking research.

Performance Trends

Collective evidence of the CS participants in the three studies indicated that participants who experienced choking during the pressure phase decreased mean performance by between 10% and 50% compared to the A_1 phase. On average, there was a 27% mean performance decrement from the A_1 to the pressure phase. One criticism of choking definitions and related research is that no definitive level of performance decline is explicitly stated to operationally define whether choking has occurred. Certainly, an aggregate mean performance decrease of 27% would indicate that most (if not all) CS participants in these studies experienced choking. Linda (Study 2) was one CS participant who, arguably, may not have experienced choking because her mean performance decreased was only 10% from the A_1 to the B_1 phase, whereas other CS participants experienced performance decrements of 17% or greater. Although Linda's mean performance did not deteriorate greatly, like some participants (e.g., Emma and Felicity) and based on currently accepted definitions, she experienced choking because a critical deterioration in skilled performance occurred under pressure.

Results from Studies 2 and 3 indicated that the 6 participants who experienced choking during the B_1 phase and participated in the planned choking interventions, increased performance after the intervention was introduced during the B_2 phase. Collectively, participants experienced a mean performance improvement of between 24% and 62%, and a mean performance improvement of 45%, based on a comparison between the B_2 phase and the earlier B_1 phase. To further illustrate the interventions' efficacy, performance during the B_2 phase was compared to the stronger performance of the two low-pressure phases. Uncertainty was associated with most participants during the A_1 phase, thus, comparing the more accurate performance of the two low-pressure phases would provide a more robust indication of the efficacy of the intervention. The result of this comparison indicated that participants experienced an improvement in mean performance of between 4% and 47%, when using the intervention compared to their more accurate low-pressure performance (i.e., either A_1 or A_2 phase), with a mean performance increase of 14%. From this result, it seems that the interventions were very effective and not only reduced choking, but resulted in performance improvements under pressure compared to best performance in the low-pressure circumstances.

Predicting Choking

Choking is not easily predicted (Hanrahan, 1996) and the results of Study 1 substantiate this claim. For Study 1, in particular, the three psychological inventories used to purposively sample participants had a 50% success rate of predicting choking with a small sample of CS participants. During Studies 2 and 3, I again purposively sampled CS participants for participation in the two intervention studies. Generally, researchers who use single-case design (SCD) methodology have suggested that 3 to 5 participants should be used. Because of the nature of the SCD, at least 3 participants (in each study) that had experienced choking during the B_1 phase were needed to continue participation in the planned intervention (B_2 phase). Thus, 5 participants (in each study) were purposively selected to take part in the experimental phases. Six out of 10 purposively sampled CS participants experienced choking, whereas 4 participants (two in each study) did not experience the expected deterioration in performance under pressure. The combined success rate for predicting choking in Studies 2 and 3 was 60%. The aggregate success rate of the psychological inventories to predict choking in CS participants for the three studies was 57%. That is, 4 participants were purposively sampled for Study 1, 5 participants were purposively sampled for Study 2, and 5 participants were purposively sampled for Study 3, with 2, 3, and 3 participants experiencing choking in the three studies, respectively. These results further supported the findings of Study 1 regarding the predictive capacity of the psychological inventories.

The success rate of the psychological inventories in predicting choking was encouraging for two main reasons: the external validity perspective and the additional variables that affect choking susceptibility. First, when conducting research, ethical restrictions require that researchers be very careful about the degree of performance pressure manipulated in experiments. That is, only a limited amount of pressure may be created in experiments because of ethical limitations. Thus, the performance pressure induced in experiments is likely to intensify during “real-world” competition, and possibly result in larger effects than reported here. I am confident, then, that not only are the results from the current study generalisable, but CS participants will, at times, experience additional pressure during “real-world” competitions, increasing the likelihood of choking. The predictive ability of the psychological inventories is encouraging because it is a method of identifying potential CS individuals in advance that may succumb to choking.

A second reason for the encouraging success rate of the psychological inventories to predict choking is that it may signify that additional variables might affect athletes' choking susceptibility. When conducting this research, I used Wang's (2002) dissertation as a resource, where A-trait, S-C, and coping styles were established as predictors of choking in two studies. Wang found somatic A-trait, private S-C, and approach coping predicted choking. Wang, Marchant, Morris, and Gibbs (2004) found that somatic A-trait and private S-C accounted for 35% of the explained variance and Wang, Marchant, and Morris (2004) demonstrated that approach coping accounted for 7% of explained performance variance under pressure. In recognition of the results by Wang and colleagues, evidence from the current dissertation extends the choking literature by indicating that A-trait, S-C, and approach coping are relatively accurate predictors of choking in an experimental setting, however, additional psychological characteristics may also predict choking in CS athletes. For example, Anshel (1997) posited introversion and extroversion as predictors of choking. Introverts, for example, are concerned about the impression they make and they may be conscious of this when interacting with others in evaluative settings (Pontari & Schlenker, 2000). In addition, low self-esteem may be a potential predictor of choking. If self-presentation is designed to communicate information about self to others, then according to Baumeister, Tice, and Hutton (1989), individuals with low self-esteem should avoid self-presentational risks to decrease the risk of embarrassment. Some participants in the studies in this dissertation (e.g., Emma, Felicity, and Michelle) appeared to have low self-esteem, pointing to a possible link between self-esteem and choking. Wallace et al. (2005) have also argued individual differences in narcissism as a possible predictor of choking resiliency. Briefly, individuals with narcissistic tendencies have a high degree of self-esteem. Wallace et al. explained that individuals with high self-esteem should be less prone to maladaptive overcautiousness in their approach to performance under pressure because they may be less concerned about protecting themselves from failure. Performers that succumb to choking often display overcautious and tentative performance, increasing the likelihood of poor performance. Undoubtedly, although the current dissertation presents promising results, additional choking research is necessary to further explain other predictors of choking, before practitioners can predict choking more accurately.

Cognitions Relating to Choking

The principal aim of conducting this research was to more completely elaborate on the mechanisms of choking. I have accomplished this through case studies of CS participants under pressure. To expand the qualitative results, I collectively analysed the 8 CS participants who experienced choking in the three studies (i.e., Emma, Felicity, Jason, Karl, Linda, Michelle, Nicole, and Olivia) and provide common cognitions. This analysis was different to the cross-case analysis of CS participants in Study 1 because it included all CS participants who experienced choking from Studies 1, 2, and 3. Other CS participants who improved performance under pressure (e.g., Grace, Helen, Peter, Ray, Sara, and Tim) were not integrated into the analysis because my primary interest was with participants who experienced choking and understanding choking-related thinking.

During the interview, the 8 CS participants explained that their performance was affected by social evaluation and the public nature of the pressure phase. Social evaluative processes have been recognised as important in competitive settings (Martens, 1977; Martens et al., 1990) and researchers (e.g., Gould, Jackson, & Finch, 1993; Scanlan et al., 1991) have provided evidence for the potential utility of a social evaluation model of competitive pressure. For example, in the Gould et al. study, social evaluation concerns were mentioned in associated sub-themes of “others’ expectations,” “pressure to skate up to national championship standards,” and “pressure to be better than previous performance.” Similarly, in the current series of studies, the presence of the audience was the most prominent source of pressure and participants’ offered quotes that alluded to the audience’s perceived judgments, suggesting their social evaluation concerns.

As argued by Wilson and Eklund (1998), it is difficult to imagine that social evaluative processes could (or would) result in perceptions of threat and anxiety without concomitant self-presentational processes. Self-presentation refers to behaviours aimed at conveying an image of self to others (e.g., Schlenker, 1980). Self-presentation is related to how others perceive a person, and is important in maintaining self-concept, to the extent that identity is social (e.g., Wicklund & Gollwitzer, 1982). Individuals attempt to create a public image that will support their preferred beliefs about themselves (Baumeister, 1982; Schlenker). As Baumeister explained, “Self-presentation is not only created by impressing others, but also through one’s choices and performances… it is concerned with establishing and maintaining one’s public self, that is, the image of oneself that exists in the minds of others” (p. 4). Self-presentational aspirations within a social evaluative setting, such as the studies in this dissertation, establish the background with which perceptions of threat would increase anxiety. Leary (1992) conceptualised competitive anxiety as a sport-specific class of social anxiety maintaining, “Competitive anxiety, whether regarded as a state or a trait, revolves around the self-presentational implications of competition” (p. 347). According to Schlenker and Leary (1982), there must be a sense of apprehension about evaluation from others in a social context, or doubt about creating adequate self-presentations, for social anxiety to occur. The CS participants were chosen, in part, because they were relatively high in A-trait and S-C, increasing their likelihood of experiencing social anxiety. All 8 CS participants who experienced choking maintained or increased cognitive anxiety during the pressure phase compared to the A_1 phase (illustrated by the reported DM-CSAI-2) and alluded to the audience's perceived judgments during the interview, perhaps as a result of potential social and negative evaluative concerns by the audience. The increase in perceived pressure may indicate a potential link to self-presentation.

Leary (1992) argued that the self-presentation perspective provides a foundation for understanding a number of issues in sport, including those associated with competitive anxiety and, specifically alluding to, choking. The link between participants' perceived self-presentational concerns and choking might be explained through participants' public S-A themes during the pressure phase of these studies. Because of the similarities in public S-A and self-presentation, it is necessary to distinguish between these two constructs. Public S-A is the ephemeral state of public S-C and Fenigstein et al. (1975) defined public S-C as the tendency to focus on outwardly observable aspects of the self (e.g., physical appearance). Individuals who experience public S-A feel they are the object of others' attention and often need approval to maintain a sense of identity (Fenigstein et al.). Highly public self-conscious individuals, similar to the 8 CS participants analysed here, are likely to become aware of being observed when under pressure, and become concerned with what people think or say about them. As a result of private S-C and public S-C being moderately correlated (Fenigstein et al.; Wang, 2002), perhaps individuals periodically oscillate attention between the self (private S-A) and others' perceptions (public S-A), depending on the perceived reactions of the audience. Self-presentation is the individual's cognitions or behaviours presented to others that help define public image. All CS participants who experienced choking were excessively concerned with public S-

A, often speculating about the audience's judgments, which may have concomitantly increased anxiety. This audience-related speculation and increased public S-A during the pressure phase may have resulted in participants thinking and behaving in a manner that would present themselves positively, by appearing competent or performing successfully.

The potential essence of being an athlete is the ability to perform successfully under pressure. Leary (1992) argued that sport fosters the creation of a variety of negative images when athletes worry about evaluation by others, such as images of being unskilled, incompetent, unprepared, unfit, or unable to handle pressure. During the pressure situation in this series of studies, public S-A increased because the audience's attention was focused on the participant's "public self." Being the centre of attention may be an immediate cause of embarrassment possibly because individual's fear the public self will be discredited (Goffman, 1967). If the public self is discredited, a negative self-presentation may occur, and the participant could be portrayed as an unsuccessful athlete under pressure, or more drastically, a "choker," potentially threatening the individual's athletic identity. Grove, Fish, and Eklund (2004) have provided evidence that changes in athletic identity occur after negative athletic experiences (i.e., being "cut" from a potential team) in comparison to positive experiences (i.e., being chosen for a sporting team). Some participants (e.g., Emma, Felicity, Karl, Nicole, and Michelle) already seemed to have a negative self-presentation because themes, such as fear of evaluation and fear of failure, emerged during their interviews. Thus, it may be logical that perceived athletic identity may change as a result of poor performance under pressure.

The link between public S-A, self-presentation, and choking may be evident when participants attempt to convey a positive self-presentation to others through performance outcome. Pontari and Schlenker (2000) suggested,

> When people are concerned or doubtful about their ability to effectively convey a desired impression, more mental resources may be needed to reach those self-presentation goals. These instances exemplify the limited interpretation as characterised by public S-A and vigilant self-monitoring. (p. 1093)

As participants experienced an increase in public S-A during the pressure phase, either increases in worry, negative cognitions, or explicit monitoring of execution occurred. These self-monitoring techniques were perhaps used, paradoxically, to convey a positive self-presentation. Pontari and Schlenker (2000) also stated,

> In such (i.e., self-presentational) instances, the evaluative stakes are high because valued outcomes are contingent on the type of impression one makes. People then become cognizant of the impression they make, become more likely to plan their performance through mental or actual rehearsal of what they will do, closely monitor their own self-presentational activities, and closely monitor the audience's reactions for information about whether they are accomplishing their self-presentational goals. (p. 1093)

Self-monitoring techniques, such as planning and explicit monitoring, for example, may ensure the appearance of being competent, or "looking the part," even if failure occurs. Karl (in Study 2) provided an example in which public approval was more important than successful performance. It seems that Karl wanted to communicate a favourable impression on the audience, rather than to perform successfully because, as Karl explained, "looking good" superseded the need for more accurate performance. For Karl, monitoring performance may have decreased fear of evaluation because he was controlling his movements, increase the probability of looking good. Thus, the increase in public S-A and anxiety for all participants who experienced choking may be linked to a general concern about conveying a positive self-presentation to others.

Cognitions Relating to the Interventions

Interventions were introduced in Studies 2 and 3 with the intention of alleviating choking. Interviews were also conducted, in part, to examine the cognitive effects of the proposed interventions. Cognitions, associated with the 6 participants who participated in the planned interventions, are discussed here.

Regardless of the choking explanation advocated, the series of studies in this dissertation indicated that S-A is a precursor to choking possibly because of increased anxiety levels. Furthermore, evidence from the intervention studies indicated that the PSR and music replaced the detrimental effects of becoming self-aware possibly because participants experienced lower levels of anxiety. Five out of six participants decreased anxiety prior to and during the B_2 phase, as measured by the DM-CSAI-2 and interview results, which may have influenced their preoccupation with S-A. Olivia (Study 3), however, experienced an increase in anxiety prior to the B_2 phase (DM-CSAI-2 results) perhaps because she did not listen to the music initially. It appears that the PSR and music interventions decreased anxiety and S-A, but in different ways. For example, in Study 2, the PSR was used as a task-relevant source of attention whereby participants took a deep breath prior to shot attempts. The deep breath may have acted as a relaxation strategy to help participants manage the pressure of the situation. In Study 3, listening to the lyrics of the music was used as an attention-diverting mechanism and incorporated cognitive restructuring (in the words of the song). Cognitive restructuring has proven effective in reducing test anxiety, a related form of performance anxiety (Goldfried, Linehan, & Smith, 1978). It seems that a decrease in anxiety and S-A perhaps diminished the tendency to focus on other demands, such as explicit monitoring of execution and worrying. More specifically, cognitive benefits of using the PSR were reduced S-A, decreased negative self-talk, reduced explicit monitoring of execution, and increased task concentration. Similarly, benefits of listening to the lyrics of the song while shooting included decreased S-A and increased cognitive restructuring. Thus, it seems that the PSR and music interventions were both effective in decreasing anxiety and S-A under pressure and facilitating performance during the B_2 phase.

It seems that both interventions also decreased social evaluative concerns during the B_2 phase. During Study 2, I instructed participants to consciously process the steps of the PSR in order to increase task concentration. All participants adhered to the PSR and also decreased audience's perceptions and social evaluative concerns. In Study 3 and similar to the PSR intervention, I asked participants to constantly monitor the words of the music during the B_2 phase. It seems that listening to the words acted as a type of avoidance coping strategy to social evaluative concerns. For example, Michelle increased thoughts about social comparison during the B_1 phase. Increased comparisons of self to other standards might increase the likelihood of S-A (Duval & Wicklund, 1972). During the B_2 phase, however, Michelle explained that the music "distracted her from the people (i.e., audience)" and that she "didn't even look at them when listening to the music." Michelle's tendency to become self-aware was reduced because she listened to the lyrics of the music. Actively avoiding the detrimental effects of S-A by listening to the music lyrics helped to decrease social evaluative concerns. Other participants in the music intervention study discussed the music in a similar fashion and explained that using the words to avoid thinking about the audience facilitated performance.

One additional point was the demand characteristics of the intervention. That is, the intervention was possibly more successful because the athletes might have believed it would be effective. For example, all participants employed the PSR immediately during the B_2 phase possibly because they believed the PSR would increase focus on the task. Unlike the PSR intervention, participants exposed to the music intervention were more sceptical about its efficacy under pressure. Participants may have even expected that listening to the words would distract them from the shooting task and decrease, rather than increase, performance. For Olivia, this possibly affected commitment to focusing on the words initially because she did not listen to the words during the initial 30 shots. Apparently, she questioned the intervention's effectiveness to facilitate performance. After her unsuccessful performance during the initial 30 attempts, she began to listen to the words with successful results.

Implications for Theory

The findings from this dissertation should have implications for researchers who intend to further investigate choking, especially in regard to theory development. A number of suggestions are, therefore, presented regarding the current findings and models of choking. I begin my discussion with Wang's (2002) integrated model, rather than the distraction (Nideffer, 1992) or self-focus (Baumeister, 1984) models, of choking because I recommend (as will be discussed) that some aspects of Wang's model may be integrated into other choking models.

Wang (2002) developed an integrated model of choking that included S-A, A-state, and coping styles as explanations for choking (see Chapter 2). The current results support Wang's contention that stable (i.e., dispositional characteristics) and unstable (i.e., situational emotional states) "causal factors" combine to affect an athlete's perception of pressure. Consistent with Wang's model, findings from the studies in this dissertation indicate that, if athletes cognitively appraise the situation as pressure inducing, an increase in S-A and A-state occurs, resulting in the athlete perceiving an increase in the importance of performing well. The results in the current series of studies indicate that Wang's proposed pathway related to perceived pressure may have explanatory power. The results are incorporated later in discussions of the distraction and self-focus models of choking.

Another aspect of Wang's (2002) model that was supported during this dissertation is that choking was more likely to occur when participants used approach coping strategies. A number of participants in the current studies provided evidence indicating they used approach coping when performing poorly under pressure. Felicity, for example, used information seeking, which is a form of approach coping, to minimise uncertainty about the "high-pressure" phase. Information seeking was possibly used to diminish uncertainty, which decreased task-focused attention, and resulted in choking effects.

The qualitative results in these studies provided evidence for some aspects of Wang's (2002) integrated model, however, other facets of Wang's model were not supported. Wang explained that as a result of using approach coping strategies, athletes who perform skill-dominant tasks that require primarily motor skills, experience choking due to the inhibition of automatic execution. In the current set of studies, three skill-dominant tasks that required mainly motor skills were used, yet, some participants (e.g., Jason and Nicole) believed their poor performance under pressure was due to "distractions", whereas other participants (e.g., Karl and Linda) discussed how explicit processing of performance was to blame. Thus, the qualitative results provided only partial support for the Wang's model related to skill-dominant tasks.

In addition, Wang (2002) also postulated that the occurrence of choking might depend on skill level, that is, elite athletes "choke" primarily because of the inhibition of automatic execution. Results from the current studies may challenge Wang's contention that elite athletes who experience choking do so primarily because of the inhibition of automatic execution. Specifically, Linda (Study 2) and Olivia (Study 3) performed poorly because the audience was a distraction, creating a "perceived" awareness of the audience's judgments, and decreasing performance. Two alternative explanations should be discussed here. First, some participants in these studies were not "elite," but were instead "experienced" athletes, which could be one reason for the difference in choking effects. Second, people do not always have perfect introspection, and thus might not articulate an accurate psychological state during the choking experience.

As a result of the studies in this dissertation, Wang's (2002) integrated model of choking could also be modified to include athletes who experience choking as a result of a lack of effective coping strategies. At present, Wang suggested that choking is a result of approach coping, yet, some participants in these studies did not possess coping strategies to manage the pressure. In fact, Emma (Study 1) is a prime example of a participant who experienced choking because of what appeared to be underdeveloped coping skills. Emma was totally exposed to the situation and did not actually use coping strategies. Instead, Emma used "catastrophic thinking" possibly because she simply did not possess appropriate coping skills to minimise the pressure. Thus, although Wang's model is well developed and largely based on empirical data, evidence is still needed to validate some aspects of Wang's model, and extend it to include athletes who possess few coping skills.

The present research may provide evidence that the distraction model is underdeveloped, excluding essential cognitive processes that initiate the increase in distractibility. Advocates of the distraction model (e.g., Nideffer, 1992) have explained that pressure situations create a distracting environment that draws attention from primary skill execution, resulting in reduced performance. Attention is redirected to either internal cognitions (e.g., worry) or external, environmental disturbances (e.g., audience noises), disrupting task-relevant cognitions. The internal cognitions explanation is based on test anxiety research, whereby poor performance occurs because attention shifts from task-relevant cues (e.g., answering questions correctly) to irrelevant cues (e.g., becoming tense or worried). The distraction model may be underdeveloped possibly because it was not devised from empirical data about choking per se, but was formulated primarily from attention and test-anxiety research. No research in sport, to date, has specifically tested Nideffer's explanation of choking via the distraction model, perhaps resulting in an immature account of the distraction model.

It seems that S-A should be included as a precursor to choking and could be integrated as a pathway in the distraction model. That is, S-A may increase as a result of the perceived pressure and may divert attention to other irrelevant cues. To elaborate further, unlike explanations of poor performance in test anxiety research, participants' attention in these studies was not specifically focused on performance worries, but the consequences of performance outcome. For example, some participants increased S-A under pressure, resulting in negative thoughts about audience's judgment and performance outcome. Perhaps increases in perceived pressure, S-A, and A-state should be included as initial pathways of the distraction model because they potentially increase the athlete's "distractibility" and divert attention away from task-relevant information, resulting in performance deteriorations. "Distractibility," in this context, can include any task-irrelevant cognition that diverts attention away from the task, such as negative cognitions, speculation about unsuccessful performance, or audience noise. Many participants in these studies experienced different “distractions” after S-A was induced, subsequently leading to a decrease in task-focused attention and diminished performance under pressure. Thus, the increase in S-A is not necessarily the explanation for the deterioration in performance under pressure per se, but a step in the pathway that leads to choking.

In their review of choking-related research, Baumeister and Showers (1986) originally postulated that the distraction and self-focus models explain choking differently, but may overlap to some degree. Baumeister and Showers stated,

> The controversy between self-awareness and distraction theories is further complicated because both may be independently correct, or they may work together. Each one (i.e., choking model) seems capable of harming performance. … Thus, distraction and self-awareness theories may each explain some instances of choking. It is also plausible that they operate together, for some self-awareness theories (e.g., Duval & Wicklund, 1972) attribute the deleterious consequences of self-awareness to distraction. (p. 376)

Some 20 years ago, Baumeister and Showers speculated that the distraction and self-focus models might interact to explain choking effects, however, no direct research evidence has confirmed these effects. If S-A were, in fact, added to the distraction model as an antecedent of choking (as stated earlier), then S-A would be linked, to some extent, in both the distraction and self-focus models and, as proposed by Baumeister and Showers, an overlapping effect could occur. Some participants (e.g., Felicity, Grace, Karl, and Linda) explained the audience distracted them (i.e., increased S-A), resulting in conscious monitoring of execution under pressure. In addition, I interpreted that Karl used explicit monitoring of execution primarily to deal with the audience’s presence, rather than to facilitate performance per se. Karl's tendency to consciously monitor execution was essentially self-preservation to "look good" in front of the audience. It seems that Baumeister and Showers' suggestion that the two models are "different (but overlapping)… or they may work together" (p. 376) has merit for choking research. Recently, Beilock, Kulp, et al. (2004) also made a similar contention, suggesting "these two effects (distraction and self-focus model) are differentially relevant to performance depending on the specific composition of the control structures governing performance and that cognitive and sensorimotor skills often differ in this regard" (p. 598). If some instances of choking are best explained by a combination of the self-focus and distraction model, how exactly they "work together" is unclear. The challenge for researchers is to design studies that test whether distraction, explicit monitoring of execution, or a combination of both is the appropriate explanation for choking.

The strongest evidence in this dissertation possibly originated from the design and results of Study 3, indicating that choking might be a product of the disruption of automatic execution. Typically, participants were high in S-C, leading them to increase S-A under pressure (Masters et al., 1993), which perhaps resulted in explicit monitoring of task execution (Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992). The shift from automatic to controlled processing ultimately disrupted performance of skilled actions during the B_1 phase. When distracted (i.e., listened to the words of the music), however, participants' performance increased, indicating that the distraction acted as a replacement strategy for S-A. Similar to the explanation from the study by Lewis and Linder (1997), the addition of the distraction prevented participants from explicitly monitoring execution, subsequently improving performance.

Methodological Issues from the Present Research

Although the studies in this dissertation were carefully designed and implemented, there were a number of limitations that should be discussed. In addition, several aspects of this research were innovative and proved to be promising for future research. The participant selection criterion for CR and CS participants was consistent across the studies and I discussed it extensively with my supervisors before commencing the studies. We felt that because choking is a relatively extreme experience, selecting a “powerful” sample was important to recruit CR participants likely to exhibit non-choking behaviour and CS participants likely to experience choking. I use “powerful” in the sense that a correct decision would be made regarding the likely behaviour of CR and CS participants. Thus, CR and CS participants on the extreme ends of a proposed “choking continuum” would represent a powerful sample. Nevertheless, the selection criteria adopted, to purposively sample participants, does represent a potentially controversial issue. To my knowledge, this was the first choking research that used this, or a similar, selection criterion. I could have utilised even stricter criteria, however, a very large original sample size would have been necessary for each of the three studies. Conversely, using a less stringent selection criterion would make participant recruitment easier, but would have resulted in a less powerful sample. The psychological inventories and selection criteria used were moderately successful in predicting choking, however, I accept that not all researchers would necessarily agree with the selection criteria used.

Another potential limitation was that, in reality, three levels of pressure occurred for the initial three phases, rather than the intended two levels (i.e., low- and high-pressure). I expected that athletes would interpret the A_1 phase as minimally pressure-inducing. Most participants, however, experienced some anxiety because they were uncertain of the procedures and about performing in front of an audience (the researcher). Clearly, the A_1 phase created "some pressure" for most participants. I labelled the A phases as "low-pressure" and the B phases as "high-pressure" in a comparative, rather than an absolute, sense. Actually, the pre-pressure baseline, pressure, and post-pressure baseline phases could have been more accurately labelled as moderate-pressure, high-pressure, and low-pressure phases, respectively. In addition, the pressure experienced during the high-pressure phases does not necessarily equate to the pressure experienced in "real-world" sporting competition. Thus, most participants experienced differences in anxiety levels during the three phases.

Since the early to mid-1990's, qualitative methodology has been increasingly recognised for its merit and flexibility, yet some scepticism still remains. For example, Kendall and Korgeski (1979) argued that people are not always aware of their cognitive processes and retrospective recall may not always be accurate, because it is dependent on memory. Similarly, Brewer, van Raalte, Linder, and van Raalte (1991) found that success or failure outcome might bias athletes' recall of experiences, with participants often reporting typical, rather than actual, psychological states. The Brewer et al. study may indicate that the post-experimental interviews used in these studies are biased by participants' success or failure during the experimental phase of the study. In any event, qualitative methodology in choking research may uncover relationships between psychological constructs that are descriptive, yet these reports may be necessary to provide a thorough understanding of choking mechanisms. Description does not necessarily equate to meaningful theory unless large sample quantitative studies provide evidence for the related descriptions. I acknowledge that, during the interview, participants were not consciously aware of every cognitive process and also did not necessarily report everything they were aware of, but undoubtedly to some extent, the interviews provided much useful information. The interviews supplemented the quantitative results and provided in-depth descriptions of choking experiences that may assist researchers in explaining choking more completely.

In retrospect, individual interviews could have been conducted following each phase, rather than completing one interview after the experiment. I was mindful of this methodology, however, opted not to proceed in this manner because I anticipated it might affect participants' performance and cognitions on subsequent phases, threatening the validity of the reported information. Conducting the interview at the completion of the experimental phases also doubled as a "debriefing" session for participants to express any concerns about their experiences in the study.

Implications for Practitioners

The findings from the studies in this dissertation may have implications for sport psychology practitioners who work with experienced athletes that have the potential to "choke". Results from the interviews confirm that uncertainty is a contributing factor of anxiety. The majority of participants experienced uncertainty during the A_1 phase because they were unfamiliar with the procedures, and as Martens et al. (1990) proposed, resulted in elevated A-state. Many coaches and sport psychologists introduce a familiarisation component in athletes' pre-competition routine, possibly because of the relationship between uncertainty and A-state. The evidence from the present studies provides support for the proposition that coaches and sport psychologists, who use acclimatisation techniques as a pre-competition routine, may help relieve pre-competition anxiety by minimising uncertainty about the competition. That is, familiarisation procedures, such as organising directions to the venue, visiting the competition site prior to the actual "game day”, preparing equipment, and becoming aware of the field conditions in soccer or court surface in basketball, should help reduce pre-competition anxiety. These procedures may be especially critical when athletes perceive the competition as particularly important.

As discussed earlier, the three psychological inventories (i.e., SCS, SAS, and CSIA) used in these studies did not accurately predict choking behaviour in CS athletes, however, these results were still encouraging. The 57% success rate of predicting choking in these three studies was above the 35% explained variance that somatic A-trait and private S-C accounted for in Wang, Marchant, Morris, and Gibbs (2004) and the 7% explained variance that approach coping accounted for in the Wang, Marchant, and Morris (2004) study. I am not directly comparing a crude “yes or no” success rate percentage with variance percentages because I understand this is incorrect, but merely illustrating the difference between variance rates and the success rate of predicting choking in these studies. Also, as illustrated earlier, in “real world” competitions, higher levels of pressure may be perceived, potentially increasing the percentage of choking in CS athletes. Thus, these inventories, which can be completed in about 20 minutes, may be a practical diagnostic tool for applied sport psychologists to use during an in-take interview with athletes who present with choking-related issues.

The results of the studies in this dissertation support the argument by Drinan et al. (2000) that choking is a combined attention and anxiety problem. That is, most participants experienced anxiety during the pressure phase, causing a diversion of attention away from task-relevant cues. When working with athletes who may potentially experience choking, practitioners should develop individually-tailored interventions by considering the extent to which anxiety or attention has contributed to the choking episode. Some athletes may experience choking because they are preoccupied with the increased anxiety, whereas others may instinctively divert attention to S-A or irrelevant information under pressure. As practitioners, it is important to investigate how athletes respond to pressure situations. Thus, using inventories, such as the SAS, SCS, and CSIA, during in-take interviews may provide insight into understanding the athlete's reaction to pressure in order to determine theory-matched interventions in helping the athlete perform more effectively under pressure.

Implications for Future Research

Based on the results of the studies in this dissertation, there are many potential avenues for choking research. I have already suggested that predictors of choking and Wang's (2002) integrated model of choking warrant further research attention. A number of additional choking sub-topics are potentially fertile areas of research exploration. For example, one question not answered, thus far, is whether the experience of choking in a sport setting is similar to the experience of choking in laboratory-based settings. Athletes in the current dissertation participated in a quasi-experimental design that included a follow-up interview. The interviews, as expected, elicited rich, descriptive information that provided me with insight into choking behaviour, albeit based on an experimental situation. The question remains, however, whether choking in "real-world" situations is similar to what might be extrapolated from research findings. Further investigations in field settings would perhaps confirm the external validity of choking explanations. Thus, further qualitative research is warranted, perhaps using phenomenological, or case history, techniques, with athletes who have experienced choking in "real world" competitions.

Results from previous studies (e.g., Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992; Masters et al., 1993) have indicated that S-C may lead to choking. Masters et al. suggested that a predisposition to be self-conscious promotes the likelihood of being self-aware during pressure situations. The present studies indicated that S-A might be an antecedent of choking, yet only a few studies have examined the influence of S-A on sport performance. To reiterate, S-C is the dispositional tendency to direct attention either inward or outward, whereas S-A is the momentary existence of self-directed attention, as a result of transient situational variables, chronic dispositions, or, more often, their interaction (Fenigstein et al., 1975). The fundamental difference between S-C and S-A is that S-C is a predisposition to direct attention to self or others, whereas S-A is a state of attentional focus reflected inwardly during a specific event. In mainstream psychology, Scheier and Carver (1977) found that an inward focus of attention is often associated with negative affect. For example, Smith and Greenberg (1981) found that private S-C and depression were positively correlated in college students. In a meta-analysis on self-focused attention, Mor and Winquist (2002) found that public self-focused attention was a stronger predictor of anxiety than private self-focused attention. In sport psychology research, Wang, Marchant, Morris, and Gibbs (2004) reported that high S-C is a predictor of choking. The results from the current three studies are consistent with previous research (e.g., Masters et al., Wang et al.) because most participants were selected on the basis of scoring high on a S-C measure, increasing the likelihood of experiencing public S-A during the high-pressure phase. With research indicating that elevated S-C negatively affects individuals, it seems essential to further explore the negative effects of S-A, in particular, on sport performance.

In Studies 2 and 3 of this dissertation, I tested two separate interventions designed to reflect current choking theories. The limited scope of the design (i.e., single-case design) in these two studies precludes broad generalisations because other factors possibly contributed to the pressure and performance results. Thus, researchers could examine these interventions in a large-sample design to determine their efficacy more decisively. Similarly, a future challenge for researchers is to develop theory-based interventions that both decrease S-A and result in athletes maintaining a task-relevant focus of attention under pressure.

Athletes' application (or lack) of coping strategies and the coping effectiveness are other avenues for future choking research. First, coping strategies are necessary to prevent or overcome choking, yet, only one study to date, outside this dissertation, has explored the effects of coping on choking. Wang, Marchant, and Morris (2004) found that athletes who predominantly used approach coping performed less accurately under pressure than those who predominantly used avoidance coping. Wang et al. suggested approach coping might increase perceived threat, leading those who actively seek to reduce anxiety to divert attention to irrelevant cues. Some participants who experienced choking in the studies in this dissertation provided support for the findings by Wang et al., with some CS participants using approach coping strategies and most CR participants employing avoidance coping strategies under pressure. Consequently, the argument by Wang et al. that approach coping strategies increase the likelihood of choking appears to have explanatory merit. Additional research should be undertaken to develop a coping strategy taxonomy identifying the most effective coping strategies to alleviate choking. Second, future research should also be undertaken regarding the coping effectiveness of the strategies used. That is, ascertaining the successfulness of the approach or avoidance coping strategy used under specific choking related pressures would help practitioners develop a classification of "successful" choking interventions.

Final Comments

The present research was designed to investigate whether choking could be predicted using psychological inventories and I also explored, more completely, choking experiences through qualitative research. The results of Study 1 were then used as a basis for examining interventions designed to alleviate choking during Studies 2 and 3. It seems that, among the case studies presented, participants who performed poorly under pressure (i.e., experienced choking) had both similar and dissimilar experiences. Individual differences existed that may be classified particularly in the self-focus model (Baumeister, 1984; Beilock & Carr, 2001; Masters, 1992), but also in the distraction model (Beilock, Kulp, et al., 2004; Nideffer, 1992), integrated model (Wang, 2002), or perhaps a combination of these choking models. One issue that seems clear is that choking is an anxiety and attention dilemma, rather than a singularly anxiety-related problem or solely an attention problem. In addition, choking may be synonymous with shifts in attention to S-A, either consciously or unconsciously, with decreases in performance being a result. If athletes can reduce the S-A experienced under pressure, choking may be considerably reduced. Thus, this dissertation has contributed to our knowledge of factors that affect choking and how we might intervene to reduce choking. I hope that other researchers will be stimulated to engage in the future research, methods, and issues presented here.

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APPENDIX A: NETBALL EXPERIENCE QUESTIONNAIRE

1. Name___________________________________
2. Gender? ___M ____F (tick one)
3. Age? ______
4. Telephone (Home)_______________ (Mobile)______________
5. Email address____
6. Do you currently play in a competitive netball league? (Circle one) Yes No

If yes, please give league name _______________and team name_________________

7. Approximately, how many competitive seasons of netball have you played? (Circle one)

   Less than 5 seasons 6-10 seasons More than 10 seasons

8. What is the highest level of netball you have competitively played? (Circle one)

   Club Division (Association) State National

9. Have you ever played in a shooting position (i.e., Goal Attack [GA] or Goal Shooter [GS])? (Circle one) Yes No

If yes, how long did you play that position?___________________________________

10. Do you currently play a shooting position on the team? (Circle one) Yes No

If yes, how long have you played that position?_______________________________

APPENDIX B: NETBALL – THE GAME

Netball is a fast, skilful team game based on running, jumping, throwing, and catching. It is a popular and competitive sport in Australia, England, and New Zealand traditionally played by women. In Australia, 278,800 people play netball each year, most of which are women (Australian Sports Commission, 2004). In comparison, 161,200 Australian adults participate in basketball (Australian Sports Commission, 2004). Netball is played in many commonwealth countries and Australia's national netball teams compete and are successful at winning many medals against other countries in international competitions. Providing these statistics may give a general indication that netball is played by many people in Australia at all competitive skill levels.

Similar to basketball, netball is played on a hard court with scoring rings at both ends. The rings, similar to the height and dimension of basketball rings, do not have a "backboard." The netball court is 30.48 m (100 ft) long by 15.24 m (50 ft) wide, approximately 1.83 (6 ft) longer and the same width as a basketball court. The court is divided into thirds that regulates where individuals on each team are allowed to move. Two goal circles (a semi-circle centred on the goal line and measuring 4.9 m [16 ft] in radius) are at each end and all scoring shots must be taken within these circles. The ball resembles a basketball, but is slightly lighter and smaller.

Netball is based on each team attempting to score as many goals as possible while preventing the opposition from scoring. Seven players participate at any one time and each player has a designated position in which she can move on the court. The positions and restricted areas of the court are as follows: Goal Shooter (GS)- allowed in the attacking one-third of the court including goal circle; Goal Attack (GA)- allowed in the attacking one-third, goal circle, and centre third; Wing Attack (WA)-allowed in the attacking one-third and centre one-third, but not in the goal circle; Centre (C)- allowed everywhere on the court except goal circles; Wing Defence (WD)- allowed in the defensive one-third and centre one-third, but not in the goal circle; Goal Defence (GD)- allowed in the defensive one-third and centre one-third, including the goal circle; and Goal Keeper (GK)- allowed in the defensive one-third, including the goal circle. Only two players from each team may score goals, the GS and GA.

Netball rules do not permit players to take more than one step when in possession of the ball. Unlike basketball, it is illegal to bounce the ball. Consequently, the only way to move the ball toward the goal is to throw the ball to a teammate. A player may catch the ball with one or both hands and must pass or shoot for goal within three seconds. Netball is a non-contact sport and no player is allowed to come personally contact the opponent in a way that will interfere with the opponent's play, either accidentally or deliberately. Accordingly, the defending player must be 0.91 m (3 ft) away when the attacking player is shooting.

APPENDIX C: NETBALL COURT DIAGRAM DURING PRESSURE PHASE

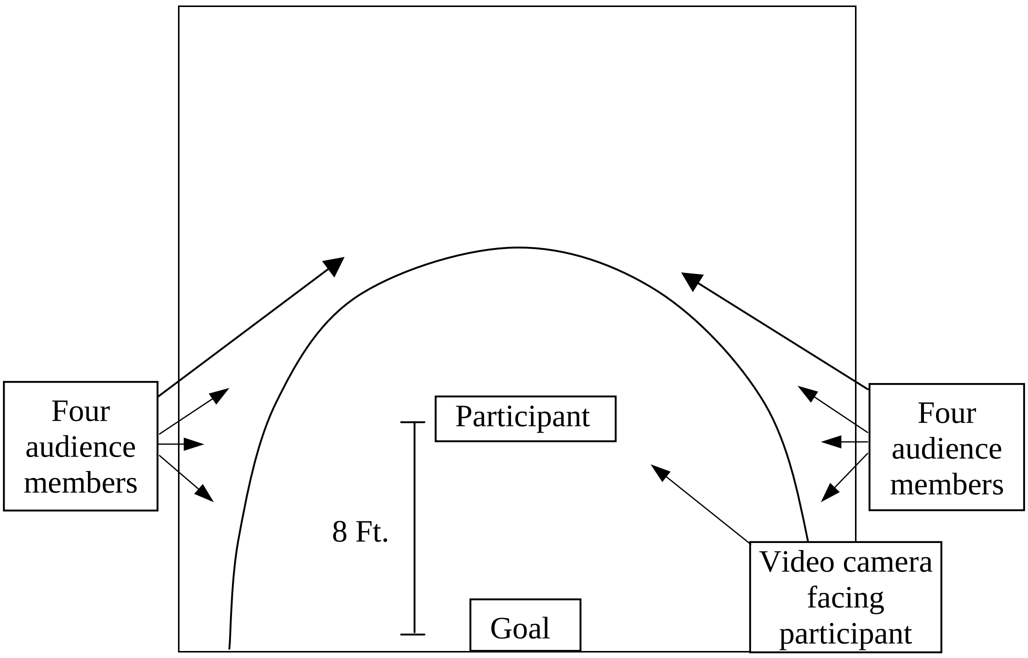

Figure A .1. Diagram of participant, video camera, audience members, and goal positions during the pressure phase of Study 1.

APPENDIX D: SELF-CONSCIOUSNESS QUESTIONNAIRE

Date: __/ __/ __ ID: __________

General Feeling Questionnaire

A number of statements that athletes have used to describe their general feelings are listed below. Read each statement and then circle the appropriate number to the right of the statement to indicate **how you generally feel**. Please be as honest as possible. There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer that best describes how you generally feel.

		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 situations.	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 look.	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 E: TRAIT ANXIETY QUESTIONNAIRE

Sport Anxiety Scale

Reactions to Competitions

Date: __/ __/ __ ID: __________

A number of statements that athletes have used to describe their thoughts and feelings before or during competitions are listed below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you usually feel prior to or during competition. Some athletes feel they should not admit to feelings of nervousness or worry, but such reactions are actually quite common, even among professional athletes. To help us better understand reactions to competition, we ask you to share your true reaction with us. There is, 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 F: COPING STYLE QUESTIONNAIRE

Date: __/ __/ __ ID: __________

Coping Scale for Sport

This survey consists of questions relating to your **typical** reactions to stressful events (i.e., making a mistake during performance) that you have experienced in sports competition. On the line after 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 honest 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 was 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 G: STATE ANXIETY QUESTIONNAIRE

Date: ___/____/___

CSAI-2-Directional

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 helpful or unhelpful 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

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APPENDIX H: CONSENT FORM FOR PARTICIPANTS INVOLVED IN RESEARCH

(NETBALL AND BASKETBALL)

INFORMATION TO PARTICIPANTS:

We are interested in your feelings and reactions to competitive situations in your sport (either netball or basketball). To study these feelings in detail we would like you to complete a number of brief questionnaires and take part in a non-competitive experiment testing your shooting accuracy.

CERTIFICATION BY PARTICIPANT:

I,

of

certify that I am at least 18 years old* and that I am voluntarily giving my consent to participate in the experiment investigating thoughts, feeling and reactions to competitive situations, being conducted at Victoria University of Technology by Dr. Daryl B. Marchant, Professor Tony Morris, & graduate student Mr. Christopher Mesagno. I certify that the objectives of the study, together with any risks and safeguards associated with this study, have been explained to me by Chris Mesagno and that I freely consent to participate.

Procedures:

First, you will be asked to fill out short questionnaires, which will take approximately 30 minutes to complete. These questionnaires are mainly about how you respond to competitive pressure and anxiety in sport. Your responses to these questionnaires will be kept totally confidential. You will then participate by taking either 180 or 240 shots. All sessions will take place within the gymnasium at Victoria University, and will take approximately 1-2 hours to complete. The goal for participants is to make as many successfully shots as possible. During each session, you will also be asked to fill out another short questionnaire. Video recordings may be made of your participation. Only those involved with the study will have access to the tapes for data analysis purposes only. At all other times the videotapes will be locked inside a file cabinet. After final analysis, the tapes will be erased. A number of participants will then be asked to take part in an interview where you will be asked to discuss your experiences in this project and sport in general. The interview will take approximately 30-60 minutes and will be audio-taped.

I certify that I have had the opportunity to have any questions answered and that I understand that I can withdraw from this study at any time and that this withdrawal will not jeopardise me in any way.
I have been informed that the information I provide will be kept confidential.

Signed: ....}

Witness other than the experimenter: ....} Date: ....}

Any queries about your participation in this project may be directed to the researcher (Name: Dr. Daryl B. Marchant ph. 03 9688 4035). If you have any queries or complaints about the way you have been treated, you may contact the Secretary, University Human Research Ethics Committee, Victoria University of Technology, PO Box 14428 MC, Melbourne, 8001 (telephone no: 03-9688 4710)

APPENDIX I: PRE-PRESSURE BASELINE PHASE INSTRUCTIONS – NETBALL

Thank you for participating. The purpose of this study is to examine feelings and reactions to competitive situations in netball. You will participate in three sessions over three days that will take approximately 30 minutes to complete each session. You might also be asked to participate in an interview after completing the sessions. The three sessions will involve netball shooting in which you will be asked to practice netball shots from a distance of 8 ft (2.44 m) from the goal post. During each session, you will be asked to take 60 shots. A 10-second break will be given between each shot and a 30-second rest period will be provided after every 10 shots. The object is to make as many shots as possible. Overall, the goal is to do the best you can during the three sessions. Before the shot attempts, you will complete the questionnaire placed in front of you. After completing the questionnaire, 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. Go ahead and fill out the questionnaire in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin. At the conclusion of the shots, a time will be scheduled to continue participation in the study. Do you have any questions?

APPENDIX J: PRESSURE PHASE INSTRUCTIONS – NETBALL (& BASKETBALL)

During these 60 shots, a video camera will be placed to the left side near the end line to record your participation. This session will be similar to the last session with the exception of a few changes.

During this session, you will receive $20 for equalling your previous performance. If you improve your previous performance, an additional $5 for each successful shot over the previous score will be given. Maximum amount of money you can receive is $100. If, however, you fail to reach the previous score, you will receive no money. For example, if your score was 40 out of 60 shots last time, if you achieve 40 out of 60 this session, you will receive $20. If your score is 39 out of 60 this session, you will receive no money because it is 1 shot less than your previous score. Likewise, if your score is 41 out of 60 this session, you will receive $25. The object of this session is to improve your performance from the previous session. Your score from the previous session was (*say participants previous score here*). You will receive $20 for reaching that score and $5 each additional successful attempt over that score, but no money if you do not reach that score. So, try to do your best. I will inform you of the amount of money you will receive at the conclusion of this session. You will receive your money at the conclusion of the study.

You will also notice that when you get on the court, a small group of fellow *students or teammates* (change depending on the audience) will be observing your participation. The *students or teammates* are there to analyse correct shot making technique and movements in *netball or basketball*. The *students or teammates* have been told not to interact, encourage, or discourage you in any way. Please do not talk to or socialise with these *students or teammates* as this might affect your performance. Audience members will be positioned to the right, left and behind you in order to observe your shot making processes. First, you will complete the questionnaire placed in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin. At the conclusion of the shots, a time will be scheduled to continue participation in the study. Do you have any question?

APPENDIX K: POST-PRESSURE BASELINE PHASE INSTRUCTIONS – NETBALL (& BASKETBALL)

This session will be similar to the first session. You will be asked to take 60 shots with a 10-second break between each shot and a 30-second rest period after 10 shots. The goal is to make as many shots as possible over the 60 attempts. Please do the best you can during this session. Before the shot attempts you will complete the questionnaire placed in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin. At the conclusion of the shots, I will discuss with you what is necessary for the remainder of the study. Do you have any questions?

APPENDIX L: NETBALL INTERVIEW GUIDE

1. Describe to me your netball history. How long have you been playing? Things like that.
2. Can you describe in as much detail as possible what you were feeling during Session 1? Session 2? Session 3?
3. Can you walk me through your thoughts during Session 1? Session 2? Session 3?
4. Can you describe your actions during Session 1? Session 2? Session 3?
5. How did the audience affect you during Session 2?
6. How did the video camera affect your shooting during Session 2?
7. How did the financial incentive influence your shooting during session 2? your feelings during Session 2? your thinking during Session 2?
8. How did you think you performed during the study?
9. Describe a past experience (outside of the study) that involved pressure on you to perform and describe to me how you dealt with the situation.
10. Tell me what you learned about yourself from taking part in the study.
11. Is there anything else you would like to add?

APPENDIX M: PARTICIPANT DEBRIEFING – NETBALL

The purpose of this post-study debriefing is to explain to you the rationale behind the study in which you participated.

The purpose of the study was to examine your reactions to pressure within your sport. Specifically, we were concerned with your cognitive processes, emotional, and behavioural responses to the pressure during the study. The questionnaires you filled out at the beginning of the study were to divide participants into their respective groups, either choking-susceptible athletes (i.e., participants likely to choke) or choking resistant athletes (i.e., participants less likely to choke).

In order to generate pressure during the second session, the combination of financial incentive, small audience, and video camera evaluation were involved.

In the pressure session, you were informed that the video camera would be used. The tape will be destroyed after analysis and no one besides the researchers will see the tape.

Also, audience members were used to watch your performance. You were informed that these human movements students were there to analyse correct shot making technique and movements that are involved in netball shooting. The students will not be analysing your performance. Researchers have suggested that audience members may increase self-awareness to performers when present; therefore audience members were present to increase self-awareness.

During the pressure session, you were informed that you would receive money for your participation during the study depending on previous performance. Your total successful shots during the first session was (*insert # of successful shots in baseline phase*), and your total successful shots during the second session was (*insert # of successful shots in pressure phase*). The amount of money you should receive is (*insert amount of money to be given*).
Here is the money that you were promised. (*Give the participant her money and have her sign receipt book*)

Do you have any questions?

Thank you for participating in my study and good luck in your academic and professional career.

APPENDIX N: LEVEL CALCULATION – ALL PARTICIPANTS

Study 1

Amy

For Amy, changes in level were assessed and the final level of the celeration line in the A_1 phase was 6.68. That is, when the celeration line for the A_1 phase intersected the onset of the B phase, the corresponding score was 6.68. The initial performance level during the B phase was 9.00. This represented a change in level for successful shots of × 2.32 (i.e., 9.00 – 6.68 = 2.32; × denotes a positive trend) between the A_1 and B phase, an increase of 35%. During the B phase, the final level of the celeration line was 9.00, whereas the initial performance level for the A_2 phase was 7.00, representing a change in level for successful shots between B and A_2 phase of ÷ 2.00 (i.e., 7.00 – 9.00 = – 2.00; ÷ denotes a declining trend), a decrease of 29%.

Beth

For Beth, the final level of the trend line in the A_1 phase was 4.92, whereas the initial level of the trend line during the B phase was 5.82. The change in level of successful shots between the A_1 and B phase was × 0.90, an increase of 18%. The final level of the trend line during the B phase was 7.48 and the initial level of the trend line for the A_2 phase was 6.00. The change in level of successful shots between the B and A_2 phase was ÷ 1.48, a decrease of 25%.

Carol

For Carol, the final level of the celeration line in the A_1 phase was 4.00 and the initial level of the celeration line during the B phase was 3.60. The change in level of successful shots between the A_1 and B phase was ÷ 0.40, a decrease of 11%. The final level of the celeration line during the B phase was 8.60, whereas the initial level of celeration line for the A_2 phase was 3.67. The change in level of successful shots between the B and A_2 phase was ÷ 4.93, a decrease of 134%.

Debbie

For Debbie, the final level of the trend line during the A_1 phase was 4.29, and the initial level of the trend line during the B phase was 7.67. The change in level between the A_1 and B phase was × 3.38, an increase of 79%. The final level of the trend line in the B phase was 9.33, and the original level of the trend line for the A_2 phase was 7.73. Thus, the change in level of successful shots between the B and A_2 phase was ÷ 1.60, a decrease of 21%.

Emma

As indicated by the slope of the trend line for Emma in the A_1 phase, the final level of performance was 6.08, whereas the initial level of the trend line during the B phase was 4.58. The change in level in successful shots between the A_1 and B phase was ÷ 1.50, a decrease of 33%. From the slope of the trend line in the B phase, the final level was 2.92, and the initial level of the trend line for the A_2 phase was 4.42. Change in level of successful shots between the B and A_2 phase was × 1.50, an increase of 51%.

Felicity

The final level of the celeration line in the A_1 phase, for Felicity, was 6.57, whereas the initial level of the celeration line in the B phase was 4.33. The change in level of successful shots between the A_1 and B phase was ÷ 2.24, a decrease of 52%. During the B phase, the final level of the celeration line was 2.67. The initial level of the celeration line for the A_2 phase was 4.47. The change in level of successful shots between the B and A_2 phase was × 1.80, an increase of 67%.

Grace

For Grace, the final level of the trend line in A_1 phase was 6.28, whereas the initial level of the trend line in the B phase was 4.00. The change in level of successful shots between the A_1 and B phase was ÷ 2.28, a decrease of 57%. A final level of the trend line for the B phase was 9.00. The initial level of the trend line for the A_2 phase was 8.00. The change in level of successful shots between the B and A_2 phase was ÷ 1.00, a decrease of 13%.

Helen

For Helen, the final level of the celeration line in the A_1 phase was 6.68, and the initial level of the celeration line in the B phase was 3.55. The change in level of successful shots between the A_1 and B phase was ÷ 3.13, a decrease of 88%. During the B phase, the final level of the celeration line was 8.55 and the initial level of the celeration line for the A_2 phase was 5.33. The change in level of successful shots between the B and A_2 phase was ÷ 3.22, a decrease of 60%.

Study 2

Jason

For Jason, the final level of the celeration line in the A_1 phase was 2.09, whereas the initial level of the celeration line in the B_1 phase was 3.17. The change in level between the A_1 and B_1 phase was × 1.08, an increase of 52%. The final level of the celeration line during the B_1 phase was 3.82 and the initial level of the celeration line during the A_2 phase was 3.01. This represented a change in level between the B_1 and A_2 phase of ÷ 0.81, a decrease of 27%. The final level of the celeration line during the A_2 phase was 2.59, whereas the initial level of the celeration line for the B_2 phase was 2.52. This indicated a change in level of ÷ 0.70, a decrease of 3%.

Karl

For Karl, the final level of the trend line in the A_1 phase was 2.70, and the initial level of the trend line during the B_1 phase was 3.31. The change in level of MAE between the A_1 and B_1 phase was × 0.61, an increase of 23%. The final level of the trend line during the B_1 phase was 3.71, whereas initial level of the trend line during the A_2 phase was 3.17. This represented a change in level of MAE of ÷ 0.54, a decrease in level of 17%. The final level of the trend line during the A_2 phase was 2.93 displayed, whereas the initial level of the trend line during the B_2 phase was 2.72. This indicated a change in level of MAE of ÷ 0.21, a decrease of 8%.

Linda

For Linda, the final level of the celeration line during the A_1 phase was 3.09, and the celeration line began at a level of 2.48 during the B_1 phase. The change in level for MAE between the A_1 and B_1 phase was ÷ 0.61, a decrease of 25%. The final level of the celeration line during the B_1 phase was 3.88. During the A_2 phase, the initial level of the celeration line was 3.34. The change in level for MAE was ÷ 0.54 between the B_1 and A_2 phase, a decrease in level of 16%. The final level of the celeration line during the A_2 phase was 3.03, whereas the initial level of the celeration line during the B_2 phase was 3.10. This indicated a change in level for MAE of × 0.07, an increase of 2%.

Peter

For Peter, the final level of the celeration line during the A_1 phase was 2.96, and the level of the celeration line was initially 1.32 during the B_1 phase. The change in level for MAE between the A_1 and B_1 phase was ÷ 1.64, a decrease of 124%. The final level of the celeration line during the B_1 phase was 2.01. During the A_2 phase, the beginning level of the celeration line was 2.83. The change in level for MAE was × 0.82 between the B_1 and A_2 phase, an increase in level of 41%.

Ray

Ray's final level of the celeration line during the A_1 phase was 2.98, and the celeration line initially began at 2.20 during the B_1 phase. The change in level for MAE between the A_1 and B_1 phase was ÷ 0.78, a decrease of 36%. The final level of the celeration line during the B_1 phase was 2.35, whereas the initial level of the celeration line during the A_2 phase was 2.05. The change in level for MAE was ÷ 0.30 between the B_1 and A_2 phase, a decrease in level of 15%.

Study 3

Michelle

For Michelle, changes in level were assessed and the final level of the celeration line in the A_1 phase was 6.72, whereas the initial level of the celeration line during the B_1 phase was 6.20. The represented change in level between the A_1 and B_1 phases was ÷ 0.52, a decrease of 8%. The final level of the celeration line during the B_1 phase was 4.54 and the initial level of the celeration line during the A_2 phase was 5.52. Thus, the change in level between the B_1 and A_2 phases was × 0.98, an increase of 22%. The final level of the celeration line during the A_2 phase was 7.18 and the initial level of the celeration line during the B_2 phase was 7.00. This was a change in level of ÷ 0.18 between the A_2 and B_2 phases, a decrease of 3%.

Nicole

For Nicole, the final level of the trend line in the A_1 phase was 6.08, whereas the trend line commenced at a level of 4.00 during the B_1 phase. The change in level between the A_1 and B_1 phase was ÷ 2.08, a decrease of 52%. The final level of the trend line in the B_1 phase was 4.00 and the initial level of the trend line during the A_2 phase was 4.90. This represented a change in level of × 0.90 between the B_1 and A_2 phases and an increase of 23%. The final level of the trend line in the A_2 phase was 6.56, whereas the initial level of the trend line for the B_2 phase was 4.33. This indicated a change in level of ÷ 2.23 from the A_2 to B_2 phase, a decrease of 52%.

Olivia

For Olivia, the final level of the celeration line in the A_1 phase was 3.77, whereas the initial celeration line level during the B_1 phase was 4.63. The change in level of successful shots between the A_1 and B_1 phase was × 0.86, an increase of 23%. The final level of the celeration line in the B_1 phase was 2.97 and the initial level of the celeration line during the A_2 phase was 3.63. This represented a change in level of × 0.66 between the B_1 and A_2 phase, an increase of 22%. A final level of the celeration line during the A_2 phase was 6.97, whereas the initial level of the celeration line during the B_2 phase was 2.12. This indicated a change in level of ÷ 4.86, a decrease of 228%.

Sara

Sara's final level of the celeration line in the A_1 phase was 7.00, whereas the initial level of the celeration line during the B_1 phase was 9.08. The change in level of successful shots between the A_1 and B_1 phase was × 2.08, an increase of 30%. The final level of the celeration line in the B_1 phase was 7.42 and the initial level of the celeration line during the A_2 phase was 8.33. This represented a change in level of × 0.91 between the B_1 and A_2 phase, an increase of 12%.

Tim

Tim's final level of the celeration line in the A_1 phase was 6.62, whereas the initial celeration line level during the B_1 phase was 8.33. The change in level of successful shots between the A_1 and B_1 phase was × 1.71, an increase of 26%. During the B_1 phase, the final level of the celeration line was 6.67 and the initial level of the celeration line during the A_2 phase was 6.08, signifying a change in level of ÷ 0.59 between the B_1 and A_2 phase, a decrease of 10%.

APPENDIX O: DIRECTION SCORES ON THE DM-CSAI-2 – ALL PARTICIPANTS

Study 1

Amy

Visual inspection of Figure A.2 shows that Amy's direction scores for cognitive anxiety prior to the A_1, B, and A_2 phases were – 9, – 13, and – 7, respectively. Thus, at the moment of completing the DM-CSAI-2 prior to the phases, Amy expected that a greater amount of cognitive anxiety would be more debilitative to performance than less cognitive anxiety. Direction scores for somatic anxiety prior to the three phases were – 2, – 17, and + 16, respectively. Thus, increases in intensity of somatic anxiety were viewed as more debilitative to performance during the B phase, whereas decreases in intensity of somatic anxiety were perceived to be facilitative regarding performance in the A_2 phase.

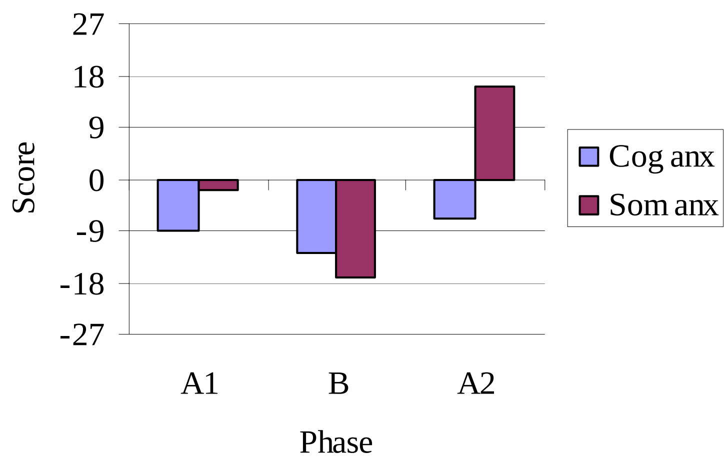

Figure A .2. Cognitive and somatic anxiety direction scores for Amy.

Beth

Visual inspection of Figure A.3 shows that Beth's direction scores for cognitive anxiety prior to the A_1, B, and A_2 phases were + 17, – 10, and + 16, respectively. At the time of completing the DM-CSAI-2, Beth considered a low level of cognitive anxiety to be facilitative to performance, whereas a high level of cognitive anxiety was debilitative to performance. Direction scores for somatic anxiety before the three phases were + 21, 0, and + 13, respectively. Beth perceived low intensity of somatic anxiety as facilitative, whereas high intensity of somatic anxiety (i.e., during the B phase) was perceived as debilitative to performance.

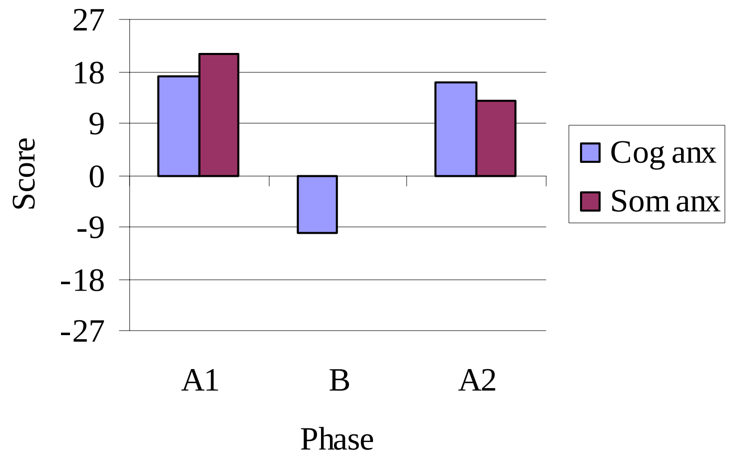

Figure A .3. Cognitive and somatic anxiety direction scores for Beth.

Carol

Visual inspection of Figure A.4 shows that Carol's direction scores for cognitive anxiety before the A_1, B, and A_2 phases were – 6, + 23, and + 26, respectively. Carol considered a high intensity of cognitive anxiety as debilitative to performance, which was most evident prior to the A_1 phase, and a low intensity of cognitive anxiety to be facilitative to performance. The direction scores for somatic anxiety before the three phases were + 8, + 18, and + 20, respectively. Thus, the low intensity levels of somatic anxiety were considered facilitative to performance.

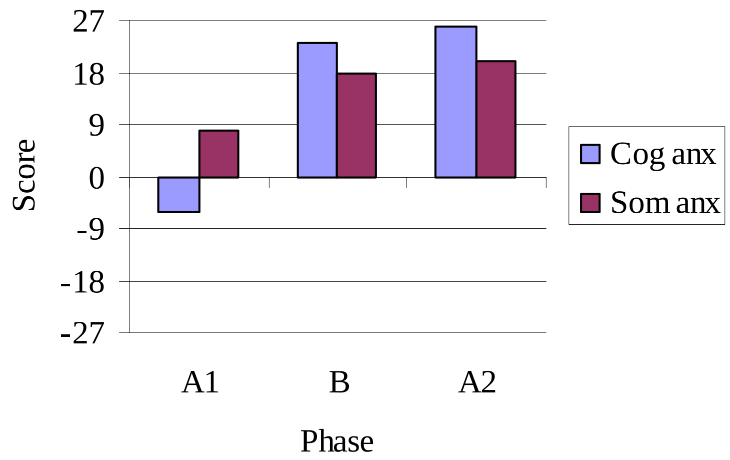

Figure A .4. Cognitive and somatic anxiety direction scores for Carol.

Debbie

Visual inspection of Figure A.5 shows that Debbie's direction scores for cognitive anxiety prior to the A_1, B, and A_2 phases were – 3, – 6, and – 2, and the direction scores for somatic anxiety leading into the three phases were 0, – 3, and – 5, respectively. It appears that Debbie considered the minimal A-state intensity neither greatly facilitative nor debilitative to performance.

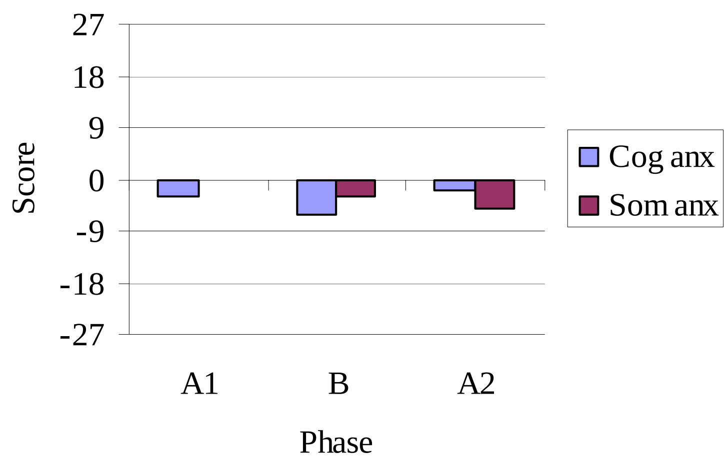

Figure A .5. Cognitive and somatic anxiety direction scores for Debbie.

Emma

Visual inspection of Figure A.6 shows that Emma's reported direction scores for cognitive anxiety prior to completing the netball shooting task in the A_1, B, and A_2 phases were – 13, – 19, and – 10, respectively. In all phases, Emma considered cognitive anxiety to be debilitative to performance. Direction scores for somatic anxiety for the three phases were + 2, – 7, and + 2, respectively. Conversely, Emma perceived a high level of intensity of somatic anxiety to be debilitative, whereas a low level in intensity of somatic anxiety was facilitative to performance.

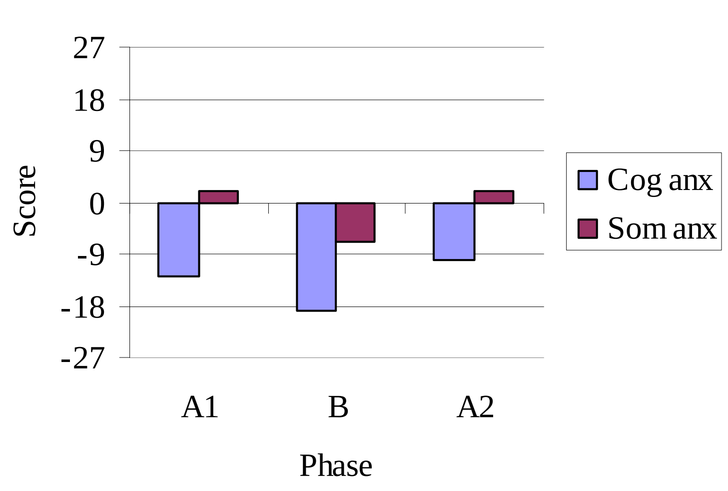

Figure A .6. Cognitive and somatic anxiety direction scores for Emma.

Felicity

Visual inspection of Figure A.7 shows that Felicity's direction scores for cognitive anxiety during the A_1, B, and A_2 phases were + 15, + 10, and + 23, and direction scores for somatic anxiety during the three phases were + 15, + 9, and + 25, respectively. Felicity considered all phases somewhat facilitative to performance, yet, as intensity of anxiety elevated, direction scores decreased, albeit minimally.

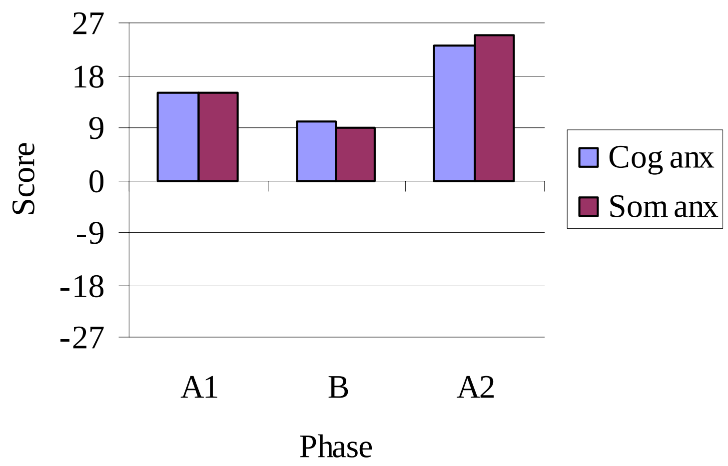

Figure A .7. Cognitive and somatic anxiety direction scores for Felicity.

Grace

Visual inspection of Figure A.8 shows that Grace's direction scores for cognitive anxiety prior to the A_1, B, and A_2 phases were – 9, – 17, and – 11, respectively. In all phases, Grace considered cognitive anxiety somewhat debilitating to performance, yet elevated intensity of cognitive anxiety was perceived as more debilitative to performance. Direction scores for somatic anxiety before the three phases were + 2, – 16, and + 14, respectively. Grace perceived low intensity of somatic anxiety as facilitative (i.e., during the A_1 and A_2 phases), whereas high intensity of somatic anxiety (i.e., during the B phase) was perceived as debilitative to performance.

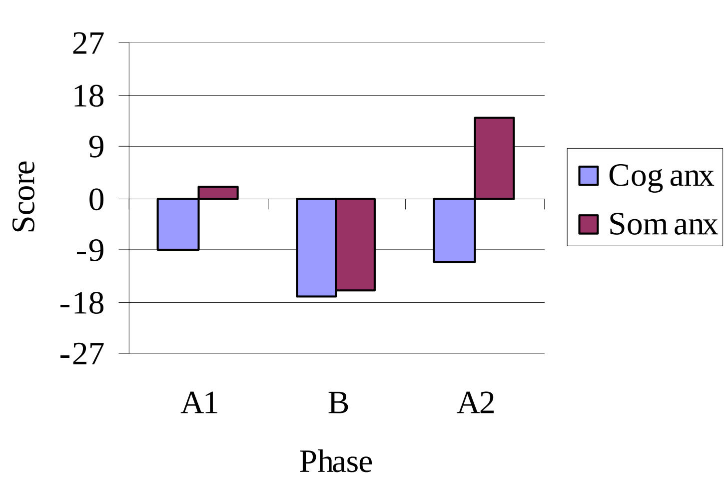

Figure A .8. Cognitive and somatic anxiety direction scores for Grace.

Helen

Visual inspection of Figure A.9 shows that Helen's direction scores for cognitive anxiety were + 1, – 10, and + 3 immediately before the A_1, B, and A_2 phases, respectively. Helen considered a greater intensity of cognitive anxiety somewhat debilitative to performance. Helen's direction scores for somatic anxiety were – 4, + 4, and + 1 prior to the three respective phases. Thus, Helen did not perceived intensity of somatic anxiety to be strongly facilitative or debilitative to performance.

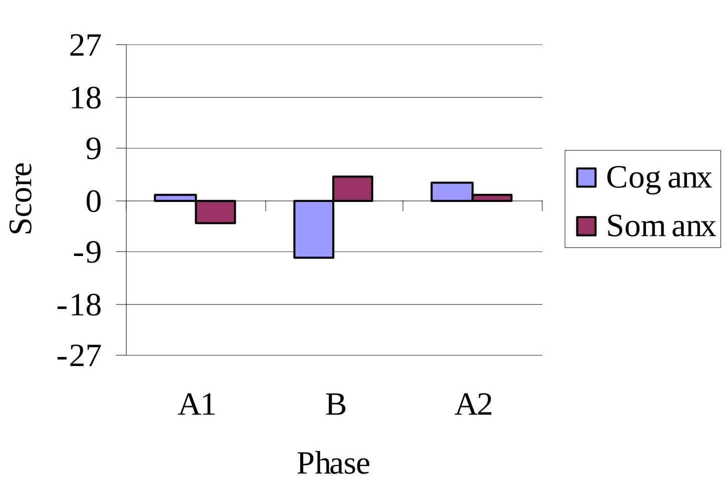

Figure A .9. Cognitive and somatic anxiety direction scores for Helen.

Study 2

Jason

Visual inspection of Figure A.10 shows that Jason's direction scores for cognitive anxiety leading into the A_1, B_1, A_2, and B_2 phases were + 1, + 2, – 2, and – 5, respectively. Direction scores for somatic anxiety immediately before the four phases were + 1, – 1, + 3, and 0, respectively. Thus, Jason did not perceive intensity of cognitive or somatic anxiety to be strongly facilitative or debilitative to performance.

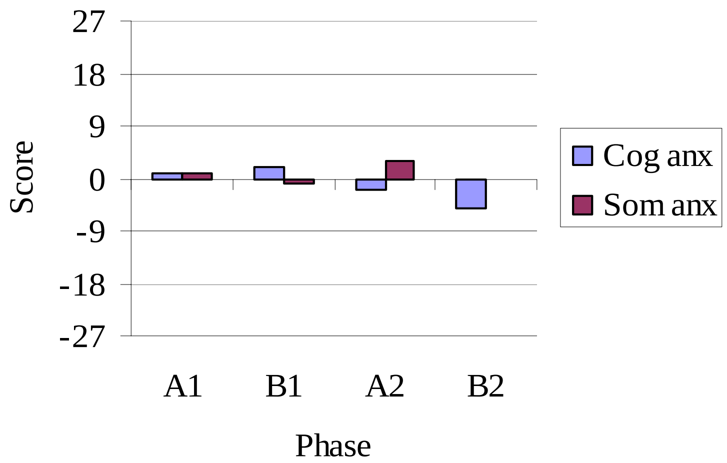

Figure A .10. Cognitive and somatic anxiety direction scores for Jason.

Karl

Visual inspection of Figure A.11 shows that Karl's direction scores for cognitive anxiety leading into the A_1, B_1, A_2, and B_2 phases were 0, – 4, – 4, and – 6, and direction scores for somatic anxiety immediately before the four phases were 0, – 8, – 7, and – 1, respectively. Karl considered intensity of cognitive and somatic anxiety in most phases to be somewhat debilitative to performance.

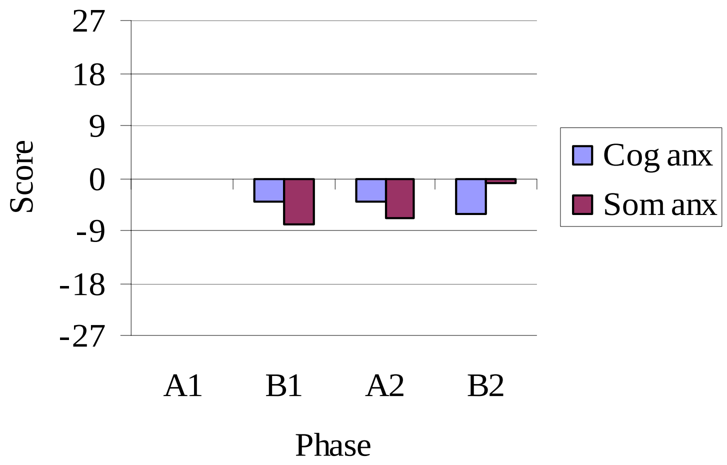

Figure A .11. Cognitive and somatic anxiety direction scores for Karl.

Linda

Visual analysis of Figure A.12 shows that Linda's direction scores for cognitive anxiety were + 2, – 1, + 9, and + 4 prior to the A_1, B_1, A_2, and B_2 phases, respectively. Direction scores for somatic anxiety were + 3, – 4, + 14, and + 2 prior to the four phases, respectively. It appears that Linda considered low intensity levels of cognitive and somatic anxiety (as shown in the A_2 phase in Figure 4.15) to be facilitative to performance.

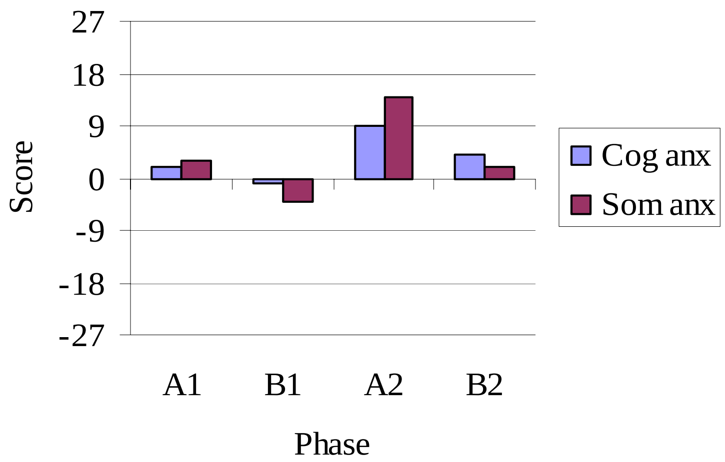

Figure A .12. Cognitive and somatic anxiety direction scores for Linda.

Peter

Visual analysis of Figure A.13 shows that Peter's direction scores for cognitive anxiety were + 10, + 11, and + 11 prior to the A_1, B_1, and A_2 phases and direction scores for somatic anxiety were + 7, + 8, and + 5 prior to the three phases, respectively. Generally, Peter perceived cognitive and somatic anxiety as facilitative.

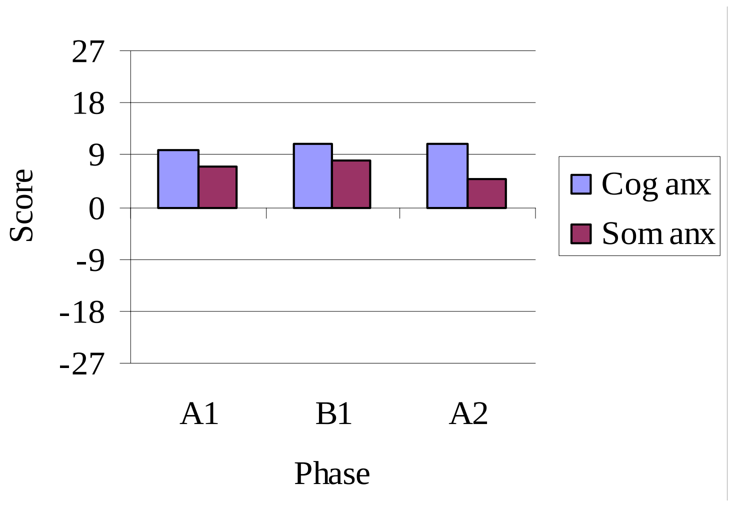

Figure A .13. Cognitive and somatic anxiety direction scores for Peter.

Ray

Visual analysis of Figure A.14 shows that Ray's direction scores for cognitive anxiety were + 13, + 1, and + 7 prior to the A_1, B_1, and A_2 phases, while direction scores for somatic anxiety were + 9, + 4, and + 5 prior to the three phases, respectively. Generally, Ray considered the perceived anxiety to be facultative to performance.

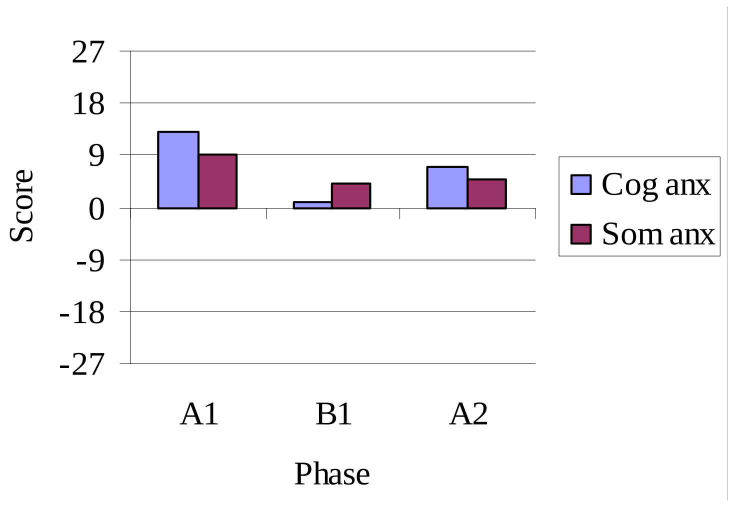

Figure A .14. Cognitive and somatic anxiety direction scores for Ray.

Study 3

Michelle

Visual inspection of Figure A.15 shows that Michelle's direction scores for cognitive anxiety preceding the A_1, B_1, A_2, and B_2 phases were + 5, – 8, + 7, and – 16, respectively. Thus, Michelle perceived elevated intensity of cognitive anxiety to be debilitative preceding the high-pressure phases. Direction scores for somatic anxiety immediately before the four phases were – 2, – 10, – 1, and – 6. On all four occasions, somatic anxiety intensity was perceived as debilitative with increases in intensity during the high-pressure phases as more debilitative.

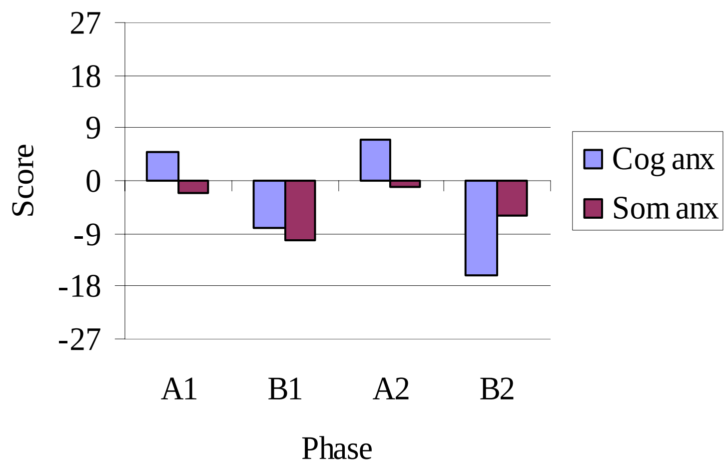

Figure A .15. Cognitive and somatic anxiety direction scores for Michelle.

Nicole

Visual inspection of Figure A.16 shows that Nicole's reported scores for directional cognitive anxiety preceding the A_1, B_1, A_2, and B_2 phases were – 15, – 15, – 10, and + 2, respectively. Direction scores for somatic anxiety prior to the four phases were – 1, – 8, – 1, and 0, respectively. For Nicole, it seems that the intervention affected her interpretation of intensity of cognitive and somatic anxiety during the B_2 phase. Clearly, direction scores of cognitive anxiety for the initial three phases follows the level of intensity. In the B_2 phase, however, when intensity is higher than the A_1 and A_2 phases, Nicole interprets anxiety levels as slightly facilitative to performance. Although not as robust, direction scores of somatic anxiety follow the same pattern indicating that the intervention may have affected Nicole's interpretation of anxiety intensity.

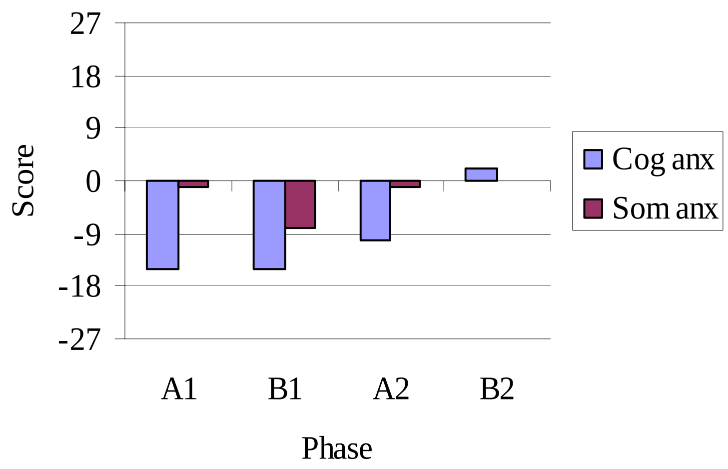

Figure A .16. Cognitive and somatic anxiety direction scores for Nicole.

Olivia

Visual inspection of Figure A.17 illustrates that Olivia's direction scores for cognitive anxiety prior to the A_1, B_1, A_2, and B_2 phases were + 6, – 12, – 10, and – 20, respectively. It appears that Olivia interpreted the cognitive anxiety as generally debilitative particularly in the B_2 phases. Direction scores for somatic anxiety preceding the four phases were + 13, – 10, + 27, and – 12, respectively. Thus, Olivia viewed higher intensities of somatic anxiety as debilitative to performance.

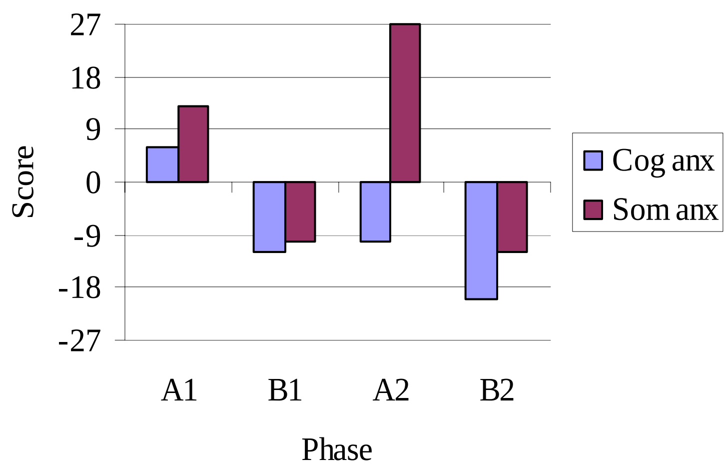

Figure A .17. Cognitive and somatic anxiety direction scores for Olivia.

Sara

Visual inspection of Figure A.18 illustrates that Sara's direction scores for cognitive anxiety preceding the A_1, B_1, and A_2, phases were + 12, – 1, and + 25, whereas direction scores for somatic anxiety preceding the three phases were + 20, + 27, and + 27, respectively. Generally, Sara interpreted aspects of cognitive and somatic anxiety as facilitative to performance.

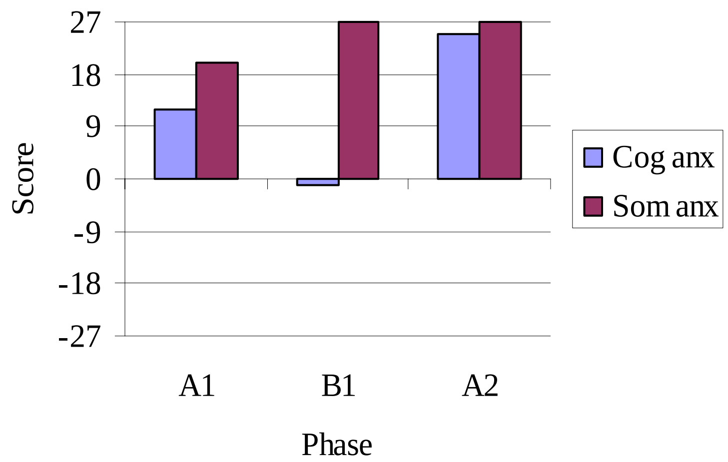

Figure A .18. Cognitive and somatic anxiety direction scores for Sara.

Tim

Visual inspection of Figure A.19 demonstrates that Tim's direction scores for cognitive anxiety immediately before the A_1, B_1, and A_2 phases were – 6, – 14, and – 10, and direction scores for somatic anxiety immediately before the three phases were – 2, – 14, and + 7, respectively. Generally, Tim's scores on the multidimensional A-state indicated that he interpreted his anxiety to be debilitative to performance.

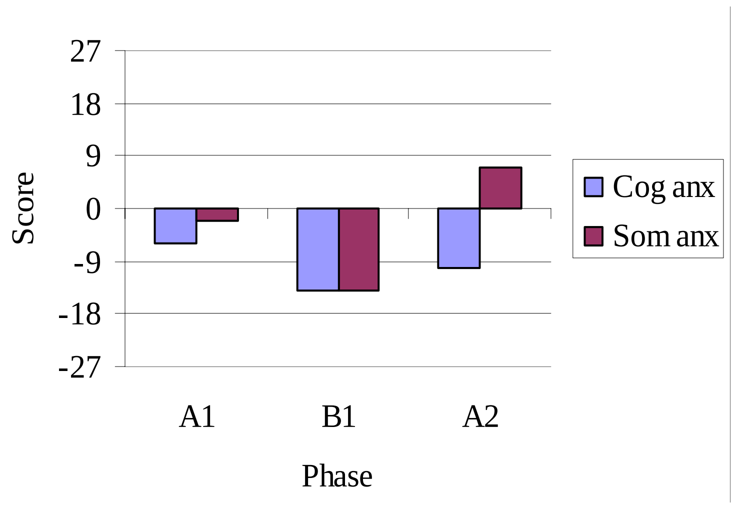

Figure A .19. Cognitive and somatic anxiety direction scores for Tim.

APPENDIX P: BOWLING EXPERIENCE QUESTIONNAIRE

1. Name__________________________________
2. Gender? ___M ____F (tick one)
3. Age? ______
4. Which hand will you be using when bowling? (Circle one) Left hand Right hand
5. Telephone (Home)____________________ (Mobile)________________________
6. Email address____
7. Which type of throw do you normally use when going for a strike?
   (Circle one) Hook ball Straight ball Back up ball
8. Do you currently bowl in a Tenpin Bowling Australia (TBA) sanctioned league?
   (Circle one) Yes No
   a. If yes, please give:

League name(s)(1)________________________(2)____________________________

Bowling centre name(s)(1)_____________________(2)_________________________

Highest current league average(s)(1)_________________(2)_____________________

Approximate # of games in league(s)(1)_________________(2)__________________

9. Approximately, how many years have you been bowling in a TBA sanctioned league?
   (Circle one) 0-3 years 4-6 years More than 6 years
10. Do you compete in competitive bowling tournaments? (Circle one) Yes No
    a. If yes, approximately how many years have you been bowling in competitive tournaments?

    (Circle one) 0-3 years 4-6 years More than 6 years
11. Do you bowl in competitive “scratch” (without handicap) bowling tournaments?
    (Circle one) Yes No
    a. If yes, approximately how many years have you been bowling in competitive “scratch” bowling tournaments?

    (Circle one) 0-3 years 4-6 years More than 6 years

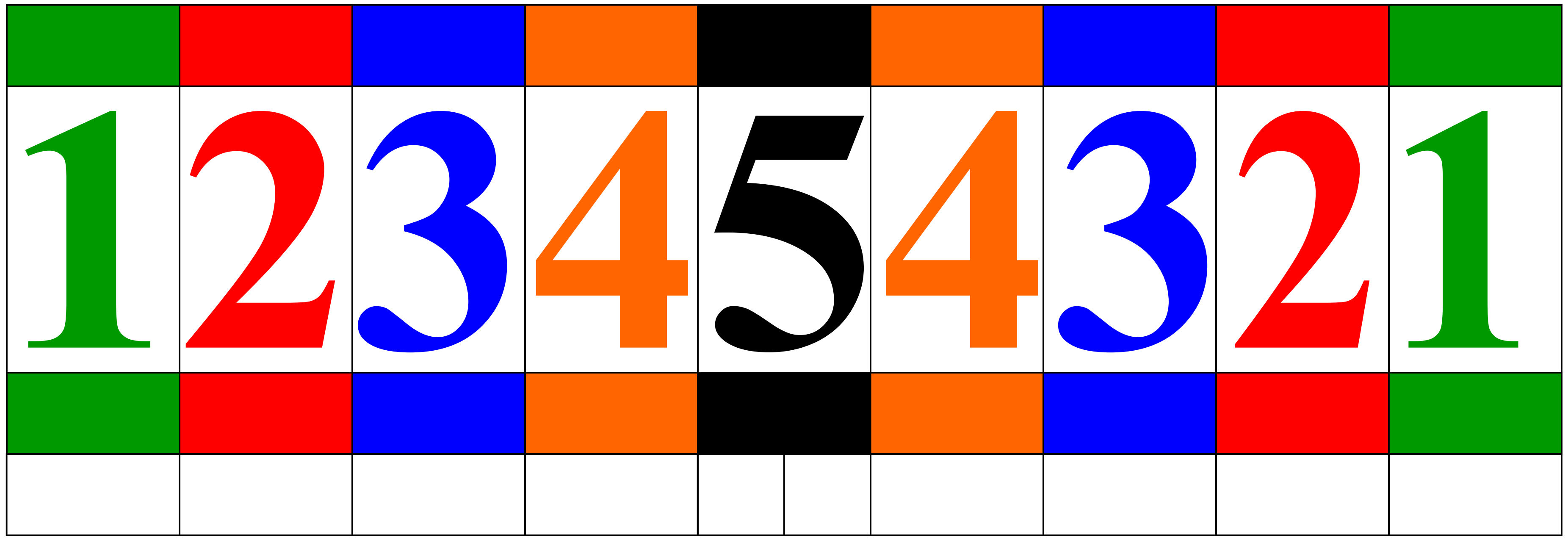

Figure A .20. Bowling target used in Study 2.

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VICTORIA UNIVERSITY OF TECHNOLOGY

APPENDIX R: CONSENT FORM FOR PARTICIPANTS INVOLVED IN RESEARCH-

(TENPIN BOWLING)

INFORMATION TO PARTICIPANTS:

We are interested in your feelings and reactions to competitive situations in your sport (tenpin bowling). To study these feelings in detail we would like you to complete a number of brief questionnaires and take part in a non-competitive experiment testing your shooting accuracy.

CERTIFICATION BY PARTICIPANT:

I,

of

certify that I am at least 18 years old* and that I am voluntarily giving my consent to participate in the experiment investigating thoughts, feeling and reactions to competitive situations, being conducted at Victoria University of Technology by Dr. Daryl B. Marchant, Professor Tony Morris, & graduate student Mr. Christopher Mesagno. I certify that the objectives of the study, together with any risks and safeguards associated with this study, have been explained to me by Chris Mesagno and that I freely consent to participate.

Procedures:

First, you will be asked to fill out short questionnaires, which will take approximately 30 minutes to complete. These questionnaires are mainly about how you respond to competitive pressure and anxiety in sport. Your responses to these questionnaires will be kept totally confidential. You will then participate by taking up to 240 shots (60 shots over 4 days). All sessions will be held at your local bowling centre or at AMF Highpoint Bowl in Maribyrnong. Each session will take approximately 45 minutes to complete. You will be asked to complete 2-4 sessions on different days. The goal for participants is to be as accurate as possible on each shot. During each session, you will also be asked to fill out another short questionnaire. Video recordings may be made of your participation. Only those involved with the study will have access to the tapes for data analysis purposes only. At all other times the videotapes will be locked inside a file cabinet. After final analysis, the tapes will be erased. A number of participants will be asked to take part in an interview where you will be asked to discuss your experiences in the project. The interview will take approximately 30-60 minutes and will be audio taped.

I certify that I have had the opportunity to have any questions answered and that I understand that I can withdraw from this study at any time and that this withdrawal will not jeopardise me in any way.
I have been informed that the information I provide will be kept confidential.

Signed: ....}

Witness other than the experimenter: ....} Date: ....}

Any queries about your participation in this project may be directed to the researcher (Name: Dr. Daryl B. Marchant ph. 03 9688 4035). If you have any queries or complaints about the way you have been treated, you may contact the Secretary, University Human Research Ethics Committee, Victoria University of Technology, PO Box 14428 MC, Melbourne, 8001 (telephone no: 03-9688 4710)

APPENDIX S: PRE-PRESSURE BASELINE PHASE INSTRUCTIONS – BOWLING

Thank you for participating. The purpose of this study is to examine feelings and reactions to competitive situations in bowling. You will participate in either two, three, or four sessions spread over four days. Each session will take approximately 30-60 minutes to complete. All sessions will involve bowling in which you will be asked to practice 60 shots at a target. As you can see (show the participant the target), the target consists of a series of numbers and will be placed approximately 13 ft (3.96 m) from the foul line. The aim is to throw the ball over the centre of the target. Blue powder will be placed on the target and as the ball rolls over the target, a definitive space will signify the ball's track and the number of points obtained. Before the shot attempts, you will complete the questionnaire placed in front of you. After completing the questionnaire, you will be introduced to a research assistant who will supervise your participation, calculate your score on each attempt, and replace the powder on the target. Go ahead and fill out the questionnaire in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin. In which area of the lane to you usually like throwing the bowling ball (i.e., 1^{st} arrow, 2^{nd} arrow, etc.)? I will be placing the target in that area of the lane. At the conclusion of the shots, a time will be scheduled for your next session. Do you have any questions?

APPENDIX T: PRESSURE PHASE INSTRUCTIONS – BOWLING

During these 60 shots, a video camera will be placed to the right side of the approach near the foul line to record your participation. This session will be similar to the last session with the exception of a few changes.

During this session, you will receive $10 for equalling your previous total accuracy score from your last session. An additional $1 for each point over the previous score will also be given. The maximum amount of money you can receive is $100. If you fail to reach the previous score, however, you will receive no money. For example, if your point's score was 150 last time and in this session you score 168, you would then receive $10 for reaching your previous score plus an additional $18 ($1 x 18). Conversely, if your point's score was 150 last time and in this session you score 149 or lower, then you will receive no money. The object of this session is to improve your performance from the previous session. Your score from the previous session was (*say participants previous score here*). You will receive $10 for reaching that score plus $1 each additional point over that score, and no money for each point under that score. You will receive your money at the conclusion of the study.

You will also notice that a small group of students will be observing your participation. The human movement students are there to analyse correct shot making technique and movements in bowling. They have been told not to interact, encourage, or discourage you in any way. Please do not talk to them. The audience members will be positioned behind you to the right and left in order to complete their observations. You will first complete the questionnaire placed in front of you. (Give time to complete questionnaire)

You will now be given 10 warm-up shots before the 60 shots begin. At the conclusion of the shots, a time will be scheduled for your next session. Do you have any question?

APPENDIX U: POST-PRESSURE BASELINE PHASE INSTRUCTIONS – BOWLING

This session will be similar to the first session. You will again take 60 shots. The goal is to do well and to be as accurate as possible. Before the shot attempts you will complete the questionnaire placed in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin. At the conclusion of the shots, I will discuss with you whether your participation beyond today is needed. If you participation is no longer required, you will be paid the money you are owed from the last session and thanked for your involvement. Do you have any questions?

APPENDIX V: PRE-SHOT ROUTINE INTERVENTION PHASE INSTRUCTIONS – BOWLING

Before performing these 60 shots, I will be helping you refine your pre-shot routine. Pre-shot routines are behaviours performed before the shot to ensure consistent preparation, which allows you to perform in an automatic nature. Pre-shot routines are a normal part of most self-paced activities such as bowling, golf, cricket, and target sports. An example of a pre-shot routine in bowling is as follows: pick up the bowling ball, wipe the ball off with a towel, blow in the thumb hole, walk on the approach and get into your set-up position by placing your left foot in your starting position, set your right foot, put your fingers in the ball, put your thumb in the ball, set your arm in a comfortable position, look at your target, and start your approach. (Demonstrate the pre-shot routine). I have made notes and have reviewed your videotape during the second session and would like to make a couple suggestions about your pre-shot routine. After I have made suggestions, you will practice your new routine without throwing any shots until you feel comfortable enough to use it. You will then demonstrate the routine by performing it five times correctly. Upon completion of that, I will explain what will happen for the remainder of the session. (Explain and refine the routine to the participants until confident that participant knows the routine well).

(Explained after the pre-shot routine has been developed). This session will be similar to the second session. You will again take 60 shots with an audience present, and the video camera recording your bowling. The money incentive will again be included, however, this time you will receive $10 for equalling the score you made on the second session (e.g., the last time you had an audience). Like last time, if you improve your accuracy, an additional $1 will be given for each point over the second session score. Once again, the maximum amount of money you can receive is $100 during this session. If you fail to reach the previous score, however, you will receive no money. The object is to improve your performance from the second session. Your score from that session was (*say participants previous score here*). You will receive $10 for reaching that score and $1 each additional point over that score, but no money for each point under that score. So, try to do your best. I will inform you of the amount of money you will receive at the conclusion of this session. You will receive all money owed to you after the interview. Do you have any questions?

The goal is to do the best you can and to be as accurate as possible over the 60 attempts. Before the shot attempts you will complete the questionnaire placed in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin. At the conclusion of the shots, I will discuss with you what is necessary for the remainder of the study. Do you have any questions?

APPENDIX W: PRE-SHOT ROUTINE INTERVIEW GUIDE

1. Describe to me your bowling history. How long have you been bowling? Do you bowl in any competitions? What your average is, things like that.
2. Describe in as much detail as possible what you were feeling during Session 1? Session 2? Session 3? Session 4?
   - Describe to me the differences in your feelings during Session 2 in comparison to Session 4?
3. Can you walk me through your thoughts during Session 1? Session 2? Session 3? Session 4?
   - Describe to me the differences in your thoughts during Session 2 in comparison to Session 4?
4. Describe your actions during Session 1? Session 2? Session 3? Session 4?
   - Describe to me the differences in your actions/ behaviours during Session 2 in comparison to Session 4?
5. Describe your feelings when you found out about the audience during Session 2? In what way did the audience affect your performance?
   - Describe your feelings when you found out about the audience during Session 4? In what way did the audience affect your performance?
6. Describe your feelings about the video camera during Session 2? In what way did the video camera affect your performance?
   - Describe your feelings about the video camera during Session 4? In what way did the video camera affect your performance?
7. Describe your feelings about the money during Session 2? In what way did the money affect your performance?
   - Describe your feelings about the money during Session 4? In what way did the money affect your performance?
8. Do you normally use a pre-shot routine? How long have you used your/ a pre-shot routine?
   - Can you describe to me your pre-shot routine during Session 2?
9. Describe the benefits you get from performing a pre-shot routine?
   - Describe how it affects your performance?
10. In Session 4, what did you think about when performing the pre-shot routine?
11. Can you describe systematically what was involved in your pre-shot routine in Session 4?
12. How did you think you performed during the study?
13. Describe a past experience (outside of the study) that involved pressure on you to perform and describe to me how you dealt with the situation.
14. Tell me what you learned about yourself from taking part in the study.
15. Is there anything else you would like to add?

APPENDIX X: PARTICIPANT DEBRIEFING – PRE-SHOT ROUTINE OR MUSIC

- The purpose of the study
    - To examine your reactions to pressure and to see whether an intervention (pre-shot routine or music) would assist you under pressure.
    - The questionnaires filled out at the beginning of the study were to determine whether you were a choking-susceptible athlete.

- Pressure during the 2nd session
    - Small audience- The audience members will not be analysing your performance.
    - Video camera evaluation- The tape will be destroyed after analysis and no one besides the researchers will see the tape
    - Financial incentive- You were informed that you would receive money for your participation during the study depending on previous performance. Talk about accuracy and how much money he/she will receive.
    - Give money promised. (Give participant money and have him/her sign receipt book)

- Brief the participant about the intervention (pre-shot routine or music) and whether it helped them during the study.

- Do you have any questions?

- Thank you very much for your participation

APPENDIX Y: RESULTS OF PARTICIPANTS – INCREASED PERFORMANCE

Interviews were not conducted for these participants because participation in the experimental phase was terminated following the A_2 phase. Thus, only limited information is presented including participant profile, reported DM-CSAI-2 results, and performance analysis. I assured participants' anonymity, thus, I used pseudonyms to identify the two participants that increased performance in Study 2 as Peter and Ray and Study 3 as Sara and Tim.

Study 2

CS Participant- Peter

Participant profile. Peter was a 31-year-old, male who had a current league average of 203. Peter was purposively sampled as a CS participant because he was high in S-C, moderately high in A-trait, and primarily used approach coping. Peter's scores were 55 on the SCS (75th to 100th percentile), 26 on the SAS (50th to 75th percentile), and + 3 on the CSIA differential score (75th to 100th percentile).

Pressure manipulation. Visual analysis of Figure A.21 shows that Peter's intensity scores for cognitive anxiety prior to the A_1, B_1, and A_2 phases were 18, 21, and 24, respectively. For Peter, perceived intensity of cognitive anxiety increased consecutively prior to all phases. Intensity scores for somatic anxiety preceding the three phases were 16, 20, and 15, respectively. Peter perceived an increase in intensity of somatic anxiety preceding the B_1 phases compared to the A_1 and A_2 phases. The DM-CSAI-2 scores also indicated that Peter experienced a low to moderate absolute level of A-state prior to the three phases.

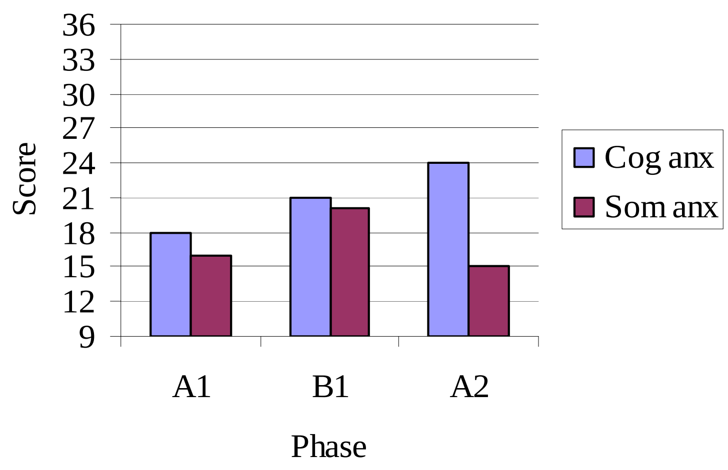

Figure A .21. Cognitive and somatic anxiety intensity scores for Peter.

Performance analysis. For Peter, MAE increased from 3.66 ± 0.96 in the A_1 phase to 1.54 ± 0.31 during the B_1 phase. This indicated an increase in accuracy of 138%. During the A_2 phase, performance was 3.15 ± 0.89, representing a decrease in accuracy of 105% between the B_1 and A_2 phase. Peter increased accuracy by 16% from the A_1 to the A_2 phase (see Figure A.22), whereas the B_1 phase performance changed drastically, indicating that the pressure manipulation was effective. As explained earlier, the reader is referred to Appendix N for participants' celeration line level calculations.

The slope of the celeration line during the A_1 phase was ÷ 1.35, and the slope of the celeration line in the B_1 phase was × 1.14, which signified a change in slope of × 1.18 during the A_1 and B_1 phase. The slope of the celeration line was × 1.11 during the A_2 phase, indicating a change in slope of ÷ 1.03.

General summary of Peter. From Peter's results, a difficulty exists in concluding the pressure manipulation was effective in increasing perceived pressure for two reasons. First, Peter's reported DM-CSAI-2 results indicated an increase in cognitive anxiety prior to the A_2 phase. The atypical elevation in cognitive anxiety preceding the low-pressure phase may indicate, although speculative, that a confounding variable potentially influenced perceived anxiety. Second, a potential, performance-related threat to the case study validity was an unstable baseline during the A_1 phase. Researchers who conduct

SCD research recommend achieving a stable baseline before arranging subsequent interventions (Barlow & Hersen, 1984; Hrycaiko & Martin, 1996). A stable baseline, with a minimal change in performance slope, allows researchers to clearly recognise strong performance trends and enhances decision-making about the efficacy of the intervention. From these results, it was difficult to conclusively determine the reason for Peter's performance improvement because the baseline measure was relatively unstable during the A_1 phase. Results during the A_1 phase may have continued in the projected direction even if the pressure manipulation was not introduced during the B_1 phase, thus, drawing adequate conclusions are complicated due to the unstable baseline and successive pressure decrease preceding the phases.

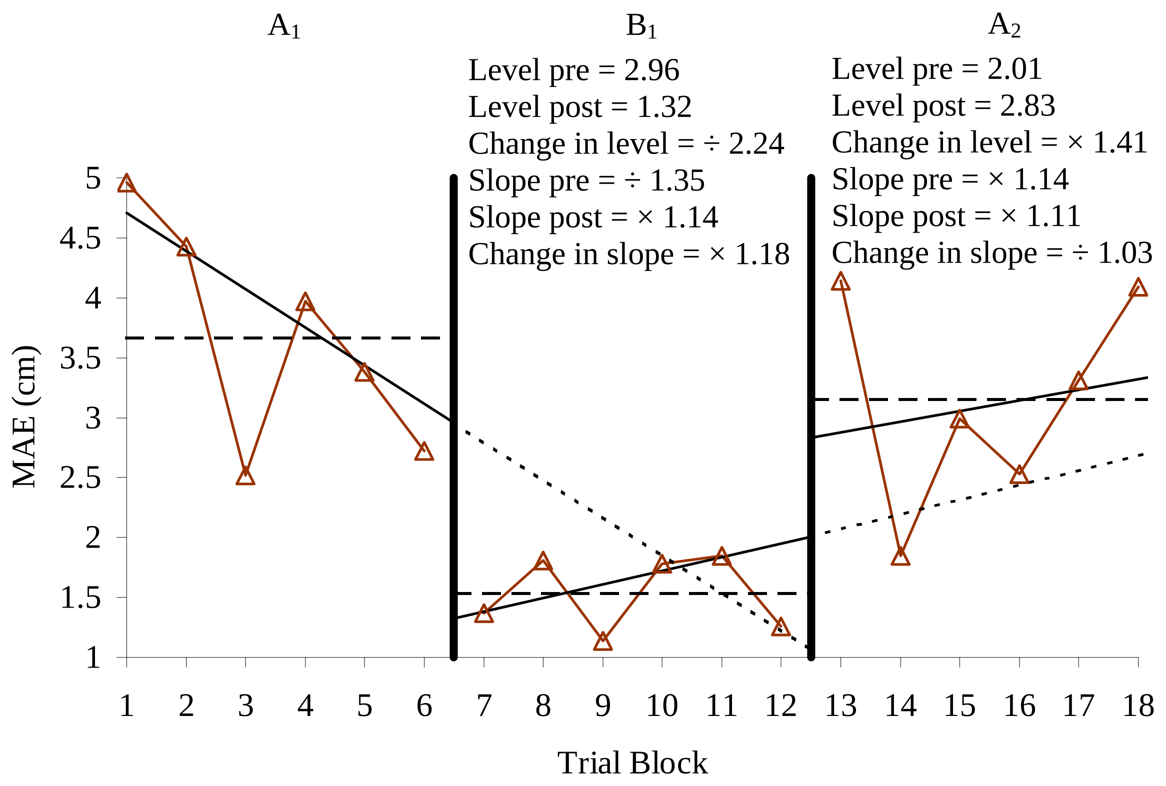

Figure A .22. Split-middle analysis for Peter.

CS Participant- Ray

Participant profile. Ray was an 18-year-old, male who had a current league average of 194. Ray was purposively sampled as a CS participant because he was high in S-C, high in A-trait, and predominantly used approach coping. Ray's scores were 46 on the

SCS (75th to 100th percentile), 52 on the SAS (75th to 100th percentile), and + 6 on the CSIA differential score (75th to 100th percentile).

Pressure manipulation. Visual analysis of Figure A.23 shows that Ray's intensity scores for cognitive anxiety prior to the A_1, B_1, and A_2 phases were 20, 12, and 11, and perceived intensity scores for somatic anxiety prior to the three phases were 17, 15, and 10, respectively. Ray experienced a similar, successive reduction in multidimensional A-state prior to the three phases. The reported DM-CSAI-2 scores also indicated that Ray experienced a low to moderate absolute level of A-state prior to each phase.

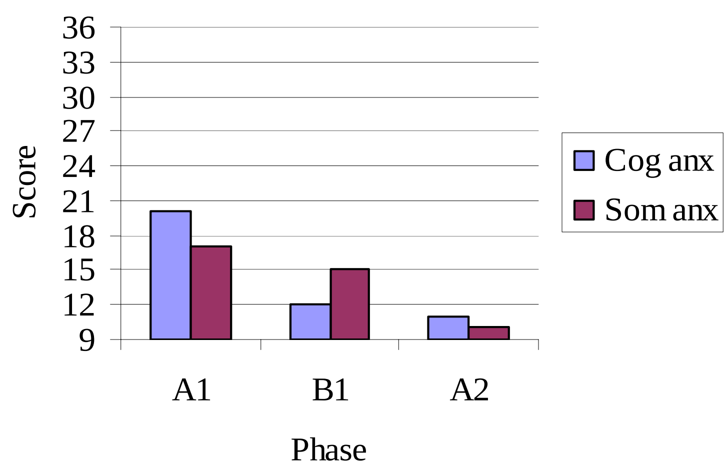

Figure A .23. Cognitive and somatic anxiety intensity scores for Ray.

Performance analysis. For Ray, MAE increased from 3.15 ± 0.46 in the A_1 phase to 2.32 ± 0.82 during the B_1 phase. This indicated an increase in accuracy of 36%. During the A_2 phase, mean performance was 2.43 ± 0.47, representing a reduction in accuracy of 5% between the B_1 and A_2 phase. MAE increased by 30% from the A_1 to the A_2 phase (see Figure A.24), which may also indicate that the pressure manipulation was not effective.

The slope of the celeration line during the A_1 phase was × 1.01, and the slope of the celeration line in the B_1 phase was × 1.03, representing a change in slope of × 1.02 during the A_1 and B_1 phase. The slope of the celeration line was × 1.10 during the A_2 phase, indicating a change in slope of × 1.07.

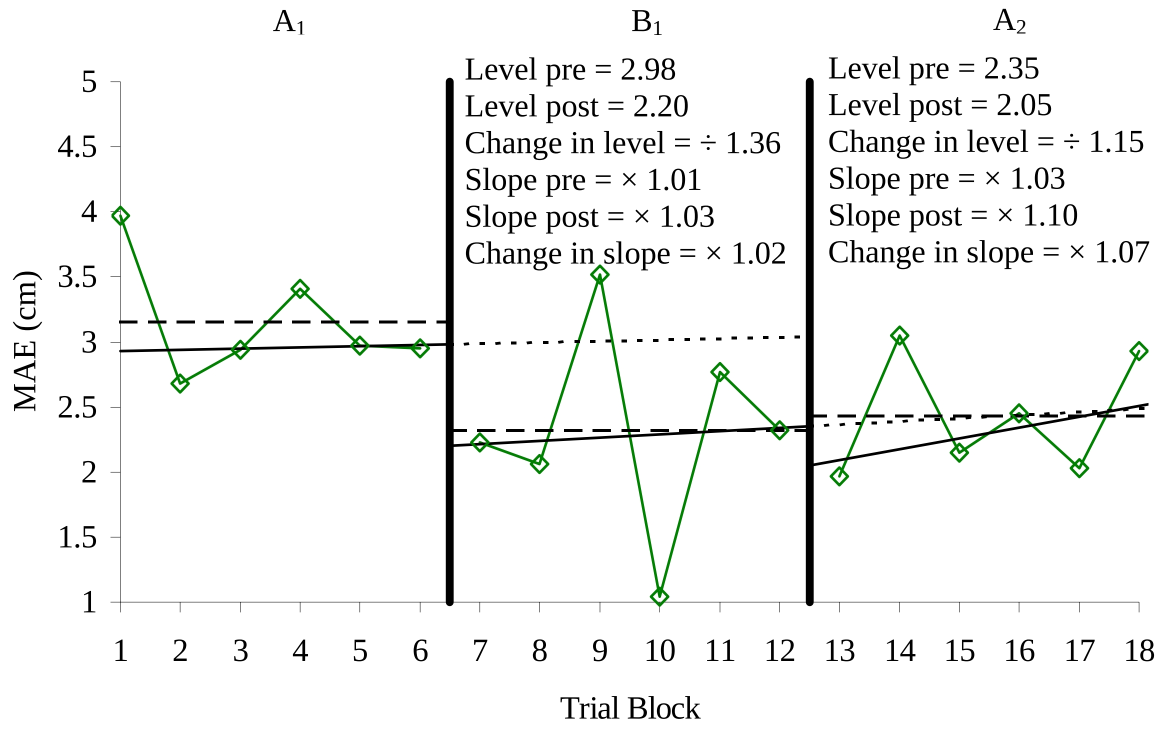

Figure A .24. Split-middle analysis for Ray.

General summary of Ray. For Ray, reported DM-CSAI-2 results indicated that the A_1 phase was the most anxiety-inducing phase. It seems that, similar to Peter, the pressure manipulation was not effective in increasing anxiety during the B_1 phase. Mean performance improved by 36% during the B_1 phase, but only decreased by 5% during the A_2 phase. Clearly, from Ray's performance results, disparate mean performances are illustrated during the A_1 and A_2 phases. Thus, the reported DM-CSAI-2 combined with the performance results may indicate that the pressure manipulation was not successful in increasing pressure during the B_1 phase. Without a successful pressure manipulation, robust conclusions about the performance outcome are difficult to ascertain.

Study 3

CS Participant- Sara

Participant profile. Sara was 19 years old and had been playing basketball on a state division team for at least 5 years (no interview was conducted hence an exact experience level could not be verified). Sara was purposively sampled as a CS participant because she was high in S-C, high in A-trait, and typically used approach coping. Specifically, Sara's scores were 50 on the SCS (75th to 100th percentile), 44 on the SAS (75th to 100th percentile), and + 5 on the CSIA differential score (75th to 100th percentile).

Pressure manipulation. Visual inspection of Figure A.25 shows that Sara's intensity scores for cognitive anxiety prior to the A_1, B_1, and A_2 phases were 15, 18, and 10, respectively. Sara experienced an elevation, albeit minimal, in cognitive anxiety prior to the B_1 phase compared to the low-pressure phases. Absolute levels of cognitive anxiety increased from low preceding the A_1 and A_2 phases to moderate during the B_1 phase. Intensity scores for somatic anxiety prior to the three phases were 14, 12, and 12, respectively. Sara's perceived absolute level of somatic anxiety was low prior to all three phases.

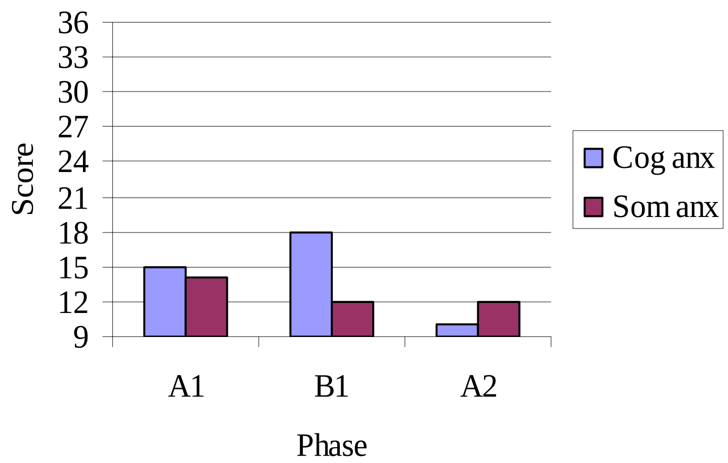

Figure A .25. Cognitive and somatic anxiety intensity scores for Sara.

Performance analysis. Mean performance for Sara increased from 6.67 ± 1.37 in the A_1 phase to 8.17 ± 0.75 during the B_1 phase. This represented a 23% performance improvement from the A_1 to the B_1 phase. During the A_2 phase, mean performance was 7.33 ± 1.21, a 12% decrease in performance between the B_1 and A_2 phase. Mean performance increased by 10% from the A_1 to the A_2 phase (see Figure A.26) whereas the B_1 phase performance changed substantially, which may indicate that the pressure manipulation was effective.

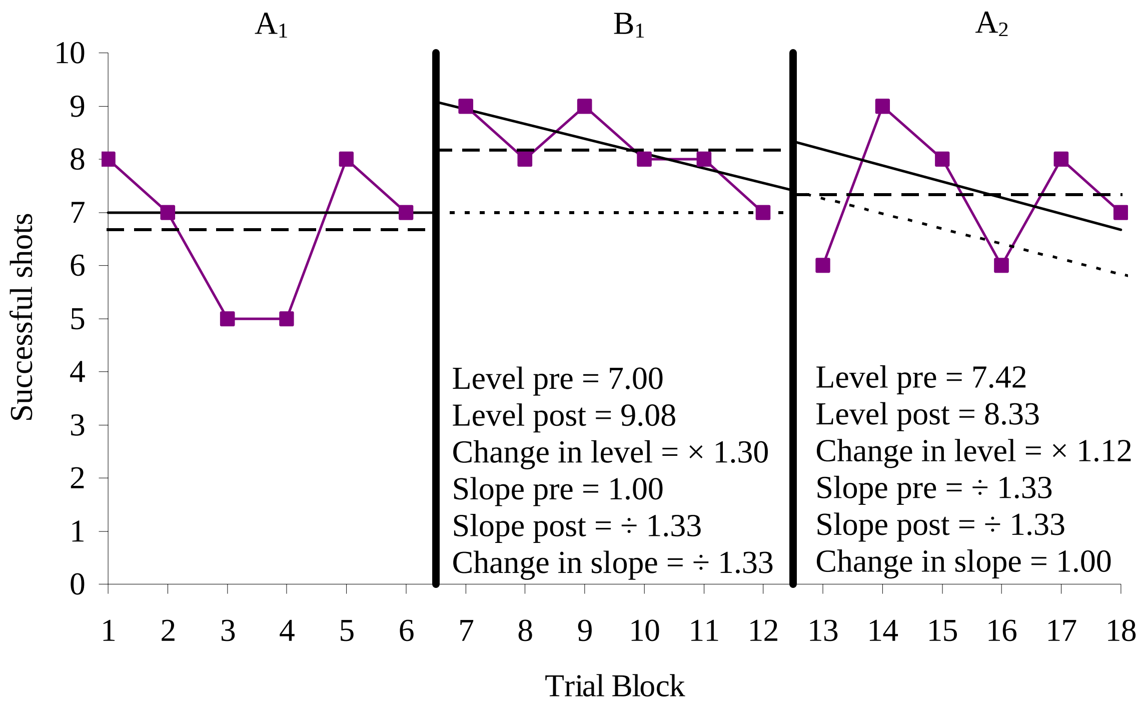

Figure A .26. Split-middle analysis for Sara.

The slope of the celeration line in the A_1 phase was 1.00 and the slope of the celeration line in the B_1 phase was ÷ 1.33, signifying a change in slope of ÷ 1.33 between the A_1 and B_1 phase. During the A_2 phase, the slope of the celeration line was ÷ 1.33, representing no change in slope from the B_1 to the A_2 phase.

General summary of Sara. The DM-CSAI-2 results signified that Sara perceived only a minimal elevation in cognitive anxiety prior to the B_1 phase compared to the other phases. Sara also reported a reduction in somatic anxiety during the B_1 and A_2 phases. Mean performance improved by 23% during the B_1 phase in comparison to the A_1 phase. Because of the similarities in reported DM-CSAI-2 score, it is difficult to determine whether the increase in performance was a product of chance or a possible effect of the pressure manipulation. Researchers should view these results with caution.

CS Participant- Tim

Participant profile. Tim was 19 years old and had been playing basketball on a state division team for at least 5 years. Tim was purposively sampled as a CS participant because he was moderately high in S-C, high in A-trait, and typically used approach coping. Specifically, Tim's scores were 37 on the SCS (50th to 75th percentile), 47 on the SAS (75th to 100th percentile), and + 7 on the CSIA differential score (75th to 100th percentile).

Pressure manipulation. Visual inspection of Figure A.27 shows that Tim's intensity scores for cognitive anxiety prior to the A_1, B_1, and A_2 phases were 17, 21, and 17, and intensity scores for somatic anxiety prior to the three phases were 13, 19, and 11, respectively. Tim experienced an elevation in intensity of multidimensional A-state preceding the high-pressure phase in comparison to the low-pressure phases. For Tim, cognitive and somatic anxiety increased from low absolute levels prior to the A_1 and A_2 phases to moderate levels prior to the B_1 phase.

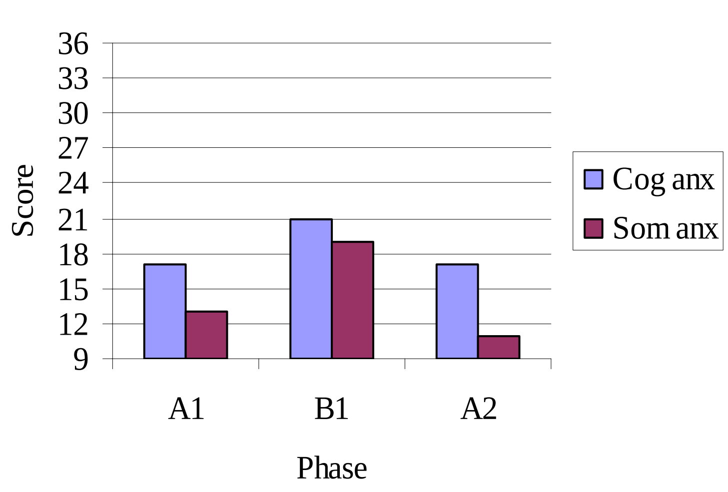

Figure A .27. Cognitive and somatic anxiety intensity scores for Tim.

Performance analysis. For Tim, mean performance increased from 5.17 ± 1.47 in the A_1 phase to 7.00 ± 0.89 in the B_1 phase. This represented a 25% increase in performance from the A_1 to the B_1 phase. During the A_2 phase, mean performance was 5.50 ± 1.05, a 27% performance decrement between the B_1 and A_2 phase. Mean performance increased by only 6% from the A_1 to the A_2 phase (see Figure A.28), while mean performance changed considerably during the B_1 phase, which may indicate that the pressure manipulation was effective.

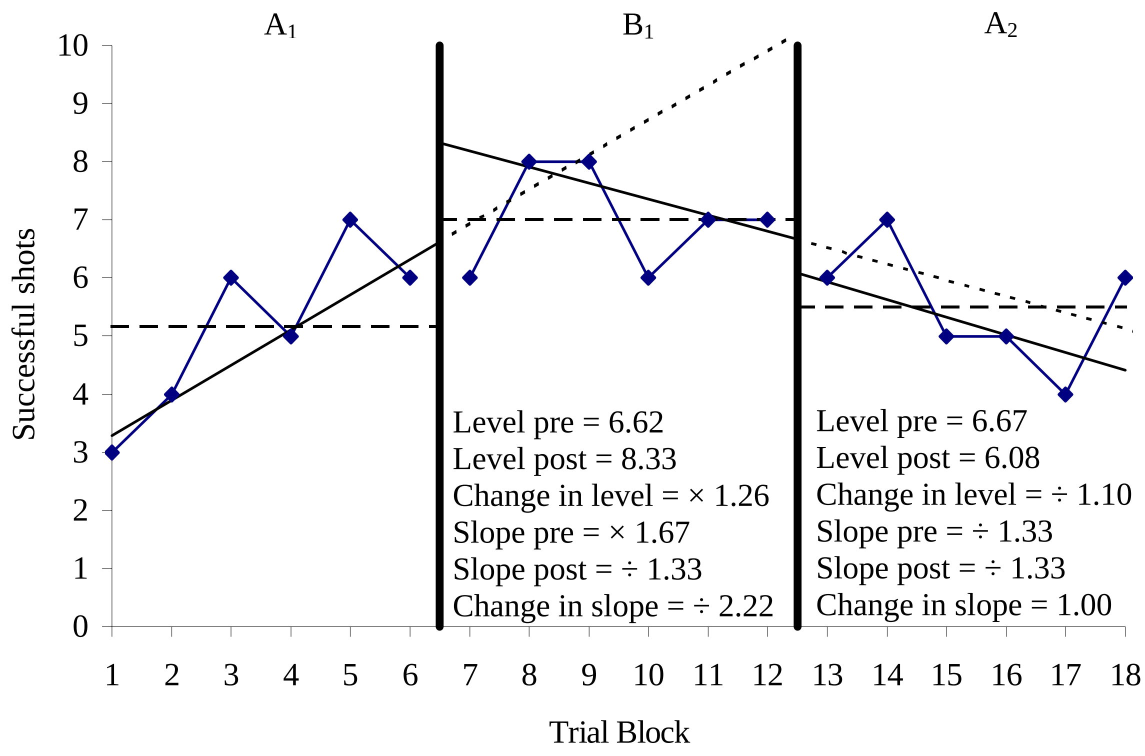

Figure A .28. Split-middle analysis for Tim.

The slope of the celeration line in the A_1 phase was × 1.67 and the slope of the celeration line in the B_1 phase was ÷ 1.33, representing a decreasing change in slope of 2.22 between the A_1 and B_1 phase. During the A_2 phase, the slope of the celeration line was ÷ 1.33, representing a stable, unchanging slope of 1.00 from the B_1 to the A_2 phase.

General summary of Tim. From the reported DM-CSAI-2 results, the pressure manipulation appeared to increase perceived pressure during the B_1 phase. Performance improvements during the B_1 phase, together with similar mean performance during the low-pressure phases, may also provide support that the pressure manipulation was effective (e.g., Barlow & Hersen, 1984; Kazdin, 1982). Clearly, a noticeable performance improvement between the A_1 and B_1 phase was also exhibited under pressure, but an unstable baseline was evident in the A_1 phase. Stability is needed to predict performance in subsequent phases. The data points in the A_1 phase (see Figure A.28) shows that a stable baseline was not achieved for Tim. Thus, improvements may have continued with (or without) the pressure manipulation being introduced.

APPENDIX Z: BASKETBALL EXPERIENCE QUESTIONNAIRE

1. Name_________________________________
2. Gender? ___M ____F (tick one)
3. Age? ______
4. Telephone (Home)________________ (Mobile)_________________
5. Email address____
6. Do you currently play in a competitive basketball league? (Circle one) Yes No

If yes, please give league name ______________and team name________________

If yes, how long (in seasons) have you played for this team?__________ seasons

7. Approximately, how many competitive seasons of basketball have you played? (Circle one) Less than 5 seasons 5-10 seasons More than 10 seasons
8. What is the highest level of basketball you have competitively played? (Circle one)

Domestic (Grade?) (Circle one) D C B A

Division (Victorian Basketball League- VBL)

Regional (Big V, SEABL, ABA)

National (National Basketball League- NBL)

APPENDIX AA: MUSIC INTERVIEW GUIDE

1. Describe to me your basketball history. How long have you been playing basketball, things like that.
2. Describe in as much detail as possible what you were feeling during Session 1? Session 2? Session 3? Session 4?
   - Describe to me the differences in your feelings during Session 2 in comparison to Session 4 when the music was played?
3. Can you walk me through your thoughts during Session 1? Session 2? Session 3? Session 4?
   - Describe to me the differences in your thoughts during Session 2 in comparison to Session 4 when the music was played?
4. Describe your actions during Session 1? Session 2? Session 3? Session 4?
   - Describe to me the differences in your actions/ behaviours during Session 2 in comparison to Session 4?
5. Describe your feelings when you found out about the audience during Session 2? In what way did the audience affect your performance?
   - Similarly, describe your feelings when you found out about the audience during Session 4? In what way did the audience affect your performance?
6. Describe your feelings about the video camera during Session 2? In what way did the video camera affect your performance?
   - Similarly, describe your feelings about the video camera during Session 4? In what way did the video camera affect your performance?
7. Tell me about your feelings regarding the money during Session 2? In what way did the money affect your performance?
   - Similarly, describe your feelings about the money during Session 4? In what way did the money affect your performance?
8. Have you ever experimented with listening to music when shooting baskets before?
9. What was it like having to listen to the words and shoot at the same time?
10. Describe to me how listening to the words affected your shooting.
11. Did you use a strategy when listening to the words of the music to help your performance? If so, what did you do?
12. Can you tell me what the song was about or recite the words of the song?
13. How did you think you performed during the study?
14. Describe a past experience (outside of the study) that involved pressure on you to perform and describe to me how you dealt with the situation.
15. Tell me what you learned about yourself from taking part in the study.
16. Is there anything else you would like to add?

APPENDIX BB: PRE-PRESSURE BASELINE PHASE INSTRUCTIONS – BASKETBALL

Thank you for participating. The purpose of this study is to examine feelings and reactions to competitive situations in basketball. You will participate in three sessions over three days that will take approximately 30 minutes to complete each session. You might also be asked to participate in an interview after completing the sessions. The three sessions will involve basketball free throw shooting. During each session, you will be asked to take 60 shots. A 10-second break will be given between each shot and a 30-second rest period will be provided after every 10 shots. The object is to make as many shots as possible. Overall, the goal is to do the best you can during the three sessions. Within each of the sessions, you will be asked a couple of questions in reference to your free throws that will be audiotaped with your permission. No one beside me (the researcher) will listen to these tapes. They will be discarded after data analysis has been conducted with the tapes. Before the shot attempts, you will complete the questionnaire placed in front of you. After completing the questionnaire, 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. Go ahead and fill out the questionnaire in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin. At the conclusion of the shots, a time will be scheduled to continue participation in the study. Do you have any questions?

APPENDIX CC: MUSIC INTERVENTION INSTRUCTIONS – BASKETBALL

In conjunction with examining feelings and reactions to competitive situations in basketball, we are also investigating the effect of music on sport performance. During the next 60 shots, I will be asking you to attentively listen to the words of the music while you are shooting. The song is “Always look on the bright side of life” from Monty Python’s Life of Brian. I will play the song twice before going into the gym so that you become familiar with the words of the song. The music will also be played during the current session. You will be wearing headphones so that you are the only person that can hear the music. The audiotape will be started just before the first shot of each 10-shot block and will be played throughout the 10 shots; however, the music will not be played during the 30-second break between each 10-shot block. The goal is to make as many shots as possible while also attending to the words of the song. I will now play the song for you twice. (Play the song for the participant 2 times)

(Explained after the music has been played to the participant). This session will be similar to the second session. You will again take 60 shots with an audience present, and the video camera recording your free-throw shooting. The money incentive will again be included, though, this time you will receive $20 for equalling the score you made on the second session (e.g., the last time you had an audience). Like last time, if you improve your score, an additional $5 will be given for each point over the second session score. Once again, the maximum amount of money you can receive is $100 during this session. If you fail to reach the previous score, however, you will receive no money. The object of this session is to improve your performance from the second session while also focusing your attention on the words of the music. Your score from that session was (*say participants previous score here*). You will receive $20 for reaching that score and $5 each additional point over that score, but no money for each point under that score. So, try to do your best. You will receive all money owed to you after the interview. Do you have any questions?

The goal is to do the best you can and to make as many baskets as possible over the 60 attempts. Before the shot attempts you will complete the questionnaire placed in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin, you will be listening to the words of the music during the 10 warm-up shots also. After the 10 warm-up shots, we will stop the tape and rewind it. Once again, please focus your attention on the lyrics or words of the music while shooting.

At the conclusion of the 60 shots, I will discuss with you what is necessary for the remainder of the study. Do you have any questions?

APPENDIX A: NETBALL EXPERIENCE QUESTIONNAIRE

1. Name___________________________________
2. Gender? ___M ____F (tick one)
3. Age? ______
4. Telephone (Home)_______________ (Mobile)______________
5. Email address____
6. Do you currently play in a competitive netball league? (Circle one) Yes No

If yes, please give league name _______________and team name_________________

7. Approximately, how many competitive seasons of netball have you played? (Circle one)

Less than 5 seasons 6-10 seasons More than 10 seasons

8. What is the highest level of netball you have competitively played? (Circle one)

Club Division (Association) State National

9. Have you ever played in a shooting position (i.e., Goal Attack [GA] or Goal Shooter [GS])? (Circle one) Yes No

If yes, how long did you play that position?____________________________________

10. Do you currently play a shooting position on the team? (Circle one) Yes No

If yes, how long have you played that position?________________________________

APPENDIX B: NETBALL – THE GAME

Netball is a fast, skilful team game based on running, jumping, throwing, and catching. It is a popular and competitive sport in Australia, England, and New Zealand traditionally played by women. In Australia, 278,800 people play netball each year, most of which are women (Australian Sports Commission, 2004). In comparison, 161,200 Australian adults participate in basketball (Australian Sports Commission, 2004). Netball is played in many commonwealth countries and Australia's national netball teams compete and are successful at winning many medals against other countries in international competitions. Providing these statistics may give a general indication that netball is played by many people in Australia at all competitive skill levels.

Similar to basketball, netball is played on a hard court with scoring rings at both ends. The rings, similar to the height and dimension of basketball rings, do not have a "backboard." The netball court is 30.48 m (100 ft) long by 15.24 m (50 ft) wide, approximately 1.83 (6 ft) longer and the same width as a basketball court. The court is divided into thirds that regulates where individuals on each team are allowed to move. Two goal circles (a semi-circle centred on the goal line and measuring 4.9 m [16 ft] in radius) are at each end and all scoring shots must be taken within these circles. The ball resembles a basketball, but is slightly lighter and smaller.

Netball is based on each team attempting to score as many goals as possible while preventing the opposition from scoring. Seven players participate at any one time and each player has a designated position in which she can move on the court. The positions and restricted areas of the court are as follows: Goal Shooter (GS)- allowed in the attacking one-third of the court including goal circle; Goal Attack (GA)- allowed in the attacking one-third, goal circle, and centre third; Wing Attack (WA)-allowed in the attacking one-third and centre one-third, but not in the goal circle; Centre (C)- allowed everywhere on the court except goal circles; Wing Defence (WD)- allowed in the defensive one-third and centre one-third, but not in the goal circle; Goal Defence (GD)- allowed in the defensive one-third and centre one-third, including the goal circle; and Goal Keeper (GK)- allowed in the defensive one-third, including the goal circle. Only two players from each team may score goals, the GS and GA.

Netball rules do not permit players to take more than one step when in possession of the ball. Unlike basketball, it is illegal to bounce the ball. Consequently, the only way to move the ball toward the goal is to throw the ball to a teammate. A player may catch the ball with one or both hands and must pass or shoot for goal within three seconds. Netball is a non-contact sport and no player is allowed to come personally contact the opponent in a way that will interfere with the opponent's play, either accidentally or deliberately. Accordingly, the defending player must be 0.91 m (3 ft) away when the attacking player is shooting.

APPENDIX C: NETBALL COURT DIAGRAM DURING PRESSURE PHASE

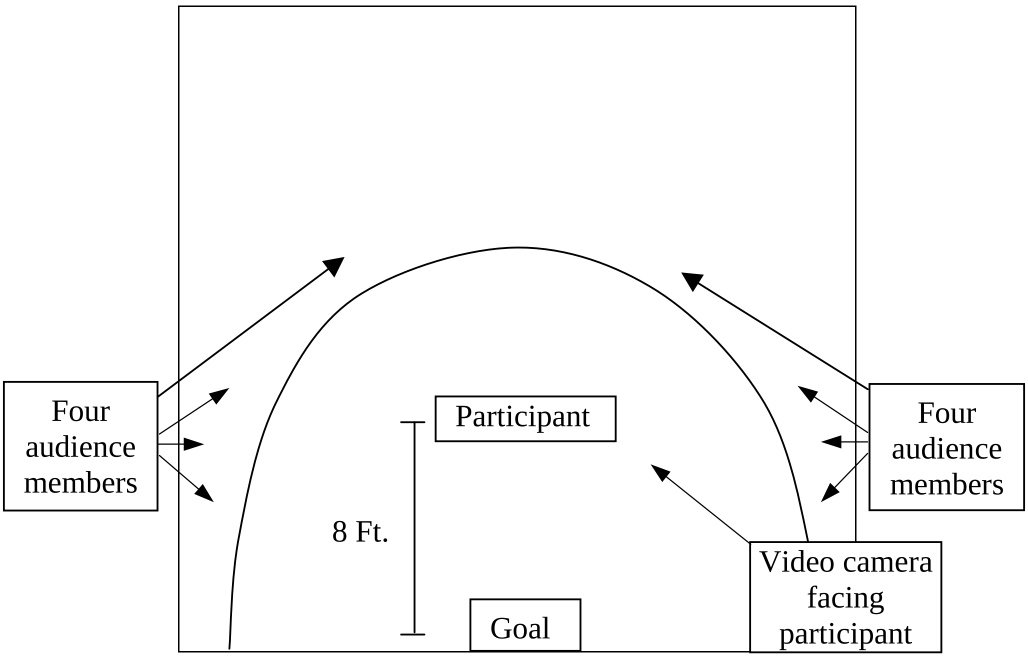

Figure A .1. Diagram of participant, video camera, audience members, and goal positions during the pressure phase of Study 1.

APPENDIX D: SELF-CONSCIOUSNESS QUESTIONNAIRE

Date: __/ __/ __ ID: __________

General Feeling Questionnaire

A number of statements that athletes have used to describe their general feelings are listed below. Read each statement and then circle the appropriate number to the right of the statement to indicate **how you generally feel**. Please be as honest as possible. There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer that best describes how you generally feel.

		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 situations.	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 look.	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 E: TRAIT ANXIETY QUESTIONNAIRE

Sport Anxiety Scale
Reactions to Competitions

Date: __/ __/ __ ID: __________

A number of statements that athletes have used to describe their thoughts and feelings before or during competitions are listed below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you usually feel prior to or during competition. Some athletes feel they should not admit to feelings of nervousness or worry, but such reactions are actually quite common, even among professional athletes. To help us better understand reactions to competition, we ask you to share your true reaction with us. There is, 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 F: COPING STYLE QUESTIONNAIRE

Date: __/ __/ __ ID: __________

Coping Scale for Sport

This survey consists of questions relating to your **typical** reactions to stressful events (i.e., making a mistake during performance) that you have experienced in sports competition. On the line after 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 honest 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 was 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 G: STATE ANXIETY QUESTIONNAIRE

Date: ___/____/___

CSAI-2-Directional

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 helpful or unhelpful 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

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APPENDIX H: CONSENT FORM FOR PARTICIPANTS INVOLVED IN RESEARCH

(NETBALL AND BASKETBALL)

INFORMATION TO PARTICIPANTS:

We are interested in your feelings and reactions to competitive situations in your sport (either netball or basketball). To study these feelings in detail we would like you to complete a number of brief questionnaires and take part in a non-competitive experiment testing your shooting accuracy.

CERTIFICATION BY PARTICIPANT:

I,

of

certify that I am at least 18 years old* and that I am voluntarily giving my consent to participate in the experiment investigating thoughts, feeling and reactions to competitive situations, being conducted at Victoria University of Technology by Dr. Daryl B. Marchant, Professor Tony Morris, & graduate student Mr. Christopher Mesagno. I certify that the objectives of the study, together with any risks and safeguards associated with this study, have been explained to me by Chris Mesagno and that I freely consent to participate.

Procedures:

First, you will be asked to fill out short questionnaires, which will take approximately 30 minutes to complete. These questionnaires are mainly about how you respond to competitive pressure and anxiety in sport. Your responses to these questionnaires will be kept totally confidential. You will then participate by taking either 180 or 240 shots. All sessions will take place within the gymnasium at Victoria University, and will take approximately 1-2 hours to complete. The goal for participants is to make as many successfully shots as possible. During each session, you will also be asked to fill out another short questionnaire. Video recordings may be made of your participation. Only those involved with the study will have access to the tapes for data analysis purposes only. At all other times the videotapes will be locked inside a file cabinet. After final analysis, the tapes will be erased. A number of participants will then be asked to take part in an interview where you will be asked to discuss your experiences in this project and sport in general. The interview will take approximately 30-60 minutes and will be audio-taped.

I certify that I have had the opportunity to have any questions answered and that I understand that I can withdraw from this study at any time and that this withdrawal will not jeopardise me in any way.

I have been informed that the information I provide will be kept confidential.

Signed: ....}

Witness other than the experimenter: ....} Date: ....}

Any queries about your participation in this project may be directed to the researcher (Name: Dr. Daryl B. Marchant ph. 03 9688 4035). If you have any queries or complaints about the way you have been treated, you may contact the Secretary, University Human Research Ethics Committee, Victoria University of Technology, PO Box 14428 MC, Melbourne, 8001 (telephone no: 03-9688 4710)

APPENDIX I: PRE-PRESSURE BASELINE PHASE INSTRUCTIONS – NETBALL

Thank you for participating. The purpose of this study is to examine feelings and reactions to competitive situations in netball. You will participate in three sessions over three days that will take approximately 30 minutes to complete each session. You might also be asked to participate in an interview after completing the sessions. The three sessions will involve netball shooting in which you will be asked to practice netball shots from a distance of 8 ft (2.44 m) from the goal post. During each session, you will be asked to take 60 shots. A 10-second break will be given between each shot and a 30-second rest period will be provided after every 10 shots. The object is to make as many shots as possible. Overall, the goal is to do the best you can during the three sessions. Before the shot attempts, you will complete the questionnaire placed in front of you. After completing the questionnaire, 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. Go ahead and fill out the questionnaire in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin. At the conclusion of the shots, a time will be scheduled to continue participation in the study. Do you have any questions?

APPENDIX J: PRESSURE PHASE INSTRUCTIONS – NETBALL (& BASKETBALL)

During these 60 shots, a video camera will be placed to the left side near the end line to record your participation. This session will be similar to the last session with the exception of a few changes.

During this session, you will receive $20 for equalling your previous performance. If you improve your previous performance, an additional $5 for each successful shot over the previous score will be given. Maximum amount of money you can receive is $100. If, however, you fail to reach the previous score, you will receive no money. For example, if your score was 40 out of 60 shots last time, if you achieve 40 out of 60 this session, you will receive $20. If your score is 39 out of 60 this session, you will receive no money because it is 1 shot less than your previous score. Likewise, if your score is 41 out of 60 this session, you will receive $25. The object of this session is to improve your performance from the previous session. Your score from the previous session was (*say participants previous score here*). You will receive $20 for reaching that score and $5 each additional successful attempt over that score, but no money if you do not reach that score. So, try to do your best. I will inform you of the amount of money you will receive at the conclusion of this session. You will receive your money at the conclusion of the study.

You will also notice that when you get on the court, a small group of fellow *students or teammates* (change depending on the audience) will be observing your participation. The *students or teammates* are there to analyse correct shot making technique and movements in *netball or basketball*. The *students or teammates* have been told not to interact, encourage, or discourage you in any way. Please do not talk to or socialise with these *students or teammates* as this might affect your performance. Audience members will be positioned to the right, left and behind you in order to observe your shot making processes. First, you will complete the questionnaire placed in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin. At the conclusion of the shots, a time will be scheduled to continue participation in the study. Do you have any question?

APPENDIX K: POST-PRESSURE BASELINE PHASE INSTRUCTIONS – NETBALL (& BASKETBALL)

This session will be similar to the first session. You will be asked to take 60 shots with a 10-second break between each shot and a 30-second rest period after 10 shots. The goal is to make as many shots as possible over the 60 attempts. Please do the best you can during this session. Before the shot attempts you will complete the questionnaire placed in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin. At the conclusion of the shots, I will discuss with you what is necessary for the remainder of the study. Do you have any questions?

APPENDIX L: NETBALL INTERVIEW GUIDE

1. Describe to me your netball history. How long have you been playing? Things like that.
2. Can you describe in as much detail as possible what you were feeling during Session 1? Session 2? Session 3?
3. Can you walk me through your thoughts during Session 1? Session 2? Session 3?
4. Can you describe your actions during Session 1? Session 2? Session 3?
5. How did the audience affect you during Session 2?
6. How did the video camera affect your shooting during Session 2?
7. How did the financial incentive influence your shooting during session 2? your feelings during Session 2? your thinking during Session 2?
8. How did you think you performed during the study?
9. Describe a past experience (outside of the study) that involved pressure on you to perform and describe to me how you dealt with the situation.
10. Tell me what you learned about yourself from taking part in the study.
11. Is there anything else you would like to add?

APPENDIX M: PARTICIPANT DEBRIEFING – NETBALL

The purpose of this post-study debriefing is to explain to you the rationale behind the study in which you participated.

The purpose of the study was to examine your reactions to pressure within your sport. Specifically, we were concerned with your cognitive processes, emotional, and behavioural responses to the pressure during the study. The questionnaires you filled out at the beginning of the study were to divide participants into their respective groups, either choking-susceptible athletes (i.e., participants likely to choke) or choking resistant athletes (i.e., participants less likely to choke).

In order to generate pressure during the second session, the combination of financial incentive, small audience, and video camera evaluation were involved.

In the pressure session, you were informed that the video camera would be used. The tape will be destroyed after analysis and no one besides the researchers will see the tape.

Also, audience members were used to watch your performance. You were informed that these human movements students were there to analyse correct shot making technique and movements that are involved in netball shooting. The students will not be analysing your performance. Researchers have suggested that audience members may increase self-awareness to performers when present; therefore audience members were present to increase self-awareness.

During the pressure session, you were informed that you would receive money for your participation during the study depending on previous performance. Your total successful shots during the first session was (*insert # of successful shots in baseline phase*), and your total successful shots during the second session was (*insert # of successful shots in pressure phase*). The amount of money you should receive is (*insert amount of money to be given*).
Here is the money that you were promised. (*Give the participant her money and have her sign receipt book*)

Do you have any questions?

Thank you for participating in my study and good luck in your academic and professional career.

APPENDIX N: LEVEL CALCULATION – ALL PARTICIPANTS

Study 1

Amy

For Amy, changes in level were assessed and the final level of the celeration line in the A_1 phase was 6.68. That is, when the celeration line for the A_1 phase intersected the onset of the B phase, the corresponding score was 6.68. The initial performance level during the B phase was 9.00. This represented a change in level for successful shots of × 2.32 (i.e., 9.00 – 6.68 = 2.32; × denotes a positive trend) between the A_1 and B phase, an increase of 35%. During the B phase, the final level of the celeration line was 9.00, whereas the initial performance level for the A_2 phase was 7.00, representing a change in level for successful shots between B and A_2 phase of ÷ 2.00 (i.e., 7.00 – 9.00 = – 2.00; ÷ denotes a declining trend), a decrease of 29%.

Beth

For Beth, the final level of the trend line in the A_1 phase was 4.92, whereas the initial level of the trend line during the B phase was 5.82. The change in level of successful shots between the A_1 and B phase was × 0.90, an increase of 18%. The final level of the trend line during the B phase was 7.48 and the initial level of the trend line for the A_2 phase was 6.00. The change in level of successful shots between the B and A_2 phase was ÷ 1.48, a decrease of 25%.

Carol

For Carol, the final level of the celeration line in the A_1 phase was 4.00 and the initial level of the celeration line during the B phase was 3.60. The change in level of successful shots between the A_1 and B phase was ÷ 0.40, a decrease of 11%. The final level of the celeration line during the B phase was 8.60, whereas the initial level of celeration line for the A_2 phase was 3.67. The change in level of successful shots between the B and A_2 phase was ÷ 4.93, a decrease of 134%.

Debbie

For Debbie, the final level of the trend line during the A_1 phase was 4.29, and the initial level of the trend line during the B phase was 7.67. The change in level between the A_1 and B phase was × 3.38, an increase of 79%. The final level of the trend line in the B phase was 9.33, and the original level of the trend line for the A_2 phase was 7.73. Thus, the change in level of successful shots between the B and A_2 phase was ÷ 1.60, a decrease of 21%.

Emma

As indicated by the slope of the trend line for Emma in the A_1 phase, the final level of performance was 6.08, whereas the initial level of the trend line during the B phase was 4.58. The change in level in successful shots between the A_1 and B phase was ÷ 1.50, a decrease of 33%. From the slope of the trend line in the B phase, the final level was 2.92, and the initial level of the trend line for the A_2 phase was 4.42. Change in level of successful shots between the B and A_2 phase was × 1.50, an increase of 51%.

Felicity

The final level of the celeration line in the A_1 phase, for Felicity, was 6.57, whereas the initial level of the celeration line in the B phase was 4.33. The change in level of successful shots between the A_1 and B phase was ÷ 2.24, a decrease of 52%. During the B phase, the final level of the celeration line was 2.67. The initial level of the celeration line for the A_2 phase was 4.47. The change in level of successful shots between the B and A_2 phase was × 1.80, an increase of 67%.

Grace

For Grace, the final level of the trend line in A_1 phase was 6.28, whereas the initial level of the trend line in the B phase was 4.00. The change in level of successful shots between the A_1 and B phase was ÷ 2.28, a decrease of 57%. A final level of the trend line for the B phase was 9.00. The initial level of the trend line for the A_2 phase was 8.00. The change in level of successful shots between the B and A_2 phase was ÷ 1.00, a decrease of 13%.

Helen

For Helen, the final level of the celeration line in the A_1 phase was 6.68, and the initial level of the celeration line in the B phase was 3.55. The change in level of successful shots between the A_1 and B phase was ÷ 3.13, a decrease of 88%. During the B phase, the final level of the celeration line was 8.55 and the initial level of the celeration line for the A_2 phase was 5.33. The change in level of successful shots between the B and A_2 phase was ÷ 3.22, a decrease of 60%.

Study 2

Jason

For Jason, the final level of the celeration line in the A_1 phase was 2.09, whereas the initial level of the celeration line in the B_1 phase was 3.17. The change in level between the A_1 and B_1 phase was × 1.08, an increase of 52%. The final level of the celeration line during the B_1 phase was 3.82 and the initial level of the celeration line during the A_2 phase was 3.01. This represented a change in level between the B_1 and A_2 phase of ÷ 0.81, a decrease of 27%. The final level of the celeration line during the A_2 phase was 2.59, whereas the initial level of the celeration line for the B_2 phase was 2.52. This indicated a change in level of ÷ 0.70, a decrease of 3%.

Karl

For Karl, the final level of the trend line in the A_1 phase was 2.70, and the initial level of the trend line during the B_1 phase was 3.31. The change in level of MAE between the A_1 and B_1 phase was × 0.61, an increase of 23%. The final level of the trend line during the B_1 phase was 3.71, whereas initial level of the trend line during the A_2 phase was 3.17. This represented a change in level of MAE of ÷ 0.54, a decrease in level of 17%. The final level of the trend line during the A_2 phase was 2.93 displayed, whereas the initial level of the trend line during the B_2 phase was 2.72. This indicated a change in level of MAE of ÷ 0.21, a decrease of 8%.

Linda

For Linda, the final level of the celeration line during the A_1 phase was 3.09, and the celeration line began at a level of 2.48 during the B_1 phase. The change in level for MAE between the A_1 and B_1 phase was ÷ 0.61, a decrease of 25%. The final level of the celeration line during the B_1 phase was 3.88. During the A_2 phase, the initial level of the celeration line was 3.34. The change in level for MAE was ÷ 0.54 between the B_1 and A_2 phase, a decrease in level of 16%. The final level of the celeration line during the A_2 phase was 3.03, whereas the initial level of the celeration line during the B_2 phase was 3.10. This indicated a change in level for MAE of × 0.07, an increase of 2%.

Peter

For Peter, the final level of the celeration line during the A_1 phase was 2.96, and the level of the celeration line was initially 1.32 during the B_1 phase. The change in level for MAE between the A_1 and B_1 phase was ÷ 1.64, a decrease of 124%. The final level of the celeration line during the B_1 phase was 2.01. During the A_2 phase, the beginning level of the celeration line was 2.83. The change in level for MAE was × 0.82 between the B_1 and A_2 phase, an increase in level of 41%.

Ray

Ray's final level of the celeration line during the A_1 phase was 2.98, and the celeration line initially began at 2.20 during the B_1 phase. The change in level for MAE between the A_1 and B_1 phase was ÷ 0.78, a decrease of 36%. The final level of the celeration line during the B_1 phase was 2.35, whereas the initial level of the celeration line during the A_2 phase was 2.05. The change in level for MAE was ÷ 0.30 between the B_1 and A_2 phase, a decrease in level of 15%.

Study 3

Michelle

For Michelle, changes in level were assessed and the final level of the celeration line in the A_1 phase was 6.72, whereas the initial level of the celeration line during the B_1 phase was 6.20. The represented change in level between the A_1 and B_1 phases was ÷ 0.52, a decrease of 8%. The final level of the celeration line during the B_1 phase was 4.54 and the initial level of the celeration line during the A_2 phase was 5.52. Thus, the change in level between the B_1 and A_2 phases was × 0.98, an increase of 22%. The final level of the celeration line during the A_2 phase was 7.18 and the initial level of the celeration line during the B_2 phase was 7.00. This was a change in level of ÷ 0.18 between the A_2 and B_2 phases, a decrease of 3%.

Nicole

For Nicole, the final level of the trend line in the A_1 phase was 6.08, whereas the trend line commenced at a level of 4.00 during the B_1 phase. The change in level between the A_1 and B_1 phase was ÷ 2.08, a decrease of 52%. The final level of the trend line in the B_1 phase was 4.00 and the initial level of the trend line during the A_2 phase was 4.90. This represented a change in level of × 0.90 between the B_1 and A_2 phases and an increase of 23%. The final level of the trend line in the A_2 phase was 6.56, whereas the initial level of the trend line for the B_2 phase was 4.33. This indicated a change in level of ÷ 2.23 from the A_2 to B_2 phase, a decrease of 52%.

Olivia

For Olivia, the final level of the celeration line in the A_1 phase was 3.77, whereas the initial celeration line level during the B_1 phase was 4.63. The change in level of successful shots between the A_1 and B_1 phase was × 0.86, an increase of 23%. The final level of the celeration line in the B_1 phase was 2.97 and the initial level of the celeration line during the A_2 phase was 3.63. This represented a change in level of × 0.66 between the B_1 and A_2 phase, an increase of 22%. A final level of the celeration line during the A_2 phase was 6.97, whereas the initial level of the celeration line during the B_2 phase was 2.12. This indicated a change in level of ÷ 4.86, a decrease of 228%.

Sara

Sara's final level of the celeration line in the A_1 phase was 7.00, whereas the initial level of the celeration line during the B_1 phase was 9.08. The change in level of successful shots between the A_1 and B_1 phase was × 2.08, an increase of 30%. The final level of the celeration line in the B_1 phase was 7.42 and the initial level of the celeration line during the A_2 phase was 8.33. This represented a change in level of × 0.91 between the B_1 and A_2 phase, an increase of 12%.

Tim

Tim's final level of the celeration line in the A_1 phase was 6.62, whereas the initial celeration line level during the B_1 phase was 8.33. The change in level of successful shots between the A_1 and B_1 phase was × 1.71, an increase of 26%. During the B_1 phase, the final level of the celeration line was 6.67 and the initial level of the celeration line during the A_2 phase was 6.08, signifying a change in level of ÷ 0.59 between the B_1 and A_2 phase, a decrease of 10%.

APPENDIX O: DIRECTION SCORES ON THE DM-CSAI-2 – ALL PARTICIPANTS

Study 1

Amy

Visual inspection of Figure A.2 shows that Amy's direction scores for cognitive anxiety prior to the A_1, B, and A_2 phases were – 9, – 13, and – 7, respectively. Thus, at the moment of completing the DM-CSAI-2 prior to the phases, Amy expected that a greater amount of cognitive anxiety would be more debilitative to performance than less cognitive anxiety. Direction scores for somatic anxiety prior to the three phases were – 2, – 17, and + 16, respectively. Thus, increases in intensity of somatic anxiety were viewed as more debilitative to performance during the B phase, whereas decreases in intensity of somatic anxiety were perceived to be facilitative regarding performance in the A_2 phase.

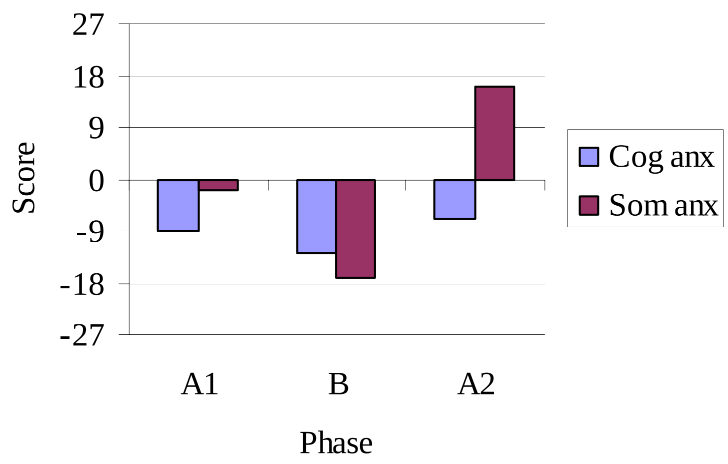

Figure A .2. Cognitive and somatic anxiety direction scores for Amy.

Beth

Visual inspection of Figure A.3 shows that Beth's direction scores for cognitive anxiety prior to the A_1, B, and A_2 phases were + 17, – 10, and + 16, respectively. At the time of completing the DM-CSAI-2, Beth considered a low level of cognitive anxiety to be facilitative to performance, whereas a high level of cognitive anxiety was debilitative to performance. Direction scores for somatic anxiety before the three phases were + 21, 0, and + 13, respectively. Beth perceived low intensity of somatic anxiety as facilitative, whereas high intensity of somatic anxiety (i.e., during the B phase) was perceived as debilitative to performance.

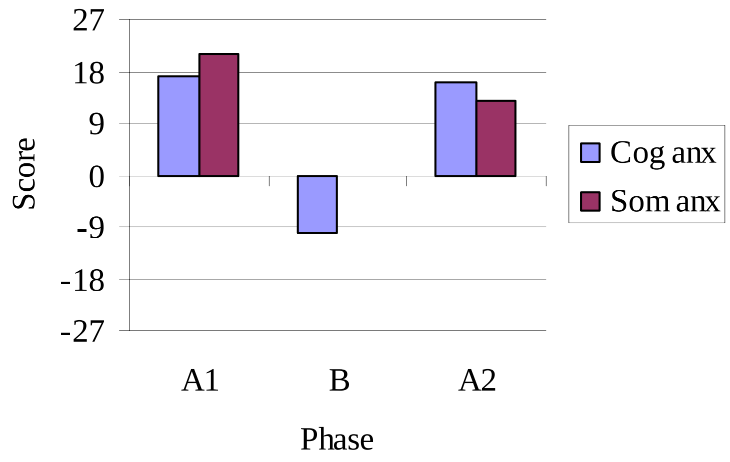

Figure A .3. Cognitive and somatic anxiety direction scores for Beth.

Carol

Visual inspection of Figure A.4 shows that Carol's direction scores for cognitive anxiety before the A_1, B, and A_2 phases were – 6, + 23, and + 26, respectively. Carol considered a high intensity of cognitive anxiety as debilitative to performance, which was most evident prior to the A_1 phase, and a low intensity of cognitive anxiety to be facilitative to performance. The direction scores for somatic anxiety before the three phases were + 8, + 18, and + 20, respectively. Thus, the low intensity levels of somatic anxiety were considered facilitative to performance.

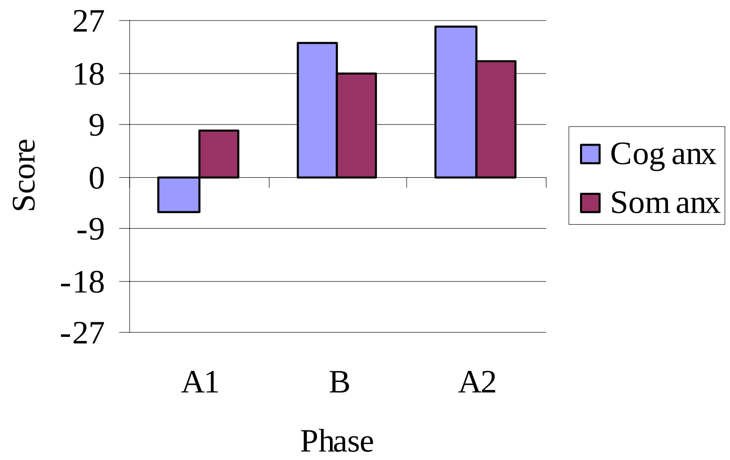

Figure A .4. Cognitive and somatic anxiety direction scores for Carol.

Debbie

Visual inspection of Figure A.5 shows that Debbie's direction scores for cognitive anxiety prior to the A_1, B, and A_2 phases were – 3, – 6, and – 2, and the direction scores for somatic anxiety leading into the three phases were 0, – 3, and – 5, respectively. It appears that Debbie considered the minimal A-state intensity neither greatly facilitative nor debilitative to performance.

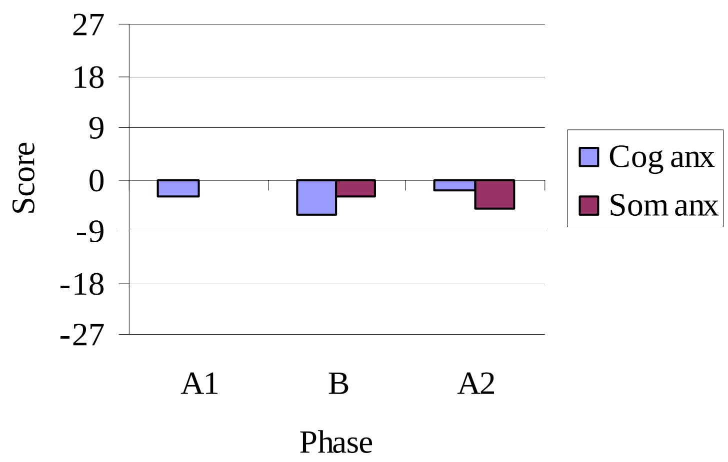

Figure A .5. Cognitive and somatic anxiety direction scores for Debbie.

Emma

Visual inspection of Figure A.6 shows that Emma's reported direction scores for cognitive anxiety prior to completing the netball shooting task in the A_1, B, and A_2 phases were – 13, – 19, and – 10, respectively. In all phases, Emma considered cognitive anxiety to be debilitative to performance. Direction scores for somatic anxiety for the three phases were + 2, – 7, and + 2, respectively. Conversely, Emma perceived a high level of intensity of somatic anxiety to be debilitative, whereas a low level in intensity of somatic anxiety was facilitative to performance.

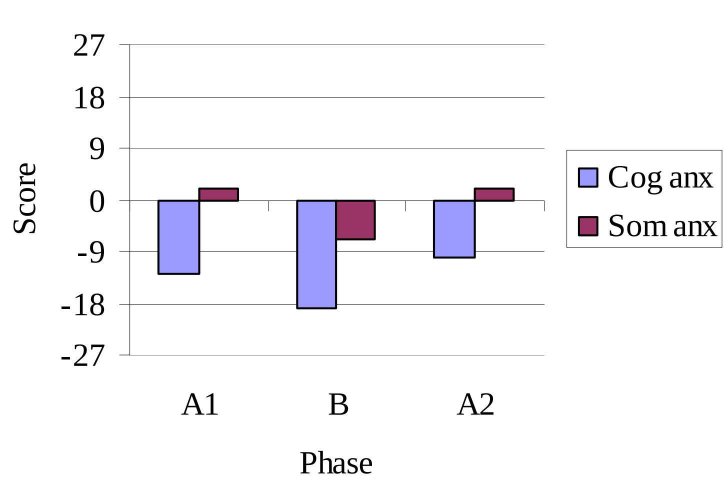

Figure A .6. Cognitive and somatic anxiety direction scores for Emma.

Felicity

Visual inspection of Figure A.7 shows that Felicity's direction scores for cognitive anxiety during the A_1, B, and A_2 phases were + 15, + 10, and + 23, and direction scores for somatic anxiety during the three phases were + 15, + 9, and + 25, respectively. Felicity considered all phases somewhat facilitative to performance, yet, as intensity of anxiety elevated, direction scores decreased, albeit minimally.

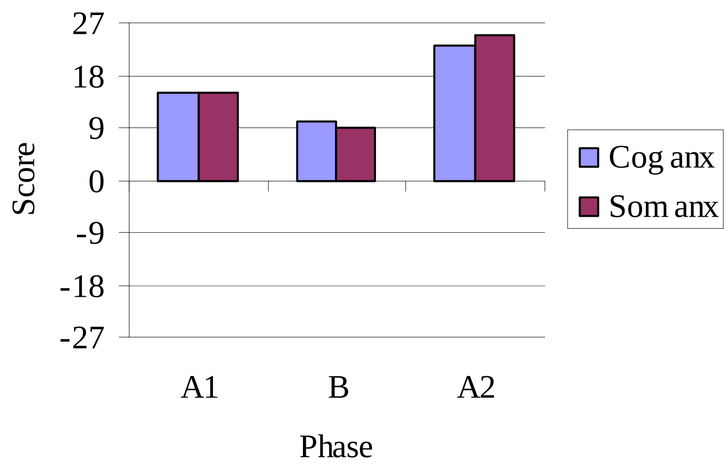

Figure A .7. Cognitive and somatic anxiety direction scores for Felicity.

Grace

Visual inspection of Figure A.8 shows that Grace's direction scores for cognitive anxiety prior to the A_1, B, and A_2 phases were – 9, – 17, and – 11, respectively. In all phases, Grace considered cognitive anxiety somewhat debilitating to performance, yet elevated intensity of cognitive anxiety was perceived as more debilitative to performance. Direction scores for somatic anxiety before the three phases were + 2, – 16, and + 14, respectively. Grace perceived low intensity of somatic anxiety as facilitative (i.e., during the A_1 and A_2 phases), whereas high intensity of somatic anxiety (i.e., during the B phase) was perceived as debilitative to performance.

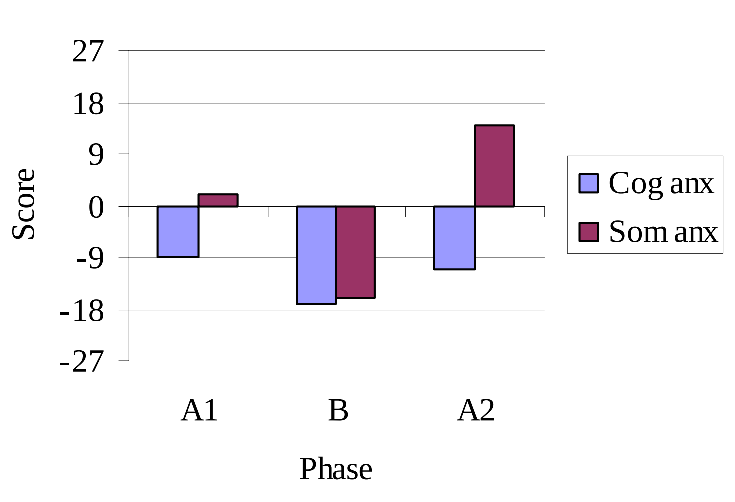

Figure A .8. Cognitive and somatic anxiety direction scores for Grace.

Helen

Visual inspection of Figure A.9 shows that Helen's direction scores for cognitive anxiety were + 1, – 10, and + 3 immediately before the A_1, B, and A_2 phases, respectively. Helen considered a greater intensity of cognitive anxiety somewhat debilitative to performance. Helen's direction scores for somatic anxiety were – 4, + 4, and + 1 prior to the three respective phases. Thus, Helen did not perceived intensity of somatic anxiety to be strongly facilitative or debilitative to performance.

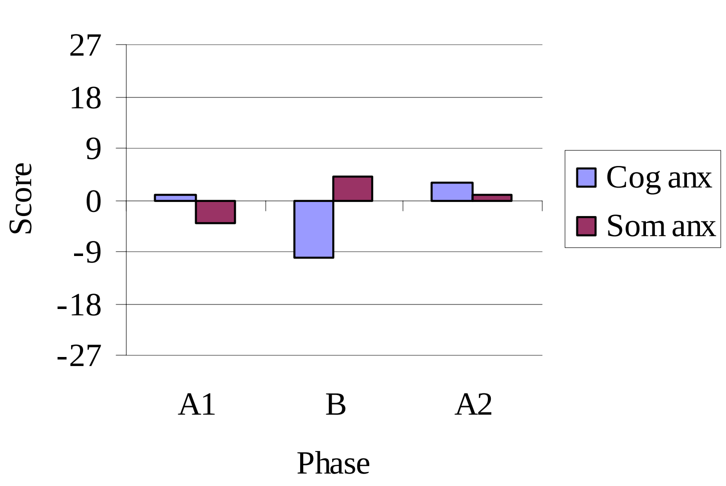

Figure A .9. Cognitive and somatic anxiety direction scores for Helen.

Study 2

Jason

Visual inspection of Figure A.10 shows that Jason's direction scores for cognitive anxiety leading into the A_1, B_1, A_2, and B_2 phases were + 1, + 2, – 2, and – 5, respectively. Direction scores for somatic anxiety immediately before the four phases were + 1, – 1, + 3, and 0, respectively. Thus, Jason did not perceive intensity of cognitive or somatic anxiety to be strongly facilitative or debilitative to performance.

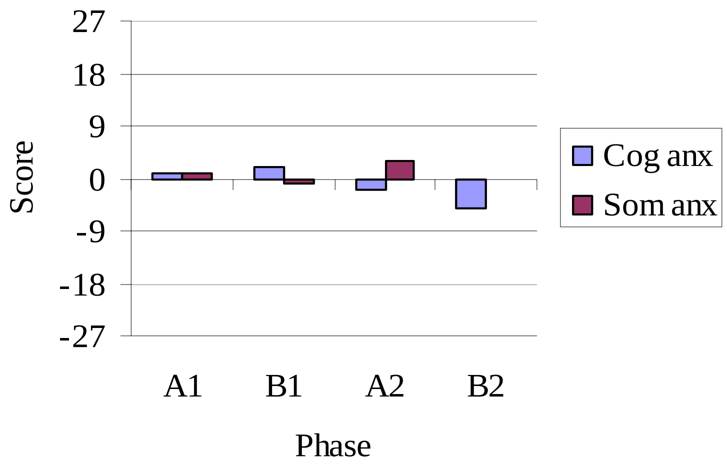

Figure A .10. Cognitive and somatic anxiety direction scores for Jason.

Karl

Visual inspection of Figure A.11 shows that Karl's direction scores for cognitive anxiety leading into the A_1, B_1, A_2, and B_2 phases were 0, – 4, – 4, and – 6, and direction scores for somatic anxiety immediately before the four phases were 0, – 8, – 7, and – 1, respectively. Karl considered intensity of cognitive and somatic anxiety in most phases to be somewhat debilitative to performance.

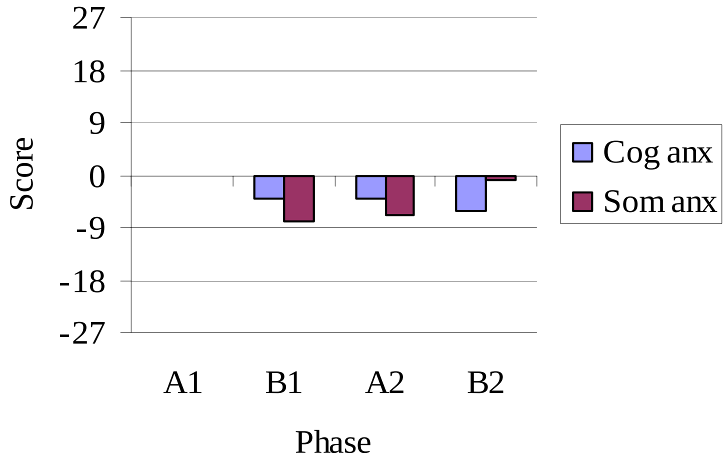

Figure A .11. Cognitive and somatic anxiety direction scores for Karl.

Linda

Visual analysis of Figure A.12 shows that Linda's direction scores for cognitive anxiety were + 2, – 1, + 9, and + 4 prior to the A_1, B_1, A_2, and B_2 phases, respectively. Direction scores for somatic anxiety were + 3, – 4, + 14, and + 2 prior to the four phases, respectively. It appears that Linda considered low intensity levels of cognitive and somatic anxiety (as shown in the A_2 phase in Figure 4.15) to be facilitative to performance.

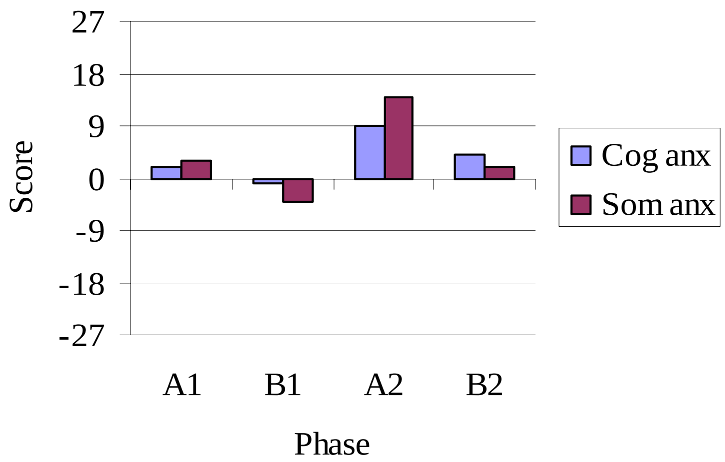

Figure A .12. Cognitive and somatic anxiety direction scores for Linda.

Peter

Visual analysis of Figure A.13 shows that Peter's direction scores for cognitive anxiety were + 10, + 11, and + 11 prior to the A_1, B_1, and A_2 phases and direction scores for somatic anxiety were + 7, + 8, and + 5 prior to the three phases, respectively. Generally, Peter perceived cognitive and somatic anxiety as facilitative.

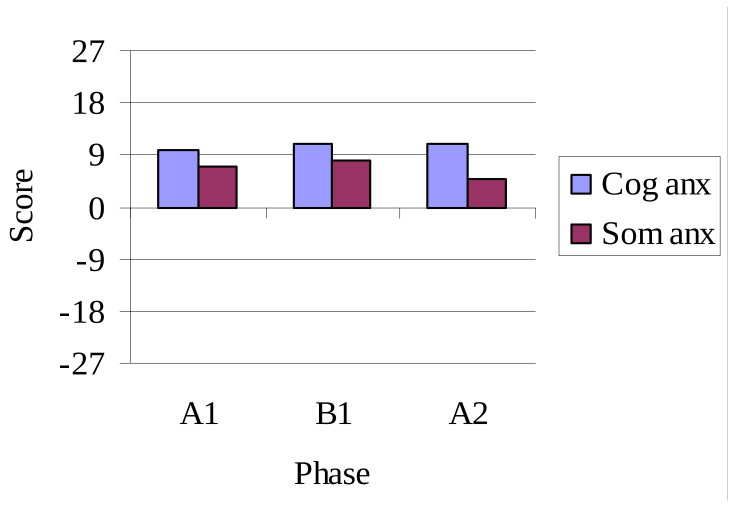

Figure A .13. Cognitive and somatic anxiety direction scores for Peter.

Ray

Visual analysis of Figure A.14 shows that Ray's direction scores for cognitive anxiety were + 13, + 1, and + 7 prior to the A_1, B_1, and A_2 phases, while direction scores for somatic anxiety were + 9, + 4, and + 5 prior to the three phases, respectively. Generally, Ray considered the perceived anxiety to be facultative to performance.

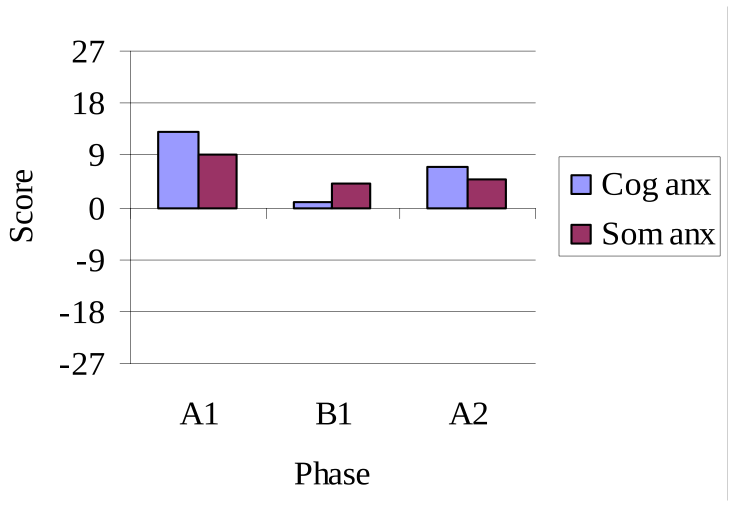

Figure A .14. Cognitive and somatic anxiety direction scores for Ray.

Study 3

Michelle

Visual inspection of Figure A.15 shows that Michelle's direction scores for cognitive anxiety preceding the A_1, B_1, A_2, and B_2 phases were + 5, – 8, + 7, and – 16, respectively. Thus, Michelle perceived elevated intensity of cognitive anxiety to be debilitative preceding the high-pressure phases. Direction scores for somatic anxiety immediately before the four phases were – 2, – 10, – 1, and – 6. On all four occasions, somatic anxiety intensity was perceived as debilitative with increases in intensity during the high-pressure phases as more debilitative.

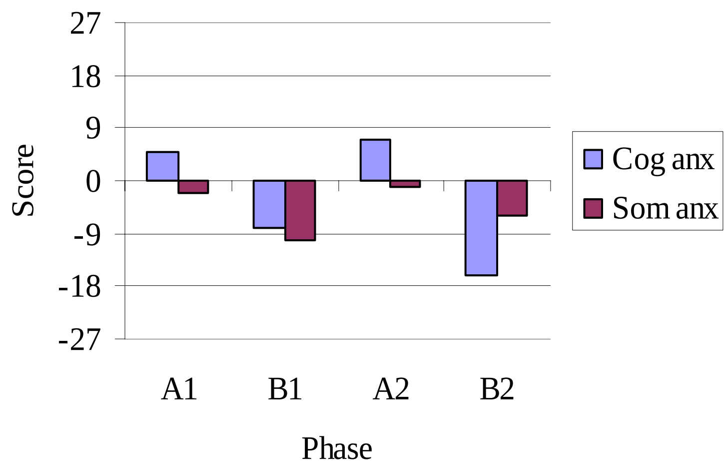

Figure A .15. Cognitive and somatic anxiety direction scores for Michelle.

Nicole

Visual inspection of Figure A.16 shows that Nicole's reported scores for directional cognitive anxiety preceding the A_1, B_1, A_2, and B_2 phases were – 15, – 15, – 10, and + 2, respectively. Direction scores for somatic anxiety prior to the four phases were – 1, – 8, – 1, and 0, respectively. For Nicole, it seems that the intervention affected her interpretation of intensity of cognitive and somatic anxiety during the B_2 phase. Clearly, direction scores of cognitive anxiety for the initial three phases follows the level of intensity. In the B_2 phase, however, when intensity is higher than the A_1 and A_2 phases, Nicole interprets anxiety levels as slightly facilitative to performance. Although not as robust, direction scores of somatic anxiety follow the same pattern indicating that the intervention may have affected Nicole's interpretation of anxiety intensity.

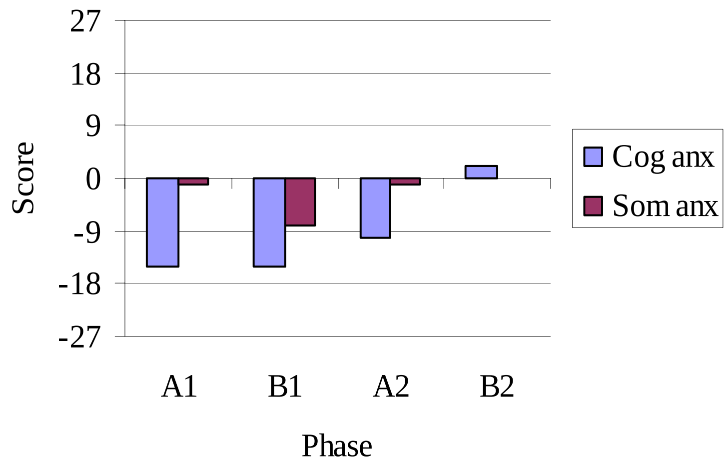

Figure A .16. Cognitive and somatic anxiety direction scores for Nicole.

Olivia

Visual inspection of Figure A.17 illustrates that Olivia's direction scores for cognitive anxiety prior to the A_1, B_1, A_2, and B_2 phases were + 6, – 12, – 10, and – 20, respectively. It appears that Olivia interpreted the cognitive anxiety as generally debilitative particularly in the B_2 phases. Direction scores for somatic anxiety preceding the four phases were + 13, – 10, + 27, and – 12, respectively. Thus, Olivia viewed higher intensities of somatic anxiety as debilitative to performance.

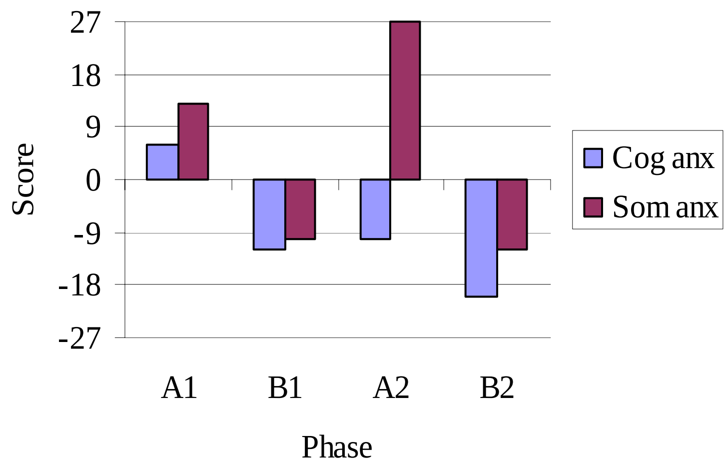

Figure A .17. Cognitive and somatic anxiety direction scores for Olivia.

Sara

Visual inspection of Figure A.18 illustrates that Sara's direction scores for cognitive anxiety preceding the A_1, B_1, and A_2, phases were + 12, – 1, and + 25, whereas direction scores for somatic anxiety preceding the three phases were + 20, + 27, and + 27, respectively. Generally, Sara interpreted aspects of cognitive and somatic anxiety as facilitative to performance.

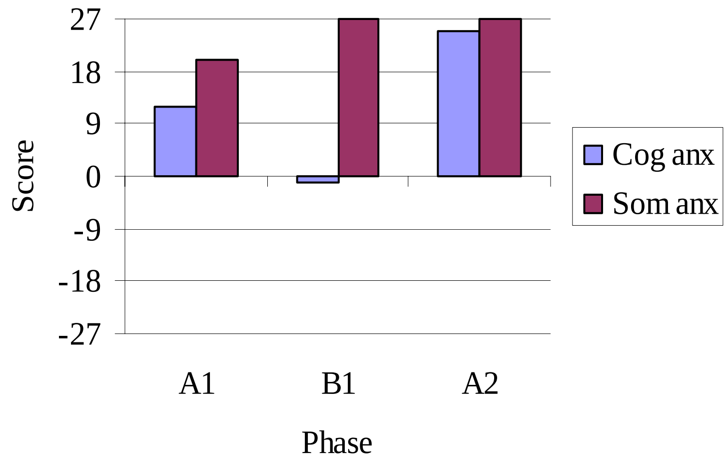

Figure A .18. Cognitive and somatic anxiety direction scores for Sara.

Tim

Visual inspection of Figure A.19 demonstrates that Tim's direction scores for cognitive anxiety immediately before the A_1, B_1, and A_2 phases were – 6, – 14, and – 10, and direction scores for somatic anxiety immediately before the three phases were – 2, – 14, and + 7, respectively. Generally, Tim's scores on the multidimensional A-state indicated that he interpreted his anxiety to be debilitative to performance.

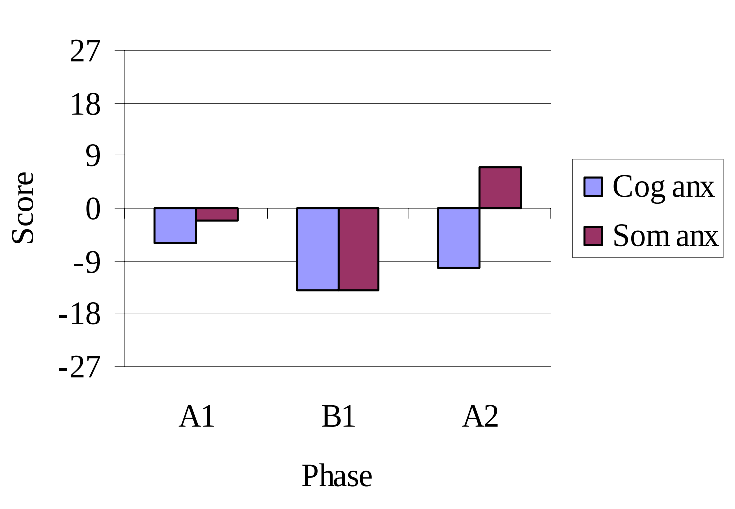

Figure A .19. Cognitive and somatic anxiety direction scores for Tim.

APPENDIX P: BOWLING EXPERIENCE QUESTIONNAIRE

1. Name___________________________________
2. Gender? ___M ____F (tick one)
3. Age? ______
4. Which hand will you be using when bowling? (Circle one)   Left hand   Right hand
5. Telephone (Home)_____________________ (Mobile)_________________________
6. Email address____
7. Which type of throw do you normally use when going for a strike?
   (Circle one)   Hook ball   Straight ball   Back up ball
8. Do you currently bowl in a Tenpin Bowling Australia (TBA) sanctioned league?
   (Circle one)   Yes   No
   a. If yes, please give:

League name(s)(1)_________________________(2)_____________________________

Bowling centre name(s)(1)______________________(2)__________________________

Highest current league average(s)(1)__________________(2)______________________

Approximate # of games in league(s)(1)__________________(2)___________________

9. Approximately, how many years have you been bowling in a TBA sanctioned league?
   (Circle one)   0-3 years   4-6 years   More than 6 years
10. Do you compete in competitive bowling tournaments? (Circle one)   Yes   No
    a. If yes, approximately how many years have you been bowling in competitive tournaments?

    (Circle one)   0-3 years   4-6 years   More than 6 years
11. Do you bowl in competitive “scratch” (without handicap) bowling tournaments?
    (Circle one)   Yes   No
    a. If yes, approximately how many years have you been bowling in competitive “scratch” bowling tournaments?

    (Circle one)   0-3 years   4-6 years   More than 6 years

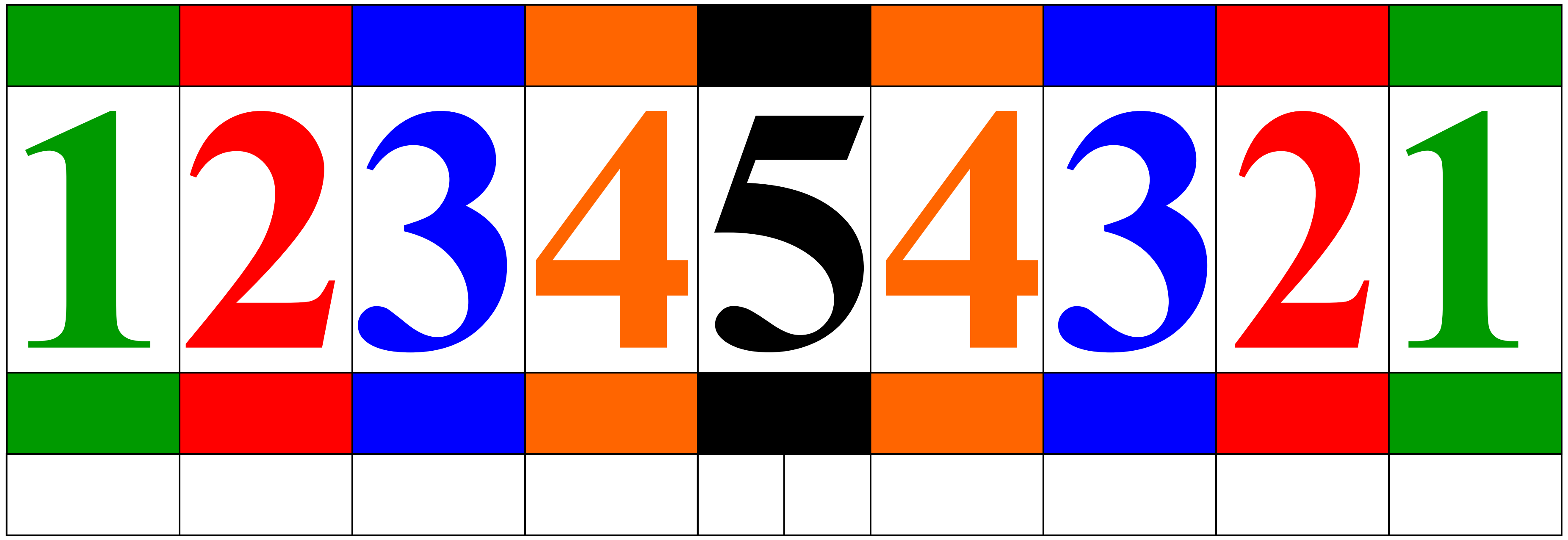

Figure A .20. Bowling target used in Study 2.

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VICTORIA UNIVERSITY OF TECHNOLOGY

APPENDIX R: CONSENT FORM FOR PARTICIPANTS INVOLVED IN RESEARCH-

(TENPIN BOWLING)

INFORMATION TO PARTICIPANTS:

We are interested in your feelings and reactions to competitive situations in your sport (tenpin bowling). To study these feelings in detail we would like you to complete a number of brief questionnaires and take part in a non-competitive experiment testing your shooting accuracy.

CERTIFICATION BY PARTICIPANT:

I,

of

certify that I am at least 18 years old* and that I am voluntarily giving my consent to participate in the experiment investigating thoughts, feeling and reactions to competitive situations, being conducted at Victoria University of Technology by Dr. Daryl B. Marchant, Professor Tony Morris, & graduate student Mr. Christopher Mesagno. I certify that the objectives of the study, together with any risks and safeguards associated with this study, have been explained to me by Chris Mesagno and that I freely consent to participate.

Procedures:

First, you will be asked to fill out short questionnaires, which will take approximately 30 minutes to complete. These questionnaires are mainly about how you respond to competitive pressure and anxiety in sport. Your responses to these questionnaires will be kept totally confidential. You will then participate by taking up to 240 shots (60 shots over 4 days). All sessions will be held at your local bowling centre or at AMF Highpoint Bowl in Maribyrnong. Each session will take approximately 45 minutes to complete. You will be asked to complete 2-4 sessions on different days. The goal for participants is to be as accurate as possible on each shot. During each session, you will also be asked to fill out another short questionnaire. Video recordings may be made of your participation. Only those involved with the study will have access to the tapes for data analysis purposes only. At all other times the videotapes will be locked inside a file cabinet. After final analysis, the tapes will be erased. A number of participants will be asked to take part in an interview where you will be asked to discuss your experiences in the project. The interview will take approximately 30-60 minutes and will be audio taped.

I certify that I have had the opportunity to have any questions answered and that I understand that I can withdraw from this study at any time and that this withdrawal will not jeopardise me in any way.

I have been informed that the information I provide will be kept confidential.

Signed: ....}

Witness other than the experimenter: ....} Date: ....}

Any queries about your participation in this project may be directed to the researcher (Name: Dr. Daryl B. Marchant ph. 03 9688 4035). If you have any queries or complaints about the way you have been treated, you may contact the Secretary, University Human Research Ethics Committee, Victoria University of Technology, PO Box 14428 MC, Melbourne, 8001 (telephone no: 03-9688 4710)

APPENDIX S: PRE-PRESSURE BASELINE PHASE INSTRUCTIONS – BOWLING

Thank you for participating. The purpose of this study is to examine feelings and reactions to competitive situations in bowling. You will participate in either two, three, or four sessions spread over four days. Each session will take approximately 30-60 minutes to complete. All sessions will involve bowling in which you will be asked to practice 60 shots at a target. As you can see (show the participant the target), the target consists of a series of numbers and will be placed approximately 13 ft (3.96 m) from the foul line. The aim is to throw the ball over the centre of the target. Blue powder will be placed on the target and as the ball rolls over the target, a definitive space will signify the ball's track and the number of points obtained. Before the shot attempts, you will complete the questionnaire placed in front of you. After completing the questionnaire, you will be introduced to a research assistant who will supervise your participation, calculate your score on each attempt, and replace the powder on the target. Go ahead and fill out the questionnaire in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin. In which area of the lane to you usually like throwing the bowling ball (i.e., 1st arrow, 2nd arrow, etc.)? I will be placing the target in that area of the lane. At the conclusion of the shots, a time will be scheduled for your next session. Do you have any questions?

APPENDIX T: PRESSURE PHASE INSTRUCTIONS – BOWLING

During these 60 shots, a video camera will be placed to the right side of the approach near the foul line to record your participation. This session will be similar to the last session with the exception of a few changes.

During this session, you will receive $10 for equalling your previous total accuracy score from your last session. An additional $1 for each point over the previous score will also be given. The maximum amount of money you can receive is $100. If you fail to reach the previous score, however, you will receive no money. For example, if your point's score was 150 last time and in this session you score 168, you would then receive $10 for reaching your previous score plus an additional $18 ($1 x 18). Conversely, if your point's score was 150 last time and in this session you score 149 or lower, then you will receive no money. The object of this session is to improve your performance from the previous session. Your score from the previous session was (*say participants previous score here*). You will receive $10 for reaching that score plus $1 each additional point over that score, and no money for each point under that score. You will receive your money at the conclusion of the study.

You will also notice that a small group of students will be observing your participation. The human movement students are there to analyse correct shot making technique and movements in bowling. They have been told not to interact, encourage, or discourage you in any way. Please do not talk to them. The audience members will be positioned behind you to the right and left in order to complete their observations. You will first complete the questionnaire placed in front of you. (Give time to complete questionnaire)

You will now be given 10 warm-up shots before the 60 shots begin. At the conclusion of the shots, a time will be scheduled for your next session. Do you have any question?

APPENDIX U: POST-PRESSURE BASELINE PHASE INSTRUCTIONS – BOWLING

This session will be similar to the first session. You will again take 60 shots. The goal is to do well and to be as accurate as possible. Before the shot attempts you will complete the questionnaire placed in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin. At the conclusion of the shots, I will discuss with you whether your participation beyond today is needed. If you participation is no longer required, you will be paid the money you are owed from the last session and thanked for your involvement. Do you have any questions?

APPENDIX V: PRE-SHOT ROUTINE INTERVENTION PHASE INSTRUCTIONS – BOWLING

Before performing these 60 shots, I will be helping you refine your pre-shot routine. Pre-shot routines are behaviours performed before the shot to ensure consistent preparation, which allows you to perform in an automatic nature. Pre-shot routines are a normal part of most self-paced activities such as bowling, golf, cricket, and target sports. An example of a pre-shot routine in bowling is as follows: pick up the bowling ball, wipe the ball off with a towel, blow in the thumb hole, walk on the approach and get into your set-up position by placing your left foot in your starting position, set your right foot, put your fingers in the ball, put your thumb in the ball, set your arm in a comfortable position, look at your target, and start your approach. (Demonstrate the pre-shot routine). I have made notes and have reviewed your videotape during the second session and would like to make a couple suggestions about your pre-shot routine. After I have made suggestions, you will practice your new routine without throwing any shots until you feel comfortable enough to use it. You will then demonstrate the routine by performing it five times correctly. Upon completion of that, I will explain what will happen for the remainder of the session. (Explain and refine the routine to the participants until confident that participant knows the routine well).

(Explained after the pre-shot routine has been developed). This session will be similar to the second session. You will again take 60 shots with an audience present, and the video camera recording your bowling. The money incentive will again be included, however, this time you will receive $10 for equalling the score you made on the second session (e.g., the last time you had an audience). Like last time, if you improve your accuracy, an additional $1 will be given for each point over the second session score. Once again, the maximum amount of money you can receive is $100 during this session. If you fail to reach the previous score, however, you will receive no money. The object is to improve your performance from the second session. Your score from that session was (*say participants previous score here*). You will receive $10 for reaching that score and $1 each additional point over that score, but no money for each point under that score. So, try to do your best. I will inform you of the amount of money you will receive at the conclusion of this session. You will receive all money owed to you after the interview. Do you have any questions?

The goal is to do the best you can and to be as accurate as possible over the 60 attempts. Before the shot attempts you will complete the questionnaire placed in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin. At the conclusion of the shots, I will discuss with you what is necessary for the remainder of the study. Do you have any questions?

APPENDIX W: PRE-SHOT ROUTINE INTERVIEW GUIDE

1. Describe to me your bowling history. How long have you been bowling? Do you bowl in any competitions? What your average is, things like that.
2. Describe in as much detail as possible what you were feeling during Session 1? Session 2? Session 3? Session 4?
   - Describe to me the differences in your feelings during Session 2 in comparison to Session 4?
3. Can you walk me through your thoughts during Session 1? Session 2? Session 3? Session 4?
   - Describe to me the differences in your thoughts during Session 2 in comparison to Session 4?
4. Describe your actions during Session 1? Session 2? Session 3? Session 4?
   - Describe to me the differences in your actions/ behaviours during Session 2 in comparison to Session 4?
5. Describe your feelings when you found out about the audience during Session 2? In what way did the audience affect your performance?
   - Describe your feelings when you found out about the audience during Session 4? In what way did the audience affect your performance?
6. Describe your feelings about the video camera during Session 2? In what way did the video camera affect your performance?
   - Describe your feelings about the video camera during Session 4? In what way did the video camera affect your performance?
7. Describe your feelings about the money during Session 2? In what way did the money affect your performance?
   - Describe your feelings about the money during Session 4? In what way did the money affect your performance?
8. Do you normally use a pre-shot routine? How long have you used your/ a pre-shot routine?
   - Can you describe to me your pre-shot routine during Session 2?
9. Describe the benefits you get from performing a pre-shot routine?
   - Describe how it affects your performance?
10. In Session 4, what did you think about when performing the pre-shot routine?
11. Can you describe systematically what was involved in your pre-shot routine in Session 4?
12. How did you think you performed during the study?
13. Describe a past experience (outside of the study) that involved pressure on you to perform and describe to me how you dealt with the situation.
14. Tell me what you learned about yourself from taking part in the study.
15. Is there anything else you would like to add?

APPENDIX X: PARTICIPANT DEBRIEFING – PRE-SHOT ROUTINE OR MUSIC

- The purpose of the study
    - To examine your reactions to pressure and to see whether an intervention (pre-shot routine or music) would assist you under pressure.
    - The questionnaires filled out at the beginning of the study were to determine whether you were a choking-susceptible athlete.

- Pressure during the 2nd session
    - Small audience- The audience members will not be analysing your performance.
    - Video camera evaluation- The tape will be destroyed after analysis and no one besides the researchers will see the tape
    - Financial incentive- You were informed that you would receive money for your participation during the study depending on previous performance. Talk about accuracy and how much money he/she will receive.
    - Give money promised. (Give participant money and have him/her sign receipt book)

- Brief the participant about the intervention (pre-shot routine or music) and whether it helped them during the study.

- Do you have any questions?

- Thank you very much for your participation

APPENDIX Y: RESULTS OF PARTICIPANTS – INCREASED PERFORMANCE

Interviews were not conducted for these participants because participation in the experimental phase was terminated following the A_2 phase. Thus, only limited information is presented including participant profile, reported DM-CSAI-2 results, and performance analysis. I assured participants' anonymity, thus, I used pseudonyms to identify the two participants that increased performance in Study 2 as Peter and Ray and Study 3 as Sara and Tim.

Study 2

CS Participant- Peter

Participant profile. Peter was a 31-year-old, male who had a current league average of 203. Peter was purposively sampled as a CS participant because he was high in S-C, moderately high in A-trait, and primarily used approach coping. Peter's scores were 55 on the SCS (75th to 100th percentile), 26 on the SAS (50th to 75th percentile), and + 3 on the CSIA differential score (75th to 100th percentile).

Pressure manipulation. Visual analysis of Figure A.21 shows that Peter's intensity scores for cognitive anxiety prior to the A_1, B_1, and A_2 phases were 18, 21, and 24, respectively. For Peter, perceived intensity of cognitive anxiety increased consecutively prior to all phases. Intensity scores for somatic anxiety preceding the three phases were 16, 20, and 15, respectively. Peter perceived an increase in intensity of somatic anxiety preceding the B_1 phases compared to the A_1 and A_2 phases. The DM-CSAI-2 scores also indicated that Peter experienced a low to moderate absolute level of A-state prior to the three phases.

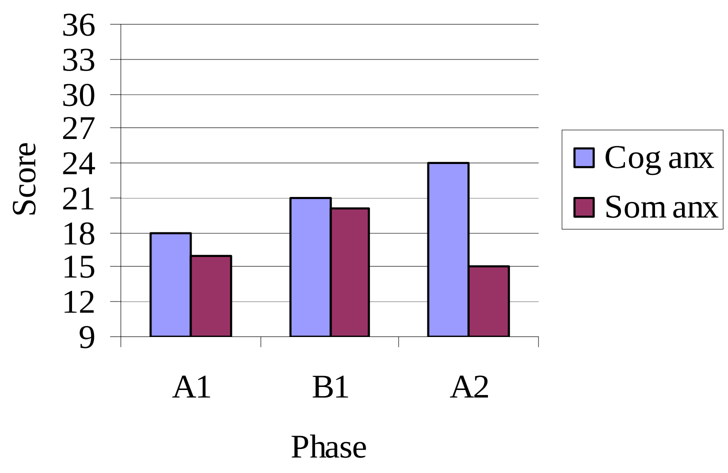

Figure A .21. Cognitive and somatic anxiety intensity scores for Peter.

Performance analysis. For Peter, MAE increased from 3.66 ± 0.96 in the A_1 phase to 1.54 ± 0.31 during the B_1 phase. This indicated an increase in accuracy of 138%. During the A_2 phase, performance was 3.15 ± 0.89, representing a decrease in accuracy of 105% between the B_1 and A_2 phase. Peter increased accuracy by 16% from the A_1 to the A_2 phase (see Figure A.22), whereas the B_1 phase performance changed drastically, indicating that the pressure manipulation was effective. As explained earlier, the reader is referred to Appendix N for participants' celeration line level calculations.

The slope of the celeration line during the A_1 phase was ÷ 1.35, and the slope of the celeration line in the B_1 phase was × 1.14, which signified a change in slope of × 1.18 during the A_1 and B_1 phase. The slope of the celeration line was × 1.11 during the A_2 phase, indicating a change in slope of ÷ 1.03.

General summary of Peter. From Peter's results, a difficulty exists in concluding the pressure manipulation was effective in increasing perceived pressure for two reasons. First, Peter's reported DM-CSAI-2 results indicated an increase in cognitive anxiety prior to the A_2 phase. The atypical elevation in cognitive anxiety preceding the low-pressure phase may indicate, although speculative, that a confounding variable potentially influenced perceived anxiety. Second, a potential, performance-related threat to the case study validity was an unstable baseline during the A_1 phase. Researchers who conduct

SCD research recommend achieving a stable baseline before arranging subsequent interventions (Barlow & Hersen, 1984; Hrycaiko & Martin, 1996). A stable baseline, with a minimal change in performance slope, allows researchers to clearly recognise strong performance trends and enhances decision-making about the efficacy of the intervention. From these results, it was difficult to conclusively determine the reason for Peter's performance improvement because the baseline measure was relatively unstable during the A_1 phase. Results during the A_1 phase may have continued in the projected direction even if the pressure manipulation was not introduced during the B_1 phase, thus, drawing adequate conclusions are complicated due to the unstable baseline and successive pressure decrease preceding the phases.

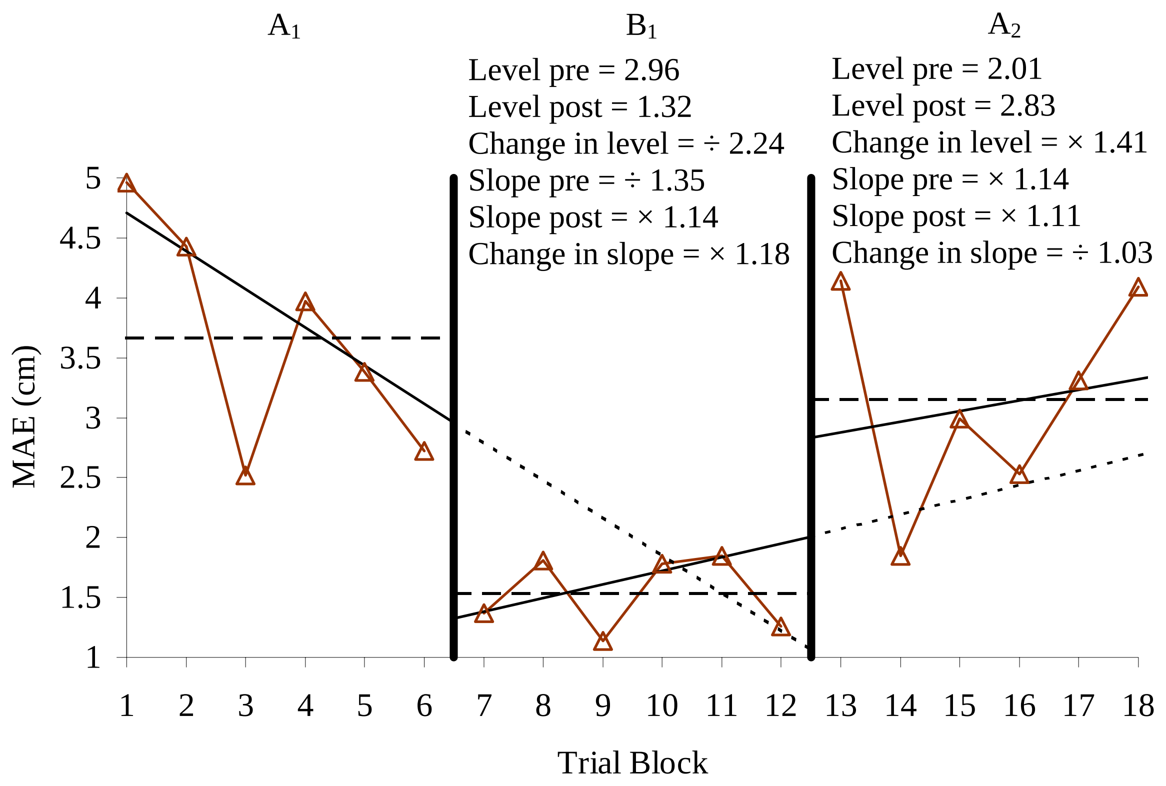

Figure A .22. Split-middle analysis for Peter.

CS Participant- Ray

Participant profile. Ray was an 18-year-old, male who had a current league average of 194. Ray was purposively sampled as a CS participant because he was high in S-C, high in A-trait, and predominantly used approach coping. Ray's scores were 46 on the

SCS (75th to 100th percentile), 52 on the SAS (75th to 100th percentile), and + 6 on the CSIA differential score (75th to 100th percentile).

Pressure manipulation. Visual analysis of Figure A.23 shows that Ray's intensity scores for cognitive anxiety prior to the A_1, B_1, and A_2 phases were 20, 12, and 11, and perceived intensity scores for somatic anxiety prior to the three phases were 17, 15, and 10, respectively. Ray experienced a similar, successive reduction in multidimensional A-state prior to the three phases. The reported DM-CSAI-2 scores also indicated that Ray experienced a low to moderate absolute level of A-state prior to each phase.

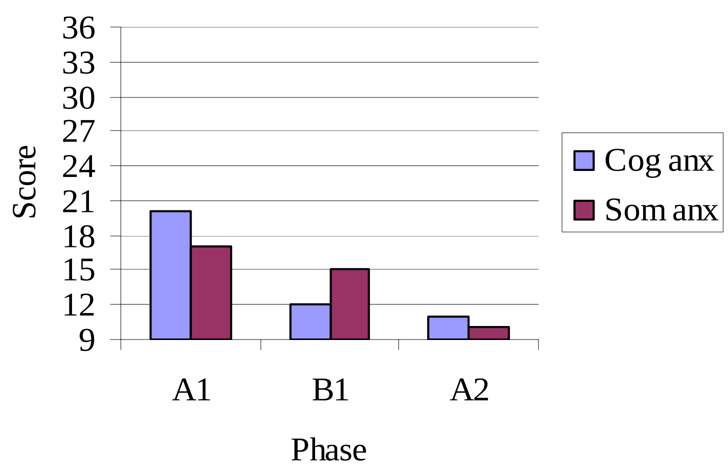

Figure A .23. Cognitive and somatic anxiety intensity scores for Ray.

Performance analysis. For Ray, MAE increased from 3.15 ± 0.46 in the A_1 phase to 2.32 ± 0.82 during the B_1 phase. This indicated an increase in accuracy of 36%. During the A_2 phase, mean performance was 2.43 ± 0.47, representing a reduction in accuracy of 5% between the B_1 and A_2 phase. MAE increased by 30% from the A_1 to the A_2 phase (see Figure A.24), which may also indicate that the pressure manipulation was not effective.

The slope of the celeration line during the A_1 phase was × 1.01, and the slope of the celeration line in the B_1 phase was × 1.03, representing a change in slope of × 1.02 during the A_1 and B_1 phase. The slope of the celeration line was × 1.10 during the A_2 phase, indicating a change in slope of × 1.07.

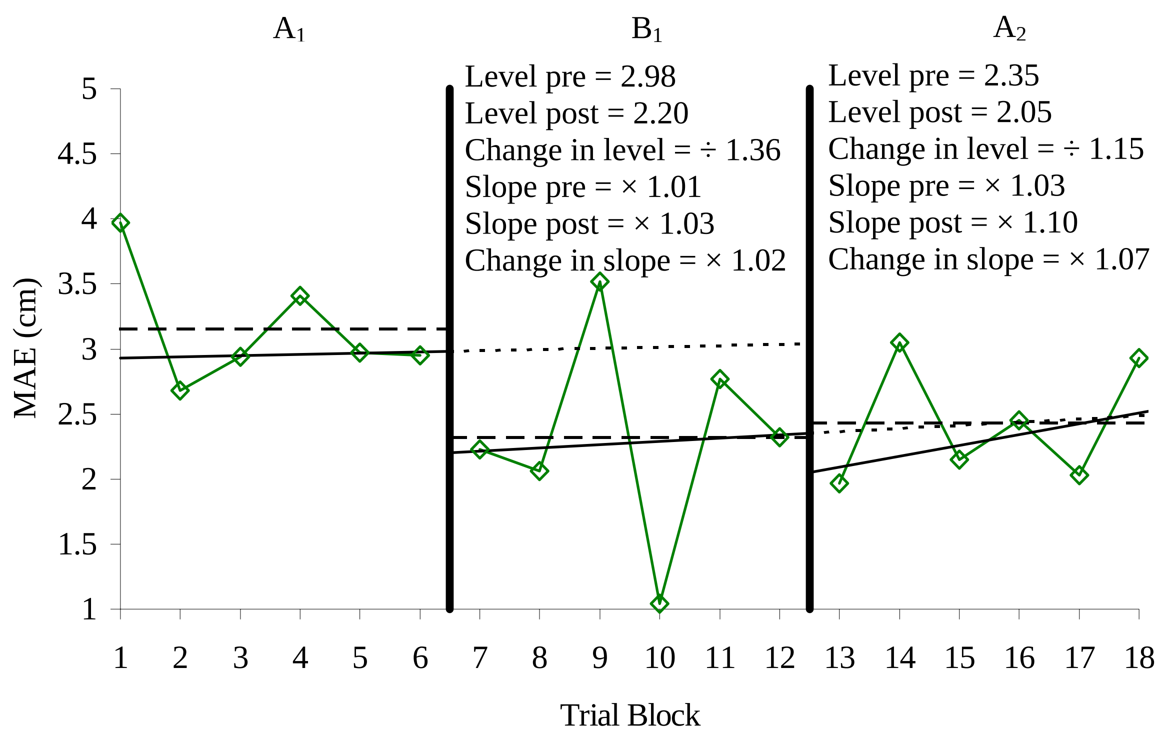

Figure A .24. Split-middle analysis for Ray.

General summary of Ray. For Ray, reported DM-CSAI-2 results indicated that the A_1 phase was the most anxiety-inducing phase. It seems that, similar to Peter, the pressure manipulation was not effective in increasing anxiety during the B_1 phase. Mean performance improved by 36% during the B_1 phase, but only decreased by 5% during the A_2 phase. Clearly, from Ray's performance results, disparate mean performances are illustrated during the A_1 and A_2 phases. Thus, the reported DM-CSAI-2 combined with the performance results may indicate that the pressure manipulation was not successful in increasing pressure during the B_1 phase. Without a successful pressure manipulation, robust conclusions about the performance outcome are difficult to ascertain.

Study 3

CS Participant- Sara

Participant profile. Sara was 19 years old and had been playing basketball on a state division team for at least 5 years (no interview was conducted hence an exact experience level could not be verified). Sara was purposively sampled as a CS participant because she was high in S-C, high in A-trait, and typically used approach coping. Specifically, Sara's scores were 50 on the SCS (75th to 100th percentile), 44 on the SAS (75th to 100th percentile), and + 5 on the CSIA differential score (75th to 100th percentile).

Pressure manipulation. Visual inspection of Figure A.25 shows that Sara's intensity scores for cognitive anxiety prior to the A_1, B_1, and A_2 phases were 15, 18, and 10, respectively. Sara experienced an elevation, albeit minimal, in cognitive anxiety prior to the B_1 phase compared to the low-pressure phases. Absolute levels of cognitive anxiety increased from low preceding the A_1 and A_2 phases to moderate during the B_1 phase. Intensity scores for somatic anxiety prior to the three phases were 14, 12, and 12, respectively. Sara's perceived absolute level of somatic anxiety was low prior to all three phases.

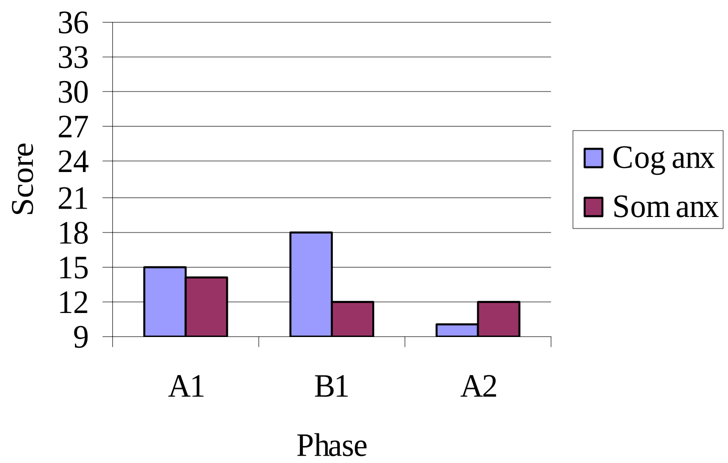

Figure A .25. Cognitive and somatic anxiety intensity scores for Sara.

Performance analysis. Mean performance for Sara increased from 6.67 ± 1.37 in the A_1 phase to 8.17 ± 0.75 during the B_1 phase. This represented a 23% performance improvement from the A_1 to the B_1 phase. During the A_2 phase, mean performance was 7.33 ± 1.21, a 12% decrease in performance between the B_1 and A_2 phase. Mean performance increased by 10% from the A_1 to the A_2 phase (see Figure A.26) whereas the B_1 phase performance changed substantially, which may indicate that the pressure manipulation was effective.

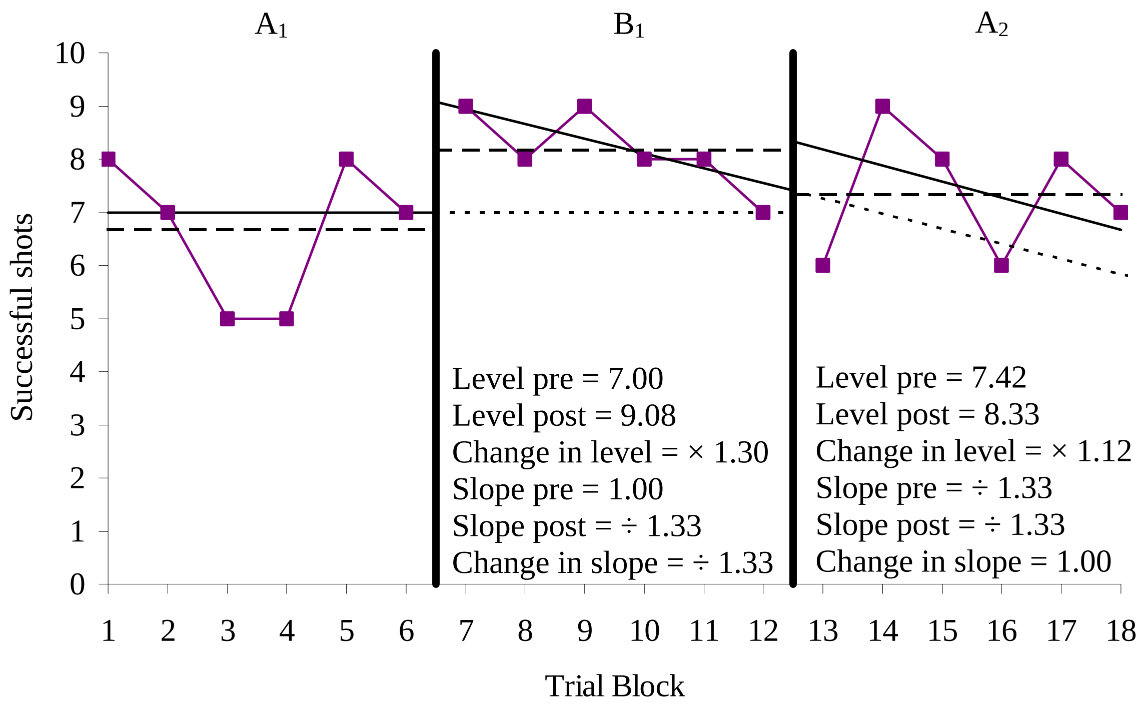

Figure A .26. Split-middle analysis for Sara.

The slope of the celeration line in the A_1 phase was 1.00 and the slope of the celeration line in the B_1 phase was ÷ 1.33, signifying a change in slope of ÷ 1.33 between the A_1 and B_1 phase. During the A_2 phase, the slope of the celeration line was ÷ 1.33, representing no change in slope from the B_1 to the A_2 phase.

General summary of Sara. The DM-CSAI-2 results signified that Sara perceived only a minimal elevation in cognitive anxiety prior to the B_1 phase compared to the other phases. Sara also reported a reduction in somatic anxiety during the B_1 and A_2 phases. Mean performance improved by 23% during the B_1 phase in comparison to the A_1 phase. Because of the similarities in reported DM-CSAI-2 score, it is difficult to determine whether the increase in performance was a product of chance or a possible effect of the pressure manipulation. Researchers should view these results with caution.

CS Participant- Tim

Participant profile. Tim was 19 years old and had been playing basketball on a state division team for at least 5 years. Tim was purposively sampled as a CS participant because he was moderately high in S-C, high in A-trait, and typically used approach coping. Specifically, Tim's scores were 37 on the SCS (50th to 75th percentile), 47 on the SAS (75th to 100th percentile), and + 7 on the CSIA differential score (75th to 100th percentile).

Pressure manipulation. Visual inspection of Figure A.27 shows that Tim's intensity scores for cognitive anxiety prior to the A_1, B_1, and A_2 phases were 17, 21, and 17, and intensity scores for somatic anxiety prior to the three phases were 13, 19, and 11, respectively. Tim experienced an elevation in intensity of multidimensional A-state preceding the high-pressure phase in comparison to the low-pressure phases. For Tim, cognitive and somatic anxiety increased from low absolute levels prior to the A_1 and A_2 phases to moderate levels prior to the B_1 phase.

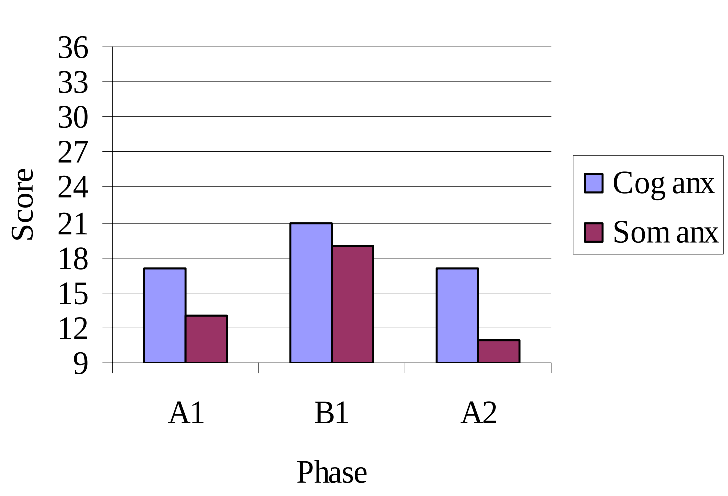

Figure A .27. Cognitive and somatic anxiety intensity scores for Tim.

Performance analysis. For Tim, mean performance increased from 5.17 ± 1.47 in the A_1 phase to 7.00 ± 0.89 in the B_1 phase. This represented a 25% increase in performance from the A_1 to the B_1 phase. During the A_2 phase, mean performance was 5.50 ± 1.05, a 27% performance decrement between the B_1 and A_2 phase. Mean performance increased by only 6% from the A_1 to the A_2 phase (see Figure A.28), while mean performance changed considerably during the B_1 phase, which may indicate that the pressure manipulation was effective.

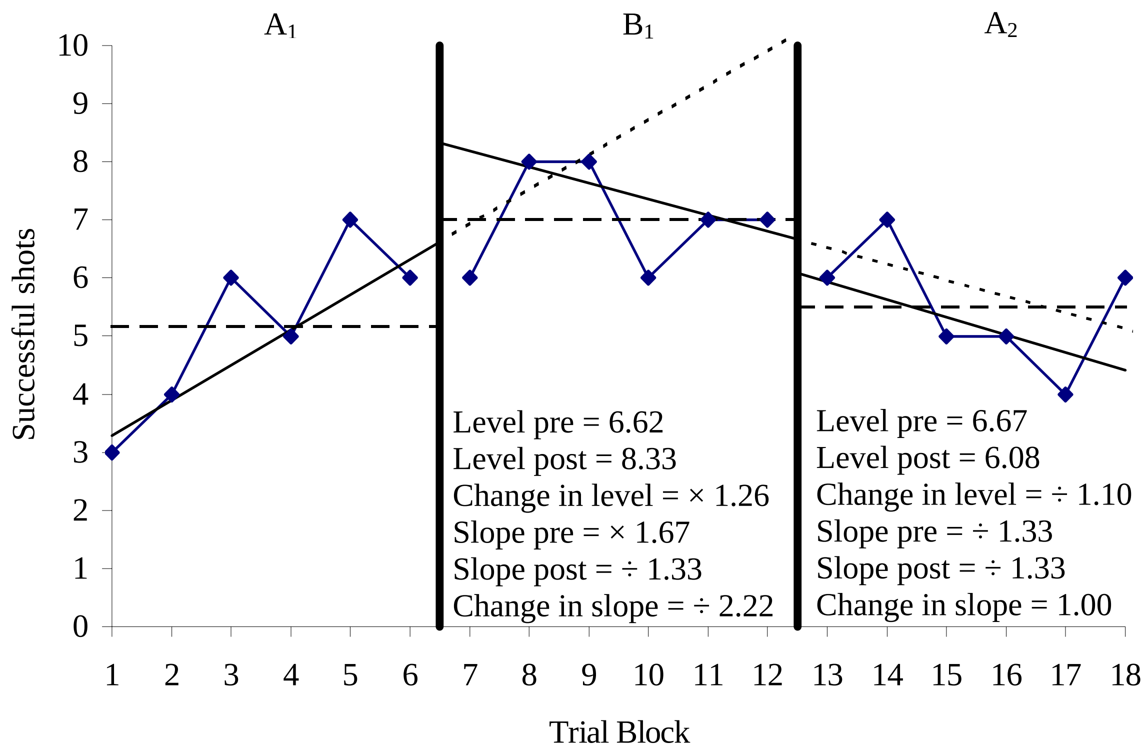

Figure A .28. Split-middle analysis for Tim.

The slope of the celeration line in the A_1 phase was × 1.67 and the slope of the celeration line in the B_1 phase was ÷ 1.33, representing a decreasing change in slope of 2.22 between the A_1 and B_1 phase. During the A_2 phase, the slope of the celeration line was ÷ 1.33, representing a stable, unchanging slope of 1.00 from the B_1 to the A_2 phase.

General summary of Tim. From the reported DM-CSAI-2 results, the pressure manipulation appeared to increase perceived pressure during the B_1 phase. Performance improvements during the B_1 phase, together with similar mean performance during the low-pressure phases, may also provide support that the pressure manipulation was effective (e.g., Barlow & Hersen, 1984; Kazdin, 1982). Clearly, a noticeable performance improvement between the A_1 and B_1 phase was also exhibited under pressure, but an unstable baseline was evident in the A_1 phase. Stability is needed to predict performance in subsequent phases. The data points in the A_1 phase (see Figure A.28) shows that a stable baseline was not achieved for Tim. Thus, improvements may have continued with (or without) the pressure manipulation being introduced.

APPENDIX Z: BASKETBALL EXPERIENCE QUESTIONNAIRE

1. Name____________________________________
2. Gender? ___M ____F (tick one)
3. Age? ______
4. Telephone (Home)__________________ (Mobile)___________________
5. Email address____
6. Do you currently play in a competitive basketball league? (Circle one) Yes No

If yes, please give league name ________________and team name__________________

If yes, how long (in seasons) have you played for this team?___________ seasons

7. Approximately, how many competitive seasons of basketball have you played? (Circle one) Less than 5 seasons 5-10 seasons More than 10 seasons
8. What is the highest level of basketball you have competitively played? (Circle one)

Domestic (Grade?) (Circle one) D C B A

Division (Victorian Basketball League- VBL)

Regional (Big V, SEABL, ABA)

National (National Basketball League- NBL)

APPENDIX AA: MUSIC INTERVIEW GUIDE

1. Describe to me your basketball history. How long have you been playing basketball, things like that.
2. Describe in as much detail as possible what you were feeling during Session 1? Session 2? Session 3? Session 4?
   - Describe to me the differences in your feelings during Session 2 in comparison to Session 4 when the music was played?
3. Can you walk me through your thoughts during Session 1? Session 2? Session 3? Session 4?
   - Describe to me the differences in your thoughts during Session 2 in comparison to Session 4 when the music was played?
4. Describe your actions during Session 1? Session 2? Session 3? Session 4?
   - Describe to me the differences in your actions/ behaviours during Session 2 in comparison to Session 4?
5. Describe your feelings when you found out about the audience during Session 2? In what way did the audience affect your performance?
   - Similarly, describe your feelings when you found out about the audience during Session 4? In what way did the audience affect your performance?
6. Describe your feelings about the video camera during Session 2? In what way did the video camera affect your performance?
   - Similarly, describe your feelings about the video camera during Session 4? In what way did the video camera affect your performance?
7. Tell me about your feelings regarding the money during Session 2? In what way did the money affect your performance?
   - Similarly, describe your feelings about the money during Session 4? In what way did the money affect your performance?
8. Have you ever experimented with listening to music when shooting baskets before?
9. What was it like having to listen to the words and shoot at the same time?
10. Describe to me how listening to the words affected your shooting.
11. Did you use a strategy when listening to the words of the music to help your performance? If so, what did you do?
12. Can you tell me what the song was about or recite the words of the song?
13. How did you think you performed during the study?
14. Describe a past experience (outside of the study) that involved pressure on you to perform and describe to me how you dealt with the situation.
15. Tell me what you learned about yourself from taking part in the study.
16. Is there anything else you would like to add?

APPENDIX BB: PRE-PRESSURE BASELINE PHASE INSTRUCTIONS – BASKETBALL

Thank you for participating. The purpose of this study is to examine feelings and reactions to competitive situations in basketball. You will participate in three sessions over three days that will take approximately 30 minutes to complete each session. You might also be asked to participate in an interview after completing the sessions. The three sessions will involve basketball free throw shooting. During each session, you will be asked to take 60 shots. A 10-second break will be given between each shot and a 30-second rest period will be provided after every 10 shots. The object is to make as many shots as possible. Overall, the goal is to do the best you can during the three sessions. Within each of the sessions, you will be asked a couple of questions in reference to your free throws that will be audiotaped with your permission. No one beside me (the researcher) will listen to these tapes. They will be discarded after data analysis has been conducted with the tapes. Before the shot attempts, you will complete the questionnaire placed in front of you. After completing the questionnaire, 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. Go ahead and fill out the questionnaire in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin. At the conclusion of the shots, a time will be scheduled to continue participation in the study. Do you have any questions?

APPENDIX CC: MUSIC INTERVENTION INSTRUCTIONS – BASKETBALL

In conjunction with examining feelings and reactions to competitive situations in basketball, we are also investigating the effect of music on sport performance. During the next 60 shots, I will be asking you to attentively listen to the words of the music while you are shooting. The song is “Always look on the bright side of life” from Monty Python’s Life of Brian. I will play the song twice before going into the gym so that you become familiar with the words of the song. The music will also be played during the current session. You will be wearing headphones so that you are the only person that can hear the music. The audiotape will be started just before the first shot of each 10-shot block and will be played throughout the 10 shots; however, the music will not be played during the 30-second break between each 10-shot block. The goal is to make as many shots as possible while also attending to the words of the song. I will now play the song for you twice. (Play the song for the participant 2 times)

(Explained after the music has been played to the participant). This session will be similar to the second session. You will again take 60 shots with an audience present, and the video camera recording your free-throw shooting. The money incentive will again be included, though, this time you will receive $20 for equalling the score you made on the second session (e.g., the last time you had an audience). Like last time, if you improve your score, an additional $5 will be given for each point over the second session score. Once again, the maximum amount of money you can receive is $100 during this session. If you fail to reach the previous score, however, you will receive no money. The object of this session is to improve your performance from the second session while also focusing your attention on the words of the music. Your score from that session was (*say participants previous score here*). You will receive $20 for reaching that score and $5 each additional point over that score, but no money for each point under that score. So, try to do your best. You will receive all money owed to you after the interview. Do you have any questions?

The goal is to do the best you can and to make as many baskets as possible over the 60 attempts. Before the shot attempts you will complete the questionnaire placed in front of you. (Give time to complete questionnaire)

You will be given 10 warm-up shots before the 60 shots begin, you will be listening to the words of the music during the 10 warm-up shots also. After the 10 warm-up shots, we will stop the tape and rewind it. Once again, please focus your attention on the lyrics or words of the music while shooting.

At the conclusion of the 60 shots, I will discuss with you what is necessary for the remainder of the study. Do you have any questions?