

**Gender Differences in the Effects of Psychological Interventions on Multidimensional State  
Anxiety Prior to Competition in Malaysian Volleyball Players**

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# **Gender Differences in the Effects of Psychological Interventions on Multidimensional State Anxiety Prior to Competition in Malaysian Volleyball Players**

## **Abstract**

*The purpose of this study was to investigate gender differences in the effects of psychological interventions on multidimensional state anxiety prior to competition in Malaysian volleyball players. The Competitive Sport Anxiety Inventory – Revised (CSAI-2R) was employed to examine the pre-competition multidimensional state anxiety one day before competition at the competition venue. Subjects were youth state volleyball players ( $N=96$ ; boys = 48; girls = 48; Age:  $M= 16.35$  yr.,  $SD = .89$  yr) competing in the under 18 National School Sport Council of Malaysia Volleyball Tournament. The group with the highest group mean scores in cognitive state anxiety was assigned to a cognitive intervention group ( $n=24$ ; 12 boys & 12 girls) where subjects underwent breathing techniques and autogenic relaxation with music lasting 30 minutes per session; the group with the highest group mean scores in somatic anxiety component ( $n=24$ ; 12 boys & 12 girls) completed the somatic intervention with progressive muscular relaxation lasting 30 minutes; the self-confidence group ( $n=24$ ; 12 boys & 12 girls) which rated the lowest mean group scores in self-confidence component carried out the intervention with positive self-talk and goal setting exercises lasting 30 minutes; and a control group ( $n=24$ ; 12 boys & 12 girls). The MANOVA indicated that the interaction effect for gender and type of intervention on CSAI-2R components was significant (Wilks's Lambda = .69,  $F (7, 88) = 3.73$ ,  $p < .001$ ). The results indicated significant main effect for gender (Wilks's Lambda = .79,  $F (7, 88) = 7.57$ ,  $p < .001$ ) and type of intervention (Wilks's Lambda = .13,  $F (7, 88)$*

$= 30.85$ ,  $p < .001$ ). The male athletes in the present study displayed lower somatic state anxiety, lower cognitive state anxiety and higher self-confidence intensities than female athletes one day prior to competition, gender did influence anxiety responses and findings of this study partially supported the hypothesis.

**Keywords:** *gender differences, psychological interventions, multidimensional state anxiety*

## **Introduction**

Anxiety is one of the most fundamental of all constructs in sport psychology and it is one of the most extensively researched topics in sport psychology (Stadulis, MacCracken, Eidson, & Severance, 2002) and it continues to attract a considerable amount of research attention in the discipline of sport psychology (Hanton, Neil, & Mellalieu, 2008; Mellalieu, Hanton, & Fletcher, 2006a). Due to the impact that anxiety can have on athletes' performances (Neil, Fletcher, Hanton, & Mellalieu, 2007), the past two decades has seen an extensive amount of research conducted into performers' experiences of this negative emotion (Mellalieu et al., 2006a).

Although there have been many theories and models that have tried to clarify the relationship between anxiety and performance, there appear to be a consensus on the notion that anxiety is multidimensional (Woodman & Hardy, 2001, 2003). Anxiety is usually conceptualized as a situation-specific multidimensional construct with both cognitive and somatic components (Martens, Burton, Vealey, Bump, & Smith, 1990). Cognitive anxiety is typified by negative self-images and self-doubts, while somatic anxiety is typified by increased heart rate, tense muscles, and clammy hands (Gould, Kleenleaf, & Krane, 2002; Woodman & Hardy, 2003).

The conceptualization of competitive anxiety into multidimensional cognitive and somatic components has enabled a clearer understanding of performers' responses to stressful situations (Woodman & Hardy, 2001). It has been suggested that cognitive anxiety might influence all forms of athletic performance, whereas somatic anxiety tends to disrupt fine motor skill more than gross motor activities (Lavallee, Kremer, Moran, & Williams, 2004). Previous research that considered the temporal patterns of anxiety has revealed that somatic anxiety decreases

significantly immediately after commencing an activity, whereas cognitive anxiety remains high for a longer period of time (Chu-min & Masters, 2001; Martens et al., 1990). Martens et al. (1990) reported that the third dimension of state anxiety is self-confidence.

Self-confidence was reported to influence anxiety interpretation, demonstrating its potential role in protecting against the debilitating effects of anxiety (Hardy, Jones, & Gould, 1996; Mellalieu et al., 2006a). To better understand these possible protecting functions of self-confidence, Hanton, Mellalieu and Hall (2004) investigated the relationship between anxiety symptoms, self-confidence, and the directional interpretation of symptoms. They found high levels of self-confidence to protect against the debilitating interpretations of competitive anxiety within elite athletes. More specifically, the performer's reported using strategies that included mental rehearsal, thought stopping, and positive self-talk as mechanisms to potentially 'protect' against debilitating interpretations of anxiety. When self-confidence levels were low, increases in competitive anxiety intensity were perceived as outside of the performer's control and debilitating to performance. When self-confidence levels were high, increases in anxiety were reported to lead to positive perceptions of control and facilitative interpretations.

State Anxiety is the "right now" feeling of apprehension and tension in a specific situation (Gould et al., 2002), whereas the trait anxiety is a general disposition of certain individuals to feel anxious in certain environmental situations (Moran, 2004). An issue for all athletes is to maintain some sort of control over their internal state. There are many forces acting on athletes preventing them from reaching this state. Anecdotal and scientific evidence have shown that anxiety might be one of the reasons that athletes do not achieve their full potential. For example,

research has found that fear of failure, negative social evaluation, concerns about injuries or physical danger, and fear for the unknown elicited anxiety in ice hockey players (Dunn & Syrotuik, 2003).

The level of precompetitive anxiety has been shown to differ depending on certain characteristics, such as sport type, experience, gender, and age (Martens et al., 1990). Females have generally been found to have higher levels of cognitive and somatic anxiety and lower self-confidence than males (Ho, Denturk, Lam, Zimmer, Hong, & Okamoto, 2000; Jones, Swain, & Cale, 1991; Martens et al., 1990). In a meta-analysis (Woodman & Hardy, 2003) of the impact of state cognitive anxiety and state self-confidence on sport performance, it was observed that gender and level of performance were important moderator variables. Overall it was found that cognitive anxiety had an insignificant negative effect on performance ( $r = -.10$ ), and self-confidence, a low to moderate positive effect ( $r = .24$ ). Men were more affected than women. Self-confidence was significantly more influential for men ( $r = .29$ ) than for women ( $r = .04$ ).

Anshel and Delany (2001) found gender differences for 11- and 12-year-old male and female field hockey players. For example, girls used considerably more confidence-building self-talk than did boys, whereas boys more often used resignation (e.g., "*I reminded myself that things could be much worse*") than did girls. Anshel, Jamieson, and Raviv (2001) found gender differences in the use of coping strategies among Israeli athletes, whereas Lane, Jones, and Stevens (2002) found no gender differences in coping with failure and changes in self-efficacy among male and female tennis players as a function of self-esteem.

A number of studies have attempted to evaluate the use of basic psychological skills (e.g., goal setting, imagery, relaxation, and self-talk) upon the competitive anxiety response (Fletcher & Hanton, 2001; Neil, Mellalieu, & Hanton, 2006; Page, Sime, & Nordell, 1999). Hardy et al. (1996) illustrated that athletes, coaches, and applied sport psychologists often combine basic psychological skills with other component parts (i.e., other mental and/or physical skills) to create more advanced psychological strategies.

Although gender differences among athletes have been rarely studied, the aim of current investigation primarily compared gender differences on multidimensional state anxiety components in the effects of psychological interventions prior to competition. Gender differences are important for acknowledging individual differences in providing effective stress management programs to athletes. We hypothesized that differences would occur between genders or females would report lower self-confidence levels, higher in cognitive state anxiety and somatic state anxiety levels prior to competition compared to male counterparts, as indicated by several previous studies (Ho et al., 2000; Jones et al., 1991, Martens et al., 1990).

## **Participants**

Participants were the youth state volleyball players ( $N = 96$ ; boys = 48, girls = 48;  $M$  age = 16.35 yr.,  $SD = .89$  yr.) competing in the Under 18 National School Sport Council of Malaysia Volleyball Tournament. They were players selected to represent four states in Malaysia (i.e., Negeri Sembilan, Malacca, Perak and Selangor) in that tournament. The participants were fully acquainted with the nature of the study prior to giving written informed consent to participate.

Their selection was based on their availability and they are competing at the national level (Hanton & Connaughton, 2002). Participants were assured confidentiality regarding the data collected and their personal identity. Ethical approval for the study was obtained from the University of Malaya ethics committee.

## **Instrument**

### *Multidimensional State Anxiety*

Pre-competition multidimensional state anxiety was measured using the Competitive State Anxiety Inventory-2 Revised (CSAI- 2R: Cox et al., 2003) two times (one month before and one day before competition) after the psychological intervention sessions.

The CSAI-2R is a 17-item scale that measures cognitive state anxiety (5 items), somatic state anxiety (7 items) and self-confidence (5 items) in a competitive setting. Respondents rate their feelings before competition (e.g. *I feel jittery, I am concerned about losing*) on a scale anchored by 1 = *not at all* and 4 = *very much so*. Subscale scores are calculated by summing items in each subscale, dividing by the number of items, and multiplying by 10. Score range is 10 – 40 for each subscale. Higher scores indicate higher intensities of cognitive and somatic state anxiety, as well as higher levels of self-confidence. The factorial validity of the CSAI-2R was previously established by Cox et al. (2003) using confirmatory factor analysis (CFA) on data from 331 athletes, which showed a good fit of the hypothesised measurement model to the data (CFI = .95, NNFI = .94, RMSEA = .054).

## **Procedures**

Participants were administered the CSAI-2R two months prior to the official competition with instructions that followed Martens et al.'s (1990) recommendations to emphasize confidentiality of responses at an individual level, honesty on the inventory, and the assurance that answer could not be "wrong". Based on the results of the first data collected, subjects were assigned to one of three interventions and a control group using the matching hypothesis proposed by Gould, Petlichkoff, & Weinberg (1984).

The group with the highest mean scores in the Cognitive Anxiety component was assigned to the Cognitive Intervention ( $n = 24$ , 12 male & 12 female). This group went through the Breathing Technique & Autogenic Relaxation (Maynard, & Cotton, 1993) with Music (Nilson, Unosson & Rawal, 2005) lasting 30 minutes per session, four times prior to competition. The group with the highest group mean scores in the Somatic Anxiety component was assigned to the Somatic Intervention ( $n = 24$ , 12 male & 12 female). They completed the Progressive Muscular Relaxation (Jacobson, 1938) with Music (Nilson et al., 2005) lasting 30 minutes per session, four times prior to competition. The group with the lowest group mean scores in the Self-Confidence scales went through the Self-Confidence intervention ( $n = 24$ , 12 male & 12 female) with the Positive Self-Talk (Hamilton, Scott & McDougall, 2007) and Goal Setting (Weinberg and Weigand, 1993) lasting 30 minutes per session for 4 sessions prior to competition. The control group ( $n = 24$ , 12 male & 12 female) met up with the researcher for discussion and game sessions. Data were collected two times (i.e., One Month Before and One Day Before competition) after each psychological intervention session by the researcher.

## Results

Preliminary descriptive analyses were computed for all dependent variables in this study. Table 1 displays the means and the standard deviations for the cognitive state anxiety, somatic state anxiety, and self-confidence intensity by type of intervention and gender one day before competition. The results indicated that the cognitive state anxiety of the male players in the cognitive intervention group ( $M=16.33\pm1.83$ ), somatic intervention group ( $M=19.00\pm2.80$ ) and the self-confidence intervention ( $M=20.00\pm0.85$ ) were lower than the female players (cognitive intervention group:  $M=18.83\pm1.27$ , somatic intervention group:  $M=20.75\pm1.55$ , and self-confidence intervention group:  $M=20.92\pm1.00$ ) which both gender went through the same interventions with the same duration. Conversely, the cognitive state anxiety intensity for the male players ( $M= 21.42\pm1.44$ ) in the control group was slightly higher than the female players ( $M=20.83\pm1.58$ ) one day prior to competition.

The mean and standard deviation for the somatic state anxiety intensity of the male players in the cognitive intervention group ( $M=15.34\pm2.41$ ) and the control group ( $M=23.83\pm4.13$ ) were lower than the female players in cognitive intervention group ( $M=17.07\pm.59$ ) and the control group ( $M=26.67\pm5.17$ ), but both genders reported similar somatic state anxiety intensity in the somatic intervention group. The analysis showed that the somatic state anxiety intensity of the male players ( $M=19.08\pm2.68$ ) was higher than the female players ( $M=18.67\pm2.31$ ) in the self-confidence intervention group. Results of current study revealed that the self-confidence intensity of the male players in the somatic intervention group and self-confidence intervention were higher than the female players one day before competition. In contrast, the female players

( $M=31.08\pm2.39$ ) reported higher in self-confidence intensity compared to male players ( $M=28.17\pm6.52$ ) in the cognitive intervention group one day before competition. Both genders showed same intensity of self-confidence intensity one day before competition in the control group.

<<<‘Table 1 near here’>>>

To examine gender and type of intervention differences in intensity scores of the CSAI-2R components,  $2 \times 4$  multivariate analyses of variance were conducted. CSAI-2R components (cognitive state anxiety, somatic state anxiety, and self-confidence) intensity served as dependent variables for the MANOVA.

The MANOVA indicated that the interaction effect for gender and type of intervention on CSAI-2R components was significant (Wilks’s Lambda = .69,  $F (7, 88) = 3.73, p < .001$ ). The results indicated significant main effect for gender (Wilks’s Lambda = .79,  $F (7, 88) = 7.57, p < .001$ ) and type of intervention (Wilks’s Lambda = .13,  $F (7, 88) = 30.85, p < .001$ ).

Follow-up univariate analysis of variance (ANOVA) revealed significant gender main effect on cognitive state anxiety,  $F (1, 88) = 11.74, p < .001$ , but not for somatic state anxiety,  $F (1, 88) = 2.89, p=.09$ , and self-confidence  $F (1, 88) = 3.64, p= .06$ . The cognitive state anxiety intensity of the female players showed a significant higher than the male players (mean diff: female – male = 1.15,  $p <.05$ ) after adjustment for multiple comparisons with Bonferroni.

Follow-up ANOVAs indicated significant type of intervention main effects for cognitive state anxiety  $F (3, 88) = 21.18, p < .001$ , multiple comparisons using Bonferroni showed that the cognitive state anxiety of the cognitive intervention group were significantly different ( $p < .001$ ) from the somatic intervention group, self-confidence intervention group and the control group one day before competition. The univariate ANOVA revealed that type of intervention main effects for somatic state anxiety intensity of the somatic intervention group were significant difference  $F (3, 88) = 75.64, p < .001$ . Bonferroni multiple comparisons test results revealed that the somatic state anxiety of the somatic intervention group were significantly lower ( $p < .001$ ) than the self-confidence intervention group and the control group, but not for cognitive intervention group (mean diff: somatic intervention – cognitive intervention = -1.54,  $p > .05$ ). Follow-up ANOVA also indicated significant type of intervention main effects for self-confidence intensity  $F (3, 88) = 16.44, p < .001$ , multiple comparisons using Bonferroni showed that the self-confidence intensity of the self-confidence intervention group were significantly higher ( $p < .05$ ) than the cognitive intervention group and the control group, but not somatic intervention group ( $p = 1.00$ ).

## **Discussion**

The main aim of the present study was to investigate gender differences in the effects of psychological interventions on multidimensional state anxiety prior to competition in Malaysian volleyball players. As expected and consistent with previous findings (Ho et al., 2000; Jones et al., 1991, Martens et al., 1990) male athletes in the present study displayed lower somatic state anxiety, lower cognitive state anxiety and higher self-confidence intensities than female athletes

one day prior to competition. Gender did influence anxiety responses and findings of this study partially supported the hypothesis. The significant gender main effect differences found on cognitive state anxiety but not on somatic state anxiety and self-confidence intensity one day prior to competition even though all components in CSAI-2R showed differences in the mean scores.

The female players had significantly higher mean cognitive state anxiety scores than their male counterparts  $F(1, 88) = 11.74, p < .001$  one day prior to competition even though both genders went through the same intervention with the same duration. The results of the present study confirm the conclusions of an extensive review of the sport psychology literature by Hoar, Kowalski, Gaudreau, & Crocker (2006) that “males and females generally cope differently” (p. 61). The current results found unexpected cognitive state anxiety results whereby the male players in the control group reported higher cognitive state anxiety intensity ( $M=21.42\pm1.44$ ) than female players ( $M=20.83\pm1.58$ ) one day prior to competition. Interestingly, both genders experienced somatic state anxiety for the somatic intervention group and self-confidence for the control group to a similar degree in this study. This finding preclude practical usage but indicate that future researchers will need to consider gender when examining competitive anxiety and implementing psychological intervention, females need more interventions to help them handle anxiety responses more positively.

In the present study, the MANOVA indicated significant main effect for type of intervention (Wilks's Lambda = .13,  $F(7, 88) = 30.85, p < .001$ ) on the components of CSAI-2R. Bonferroni multiple comparisons further verified that mean scores of the cognitive state anxiety of the

cognitive intervention group was significantly different from the somatic intervention group, self-confidence intervention group and the control group one day before competition. Similar findings were found by Maynard and Cotton (1993). The Breathing Technique and Autogenic Relaxation with Music lasting 30 minutes per session are able to maintain the cognitive state anxiety prior to competition (Nilson et al., 2005).

The scores of the somatic state anxiety for the somatic intervention group were significantly lower ( $p<.001$ ) than the self-confidence intervention group and the control group, but not for cognitive intervention group (mean diff: somatic intervention – cognitive intervention=-1.54,  $p>.05$ ). The findings revealed that the somatic intervention with progressive muscular relaxation with music lasting for 30 minutes per session was able to facilitate in maintaining the somatic state anxiety prior to competition. Findings of the current study is supported Cox, Qiu, & Liu (1993) findings which found that progressive muscular relaxation is better suited for athletes. Thus, athletes who learn progressive muscular relaxation can ideally achieve relaxation just prior to or during a competition.

Again, in the current study, the self-confidence scores of the self-confidence intervention group were significantly higher ( $p<.05$ ) than the cognitive intervention group and the control group, but not somatic intervention group ( $p=1.00$ ). The results of this study was consistent with the findings of previous studies which revealed that self-confidence plays a role in determining the interpretation that performers place upon their anxiety symptoms, and therefore the effect of anxiety upon performance (Jones, 1995). Jones, Swain & Hardy (1993) found that self-confidence intensity correlated more strongly with performers' directional interpretations of their

cognitive and somatic symptoms than with the intensity of these symptoms. The use of strategies required to deal effectively with the stressful situation has been observed to develop via competitive experiences (Hanton et al., 2007; Hanton & Jones, 1999). Here, the ability to use such strategies is also suggested to increase athletes' confidence, allowing them to prevail in adversity (Mellalieu, Neil, & Hanton, 2006b). Generally, lower levels of self-confidence are associated with lower levels of performance (Woodman & Hardy, 2003). More research is required to investigate the relationship between self-confidence intensity especially with psychological intervention more fully.

The finding that self-confidence scores was lower in male players compare to female players in the cognitive intervention group. This finding was consistent with previous study by Anshel and Delany (2001). In their study of 11- and 12-year-old male and female field hockey players, Anshel and Delany (2001) found that girls used more confidence-building self-talk than did boys, whereas boys used more resignation (e.g., "*I reminded myself that things could be much worse*") than did girls.

When providing interventions to groups, the majority of athletes would benefit from interventions that target increasing self-confidence, decreasing cognitive and somatic anxieties. The best effect, however, would come from sufficient knowledge and the opportunity to individualize interventions. Interventions have been tailored to teach the strategies that 'facilitative' athletes employ when experiencing anxiety during performance. This has been demonstrated by the procedures designed by Hanton and Jones (1999) and Thomas, Maynard, & Hanton (2007), where information provided by elite performers who consistently reported

anxiety symptoms as facilitative was collated and used to create and implement cognitive restructuring strategies with athletes who interpreted symptoms as debilitative. The findings of both studies indicated that the intervention successfully changed players' interpretations of anxiety symptoms, with performance improvements also evident. Mamassis and Doganis (2004) also used a comparable mental skills package to that employed by Hanton and Jones (1999) and showed increases in facilitative interpretations and performance in junior tennis players as a result.

Practitioners and researchers have traditionally neglected examining individual differences for improving the coping skills of athletes. With respect to the present study, acknowledging the unique needs and coping tendencies of athletes as functions of their gender in predictability of the athletes' coping responses (Crocker, Kowalski, & Graham., 1998). Thus, using the state CSAI-2R to ask youth volleyball players to report how they feel "right now" could reveal higher intensities. More research with youth athletes will further clarify these findings.

Mellalieu et al. (2006a) stated that anxiety is, of course, a negative emotional response to competition stressors, but acknowledged the perspective that athletes may interpret their anxiety symptoms as beneficial to upcoming performance. This viewpoint is heavily based on the findings of a plethora of studies that have investigated direction (Jerome & Williams, 2000; Neil et al., 2006). Indeed, it is clear that many athletes seem to reach and maintain high levels of performance even when they reported being extremely anxious.

These results demonstrate the importance of considering multidimensional components of anxiety, with regard to the intensity of competitive anxiety in males and females, as these differences may relate to other variables, such as performance, enjoyment, or sport commitment, that were not assessed in this study.

Following the experimental intervention, the stress management groups showed significantly fewer cognitive state anxiety and somatic state anxiety, significantly greater self-confidence intensity than the control group. Managing anxiety so as to maintain optimal levels of arousal has often been shown to be an important factor in sport performance (Burton, 1988). Improvements in an athlete's ability to manage or reduce cognitions associated with anxiety may be particularly important because it suggests an ability to reinterpret potentially anxiety-eliciting situations. Many athletes routinely in which there is great pressure to perform well; the ability to refrain from or replace anxiety-provoking thoughts in such situations is likely to be beneficial.

In conclusion, the psychological preparation of volleyball players must be taken into consideration during the coaching process. Professional help and programming of the psychological preparation of the athletes and observation of their emotional conditions before and during a game is necessary to reduce competitive anxiety and contribute to the high effectiveness of volleyball players in Malaysia. Finally, we recommend the inclusion of psychological training programs in the training regimen for youth volleyball players in order to help them better deal with their experiences of somatic, as well as cognitive, anxiety.

**Table 1**

Means and Standard Deviations for Cognitive State Anxiety, Somatic State Anxiety, and Self-Confidence Intensity by Type of Intervention and Gender

	Cognitive		Somatic		Self-		Control Group	
	Intervention		Intervention		Confidence			
	Group	Group	Group	Intervention	M	SD	M	SD
<b>Cognitive State Anxiety</b>								
Males	16.33	1.83	19.00	2.80	20.00	0.85	21.42	1.44
Females	18.83	1.27	20.75	1.55	20.92	1.00	20.83	1.58
<b>Somatic State Anxiety</b>								
Males	15.34	2.41	14.92	1.51	19.08	2.68	23.83	4.13
Females	17.07	3.59	14.42	1.62	18.67	2.31	26.67	5.17
<b>Self-Confidence</b>								
Males	28.17	6.52	34.83	2.62	35.75	3.91	27.83	1.80
Females	31.08	2.39	30.83	2.48	31.67	2.39	27.83	1.59

## References

- Anshel, M.H., & Delany, J. (2001). Sources of acute stress, cognitive appraisals, and coping strategies of male and female child athletes. *Journal of Sport Behavior, 24*, 329-353.
- Anshel, M.H., Jamieson, J., & Raviv, S. (2001). Cognitive appraisals and coping strategies following acute stress among skilled competitive male and female athletes. *Journal of Sport Behavior, 24*, 129-143.
- Burton, D. (1988). Do anxious swimmers swim slower? Re-examining the elusive anxiety-performance relationship. *Journal of Sport and Exercise Psychology, 10*, 45-61.
- Chu-min, L., & Masters, R.S.W. (2001). Analogy learning: a means to implicit motor learning. *J. Sports Sci. 19*:307-319.
- Cox, R. H., Martens, M. P., & Russell, W. D. (2003). Measuring anxiety in athletics: The Revised Competitive State Anxiety Inventory-2. *Journal of Sport and Exercise Psychology, 25*, 519-533.
- Cox, R. H., Qiu, Y. & Liu, Z. (1993). Overview of sport psychology. In R. L. Singer, M. Murphrey, & L. K. Tennant (Eds.), *Handbook of research on sport psychology* (pp. 3-31). New York: Macmillan Publishing Company.
- Crocker, P., Kowalski, K. C., & Graham, T. R. (1998). Measurement of coping strategies in sport. In J. L. Duda (Ed.), *Advances in sport and exercise psychology measurement* (pp. 149–164). Morgantown, WV: Fitness Information Technology.
- Dunn, J.G.H., & Syrotuik, D.G. (2003). An investigation of multidimensional worry disposition in a high contact sport. *Psychology of Sport and Exercise, 4*, 265-282.
- Fletcher, D., & Hanton, S. (2001). The relationship between psychological skills usage and competitive anxiety responses. *Psychology of Sport and Exercise, 2*, 89-101.

Gould, D., Greenleaf, C., & Krane, V. (2002). Arousal-anxiety and sport behavior. In T. Horn (Ed.) *Advances in sport psychology* (pp. 207\_241). Champaign, IL: Human Kinetics.

Gould, G., Petlichkoff, L. & Weinberg, R. S. (1984). Antecedents of temporal changes in and relationships between CSAI-2 components. *Journal of Sport Psychology, 6*, 289-304.

Hamilton, R.A., Scott, D. & MacDougall, M.P. (2007). Assessing the effectiveness of self-talk interventions on endurance performance. *Journal of Applied Sport Psychology, 19*, 226-239.

Hanton, S., & Connaughton, D. (2002). Perceived control of anxiety and its relationship to self-confidence and performance. *Research Quarterly for Exercise and Sport, 73*, 87\_97.

Hanton, S., Cropley, B., Neil, R., Mellalieu, S. D., & Miles, A. (2007). Experience in sport and its relationship with competitive anxiety. *International Journal of Sport and Exercise Psychology, 5*, 28-53.

Hanton, S., & Jones, G. (1999). The acquisition and development of cognitive skills and strategies. I: Making the butterflies fly in formation. *The Sport Psychologist, 13*, 1-21.

Hanton, S., Mellalieu, S. D., & Hall, R. (2004). Self-confidence and anxiety interpretation: A qualitative investigation. *Psychology of Sport and Exercise, 5*, 477-495.

Hanton, S., Neil, R., & Mellalieu, S. D. (2008). Recent developments in competitive anxiety direction and competition stress research. *International Review for Sport and Exercise Psychology, 1*, 45-57.

Hardy, L., Jones, G., & Gould, D. (1996). *Understanding Psychological Preparation for Sport: Theory and Practice of Elite Performers*. Chichester, Sussex: Wiley.

Hoar, S. D., Kowalski, K. C., Gaudreau, P., & Crocker, P. R. E. (2006). A review of coping in sport. In S. Hanton & S. D. Mellalieu (Eds.), *Literature reviews in sport psychology* (pp. 47–90). New York: Nova Science.

Ho, H-Z., Denturk, D., Lam, A.G., Zimmer, J.M., Hong, S., Okamoto, Y, et al. (2000). The affective and cognitive dimensions of math anxiety: A cross-national study. *Journal for Research in Mathematics Education*, 31, 362-379.

Jacobson, E. (1938). *Progressive Relaxation*. Chicago, IL: University of Chicago Press.

Jerome, G. J., & Williams, J. M. (2000). Intensity and interpretation of competitive state anxiety: Relationship to performance and repressive coping. *Journal of Applied Sport Psychology*, 12, 236-250.

Jones, G. (1995). More than just a game: Research developments and issues in competitive anxiety in sport. *British Journal of Psychology*, 86, 449-478.

Jones, G., Swain, A. & Hardy, L. (1993). Intensity and direction dimensions of competitive state anxiety and relationships with performance. *Journal of Sport Sciences*, 11, 525-532.

Jones, G., Swain, A.B.J., & Cale, A. (1991). Gender differences in pre-competition temporal patterning and antecedents of anxiety and self-confidence. *Journal of Sport & Exercise Psychology*, 75, 1-15.

Lane, A. W., Jones, L., & Stevens, M. J. (2002). Coping with failure: The effects of self-esteem and coping on changes in self-efficacy. *Journal of Sport Behavior*, 25, 331–345.

Lavallee, D., Kremer, J., Moran, A.P., & Williams, M. (2004). *Sport psychology: Contemporary themes*. Basingstoke, UK: Palgrave Macmillan.

Lundqvist, C., & Hassmen, P. (2005). Competitive State Inventory-2 (CSAI-2): Evaluating the Swedish version by confirmatory factor analyses. *Journal of Sport Sciences*, 23, 727-736.

Mamassis, G., & Doganis, G. (2004). The effects of a mental training program on juniors precompetitive anxiety, self-confidence, and tennis performance. *Journal of Applied Sport Psychology*, 16, 118-137.

Martens, R., Burton, D., Vealey, R. S., Bump, L. A., & Smith, D. E. (1990). Development and validation of the Competitive State Anxiety Inventory-2 (CSAI-2). In R. Martens, R. S. Vealey, & D. Burton (Eds.), *Competitive anxiety in sport* (pp. 117-190). Champaign, IL: Human Kinetics.

Maynard, I. W. & Cotton, P. C. J. (1993). An investigation of two stress management techniques in field settings. *Sport Psychologist*, 7, 375-387.

Mellalieu, S. D., Hanton, S., & Fletcher, D. (2006a). A competitive anxiety review: Recent directions in sport psychology research. In S. Hanton, & S. D. Mellalieu (Eds.), *Literature reviews in sport psychology* (pp. 1-45). Hauppauge, NY: Nova Science.

Mellalieu, S. D., Neil, R., & Hanton, S. (2006b). An investigation of the mediating effects of self-confidence between anxiety intensity and direction. *Research Quarterly for Sport and Exercise*, 77, 263-270.

Moran, A.P. (2004). *Sport and exercise psychology: A critical introduction*. London: Routledge.

Neil, R., Mellalieu, S.D., & Hanton, S. (2006). Psychological skills usage and the competitive trait anxiety response as a function of skill level in rugby union. *Journal of Sports Science and Medicine*, 5, 415-423.

Neil, R., Fletcher, D., Hanton, S., & Mellalieu, S.D. (2007). Reconceptualizing competition stress in sport performers. *Sport & Exercise Psychology Review*, 3, 23-29.

- Nilson, U., Unosson, M. & Rawal, N. (2005). Stress reduction and analgesia in patients exposed to calming music postoperatively: A randomized controlled trial. *European Journal of Anesthesiology*, 22 (96-102).
- Page, S.J., Sime, W., & Nordell, K. (1999). The effects of imagery on female college swimmers' perceptions of anxiety. *The Sport Psychologist*, 13, 458-469.
- Stadulis, R.E., MacCracken, M.J., T.A. Eidson, T.A., & Severance. C. (2002). The children s form of the CSAI: the CSAI-2C. *Meas. Phys. Educ. Exerc. Sci.* 6:147-165.
- Thomas, O., Maynard, I. & Hanton, S. (2007). Intervening with athletes during the time leading up to competition: Theory to practice II. *Journal of Applied Sport Psychology*, 19, 398-418.
- Weinberg, R. & Weigand, D. (1993). Goal setting in sport and exercise: A reaction to Locke. *Journal of Sport and Exercise Psychology*, 15, 88-96.
- Woodman, T., & Hardy, L. (2001). Stress and anxiety. In R. Singer, H.A. Hausenblas & C.M. Janelle (Eds.) *Handbook of research on sport psychology* (pp. 290\_318). New York: Wiley.
- Woodman, T., & Hardy, T. (2003). The relative impact of cognitive anxiety and self-confidence upon sport performance: A meta-analysis. *Journal of Sport Sciences*, 21, 443-457.