

Directional anxiety responses in elite and sub-elite young athletes: intensity of anxiety symptoms matters

C. Lundqvist¹, G. Kenttä¹, J. S. Raglin²

¹The Swedish School of Sport and Health Sciences, Stockholm, Sweden, ²Indiana University-Bloomington, Bloomington, Indiana, USA

Corresponding author: Carolina Lundqvist, PhD, The Swedish School of Sport and Health Sciences, P.O. Box 5626, SE-114 86 Stockholm, Sweden. Tel: +46 84022283, Fax: +46 8224403, E-mail: carolina.lundqvist@gih.se

Accepted for publication 8 January 2010

The objective was to examine the differences in anxiety ratings of elite and sub-elite athletes when the relationship between intensity and direction scores of anxiety ratings is considered in analyses. Participants were 31 junior elite (Mean age: 17.7, SD = 1.1) and 53 sub-elite (Mean age: 17.5, SD = 1.1) cross country skiers and swimmers who completed the direction modified CSAI-2R before important competitions. Results showed that elite athletes rated a higher percent of items as facilitative to their performance whereas sub-elite athletes rated a higher percent of items as debilitating. No significant differences between the elite and sub-elite samples were displayed regarding rated direction

scores of cognitive or somatic anxiety at moderate to high-intensity levels. A significant difference in facilitative anxiety ratings was displayed at a low anxiety intensity level ($Z = -2.20$, $P < 0.05$). Outcome performance data showed no consistent congruence with athletes' anxiety direction ratings. The findings suggest that facilitative direction scores are a consequence of low anxiety intensity, possibly combined with high self-confidence levels. Directional anxiety researchers analyzing separate total scores of intensity and direction respectively, which is the traditional approach, may draw incorrect conclusions about the importance of facilitative ratings of anxiety symptoms.

One of the most studied topics in sport psychology has been anxiety responses to competition (Woodman & Hardy, 2001). The majority of research has used various self-report inventories to test the efficacy of different theories (Burton, 1998), and the Competitive State Anxiety Inventory-2 (CSAI-2) (Martens et al., 1990) has been a widely used sport-specific instrument for assessing the dimensions of cognitive anxiety, somatic anxiety and self-confidence in relation to sport performance.

The CSAI-2 was originally developed and conceptualized according to a multidimensional theory of anxiety and sport performance hypothesizing that cognitive anxiety exhibits a negative-linear relationship to performance, self-confidence a positive-linear relationship and somatic anxiety a non-linear relationship expressed in the form of an inverted-U (Martens et al., 1990). However, some athletes manage to perform successfully despite an intense level of anxiety, and even more importantly, athletes may vary in regard to their preferred intensity level of experienced anxiety levels (Hanin & Syrjä, 1996; Pijpers et al., 2003). As a consequence, more complex conceptualizations of the anxiety construct have been proposed. The directional perception approach pro-

poses that anxiety symptoms, irrespective of intensity level, can be perceived by athletes as either debilitating or facilitative to performance (Jones, 1991, 1995; Jones & Swain, 1992). Thus, the direction dimension of anxiety refers to the athlete's perception of the anticipated functional effects of anxiety symptoms on the upcoming performance (Mellalieu et al., 2006a, b; Robazza et al., 2008). This approach was based on the hypothesis that athletes' level of confidence and perceived control influences how symptoms of the anxiety response are interpreted. More specifically, athletes who have positive expectancies regarding their ability to cope and of their goal attainment should be more likely to anticipate anxiety symptoms as facilitative to performance, whereas their counterparts were suggested to anticipate similar symptoms as debilitating to performance.

The method for simultaneously assessing intensity and direction perceptions of anxiety has typically been to use a modified version of the CSAI-2, or of alternative anxiety questionnaires such as the Mental Readiness Form (Krane, 1994), including a directional scale after each item. Total intensity and directional scores are simply obtained by summarizing the scores of items on the intensity and directional

scales separately (Jones & Swain, 1992). Univariate and multivariate analyses of variance have yielded support to the hypothesis that athletes differ in their ratings of anxiety symptoms as facilitative or debilitating (Jones & Swain, 1992; Jones et al., 1993; Jones & Hanton, 1996; Hanton & Jones, 1997; Hanton et al., 2000; Fletcher & Hanton, 2001; Mellalieu et al., 2004). Significant differences in the *total score of directional dimension* of perceived anxiety symptoms, despite a general lack of significant differences in *total anxiety intensity scores*, have been displayed among samples differing in goal attainment expectancies, competitiveness and as a function of sport type and coping responses (Jones & Swain, 1992; Jones & Hanton, 1996; Hanton et al., 2000, 2008). Athletes identified as skilled or elite status have also been found to be more likely to rate similar overall intensity levels of anxiety symptoms as more facilitative than their less-skilled and non-elite counterparts (Jones et al., 1993, 1994; Jones & Swain, 1995; Perry & Williams, 1998; Mellalieu et al., 2006a, b). The directional perception approach has thus been suggested as more sensitive to differences between various levels of athletes in comparison with ratings based only on anxiety intensity. As these studies have also found significantly higher self-confidence levels among athletes displaying more facilitative than debilitating direction scores, self-confidence is regarded to act as a buffer against perceptions of elevated anxiety symptoms as debilitating (Jones & Hanton, 2001).

An alternative explanation proposes that the wording of anxiety items in the CSAI-2 may be either too neutral or ambiguous (e.g., the word “concern”), easily resulting in the interpretation of items as either a threat-related anxiety response (i.e., debilitating) or a challenge associated with positive emotions (i.e., facilitative; Burton & Naylor, 1997; Burton, 1998; Cerin, 2003). Accordingly, the directional scale is suggested to be useful in distinguishing between a negative direction score indicating an athlete’s experience of anxiety and a positive direction score indicating an athlete’s experience of a facilitative pre-performance state (Jones & Hanton, 2001; Mellalieu et al., 2003). Others have argued that anxiety is by definition a negatively toned unpleasant state and that directional ratings instead represent the athlete’s perception of anticipated functional effects of this unpleasant emotion (Hanin, 2007).

Importantly, the preceding evidence and conclusions supporting the directional perception approach are based on total scores of the intensity and direction subscales of anxiety assessments when analyzed separately as two variables. This procedure provides no information about the typical configuration (i.e., response set) of specific items. Consequently, no information is available about the frequency with

which specific anxiety symptoms are labelled as debilitating or facilitative. Such information, paired with the intensity ratings for each specific item, would provide a more comprehensive understanding of the relationship between anxiety and its perceived impact as debilitating or facilitative. Furthermore, there is no published information comparing the extent to which skilled and less skilled athletes recognize individual anxiety symptoms as debilitating or facilitative in comparison to the experienced intensity of the particular symptom. Elite athletes could, for example, more often respond to competition with lower anxiety intensity than less skilled or less experienced athletes and thus rate the symptoms as more facilitative to performance (Hanin, 2007). The directional scale used in interpreting anxiety items also includes a “zero” option (i.e., “Neither debilitating nor facilitative for performance”), which might imply that some athletes experience anxiety symptoms but largely perceive them as not affecting upcoming performance. Hence, as also noted by Burton and Naylor (1997) and Hardy (1998), the use of separate scales to assess intensity and direction implies that the intensity levels of the symptoms rated as debilitating or facilitative will vary considerably among athletes, making differences in such non-standardized scores difficult to interpret. In addition, the directional scale is bipolar and athletes who rate items in a negative or positive direction at a roughly equal frequency would end up with a summated score close to zero. With the separate use of total scores of anxiety intensity and direction, significant differences in total direction scores but not in total intensity scores between elite and non-elite samples would not necessarily reveal whether elite athletes interpret similar intensities of similar symptoms as more facilitative. Such findings could actually be a result of any response combination of intensity and direction on single items (Burton & Naylor, 1997). Although some qualitative studies have also been conducted to investigate anxiety direction, similar limitations are evident in this line of research (e.g., Hanton & Jones, 1999). More specifically, in the qualitative studies conducted, anxiety “debilitators” and “facilitators” have commonly been identified based solely on their total direction score without consideration of the anxiety intensity levels (e.g., Eubank & Collins, 2000) or, alternatively, without providing quantitative reference values to evaluate the intensity level to which athletes’ idiographic descriptions of debilitating or facilitative symptoms refer (Hanton & Connaughton, 2002; Hanton et al., 2002, 2004). Thus, if symptoms identified by athletes as facilitative (vs debilitating) were rarely or never paired with moderate or high-intensity, then the contention that symptoms associated with anxiety, even if intensity levels are elevated, can be perceived

as having either an anticipated debilitating or facilitative effect on performance (Jones, 1995) would be called into question. Finally, most studies investigating anxiety direction have not included performance data to validate how the anticipated effects of anxiety correspond with Successful or Unsuccessful performances. Thus, the utility of assessing direction scores of anxiety to predict or explain performance is still unclear. Also, there is presently little empirical support that perceived anticipated debilitating or facilitative effect of anxiety symptoms is actually related to performance outcomes (Hanin, 2007; Robazza et al., 2008).

Although there has been extensive research on anxiety direction in sport, no study has yet scrutinized the intensity and direction relationship of anxiety ratings and evaluated this information with performance outcome. Investigating this combination of variables should reveal more specific information about athletes' ratings of diverse symptoms associated with anxiety across intensity levels than an approach limited to total anxiety scores. Hence, the aim of the present study was to examine differences between elite and sub-elite athletes' anxiety symptoms when the relationship between intensity and direction scores is taken into account, and also to contrast response patterns of anxiety direction scores with actual performance data. Because earlier work (e.g., Jones et al., 1993, 1994; Jones & Swain, 1995; Hanton et al., 2008) has consistently found that athletes at different skill levels differ in direction scores but not in anxiety intensity scores, the first hypothesis in the present study was that the elite athletes would show significantly more facilitative direction ratings of anxiety symptoms at diverse intensity levels (e.g., both low and medium to high-intensity) than would their sub-elite counterparts when intensity and direction scores were combined in analyses. The second hypothesis was that the response pattern of anxiety symptoms would show significantly more items rated as facilitative among athletes with Successful performances in contrast to athletes with Unsuccessful performances.

Method

Participants

The participants consisted of 84 athletes (48 men and 36 women) with a mean age of 17.56 ($SD = 1.9$), studying at designated sport high schools in Sweden. The athletes had an average training background of 9.9 years ($SD = 2.5$) in cross country skiing or swimming. A total of 31 of the athletes (16 men and 15 women), with a mean age of 17.7 ($SD = 1.1$) and 10.0 ($SD = 2.6$) years of training experience in their sport, were classified as junior elite athletes because they either were the top three finishers at the Swedish Championships or had been selected to participate in the Swedish junior or senior National Team. The remaining 53 athletes (32 men and 21 women) were classified as sub-elite; they averaged 17.5 ($SD = 1.1$) years in

age and had been training an average of 9.6 ($SD = 2.5$) years. The sub-elite athletes were all competing at national level but had never finished in the top three in their age group in any major Swedish competitions. Before any of the athletes agreed to take part in the study, they were given written and verbal information that participation was voluntary and that their results would be confidential. They were also informed that they could discontinue participation at any time without consequences. All participants thereafter signed a written informed consent, and all procedures followed ethical standards in accordance with institutional guidelines.

Instruments

Anxiety was assessed with the CSAI-2R (Cox et al., 2003), a revised 17-item version of the original CSAI-2 (Martens et al., 1990) that assesses cognitive anxiety (five items; intensity range: 5–20), somatic anxiety (seven items; intensity range: 7–28) and self-confidence (five items; intensity range: 5–20). The respondents rate their answers on a four-point scale, with the response options of (1) "Not at all," (2) "Somewhat," (3) "Moderately so" and (4) "Very much so." Based on findings of improved factorial validity showing acceptable model fit when evaluated with confirmatory factor analysis ($CFI = 0.95$, $NNFI = 0.94$ and $RMSEA = 0.05$), the CSAI-2R has been found to be more psychometrically sound than the original version of the CSAI-2 (Cox et al., 2003). In the present study a Swedish version of the inventory was utilized, and research using this translation indicates that it possesses psychometric properties consistent with the English version, in terms of both acceptable model fit and acceptable internal consistency for all subscales ($\alpha > 0.80$) (Lundqvist & Hassmén, 2005).

In order to also assess the direction interpretation of anxiety responses, a seven-point bipolar directional scale was included after each anxiety item according to procedures described by Jones and Swain (1992). This directional scale ranges from -3 ("Very debilitating for performance") to $+3$ ("Very facilitative for performance"), with a mid-point of 0 ("Neither debilitating nor facilitative for performance"). Total direction scores range from -15 to $+15$ on the cognitive subscale and from -21 to $+21$ on the somatic subscale.

Performance outcome was assessed using two seven-point single-item scales: (1) Satisfaction with performance that ranged from 1 ("Not satisfied at all") to 7 ("Completely satisfied") and (2) Performance based on one's own expectations before the event that ranged from 1 ("Much worse than expected") to 7 ("Much better than expected").

Procedures

In consultation with the team coaches and athletes, one competition was chosen based on the judgment that the event was of particular importance to the majority of the skiers or swimmers. In discussion with the athletes during an information meeting, the subjectively experienced importance of the competitions was confirmed verbally by the athletes themselves. Moreover, both perceived importance of competition and uncertainty about the outcome have been identified as primary factors in elevating the precompetition anxiety (Martens et al., 1990). During the information meeting, the cross country skiers also individually rated how important they perceived the current competition to be on a seven-point scale (1 = "Totally unimportant" to 7 = "Extremely important"). The mean score of perceived importance was 5.51 ($SD = 1.10$). For the swimmers, only one qualification race preceded the finals, and at their information meeting they rated how certain they were of reaching the finals using a similarly designed

response scale (1 = “Completely certain to not reach the finals” to 7 = “Completely certain to reach the finals”). The mean score for the swimmers was 3.24 (SD = 1.90).

Previous research has consistently found anxiety levels to be significantly elevated when assessed within 1 h before important competitions (Raglin & Hanin, 2000). Thus, the participants completed the direction modified CSAI-2R once within 45 min before the commencement of their competitive event. Immediately after their race, the athletes completed performance scales. One of the elite athletes failed to report the performance scores and was therefore treated as missing data in all analyses involving performance outcomes.

Data analysis

In order to combine intensity and direction scores of anxiety items, the frequency of cognitive and somatic items that each athlete had rated as moderate to high (i.e., 3 = “Moderately so” or 4 = “Very much so”) in intensity combined with a debilitating and a facilitative direction score, respectively, was computed. The same approach was used to combine the scores of cognitive and somatic items rated as low (i.e., 2 = “Somewhat”) in intensity. Hence, this procedure resulted in the intensity and directional scale being merged into the frequency of items rated as: (1) moderate to high in anxiety intensity and rated as debilitating, (2) moderate to high in anxiety intensity and rated as facilitative, (3) low in anxiety intensity and rated as debilitating and (4) low in anxiety intensity and rated as facilitative. Mann–Whitney *U*-tests were subsequently performed using SPSS 17.0 to evaluate any differences between the elite and sub-elite athletes’ responses of debilitating and facilitative anxiety on the different intensity levels. In order to evaluate the interactive effects of cognitive and somatic anxiety with different direction scores, K-mean cluster analyses were performed using SPSS 17.0.

Results

Mean scores and standard deviations of anxiety and self-confidence intensity and anxiety directional scores for the entire sample and the sub-samples of elite skiers and sub-elite skiers are displayed in Table 1. Also shown is Cronbach’s α for the different CSAI-2R subscales.

Cognitive anxiety symptoms

The total distribution of ratings of cognitive items for elite and sub-elite athletes, when selected intensity levels are combined with selected direction scores, is

displayed in Figs 1 and 2. A total of 28.4% and 40.4% of the responses for the elite and sub-elite samples, respectively, were identified as Debilitative (–) and a total of 47.1% and 34.0% responses of the elite and sub-elites, respectively, were identified as Facilitative (+). Of the five cognitive items, elite athletes had an average rated frequency of 0.52 (SD = 0.96) and the sub-elite athletes had an average rated frequency of 0.89 (SD = 1.31) of the items as Cognitive – in combination with a moderate or high-intensity score. In addition, an average frequency of 0.03 (SD = 0.18) and 0.04 (SD = 0.19) of moderate to high-intensity scored items were rated as “Neither debilitating nor facilitative” (0) by the elites and sub-elites. At the same intensity level, an average frequency of 0.03 (SD = 0.18) and 0.02 (SD = 0.14) of the cognitive items were rated as Cognitive+ by elite and sub-elite athletes, respectively. In order to analyze whether elite and sub-elite athletes differed in frequency of rated direction scores of anxiety symptoms identified at moderate and high-intensity, Mann–Whitney *U*-tests were performed. The results of this analysis indicated significant differences between elite and sub-elite athletes regarding moderate to high anxiety intensity rated as: (1) Cognitive – ($Z = -1.09$, $P = \text{NS}$), (2) Cognitive+ ($Z = -0.39$, $P = \text{NS}$) or (3) Cognitive 0 ($Z = -0.13$, $P = \text{NS}$). At low anxiety intensity level, the elite and sub-elite athletes rated an average frequency of 0.73 (SD = 1.23) and an average frequency of 1.06 (SD = 1.18) items as Cognitive –, respectively. Concerning items rated as Cognitive+ at the same anxiety level, elite athletes displayed an average frequency of 0.48 (SD = 0.81) and sub-elite athletes displayed an average frequency of 0.15 (SD = 0.41). An average frequency of 0.26 (SD = 0.51) and 0.36 (SD = 0.65) of the items at low-intensity level were rated as Cognitive 0 by the two samples, respectively. Mann–Whitney *U*-tests showed no significant differences between the elite and sub-elite athletes regarding Cognitive – ratings at low-intensity level ($Z = 0.98$, $P = \text{NS}$) or low anxiety levels rated as Cognitive 0 ($Z = -0.61$, $P = \text{NS}$). A significant difference was found for Cognitive+ ratings ($Z = -2.20$, $P < 0.05$).

Table 1. Descriptive statistics and Cronbach’s α values of the CSAI-2R for the samples of elite and sub-elite athletes

CSAI-2R subscales	Elite athletes ($n = 31$)			Sub-elite athletes ($n = 53$)			Total sample ($N = 84$)		
	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α
Cognitive anxiety intensity	7.97	2.75	0.83	8.70	3.35	0.86	8.42	3.15	0.85
Cognitive anxiety direction	3.29	6.72	0.90	0.57	6.00	0.81	1.57	6.42	0.86
Somatic anxiety intensity	11.58	2.69	0.66	11.43	2.90	0.72	11.49	2.81	0.70
Somatic anxiety direction	5.90	7.25	0.88	2.77	6.02	0.76	3.98	6.63	0.82
Self-confidence	14.77	3.17	0.77	13.42	2.96	0.78	13.92	3.09	0.79

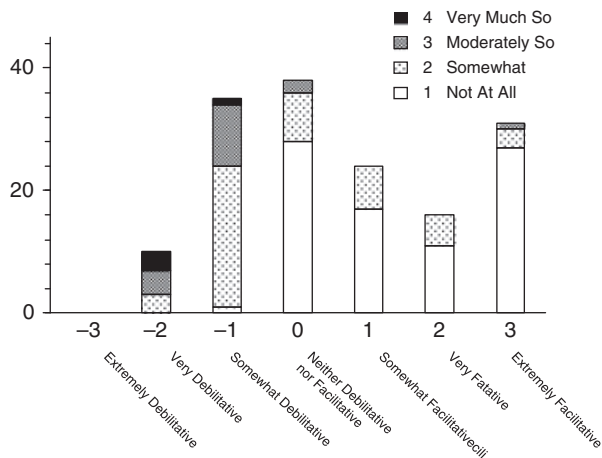


Fig. 1. Total number of times cognitive anxiety items were identified as either debilitating or facilitative ranked by selected intensity for the elite athletes.

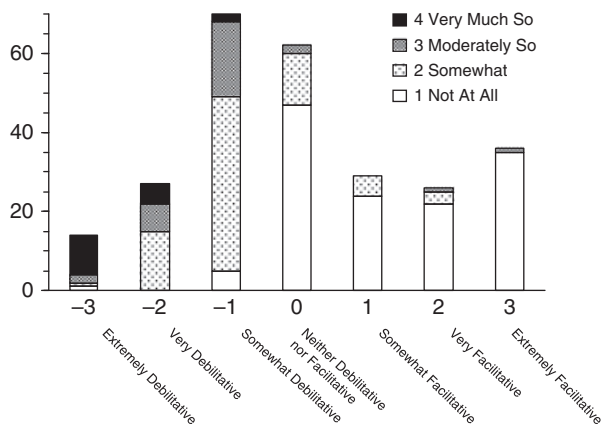


Fig. 2. Total number of times cognitive anxiety items were identified as either debilitating or facilitative ranked by selected intensity for the sub-elite athletes.

Somatic anxiety symptoms

In Figs 3 and 4, the total distribution of ratings of somatic items for elite and sub-elite athletes, when selected intensity levels are combined with selected direction scores, are displayed. When the response distribution was inspected, 13.4% and 24.3% of the elite and sub-elite samples' responses, respectively, were rated as Somatic-. Somatic+ ratings constituted 51.6% and 37.2% of the elite and sub-elite samples' responses, respectively. Of the seven somatic items, the elite athletes had an average rated frequency of 0.26 (SD = 0.58) of the items as Somatic- and an average rated frequency of 0.29 (SD = 0.74) as Somatic+ on a moderate to high-intensity levels. An average frequency of 0.06 (SD = 0.25) of the items were rated as Somatic 0 on this intensity level. In contrast, on the same intensity level, sub-elite athletes rated an average frequency of 0.45 (SD = 0.80) of the items as Somatic-, an

Anxiety and directional interpretations

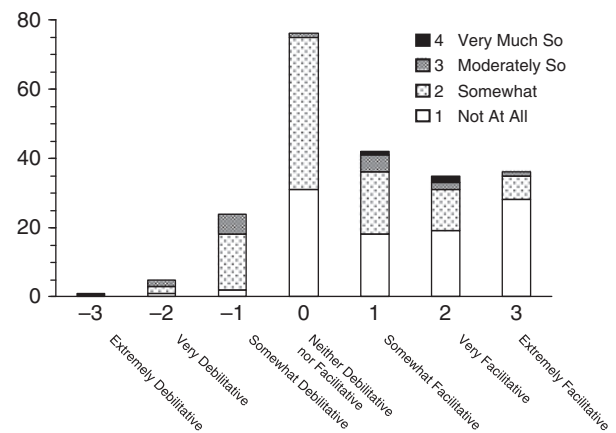


Fig. 3. Total number of times somatic anxiety items were identified as either debilitating or facilitative ranked by selected intensity for the elite athletes.

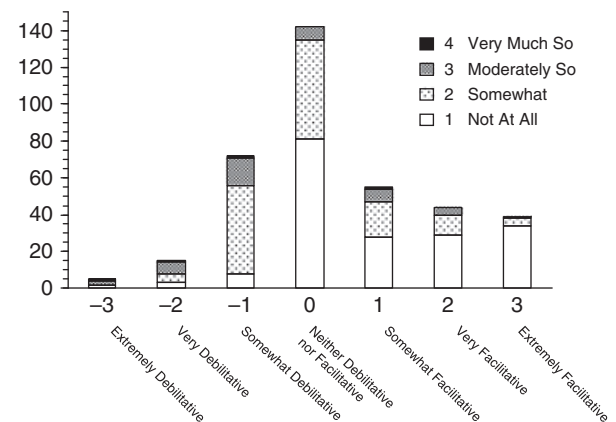


Fig. 4. Total number of times somatic anxiety items were identified as either debilitating or facilitative ranked by selected intensity for the sub-elite athletes.

average frequency of 0.25 (SD = 0.55) as Somatic+, and an average frequency of 0.15 (SD = 0.46) as Somatic 0. Mann-Whitney *U*-tests indicated no differences between elite and sub-elite athletes for items scored with moderate to high-intensity and rated Somatic- ($Z = -1.12$, $P = \text{NS}$), Somatic+ ($Z = -0.18$, $P = \text{NS}$), or Somatic 0 ($Z = -0.77$, $P = \text{NS}$). In the case of low anxiety intensities, the elite athletes rated an average frequency of 0.38 (SD = 0.72), 1.5 (SD = 1.79) and 1.13 (SD = 1.20) items as Somatic-, Somatic+ and Somatic 0, respectively. The corresponding frequency of ratings for the sub-elite athletes was 0.86 (SD = 1.08), 0.70 (SD = 0.97) and 0.97 (SD = 1.19). For low intensities of somatic anxiety, no differences were found between the elite and sub-elite samples for direction ratings (Somatic- ratings: $Z = -1.64$, $P = \text{NS}$, Somatic+ ratings: $Z = -1.47$, $P = \text{NS}$ and Somatic 0 ratings: $Z = -0.49$, $P = \text{NS}$).

Rated anxiety direction and performance outcome

In Table 2, the number of all athletes who had a predominant pattern (i.e., ≥ 3 cognitive anxiety items or ≥ 4 somatic anxiety items rated in a similar direction) of either “Debilitative” (–), “Facilitative” (+) or “Neither debilitative nor facilitative” (0) ratings on the separate anxiety subscales, combined with at least some intensity (i.e., ≥ 2 = “Somewhat”), are shown. Also displayed are the numbers of these athletes who rated themselves as satisfied and who performed as expected or better (i.e., Successful performances), or rated themselves as dissatisfied and performed worse than expected (i.e., Unsuccessful performances). For the cognitive subscale, 30% of the athletes had a predominant pattern of Cognitive – ratings with 50% reporting Successful performances and the remainder of the athletes with this response pattern reporting Unsuccessful performances. Very few athletes (≤ 5 on each subscale) could be identified as having any other predominant anxiety direction response pattern, and among them no clear descriptive trend regarding performance outcome was evident.

In order to examine the interactive effects of cognitive and somatic anxiety rated as having a “Debilitative” (–), “Facilitative” (+) or “Neither debilitative nor facilitative” (0) impact on the upcoming performance of elite and sub-elite athletes, and to compare the response profiles with the athletes’ actual performance outcome, K-mean cluster analyses were performed separately for the samples. The number of anxiety items on the subscales rated with the different directions (–, + or 0) combined with an intensity rating of at least somewhat (≥ 2) were included in the cluster analysis together with the two performance scores. Among both the elite and sub-elite athletes, two interpretable clusters were

revealed, consisting of athletes who reported Successful performances (elite athletes, $n = 24$ and sub-elite athletes, $n = 25$) and Unsuccessful performances (elite athletes, $n = 6$ and sub-elite athletes, $n = 28$). Mann–Whitney *U*-tests confirmed that the Successful and Unsuccessful performance clusters differed significantly in terms of athletes’ performance scores, among both the elite athletes (Satisfaction with performance: $Z = -3.83$, $P < 0.001$, Performance based on expectations: $Z = -3.72$, $P < 0.001$) and the sub-elite athletes (Satisfaction with performance: $Z = -6.21$, $P < 0.001$, Performance based on expectations: $Z = -5.51$, $P < 0.001$). No further differences regarding the number of cognitive and somatic anxiety items at any intensity level (i.e., ≥ 2) and with different directions (i.e., –, + or 0) were found between the Successful and Unsuccessful clusters within the elite or the sub-elite sample.

Figure 5, displays the comparison between the response profile of elite and sub-elite athletes clustered as Successful in their performances. A significant difference was observed between elite and sub-elites regarding number of items rated as Somatic – ($Z = -2.17$, $P < 0.05$). Regarding the remaining anxiety dimensions and the performance scores, no significant differences between the two Successful performance clusters were revealed. The comparison between the response profile of elite and sub-elite athletes clustered as Unsuccessful in their performance is shown in Fig. 6, and Mann–Whitney *U*-tests revealed no significant differences between the clusters regarding anxiety scores or performance scores.

Discussion

Previous research involving the directional modification of the CSAI-2 has indicated that skilled athletes

Table 2. Descriptive statistics of total number of athletes with a predominant response pattern of anxiety type and rated effect on performance and number of athletes with perceived successful or unsuccessful performances

Anxiety type and perceived impact	Response pattern <i>n</i> (% of sample)	Perceived outcome with performance <i>n</i> (% of athletes with response pattern)			
		Satisfied	As expected or better	Dissatisfied	Worse than expected
Cognitive –	25 (30)	11 (44)	13 (52)	11 (44)	12 (48)
Cognitive +	1 (1)	0 (0)	0 (0)	1 (100)	1 (100)
Cognitive 0	2 (2)	1 (50)	1 (50)	1 (50)	1 (50)
Somatic –	4 (5)	3 (75)	3 (75)	1 (25)	1 (25)
Somatic +	5 (6)	4 (80)	3 (60)	1 (20)	2 (40)
Somatic 0	5 (6)	4 (80)	3 (60)	1 (20)	2 (40)

–, debilitative effect; +, facilitative effect; 0, neither debilitative nor facilitative effect.

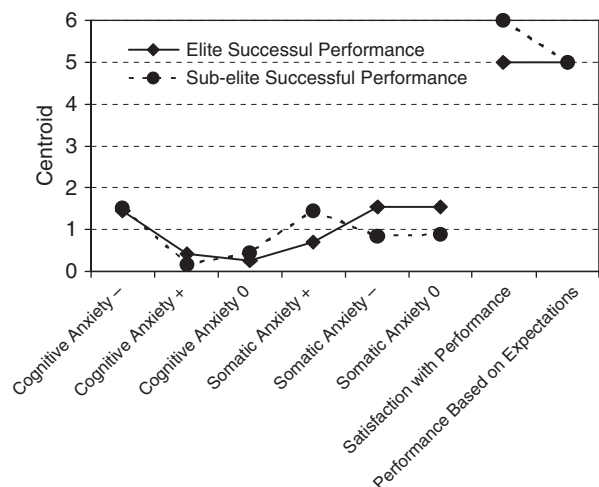


Fig. 5. Number of anxiety ratings combined with diverse direction ratings among elite ($n = 24$) and sub-elite athletes ($n = 25$) clustered as successful performances.

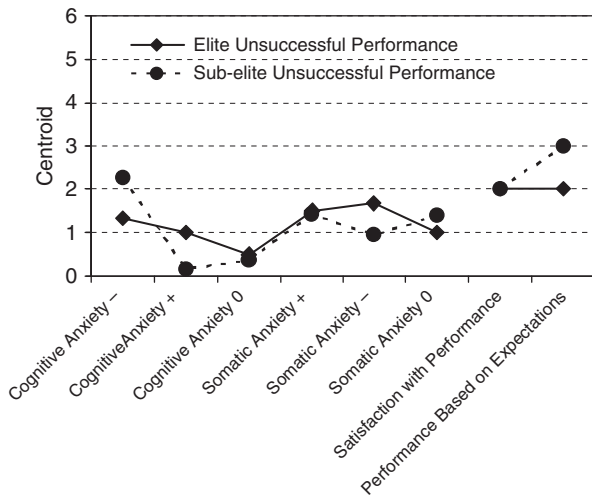


Fig. 6. Number of anxiety ratings combined with diverse direction ratings among elite ($n = 6$) and sub-elite athletes ($n = 28$) clustered as unsuccessful performances.

are more likely to rate similar intensity levels of anxiety symptoms as facilitative to performance compared with their less skilled counterparts (Jones et al., 1993, 1994; Jones & Swain, 1995; Perry & Williams, 1998; Mellalieu et al., 2006a, b). A major limitation of this research is that these findings were yielded, most commonly, using univariate or multivariate analyses of variance wherein separate total scores of the intensity and directional scales are included as dependent variables. The use of such total scores disallows statistical examination of the individual direction scores and the selected intensity level of each anxiety item. As a consequence, the present investigation was conducted to examine the anxiety intensity and direction responses in samples of young elite and sub-elite athletes using a statistical approach that allows examination of the relationship between intensity and direction scores.

The first hypothesis, anticipating that the elite athletes would report a higher degree of facilitative ratings on various intensity levels of anxiety than sub-elite athletes would, was only partially supported. When the percent of facilitative responses was inspected, the findings indicated that the elite athletes reported a higher percent of cognitive and somatic items as facilitative to performance compared with the sub-elite athletes. Interestingly, the samples did not differ in average frequency of debilitating or facilitative anxiety items rated at a moderate or high-intensity levels. Instead, differences occurred only for facilitative cognitive items rated at low-intensity levels, which are symptoms likely only vaguely perceived and therefore potentially open to more varying interpretations. The findings from this study indicate that differences in total direction scores, despite a lack of differences in total

intensity scores, do not necessarily provide evidence that elite athletes rate similarly intense levels of symptoms as more facilitative. Such differences in total scores could be spurious and actually conceal the true pattern of interplay between intensity and direction on single items. The second hypothesis, anticipating that the response pattern of direction ratings of items would be related to performance outcome, was not supported. The descriptive examination of the results showed that a predominant response pattern with a majority of items rated in the same direction rarely occurred, with the exception of cognitive anxiety being rated as debilitating. No clear trends related to performance outcome could be detected. Furthermore, athletes clustered as performing successfully or unsuccessfully did not differ in their response pattern either within the elite and sub-elite samples or between the samples. The results therefore suggest that the congruence between anticipated functional effects of anxiety and actual performance outcome is low, which is a serious limitation to this line of research and questions the utility of the directional perception approach in terms of predicting performances.

As a result of the present findings, it is proposed that research based on statistical analyses that examine total and independent scores of intensity and direction, and also the absence of performance data for validating the scores, may result in misleading conclusions that inflate the importance and actual incidence of facilitative ratings of symptoms associated with anxiety. As such, future research involving the direction modified CSAI-2 or CSAI-2R should use statistical analyses that clearly elucidate the relationship between the selected intensity levels and direction scores on anxiety items and evaluate findings in relation to performance outcome to provide a fuller picture of athletes' perceptions of precompetition anxiety symptoms as debilitating or facilitative. Moreover, there is a need to investigate whether the response patterns observed in the present study also hold for other samples of athletes who vary in skill level as well as personal and situational factors (e.g., gender and competitiveness) (Jones & Swain, 1992; Perry & Williams, 1998).

It is noteworthy that a the majority of anxiety items identified as facilitative to performance for both the elite and sub-elite samples were rated at an intensity of "Not at all." As it indicates the *absence* of any perceived anxiety for these items it is probably the main reason the athletes in this study rated them as facilitative to performance. These results provide an alternative explanation for findings of facilitative interpretations of anxiety symptoms. It has been proposed that high self-confidence acts as a buffer that protects athletes from interpreting aspects of anxiety perceived at moderate or high

intensities as debilitating. In addition, these interpretations are also proposed to change the emotional response to a positive state that has symptoms similar to those of the anxiety response (Jones et al., 1993, 1994; Jones & Hanton, 2001; Mellalieu et al., 2003). Considering this explanation and the fact that both elite and sub-elite athletes investigated in the current study displayed a moderate high mean self-confidence, it is noteworthy that neither elite nor sub-elite athletes exhibited a clear tendency to rate cognitive symptoms perceived at moderate or higher intensities as facilitative. The present results reveal that items rated as facilitative are overwhelmingly paired with low-intensity ratings or a complete absence of intensity, implying that symptoms are particularly perceived as beneficial for performance by athletes when either not experienced at all or only at a low-intensity. These results cannot support the notion that self-confidence acts to change the interpretations of anxiety symptoms to a positive emotional state in an athlete, but rather indicate that self-confidence may decrease the intensity level by which the anxiety symptoms are perceived. This pattern would also explain previous findings showing that “facilitators” label their emotional state with more positively toned descriptors when compared with “debilitators” (Jones & Hanton, 2001; Mellalieu et al., 2003). Hence, a facilitative total score on the directional scale displayed when direction scores are summated independently from the selected intensity scores could, at least with regard to the cognitive subscale, simply be a consequence of low and thus controllable perceived intensity of anxiety symptoms in combination with high self-confidence.

The present results also revealed a potentially more serious concern regarding the CSAI-2R, namely that athletes rated a high amount of the responses in the entire inventory as “Neither debilitating nor facilitative.” While these ratings were most commonly paired with no or low-intensity levels, they may accurately indicate that athletes perceived a low level of anxiety intensity, and consequently, that this intensity was not interpreted as impacting performance. In the present study, findings of low anxiety levels were unexpected as the competitive events were confirmed as important by the athletes and their coaches, and the swimmers, indicated that they were less certain about the outcome of the qualification race. These perceptions have been identified as a significant precompetition stressor that should lead to elevated anxiety (Martens et al., 1990). Thus, the great amount of items rated as “Neither debilitating nor facilitative” may also indicate that many of the specific anxiety items in the inventory are perceived by young athletes as irrelevant for performance. Further research is needed to determine whether items included in the inventory

accurately describe anxiety symptoms perceived by athletes and whether the trend of a significant number of items being rated as “Neither debilitating nor facilitative” can be generalized to other samples from various sports and of different ages. If so, this would indicate that the scale has serious limitations and that other valid indicators of anxiety and related emotional responses may be preferable, such as the idiographic methods developed by Hanin (Hanin, 2000; Lazarus, 2000). There is research indicating that the emotional response of athletes is individual and complex. The assessment of anxiety as a single emotion might therefore be oversimplified in explaining its outcome for the performance process (Hanin, 2007).

In the present study, the CSAI-2R was utilized instead of the CSAI-2, which has previously been most commonly applied to investigate anxiety direction. It is therefore possible that an attenuation of the facilitative directional ratings may have resulted from the exclusion of the four cognitive and two somatic items identified by Cox et al., (2003) as psychometrically weak. Thus, the omitted items may have been more likely to be rated as facilitative at a moderate or high-intensity. There is however a dearth of research that has actually investigated single symptoms of the CSAI-2 in preference of the total scores of all symptoms (i.e., the latent construct of anxiety). This is somewhat surprising because directional anxiety researchers have underlined that it is not anxiety *per se*, but rather the interpretations of symptoms associated with the anxiety response that athletes interpret on a debilitating–facilitative continuum (e.g., Jones & Hanton, 2001). No published information is available to evaluate whether some CSAI-2 items are more or less consistently identified as facilitative. Future research should investigate directional interpretations of single anxiety symptoms, and compare the occurrence of directional ratings on items of the CSAI-2 and the CSAI-2R.

Another potential concern was that while the classification of elite athletes followed criteria similar to those used in previous research (e.g., Mellalieu et al., 2004) it is possible that the athletes in the sub-elite sample more closely resemble the elite sample than do non-elites previously included. Replications of the findings in independently drawn samples of athletes with various skill levels with the use of a statistical approach similar to the one adopted in the present study are therefore warranted. Moreover, as both men and women were included in the present study, future researchers need to investigate whether the findings are invariant across sex. The present study was also cross-sectional in nature; thus, evidence that the findings would be replicated with the same athletes in a similar situation is lacking. Future

studies should be designed to conduct repeated assessments over a greater number of competitions to investigate the stability of athletes' response patterns over time.

In summary, the present study highlights the need for future directional anxiety research to consider the interdependence of intensity and direction scores on individual items and also to investigate the perceived functional effect of anxiety in relation to performance outcome. Furthermore, the results revealed in the present study, which indicate that a large amount of facilitative responses might be characterized by a low-intensity level of anxiety among athletes, urge caution when previous results supporting the importance of facilitative anxiety interpretations are considered.

Perspectives

Since the introduction of a directional dimension of the competition anxiety construct (e.g., Jones, 1991, 1995; Jones & Swain, 1992), a vast number of studies have used separate anxiety intensity and anxiety direction subscales to investigate athletes' perceptions of functional effect of their anxiety symptoms. A methodological limitation of these studies is that the relationship between the selected intensity score

of anxiety and the rated direction (i.e., facilitative or debilitating to performance) has not been accounted for. Performance outcome data have also been lacking in a majority of the studies. The present study presents an approach to overcome this limitation by analyzing athletes' directional ratings of anxiety at diverse intensity levels and comparing the direction scores with performance outcome. Because this study identifies a majority of facilitative ratings to relate to merely low or no perceived anxiety intensity levels, concerns are raised regarding the empirical support previously presented for the importance of an anxiety direction dimension. The findings also question the utility of the approach in explaining or predicting performance outcome. The need for advances in measurement and statistical approaches utilized in anxiety research in order to enable an integrated study of anxiety intensity and direction is emphasized.

Key words: competitive anxiety, measurement, emotions.

Acknowledgements

This study was made possible by research grants from the Swedish School of Sport and Health Sciences and the Swedish National Centre for Sports Research.

References

- Burton D. Measuring competitive state anxiety. In: Duda J, ed. *Advances in sport and exercise psychology*. Morgantown: Fitness Informational Technology, 1998: 129–148.
- Burton D, Naylor S. Is anxiety really facilitative? Reaction to the myth that cognitive anxiety always impairs performance. *J Appl Sport Psychol* 1997; 9: 295–302.
- Cerin E. Anxiety versus fundamental emotions as predictors of perceived functionality of pre-competitive emotional states, threat, and challenge in individual sports. *J Appl Sport Psychol* 2003; 15: 223–238.
- Cox RH, Martens MP, Russell WD. Measuring anxiety in athletics: the revised competitive state anxiety inventory-2. *J Sport Exerc Psychol* 2003; 25: 519–533.
- Eubank M, Collins D. Coping with pre- and in-event fluctuations in competitive state anxiety: A longitudinal approach. *J Sports Sci* 2000; 18: 121–131.
- Fletcher D, Hanton S. The relationship between psychological skills usage and competitive anxiety responses. *Psychol Sport Exerc* 2001; 2: 89–101.
- Hanin YL. Individual zones of optimal functioning (IZOF) model. Emotion-performance relationships in sport. In: Hanin YL, ed. *Emotions in sport*. Champaign, IL: Human Kinetics, 2000: 65–111.
- Hanin YL. Emotions in sport: current issues and perspectives. In: Tenenbaum G, Eklund RC, eds. *Handbook of sport psychology*, 3rd edn. Hoboken, NJ: John Wiley & Sons, 2007: 31–58.
- Hanin YL, Syrjä P. Predicted, actual and recalled affect in Olympic-level soccer players: idiographic assessments and individualized scales. *J Sport Exerc Psychol* 1996; 18: 325–335.
- Hanton S, Connaughton D. Perceived control of anxiety and its relationship to self-confidence and performance. *Res Q Exerc Sport* 2002; 73: 87–97.
- Hanton S, Jones G. Antecedents of intensity and direction dimensions of competitive anxiety as a function of skill. *Psychol Rep* 1997; 81: 1139–1147.
- Hanton S, Jones G. The acquisition and development of cognitive skills and strategies: I. Making butterflies fly in formation. *Sport Psychol* 1999; 13: 1–21.
- Hanton S, Jones G, Mullen R. Intensity and direction of competitive state anxiety as interpreted by rugby players and rifle shooters. *Percept Mot Skills* 2000; 90: 513–521.
- Hanton S, Mellalieu SD, Hall R. Self-confidence and anxiety interpretation: a qualitative investigation. *Psychol Sport Exerc* 2004; 5: 477–495.
- Hanton S, Mellalieu SD, Young SG. A qualitative investigation of the temporal pattern of the precompetitive anxiety response. *J Sports Sci* 2002; 20: 911–928.
- Hanton S, Neil R, Mellalieu SD, Fletcher D. Competitive experience and performance status: an investigation into multidimensional anxiety and coping. *Eur J Sport Sci* 2008; 8: 143–152.
- Hardy L. Responses to the reactants on three myths in applied consultancy work. *J Appl Sport Psychol* 1998; 10: 212–219.
- Jones G. Recent developments and current issues in competitive state anxiety research. *Sport Psychol* 1991; 4: 152–155.
- Jones G. More than just a game: research developments and issues in competitive

- state anxiety in sport. *Br J Psychol* 1995; 86: 449–478.
- Jones G, Hanton S. Interpretation of competitive state anxiety symptoms and goal attainment expectancies. *J Sport Exerc Psychol* 1996; 18: 144–157.
- Jones G, Hanton S. Pre-competitive feeling states and directional anxiety interpretations. *J Sports Sci* 2001; 19: 385–395.
- Jones G, Hanton S, Swain A. Intensity and interpretation of anxiety symptoms in elite and non-elite sports performers. *Pers Individ Dif* 1994; 17: 657–663.
- Jones G, Swain A. Intensity and direction dimensions of competitive state anxiety and relationships with competitiveness. *Percept Mot Skills* 1992; 74: 467–472.
- Jones G, Swain A. Predispositions to experience debilitating and facilitative anxiety in elite and non-elite performers. *Sport Psychol* 1995; 9: 201–211.
- Jones G, Swain A, Hardy L. Intensity and direction dimensions of competitive state anxiety and relationships with performance. *J Sport Sci* 1993; 11: 525–532.
- Krane V. The mental readiness form as a measure of competitive state anxiety. *Sport Psychol* 1994; 8: 189–202.
- Lazarus R. How emotions influence performance in competitive sports. *Sport Psychol* 2000; 14: 229–252.
- Lundqvist C, Hassmén P. Competitive state anxiety inventory-2: evaluating the Swedish version by confirmatory factor analyses. *J Sports Sci* 2005; 23: 727–736.
- Martens R, Burton D, Vealey RS, Bump L, Smith DE. Development and validation of the competitive state anxiety inventory-2 (CSAI-2). In: Martens R, Vealey RS, Burton D, eds. *Competitive anxiety in sport*. Champaign, IL: Human Kinetics, 1990: 117–213.
- Mellalieu SD, Hanton S, Fletcher D. A competitive anxiety review: recent directions in sport psychology research. In: Hanton S, Mellalieu SD, eds. *Literature reviews in sport psychology*. New York: Nova Sciences, 2006a: 1–45.
- Mellalieu SD, Hanton S, Jones G. Emotional labeling and competitive anxiety in preparation and competition. *Sport Psychol* 2003; 17: 157–174.
- Mellalieu SD, Hanton S, O'Brian M. Intensity and direction of competitive state anxiety as a function of sport type and experience. *Scand J Med Sci Sports* 2004; 14: 326–334.
- Mellalieu SD, Neil R, Hanton S. An investigation of the mediating effects of self-confidence between anxiety intensity and direction. *Res Q Exerc Sport* 2006b; 77: 263–270.
- Perry JD, Williams JM. Relationship of intensity and direction of competitive trait anxiety to skill level and gender in tennis. *Sport Psychol* 1998; 12: 169–179.
- Pijpers JR, Oudejans RRD, Holsheimer F, Bakker FC. Anxiety-performance relationships in climbing: a process-oriented approach. *Psychol Sport Exerc* 2003; 4: 283–304.
- Raglin JS, Hanin YL. Competitive anxiety in sport. In: Hanin YL, ed. *Emotions in sport*. Champaign, IL: Human Kinetics, 2000: 93–111.
- Robazza C, Pellizzari M, Berollo M, Hanin YL. Functional impact of emotions on athletic performance: comparing the IZOF model and the directional perception approach. *J Sports Sci* 2008; 26: 1033–1047.
- Woodman T, Hardy L. Stress and anxiety. In: Singer RN, Hausenblas HA, Janelle M, eds. *Handbook of sport psychology*, 2nd edn. New York: John Wiley & Sons Inc., 2001: 290–318.

Copyright of Scandinavian Journal of Medicine & Science in Sports is the property of Wiley-Blackwell and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.