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**The Use of Mental Skills by Male and Female Athletes**

**By  
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**THESIS**

**Submitted to the School of Graduate Studies and Research in partial fulfillment of the  
requirements for the degree of Master of Arts in Human Kinetics**

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**ABSTRACT**

The purpose of this study was to gain a better understanding of the relationship between selected independent variables (gender and skill) and mental skills of athletes (goal-setting, self-confidence, commitment, imagery, mental practice, focusing, refocusing, competition planning, activation, relaxation, stress and fear control). The Ottawa Mental Skills Assessment Tool (OMSAT-3\*) was administered to a sample of 249 (121 males and 128 females) athletes aged 14 to 19 who participated in sport at either a developing or provincial level in a variety of sports. A gender by skill (2 x 2) MANOVA resulted in a main effect ( $p < .004$ ) for skill on the goal-setting, commitment, competition planning, focus, and refocus scales, as well as for foundation, cognitive, and psychosomatic skills components. The results imply there were no gender differences in athletes' level and use of mental skills.

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**Chapter 1**

**General Introduction**

Athletes continuously search for ways to improve their performance. One way this has been achieved has been through the training and implementation of mental skills programs (Weinberg & Williams, 1998). Mental skills training programs have been found to be effective in improving performance (Greenspan & Feltz, 1989; Vealey, 1994; Weinberg & Comar, 1994), however, Weinberg and Williams acknowledged that more studies need to be conducted across different populations and skill levels. Very little research has been conducted to date to determine if male and female athletes differ in their level and use of mental skills. Empirical studies in this area would therefore benefit both genders by helping practitioners to better serve their clients and advance future research.

#### The Ottawa Mental Skills Assessment Tool (OMSAT-3\*)

Over the past few years, a multitude of measurement tools that assess mental skills have been published. Many of these are specific and measure isolated skills such as the Competitive State Anxiety Inventory-2 (CSAI) (Martens, Vealey, & Burton, 1990), which measures state and trait anxiety as well as self-confidence. There has, however, been some question as to the general utility and applicability of these tools (Chartrand, Jowdy, & Danish, 1992; Summers & Ford, 1990). Furthermore, it appears that there is a need for assessment tools that measure a broad range of skills rather than isolated components.

The Ottawa Mental Skills Assessment Tool's (OMSAT-3\*) (Durand-Bush & Salmela, 1999) conceptual base evolved from Orlick's (1992) Wheel of Excellence and from published findings related to mental skills proven to be important in expert performance. It was developed with the intent to distinguish and measure various

psychological skills that are used by athletes to enhance performance. It was purposefully created to be used to assess the skills of all athletes, i.e., not only elite but developing athletes as well. Also, the OMSAT could be a useful tool for sport psychologists for assessment and intervention purposes, as well as for research purposes to provide information on the effectiveness of psychological skills training programs.

The original OMSAT contained 14 mental skills grouped under five categories: foundation skills (goal-setting, commitment, belief); affective skills (stress reactions, fear, relaxation, energizing); cognitive skills (imagery, mental practice, focusing, refocusing); competition skills (simulation, competition planning); and team dynamics. Bota (1993) subjected the OMSAT to statistical analyses to determine its reliability and validity, and found it yielded acceptable results. Furthermore, his analyses revealed that it would be beneficial to have a shorter version, which led to the development of the OMSAT-2. This version was reduced to 12 mental skills and 71 items with the team dynamics scale being dropped and the simulation scale was combined with the mental practice scale. Further statistical analysis by Draper, Salmela, and Durand-Bush (1995) provided statistical evidence that the OMSAT-2 was both valid and reliable.

Following this study, Durand-Bush (1995) proposed an improved version of the OMSAT-2 (OMSAT-3) to assess its psychometric properties. The OMSAT-3 was administered to 335 athletes from 35 different sports and was divided into one of two groups based on their level of participation in sport: an elite and a competitive group. The elite group consisted of 147 participants, more precisely 77 males and 70 females. The competitive group consisted of 188 participants, 98 males and 90 females. An initial first-order confirmatory factor analysis (CFA) revealed that the model displayed an adequate

fit, which led to the postulation of a more robust version, the OMSAT-3\*. A CFA on this latter version, which included 48 items and 12 mental skills scales grouped under three broader conceptual components-foundation, psychosomatic, and cognitive skills, indicated that the proposed model fit the data well. A second-order CFA assessing the three broader components also yielded adequate indices of fit. The OMSAT-3\* significantly discriminated between competitive and elite level athletes and its scales yielded acceptable internal consistency and test-retest reliability.

To date the only study using the OMSAT-3\* as a research tool was conducted by Calmels, Fournier, Durand-Bush, and Salmela (1998). They used the OMSAT-3\* to test the effectiveness of a mental training program with elite gymnasts. Their results revealed that the program was effective because the gymnasts' scores on most of the OMSAT-3\* scales increased. However, scores on the commitment scale remained unchanged and there were more gymnasts whose scores on the self-confidence scale decreased than increased. This study demonstrated the potential benefits of the OMSAT-3\* as a research tool through the identification of strengths and weaknesses of athletes' mental skills. While the OMSAT-3\* has not yet been used in gender research, very little research, in general, has considered the relationship between gender and various mental skills, which lends further support to the significance of the present study.

Researchers have espoused the importance of a variety of mental skills utilized by athletes to improve performance, such as the 12 skills assessed in the OMSAT-3\*. However, it is still unclear whether or not athletes of both genders differ in their level and use of these skills. When differences have been reported the purpose of the studies involved have very rarely been to identify gender differences, as it has been a

consequence of their sample enabling them to assess any differences. This provides support for the significance of the design of the present study, whose primary purpose is to identify potential gender differences in the level and use of a variety of important mental skills. Those mental skills which have been studied, self-confidence, goal-setting, and anxiety are reviewed next.

### Gender Differences in Self-confidence

Self-confidence has been studied and shown to be lower in female athletes than in their male counterparts (Cox & Liu, 1993; Mahoney, Gabriel, & Perkins, 1987; Martens, Vealey, & Burton, 1990). Lenney's (1977) work on self-confidence in achievement situations, such as obtaining a doctorate, which is associated with having high status or power, offers interesting insights into understanding self-confidence as it relates to one's gender. She reported that women displayed lower self-confidence than did men across almost all achievement situations.

Lenney (1977) concluded that this was not true in all achievement situations, and three variables were identified that influenced gender differences in self-confidence. The first variable was the nature of the task. While it was still unclear what types of tasks caused lower self-confidence, it was true that women had greater self-confidence on certain tasks. Secondly, whether or not there were gender differences in self-confidence depended on the availability of clear and unambiguous information. If women were given clear feedback regarding their performance they reported similar self-confidence as men. The third and final variable was the use of social comparison cues. When women worked alone and in situations that did not involve social comparison, they displayed levels of

self-confidence that were equal to those of men. However, when they were in a situation where there was social comparison, their self-confidence was lower.

Lirgg (1991) conducted a meta-analysis to determine if there were gender differences in self-confidence and to test Lenney's claims that women are less confident when tasks are male-appropriate or when situations are competitive in nature. Lirgg supported Lenney's contention that women showed lower self-confidence when performing male-appropriate tasks. However, there was no support for the assertion that women were less confident in competitive/social comparison situations, if the task was not female-inappropriate. Therefore, the study neither corroborated or refuted Lenney's assertions.

Two other studies shed some interesting results on this area of research. Clifton and Gill (1994) considered gender differences in self-confidence when performing the feminine-typed task of cheerleading. It was found that women possessed higher self-confidence in their ability to cheerlead and perform various subtasks than did men. Also, cheerleaders rated their sport as less gender-stereotyped than did non-cheerleaders. The results indicated that women did not suffer a decrease in self-confidence if they perceived the task as being gender neutral or female-appropriate. Lirgg, George, Chase, and Ferguson (1996) assessed the self-confidence of men and women performing the feminine task of baton twirling and the masculine task of kung fu, under differing belief conditions of ability regarding self-efficacy in the physical realm. Results indicated that men were unaffected by either the gender-inappropriate task and their conceptions about ability. However, women were affected by both the nature of the task and their conceptions about ability. This led them to postulate that the combination of a perceived



masculine task and the belief that ability was innate lead to lower self-confidence in women. Women did, however, have higher levels of self-confidence when they believed that the ability or skill to perform a masculine task could be learned.

Finally, in the development of a sport-specific model of sport-confidence, Vealey, Hayashi, Garner, Holman, and Giacobbi (1998) reported interesting findings using the Sources of Sport Confidence Questionnaire. Gender differences were found on two of the eight subscales. More specifically, female athletes indicated that social support was a more important source of sport-confidence than did male athletes. In addition, male athletes reported that demonstration of ability was a more important source of confidence than for female athletes. Overall, studies involving self-confidence and gender have identified that female athletes reported having lower levels of self-confidence, however, more research needs to be done to confirm these findings.

#### Gender Differences in Goal-setting

Just as it has been reported that having high self-confidence is associated with high level performance, the same has been found in the realm of goal-setting. Burton (1993) discovered gender differences in goal-setting with 77 men and 127 women who completed the Goal-Setting in Sport Questionnaire. Results indicated that female athletes reported setting goals more frequently and perceived goal-setting as a more effective strategy in their development as athletes. They also set more short-term, competitive, team, conditioning, and psychological skills development goals. They also reported more written goals and used goals more often to develop and maintain motivation than their male counterparts. Conversely, men reported outcome goals as being more important than performance goals. Many of these results were corroborated by Weinberg, Burton,

Yukelson, and Weigland (1993) who reported that female athletes set short-term, team, and psychological skills goals significantly more than did male athletes, however, male athletes set significantly more outcome goals.

Weinberg, Burke, and Jackson (1997) also reported gender differences in the type of goals athletes set. More specifically, they indicated that female athletes aged 14 to 18 set significantly easier long-term goals than did male athletes. In addition, female tennis players set significantly more long-term goals that were too difficult than their male counterparts. It therefore appears that female youth tennis players had more difficulty than males in setting realistic long-term goals, since they tended either to be overly easy or difficult.

#### Gender Differences in Anxiety

Although gender differences have been found in both state and trait anxiety of athletes the results have been equivocal. Gill (1988), using the Sport Competition Anxiety Test (SCAT) (Martens, 1977), found that high school and collegiate female athletes were higher in competitive trait anxiety than male athletes. In contrast, Rainey and Cunningham's (1988) study of Division III athletes revealed no significant gender differences using the SCAT. These findings might suggest that older athletes are better able to control their stress reactions. In regards to cognitive and somatic anxiety, Martens, Vealey, and Burton (1990) in their validation of the of the Competitive State Anxiety Inventory-2 (CSAI) reported that female athletes demonstrated significantly higher cognitive and somatic anxiety levels than male athletes. Their results were partially supported by Wiggins (1998) who using the same instrument and found that high school female athletes reported higher scores than male athletes on the cognitive but not somatic

anxiety scales. Furthermore, Wiggins suggested that these gender differences should be interpreted cautiously because although there were significant differences, both genders responded similarly on 81% of the measures.

### Mental Skills and Gender

Unlike other studies that involved measuring a limited number of mental skills, Cox and Liu (1993) used the Psychological Skills Inventory for Sports (PSIS) (Mahoney, Gabriel & Perkins, 1987), which measures anxiety control, concentration, confidence, mental preparation, motivation, and emphasis on team goals. The purpose of their study was to gain a better understanding of the relationship between sport, nationality, and gender. Participants were 350 American and Chinese university athletes who participated in track and field, basketball, volleyball, and swimming. There was a significant difference between male and female athletes in anxiety control for male swimmers and volleyball players with males reporting a higher score and thus a greater ability to control anxiety. Male athletes exhibited higher confidence scores than female athletes for all four sports. Finally, male athletes also reported significantly higher levels of motivation than their female counterparts. The researchers concluded that regardless of nationality, male athletes displayed higher levels of psychological skills than female athletes for the sports of volleyball and swimming. However, these results must be interpreted with caution as the psychometric properties of the PSIS have come under scrutiny (Chartrand, Jowdy, & Danish, 1992).

### Skill Level

There has been much research done to ascertain that elite athletes differ from non-elite athletes in their mental skills ability. Orlick and Partington (1988) in their

examination of Canadian Olympians reported certain mental skills that separated successful and unsuccessful athletes. Certain “success elements” were associated with quality training, which included setting clear daily goals, daily use of imagery to perfect skills and prepare for practice and competition, and simulation training. Also, the elite athletes utilized precompetition plans, competition focus plans, competition evaluations, and distraction control techniques to a greater extent than their non-elite counterparts. In the validation of the Psychological Skills Inventory for Sport (PSIS) Mahoney, Gabriel, and Perkins (1987) reported that elite athletes were more confident, better able to focus before and during competition, less anxious, possessed greater internally-focused imagery skills, and were more committed to excelling in their sport than competitive athletes a lesser skill levels.

Gould, Eklund, and Jackson (1990) reported that Olympic wrestling champions adhered to their mental preparation plans and precompetition plans, and were better able to cope with distractions than non-medallists. Part of a precompetition plan can include goal-setting. Burton (1993) revealed that athletes of higher skill level set significantly more goals than did less skilled athletes. More recently, Durand-Bush and Salmela (1999), in the development of the OMSAT-3\*, recognized 12 mental skills (goal-setting, self-confidence, commitment, imagery, mental practice, focusing, refocusing, competition planning, activation, relaxation, stress and fear control) that differentiated between elite and non-elite athletes. The research clearly indicates that higher skilled athletes possess greater mental skills.

### Purpose and Significance of the Study

Recent reviews of current sport psychology literature have indicated that the field has contributed little to the understanding of gender and the psychological processes in sport (Duda, 1991). The cause of this may be due to the fact that little research is being carried out using significant populations of women. Duda revealed that between 1979 and 1986, studies involving women were only 17% of the total sample of published research, and 15% did not compare data as a function of gender. Wann and Hamlet (1995) reviewed relevant literature from 1987 to 1991 and found that women were underrepresented in studies examining either one or both genders. Another significant problem was the fact that non-significant results revealing no gender differences were rarely published or discussed in sport psychology (Duda, 1991). Furthermore, the possibility that psychological skills training programs and techniques may be differentially beneficial to men and women has been virtually ignored.

In light of the aforementioned gaps in the literature, the purpose of this study is to expand the knowledge base on the relationship between gender and a broad range of mental skills using the OMSAT-3\* (Durand-Bush & Salmela, 1999). Due to the breadth of mental skills assessed, the OMSAT-3\* was deemed appropriate to assess potential gender differences. Due to the scarcity of research conducted in this area, no hypotheses were advanced concerning potential similarities or differences in male and female athletes' use and level of mental skills.

**Chapter II**

**Article**

**Running Head: GENDER AND MENTAL SKILLS**

**The Use of Mental Skills by Male and Female Athletes**

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**ABSTRACT**

The purpose of this study was to gain a better understanding of the relationship between selected independent variables (gender and skill) and the mental skills of athletes (goal-setting, self-confidence, commitment, imagery, mental practice, focusing, refocusing, competition planning, activation, relaxation, stress and fear control). The Ottawa Mental Skills Assessment Tool (OMSAT-3\*) was administered to a sample of 249 (121 males and 128 females) athletes aged 14 to 19 who participated in sport at either a developing or provincial level in a variety of sports. A gender by skill (2 x 2) MANOVA resulted in a main effect ( $p < .004$ ) for skill on the goal-setting, commitment, competition planning, focus, and refocus scales, as well as for the cognitive skills conceptual component. The results imply there were no gender differences in the level and use of athletes' mental skills.



### The Use of Mental Skills by Male and Female Athletes

Athletes continuously search for ways to improve their performance. One way this has been achieved has been through the training and implementation of mental skills programs (Weinberg & Williams, 1998). Mental skills training programs have been found to be effective in improving performance (Greenspan & Feltz, 1989; Vealey, 1994; Weinberg & Comar, 1994), however, Weinberg and Williams acknowledged that more studies need to be conducted across different populations, skill levels, and age groups. Very little research has been conducted to date to determine if male and female athletes differ in their level and use of mental skills. Empirical studies in this area would therefore benefit both genders by helping practitioners to better serve their clients and advance future research.

The Ottawa Mental Skills Assessment Tool (OMSAT-3\*) (Durand-Bush & Salmela, 1999) is an instrument that was developed to measure a broad range of mental skills. More specifically, it measures the level and use of 12 mental skill scales that are grouped under three broader conceptual components: foundation, psychosomatic, and cognitive skills. The OMSAT-3\* is a valuable tool to conduct research, including that on gender, since it does tap into various mental skills associated with different levels of performance and has been found to be a reliable and valid instrument (Durand-Bush & Salmela, 1999). More recently, Calmels, Fournier, Durand-Bush, and Salmela (1998) used the OMSAT-3\* to determine the effectiveness of a mental training program with elite female gymnasts. They reported that gymnasts' scores on the OMSAT-3\* improved on every skill with the exception of self-confidence and commitment, which remained unchanged. While the OMSAT-3\* has not yet been used in gender research, few

attempts, in general, have considered the relationship between gender and various mental skills. That which have been studied, self-confidence, goal-setting, and anxiety are reviewed next.

### Mental Skills

Self-confidence has been studied and shown to be lower in female athletes than in their male counterparts (Cox & Liu, 1993; Mahoney, Gabriel, & Perkins, 1987; Martens, Vealey, & Burton, 1990). Furthermore, a meta-analysis by Lirgg (1991) revealed that men were more self-confident in exercise and physical activity settings than were women. A potential explanation for these differences was proposed by Lenney (1977) who suggested that women displayed lower self-confidence when the task was male-oriented, the situation was competitive, or when feedback was ambiguous. It is noteworthy that Lenney's hypotheses have not been corroborated or rejected (Lirgg, 1991).

Gender differences have also been reported in the goal-setting literature. Burton (1993) discovered gender differences in goal-setting for 77 men and 127 women who completed the Goal-Setting in Sport Questionnaire. Results indicated that female athletes reported setting goals more frequently and perceived goal-setting as a more effective strategy in their development as athletes. They also set more short-term, competitive, team, conditioning, psychological skills development, and written goals, and used goal-setting more often to develop and maintain motivation than their male counterparts. Additionally, women rated goal-setting as more effective for long- and short-term goals, practice goals, competition goals, team goals, skill development goals, conditioning goals, psychological skill development goals, overall performance goals, and written

goals. Conversely, men reported outcome goals as being more important than performance goals. These results were partially corroborated by Weinberg, Burton, Yukelson, and Weigand (1993) who reported that women set short-term, team, and psychological skills goals significantly more than did male athletes, however, the latter set significantly more outcome goals. Weinberg, Burke, and Jackson (1997) reported gender differences in the type of goals athletes set. More specifically, they found that youth female tennis players set significantly more long-term goals that were either too easy or too difficult, than their male counterparts.

Finally, another area in which gender differences have been reported is sport anxiety. However, the research on both state and trait anxiety has been equivocal. Gill (1988) reported that high school and collegiate female athletes had higher competitive trait anxiety than male athletes when using the Sport Competition Anxiety Test (SCAT) (Martens, 1977). In contrast, Rainey and Cunningham's (1988) study of Division III athletes revealed no significant gender differences while using the same instrument. In regards to cognitive and somatic anxiety, Martens, Vealey, and Burton (1990), in their validation of the Competitive State Anxiety Inventory-2 (CSAI-2), reported that female athletes demonstrated significantly higher cognitive and somatic anxiety levels than male athletes. This finding was partially supported by Wiggins (1998) who indicated that high school female athletes reported higher scores than male athletes on the cognitive, but not the somatic anxiety scale.

Recent reviews of current sport psychology literature have indicated that the field has contributed little to the understanding of gender and the psychological processes in sport (Duda, 1991). The cause of this may be due to the fact that little research is being

carried out using significant populations of women. Duda revealed that between 1979 and 1986, studies involving women were only 17% of the total sample of published research, and 15% did not compare data as a function of gender. Wann and Hamlet (1995) reviewed relevant literature from 1987 to 1991 and found that women are underrepresented in studies examining either one or both genders. Another significant problem was the fact that non-significant results revealing no gender differences were rarely published or discussed in sport psychology (Duda, 1991). Furthermore, the possibility that psychological skills training programs and techniques may be differentially beneficial to men and women has been virtually ignored.

Over the past few years, a multitude of measurement tools that assess mental skills have been published. Many of these are specific and measure individual constructs such as the CSAI-2 (Martens, Vealey, & Burton, 1990), which measures state and trait anxiety as well as self-confidence. There has, however, been some question as to the general utility and applicability of these tools (Chartrand, Jowdy, & Danish, 1992; Summers & Ford, 1990). Recently, Durand-Bush and Salmela (1999) developed the OMSAT-3\*, an instrument designed to assess athletes' use and level of mental skills. The OMSAT-3\* is unique in that it measures 12 mental skills, more specifically: goal-setting, self-confidence, commitment, or foundation skills; imagery, mental practice, focusing, refocusing, competition planning, or cognitive skills; and activation, relaxation, stress and fear control, or psychosomatic skills. Utilizing a sample of 335 athletes from 35 different sports, Durand-Bush and Salmela (1999) conducted first and second-order confirmatory factor analyses to assess the validity of the OMSAT-3\* and found acceptable indices of fit. Furthermore, the OMSAT-3\* significantly discriminated

between competitive and elite level athletes and its scales yielded acceptable internal consistency and test-retest reliability. Therefore, the OMSAT-3\* is an excellent research tool to utilize in the acquisition of a better understanding of gender and mental skills.

### Skill Level

Although there has been relatively little research in the gender differences domain involving mental skills, there has been much research done to ascertain that elite athletes differ from non-elite athletes in their mental skills ability. Orlick and Partington (1988) in their examination of Canadian Olympians reported certain mental skills that separated successful and unsuccessful athletes. Certain “success elements” were associated with quality training, which included setting clear daily goals, daily use of imagery to perfect skills and prepare for practice and competition, and simulation training. Also, the elite athletes utilized precompetition plans, competition focus plans, competition evaluations, and distraction control techniques to a greater extent than their non-elite counterparts. In the validation of the Psychological Skills Inventory for Sport (PSIS) Mahoney, Gabriel, and Perkins (1987) reported that elite athletes were more confident, better able to focus before and during competition, less anxious, possessed greater internally-focused imagery skills, and were more committed to excelling in their sport than competitive athletes a lesser skill levels.

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more goals than did less skilled athletes. The research clearly indicates that higher skilled athletes possess greater mental skills.

In light of the aforementioned gaps in the literature, the purpose of this study is to expand the knowledge base on the relationship between gender and a broad range of mental skills using the OMSAT-3\* (Durand-Bush & Salmela, 1999). Due to the breadth of mental skills assessed, the OMSAT-3\* was deemed appropriate to assess potential gender differences. Due to the scarcity of research conducted in this area, no hypotheses were advanced concerning potential similarities or differences in male and female athletes' use and levels of mental skills.

## Methodology

### Participants

A total of 249 male and female athletes from the Province of Ontario participated in this study and were assigned to one of two groups: a provincial and a development group. Criteria for the provincial group was that athletes had to have represented their province in their sport, while athletes representing their region or high school were placed in the development group. The provincial group consisted of 122 athletes, more precisely 59 males and 63 females, whereas the development group was comprised of 62 males and 65 females. Participants were aged between 14 and 19 years and the mean age was 16.1 (SD = 1.26) yrs. Athletes were from various sport disciplines: more specifically, 21 sports were represented, with athletes from volleyball (87), soccer (30), swimming (24), and rugby (20) being the most numerous (see Table 1).

### Instrument

The OMSAT-3\* (Durand-Bush & Salmela, 1999) was used for data collection. It included 48 items and 12 mental skill scales grouped under three broader conceptual components: (a) foundation skills (goal-setting, self-confidence, commitment), (b) psychosomatic skills (stress reactions, fear control, relaxation, activation), and (c) cognitive skills (imagery, mental practice, focusing, refocusing, and competition planning). Demographic questions pertaining to the participants' age, sex, sport discipline, country of origin, current level of participation in sport, and highest level of education were included. Each item in the OMSAT-3\* was answered on a "strongly disagree" to "strongly agree" 7-point Likert scale. The OMSAT-3\*'s psychometric properties have been found to be valid and reliable (Durand-Bush & Salmela, 1999).

### Procedure

To facilitate the recruitment of participants, the researcher contacted club officials and coaches, high school sport administrators, as well as consultants and sport administrators who received a letter of information / approval, which explained the purpose of the study, and issues related to anonymity and confidentiality of the results. The researcher made arrangements and received consent to administer the OMSAT-3\* in person either in a one on one or group setting.

## Results

### Descriptive Statistics

Mean scale scores of both male and female athletes who participated in the study are presented in Table 2. Both provincial and developing male and female athletes scored highest on the self-confidence and goal-setting scales. Also, both developing male and

female and provincial male athletes reported their lowest scores for the refocusing scale.

The OMSAT-3\* scales were regrouped under the three broader conceptual components: foundation skills, psychosomatic skills, and cognitive skills with mean component scores presented in Table 3. The highest scores for all athletes were associated with the foundation skills. The psychosomatic skills were second highest for male and female developing athletes while male and female provincial athletes scored second highest on cognitive skills.

#### Multivariate Analysis of Variance (MANOVA)

A MANOVA was conducted to test for main effects and interactions of gender (male and female) and skill (developing and provincial) on all OMSAT-3\* scales (see Table 4). An original alpha level of .05 was changed to a Bonferroni corrected alpha level of .004. The results revealed no significant interactions between gender and skill and most importantly no main effect for gender. A significant main effect for skill, Wilks' Lambda = .79,  $F(12, 230) = 4.84$ ,  $p < .004$  was reported.

The significant main effect for skill was for the following mental skill scales; goal-setting, commitment, competition planning, focusing, and refocusing. These results indicate that athletes who participated at the provincial level had significantly higher scores on those scales than did their developing athlete counterparts. Thus, it appears that it is skill, rather than gender that has the greatest impact on an athlete's level and use of mental skills.

#### Discussion

The primary purpose of the present study was to determine whether gender differences exist in the level and use of various mental skills of athletes. Since there has



been little comprehensive research conducted in this domain, this study offers some interesting and unique results. More specifically, the results of the present study offer clear support that there are no differences in the mental skills of male and female athletes aged 14-19. Since few researchers have reported gender differences, perhaps it is time to reinforce that male and female athletes are more similar than dissimilar in their mental skills. Most importantly, of the variables addressed in the study (gender and skill), only skill level was statistically significant. Since gender is biological in nature, it could be hypothesized that it is an athlete's environment that makes the greatest contribution to the development of mental skills. Therefore, mental skills can be learned and accessed by all athletes.

### Gender Differences

Although significant differences between self-confidence of male and female athletes were found in the literature, no gender differences were obtained in this study. A potential explanation for this might be a consequence of the OMSAT-3\* items being more general than specific. Future researchers may wish to use a research tool such as Vealey's sport-confidence model, which measures eight aspects of self-confidence, to identify specific areas in which male and female athletes potentially differ in their self-confidence.

Further explanation for the lack of significant gender differences in self-confidence could be linked to the results of Lirgg, George, Chase, and Ferguson (1996). They reported that female athletes had higher levels of self-confidence when they believed that the skill involved could be learned regardless of whether or not the skill was a masculine or feminine task. Perhaps the participants, both male and female, in the

present study held such beliefs. That is, they participated in sports in which they believed they could improve. It was not a matter of whether or not the sport was masculine or feminine typed, instead it was their belief that they could master the skills necessary to excel. Overall, the present study refutes currently held stereotypes that female athletes possess less self-confidence than their male peers.

The present study found no gender differences in goal-setting. Burton (1993) revealed that female athletes set goals more frequently and found goal-setting to be effective in their development as athletes. Once again contrasting results could be due to the general nature of the OMSAT-3\* questions versus those included in Burton's questionnaire, which is comprised of 49 items assessing different types of goals and their effectiveness. The overall difference in goal-setting might be from Burton's study could be explained by the participants' skill level, who were all collegiate athletes from eight sports. Indeed, Burton found that high ability athletes reported setting significantly more goals, a finding that corroborates the results of the present study. However, the results of Burton's study should be interpreted cautiously because of the self-reports of athletes of their ability and it is not known whether or not the sample consisted solely of varsity athletes or intramural athletes.

No significant gender differences were found for the rest of the OMSAT-3\* scales. Unfortunately, there is no research to which one can refer to corroborate or refute these current findings. Perhaps research involving gender differences on these nine mental skills have not produced significant differences and subsequently the results were not published. One must also be reminded that gender research has been seriously ignored. As Duda (1991) and Wann and Hamlet (1995) reported, very few studies

attempted to utilize equal samples of male and female athletes and gender was rarely a central variable of the research design. In order for researchers to refute or corroborate past research it would seem appropriate that non-significant results be published or made available, and that researchers put more effort into incorporating women in their research protocols.

### Skill Level Differences

Results of the present study indicate that provincial level athletes scored significantly higher than developing athletes on the goal-setting, commitment, competition planning, focusing, and refocusing scales. These results are not surprising given that more skilled athletes have been shown to have higher levels of mental skills (Durand-Bush, 1995; Mahoney, Gabriel, & Perkins, 1987). Also, one could expect that athletes having attained higher skill levels would have learned mental skills, which in turn could have enabled them to attain their current level. Durand-Bush (1995) found that commitment, goal-setting, and self-confidence were the best discriminating skills between elite and competitive athletes. Commitment and goal-setting scores in the present study were significantly higher for the provincial athletes than for developing ones, which further supports these results. It appears that even at a relatively early age, being committed to sport and setting goals are important skills. As was the case for gender, there were no differences between self-confidence based on athletes' skill. However, as stated previously, the general nature of the OMSAT-3\*' items could explain such non-significant differences.

It should come as no surprise that provincial athletes reported higher levels of commitment. As athletes progress from one skill level to another, the demands placed on

them increase. Athletes must decide if they are willing to invest extra time and effort needed not only to compete at a higher level but to succeed as well. Perhaps once this commitment is established, athletes decide that since they will commit to a higher performance level, they should strive towards more difficult of goals, thus explaining why provincial athletes scored significantly higher on the goal-setting scale. A possible explanation for the differences between skill levels on the commitment scale can be found in Eisenberger's (1992) learned industriousness theory. This theory postulates that if an individual is rewarded for their large amounts of cognitive and physical effort towards a task, the sensation of that effort acquires secondary reward properties and negative feelings towards high effort are reduces. Therefore, it could be the provincial athletes possess this learned industriousness, which is similar to most definitions of commitment, to a greater degree than did the developing athletes.

The theory of deliberate practice offers some unique insights into the acquisition of mental skills. This theory contends that innate qualities contribute little to exceptional performance, while the greatest effects on learning are attributable to one's environment. Ericsson, Krampe and Tesch-Romer (1993) suggested that the development of expert performance requires a minimum of 10 years or 10 000 hours of intense deliberate practice, which is defined as an effortful activity that is motivated by the goal of improving performance. This highlights the importance of investing a substantial amount of time in training and competition to achieve high level performance. As previously mentioned, when athletes reach a higher skill level, the amount of time dedicated to their sport their sport usually increases, which would allow them to engage in more deliberate practice and mental skill development.

There were also significant differences for the focusing, refocusing, and competition planning scales. The ability to focus and refocus has been shown to be critical to successful athletic performance (Nideffer, 1985; Orlick, 1986). It appears that the provincial athletes had a greater ability to focus on their task and refocus when needed, which might explain their current level of participation. The differences in competition planning could be explained by the fact that the provincial athletes could have competed in their sport more often than the developing athletes, and consequently had more opportunities or demands to plan for competitions (Orlick, 1986).

Although there were differences found for the previously mentioned scales, no differences were found for the self-confidence, stress reactions, fear control, relaxation, activation, imagery, and mental practice scales. A possible answer to the lack of differences in the stress reactions, fear control, relaxation, and activation scales is that there were 21 different sports represented in this study and such mental skills require different levels for optimal performance. For example, in football athletes require a high level of activation, there is some concern of fear, and being relaxed can be detrimental to performance. In contrast, a sport such as golf demands a low level of arousal, there is no fear involved, and the athlete should learn to relax. Because so many sports were used, the possibility exists that potential differences were averaged out. Non-significant differences in stress reactions could be explained in the same light where individual and team sports were involved. Martens, Burton, and Vealey (1990) reported that individual sport athletes displayed significantly higher levels of somatic and cognitive anxiety than did team sport athletes. With a variety of team and individual sports, once again differences may have been averaged out.

The practical implications of this study are important for those who work as mental trainers or sport psychologists with younger athletes. More specifically, one should not assume that athletes possess certain mental skills or different abilities to acquire mental skills because they are young or either male or female. Furthermore, although practitioners should treat all athletes as individuals, they should also recognize that they have the ability to learn and refine their mental skills. They should not enter learning situations with preconceived stereotypes of what male or female athletes need or have to improve. The results of this study indicate that there are significant differences between certain mental skills of developing athletes. These differences should be acknowledged by practitioners who attempt to individualize mental training programs to optimize performance.

### Limitations

Future research in the gender and athletic skill domains could be ameliorated with a few changes. First, since this was an original study, involving 12 different skills, more research should be conducted to refute or corroborate its results. Including athletes from one or a few sports would increase the generalizability of the results and also potentially reduce the variance in mental skills that could have resulted from the nature and demands of the different sports used in this study. Also, since skill was such an important variable in the present study, perhaps it would be beneficial to include developing, provincial, and national level athletes in future studies. Having athletes from all skill levels would enable researchers to determine if gender and skill differences exist between these levels and would enable them to identify if higher skill equates to greater mental skills as well as ascertain if gender differences exist. Research along these lines could corroborate or

**refute the present study's conclusions that there are no gender differences and it is an athlete's skill level that determines the athlete's use and level of mental skills.**

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Table 1

**Frequency of Participants per Sport**

Sport	Number of Participants	
	Males	Females
Volleyball	33	54
Basketball	8	5
Football	7	-
Rugby	10	10
Track and Field	6	7
Hockey	12	1
Golf	8	-
Tennis	2	5
Soccer	10	20
Skiing	5	4
Cycling	2	-
Wakeboarding	1	-
Badminton	1	-
Baseball	3	1
Dressage	-	2
Figure skating	-	2
Dance	-	2
Waterpolo	-	2
Swimming	13	11
Tae-kwon Do	-	1
Snowboarding	-	1

Table 2

**Cell Means for Mental Skills as a Function of Sex and Skill**

Skill	Sex	Mental Skill M (SD)					
		Activ	Comm	Conf	CP	Fear	Focus
Provincial	Male	4.94(.81)	5.22(1.03)	5.67(.75)	4.88(1.04)	5.08(.86)	5.14(.89)
	Female	4.57(.92)	5.32(.94)	5.39(.91)	4.94(1.16)	4.92(1.01)	4.74(.86)
Developing	Male	4.60(.89)	4.69(1.21)	5.62(.72)	4.06(1.20)	4.88(1.10)	4.48(1.12)
	Female	4.58(.94)	5.02(1.19)	5.43(.99)	4.23(1.05)	4.68(1.21)	4.43(1.04)
		Goals	Imagery	MP	Refocus	Relax	Stress
Provincial	Male	5.76(.60)	5.33(.80)	4.66(1.08)	4.64(.88)	4.72(.88)	4.69(1.15)
	Female	5.37(.88)	4.84(.99)	4.47(.97)	4.36(1.01)	4.30(.86)	4.60(1.01)
Developing	Male	5.09(1.09)	4.89(1.14)	4.40(1.15)	3.77(1.26)	4.60(1.09)	4.25(1.23)
	Female	5.33(.83)	4.68(0.98)	4.24(1.15)	3.95(1.15)	4.35(1.09)	4.33(1.12)

**Note.** Activ = Activation, Comm = Commitment, Conf = Self-confidence, CP =

Competition, Planning, Goals = Goal-setting, MP = Mental Practice, Relax = Relaxation

Table 3

Cell Means for Conceptual Components as a Function of Sex and Skill

Skill	Sex	Conceptual Component M (SD)		
		Foundation Skills	Psychosomatic Skills	Cognitive Skills
Provincial	Male	5.33(0.80)	4.86(0.61)	4.97(0.46)
	Female	4.84(0.99)	4.60(0.64)	4.77(0.58)
Developing	Male	4.89(1.14)	4.58(0.68)	4.37(0.67)
	Female	4.68(0.98)	4.48(0.72)	4.42(0.71)

Table 4

Summary of MANOVA F-Ratios

Source	Mental Skill					
	Activ	Comm	Conf	CP	Fear	Focus
Sex	1.90	2.70	2.22	1.33	0.83	2.15
Skill	4.76	9.75*	0.47	25.08*	2.43	13.78*
Sex x Skill	1.26	0.32	0.10	0.13	0.26	2.91
* $p < .004$						
Source	Mental Skill					
	Goals	Imagery	MP	Refocus	Relax	Stress
Sex	0.00	4.36	0.35	0.00	6.85	0.77
Skill	9.31*	7.30	3.72	20.57*	0.46	0.03
Sex x Skill	8.69*	1.10	0.01	3.32	0.21	0.16
* $p < .004$						

Note. Activ = Activation, Comm = Commitment, Conf = Self-confidence, CP =

Competition planning, MP = Mental practice, Relax = relaxation.



**Chapter III**

**General discussion and conclusion**

The primary purpose of the present study was to determine whether gender differences exist in the level and use of various mental skills of athletes. Since there has been little comprehensive research conducted in this domain, this study offers some interesting and unique results. More specifically, the results of the present study offer clear support that there are no differences in the mental skills of male and female athletes aged 14-19. Since few researchers have reported gender differences, perhaps it is time to reinforce that male and female athletes are more similar than dissimilar in their mental skills. Most importantly, of the variables addressed in the study (gender and skill), only skill level was statistically significant. Since gender is biological in nature, it could be hypothesized that it is an athlete's environment that makes the greatest contribution to the development of mental skills. Therefore, mental skills can be learned and accessed by all athletes.

### Gender Differences

Although significant differences between self-confidence of male and female athletes were found in the literature, no gender differences were obtained in this study. A potential explanation for this might be a consequence of the OMSAT-3\* items being more general than specific. Future researchers may wish to use a research tool such as Vealey's sport-confidence model, which measures eight aspects of self-confidence, to identify specific areas in which male and female athletes potentially differ in their self-confidence.

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believed that the skill involved could be learned regardless of whether or not the skill was a masculine or feminine task. Perhaps the participants, both male and female, in the present study held such beliefs. That is, they participated in sports in which they believed they could improve. It was not a matter of whether or not the sport was masculine or feminine typed, instead it was their belief that they could master the skills necessary to excel. Overall, the present study refutes currently held stereotypes that female athletes possess less self-confidence than their male peers.

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No significant gender differences were found for the rest of the OMSAT-3\* scales. Unfortunately, there is no research to which one can refer to corroborate or refute these current findings. Perhaps research involving gender differences on these nine mental skills have not produced significant differences and subsequently the results were

not published. One must also be reminded that gender research has been seriously ignored. As Duda (1991) and Wann and Hamlet (1995) reported, very few studies attempted to utilize equal samples of male and female athletes and gender was rarely a central variable of the research design. In order for researchers to refute or corroborate past research it would seem appropriate that non-significant results be published or made available, and that researchers put more effort into incorporating women in their research protocols.

### Skill Level Differences

Results of the present study indicate that provincial level athletes scored significantly higher than developing athletes on the goal-setting, commitment, competition planning, focusing, and refocusing scales. These results are not surprising given that more skilled athletes have been shown to have higher levels of mental skills (Durand-Bush, 1995; Mahoney, Gabriel, & Perkins, 1987). Also, one could expect that athletes having attained higher skill levels would have learned mental skills, which in turn could have enabled them to attain their current level. Durand-Bush (1995) found that commitment, goal-setting, and self-confidence were the best discriminating skills between elite and competitive athletes. Commitment and goal-setting scores in the present study were significantly higher for the provincial athletes than for developing ones, which further supports these results. It appears that even at a relatively early age, being committed to sport and setting goals are important skills. As was the case for gender, there were no differences between self-confidence based on athletes' skill. However, as stated previously, the general nature of the OMSAT-3\*' items could explain such non-significant differences.

It should come as no surprise that provincial athletes reported higher levels of commitment. As athletes progress from one skill level to another, the demands placed on them increase. Athletes must decide if they are willing to invest extra time and effort needed not only to compete at a higher level but to succeed as well. Perhaps once this commitment is established, athletes decide that since they will commit to a higher performance level, they should strive towards more difficult of goals, thus explaining why provincial athletes scored significantly higher on the goal-setting scale. A possible explanation for the differences between skill levels on the commitment scale can be found in Eisenberger's (1992) learned industriousness theory. This theory postulates that if an individual is rewarded for their large amounts of cognitive and physical effort towards a task, the sensation of that effort acquires secondary reward properties and negative feelings towards high effort are reduces. Therefore, it could be the provincial athletes possess this learned industriousness, which is similar to most definitions of commitment, to a greater degree than did the developing athletes.

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did team sport athletes. With a variety of team and individual sports, once again differences may have been averaged out.

### Age Group Differences

A subsequent post-hoc MANOVA including age as a factor led to an interesting finding, which was that age had no interaction with gender or skill and there was no main effect of age. One might expect that older athletes would report higher levels of mental skills because of their personal development and subsequent maturity as a result of more sporting experience. However, this rationale might actually explain the non-significant findings. An athlete may not simply acquire mental skills as a result of having more sport experience. The present study's findings promotes the notion that skill is a very important factor in the level and use of mental skills. The higher the skill level requires a greater degree of mental skill, and, therefore, an athlete's age becomes less significant.

The practical implications of this study are important for those who work as mental trainers or sport psychologists with younger athletes. More specifically, one should not assume that athletes possess certain mental skills or different abilities to acquire mental skills because they are young or either male or female. Furthermore, although practitioners should treat all athletes as individuals, they should also recognize that they have the ability to learn and refine their mental skills. They should not enter learning situations with preconceived stereotypes of what male or female athletes need or have to improve. The results of this study indicate that there are significant differences between certain mental skills of developing athletes. These differences should be acknowledged by practitioners who attempt to individualize mental training programs to optimize performance.

### Limitations

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## Chapter IV

### Statement of contributors and collaborators

The preceding article was developed and written solely by the author Mike Stevenson. Guidance for both research methodology and writing style were provided by the thesis supervisor John Salmela.

**Chapter V**

**Methodology/Appendices**

## Methodology

### Participants

A total of 249 male and female athletes from the province of Ontario participated in this study and were assigned to one of two groups: a provincial and a development group. Criteria for the provincial group was that athletes had to have represented their province in their sport, while athletes representing their region or high school were placed in the development group. The provincial group consisted of 122 athletes, more precisely 59 males and 63 females, whereas the development group was comprised of 62 males and 65 females. Participants were aged between 14 and 19 years and the mean age was 16.1 (SD = 1.26) yrs. Athletes were from various sport disciplines: more specifically, 21 sports were represented, with athletes from volleyball (87), soccer (30), swimming (24), and rugby (20) being the most numerous (see Table 1).

### Instrument

The OMSAT-3\* (Durand-Bush & Salmela, 1999) was used for data collection. It included 48 items and 12 mental skill scales grouped under three broader conceptual components: (a) foundation skills (goal-setting, self-confidence, commitment), (b) psychosomatic skills (stress reactions, fear control, relaxation, activation), and (c) cognitive skills (imagery, mental practice, focusing, refocusing, and competition planning). Demographic questions pertaining to the participants' age, sex, sport discipline, country of origin, current level of participation in sport, and highest level of education were included. Each item in the OMSAT-3\* was answered on a "strongly disagree" to "strongly agree" 7-point Likert scale. The OMSAT-3\*'s psychometric properties have been found to be valid and reliable (Durand-Bush & Salmela, 1999).

**Procedure**

To facilitate the recruitment of participants, the researcher contacted club officials and coaches, high school sport administrators, as well as consultants and sport administrators who received a letter of information / approval, which explained the purpose of the study, and issues related to anonymity and confidentiality of the results. The researcher made arrangements and received consent to administer the OMSAT-3\* in person either in a one on one or group setting.



Appendix

Ottawa Mental Skills Assessment Tool – 3\* (OMSAT-3\*)

# OMSAT

*For more information, please contact*  
**John Salmela, Ph.D. or**  
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ID (last four digits of tel. #): \_\_\_\_\_  
Age: \_\_\_\_\_  
Sex:  M  F  
Country: \_\_\_\_\_  
Sport: \_\_\_\_\_

### Current level of participation in your sport (please check *✓* one):

- I represent my sport within my region / city
- I represent my region / city in my province / state
- I represent my province / state in my country
- I represent my country in the world

### Highest level of participation in your sport (please check *✓* one):

- I have represented my sport within my region / city
- I have represented my region / city in my province / state
- I have represented my province / state in my country
- I have represented my country in the world

### Highest level of education (please check *✓* one):

- Secondary School  University: undergraduate level
- masters level
- doctorate level

Please circle a number from 1 to 7 to indicate your level of agreement with each of the statements. There are no right or wrong answers so please give an immediate and honest response. Please answer all the questions. Think of the most recent performances in your sport, whether in training or competition, while responding to the items.

- |  |   |   |   |   |   |   |   |                   |          |                   |                              |                |       |                |
|--|---|---|---|---|---|---|---|-------------------|----------|-------------------|------------------------------|----------------|-------|----------------|
| 1. I set daily training goals.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly Disagree | Disagree | Somewhat Disagree | Don't Agree / Don't Disagree | Somewhat Agree | Agree | Strongly Agree |
| 2. I believe I can succeed in my chosen activity in spite of any obstacles I encounter.                | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 3. I find it easy to relax.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 4. There are a number of things in my sport that are potentially dangerous and make me afraid.         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 5. I can increase my energy level when I am tired in training.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 6. I experience performance problems because I am too nervous.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 7. I am determined to never give up in my sport.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 8. I lose my focus during important competitions.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 9. I find it easy to create mental images.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 10. I feel difficult but achievable goals.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 11. I plan a regular set of things to do before a competition.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 12. I act confidently even in difficult sport situations.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 13. I mentally practice my sport on a daily basis.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 14. My body tightens unnecessarily in competition.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly Disagree | Disagree | Somewhat Disagree | Don't Agree / Don't Disagree | Somewhat Agree | Agree | Strongly Agree |
| 15. I lose my focus during daily training.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 16. I find it difficult to train because of the fear involved in my sport.                             | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 17. I am committed to becoming an outstanding competitor.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 18. I find it easy to change images in my mind.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 19. I can consciously decrease the tension in my muscles.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 20. I can increase my energy level when I am too relaxed in competition.                               | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 21. I mentally practice my sport with maximum performance in mind.                                     | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 22. Mistakes often lead to other mistakes when I compete.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 23. I set goals to improve daily aspects of my performance.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 24. I am afraid to lose.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 25. I plan a regular set of things to think about before a competition.                                | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 26. I have clear mental images.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 27. I find it hard to regain control after getting upset during a performance.                         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 28. I believe I have the personal capacity to achieve my goals.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 29. I find it easy to relax quickly.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 30. I am willing to sacrifice most other things to excel in my sport.                                  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 31. I find it difficult to concentrate in certain training situations.                                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly Disagree | Disagree | Somewhat Disagree | Don't Agree / Don't Disagree | Somewhat Agree | Agree | Strongly Agree |
| 32. I find that big crowds get me nervous in competition.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 33. I can feel movements in my imagery.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 34. I find it hard to get an unexpected event off my mind during competition.                          | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 35. My mental practice is planned.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 36. I compete better in practice than I do in competition.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 37. I can easily activate myself up to an optimal level where my performance is at its best.           | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 38. I have difficulty finding effective strategies to remain focused throughout an entire competition. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 39. I feel more committed to improve in my sport than to anything else in my life.                     | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 40. I plan a regular set of things to do during a competition.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 41. My goals push me to work harder.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 42. I can relax effectively during critical moments in a competition.                                  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 43. I find it hard to gain control of things to reduce my fears in training.                           | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 44. I dwell upon mistakes during training.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 45. I mentally practice for critical situations in competition.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 46. I can easily activate myself before a competition if I am down.                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 47. I have a plan that includes certain cue words I say to myself in competition.                      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |
| 48. I am confident in most aspects of my performance.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |                   |          |                   |                              |                |       |                |