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Competitive anxiety responses in the week leading up to competition: the role of intensity, direction and frequency dimensions

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Abstract

Objectives: To investigate the symptom responses associated with competitive anxiety through a fine-grained measurement approach. Incorporating dimensions of intensity, perceptions of direction, and frequency of intrusions, possible time-to-event changes were assessed with respect to the between-subjects variable of skill level.

Method: Male athletes ($N = 82$), separated into two skill classifications (club $N = 45$ vs. national $N = 37$), completed the competitive state anxiety inventory-2 (CSAI-2) modified to account for the dimensions of intensity, direction and frequency at five precompetition times (1 week, two days, one day, 2 h, 30 min).

Results: Multivariate analysis of variance (skill level×time-to-competition) with follow-up analyses indicated main effects for skill level and time-to-competition with no interactions. For skill level differences, national athletes were more facilitative in their interpretation of the symptoms associated with cognitive and somatic anxiety. For change-over-time effects, intensities of cognitive and somatic anxiety increased and self-confidence decreased between 2 h and 30 min precompetition. Frequencies of cognitive anxiety increased from seven to two days, one day to 2 h and 2 h to 30 min precompetition; frequencies of somatic anxiety increased from seven days to two days and 2 h to 30 min pre-event; frequencies of self-confidence increased from seven to two days.

Conclusions: Findings support the notion of measuring the separate dimensions of symptoms associated with competitive anxiety and emphasise the importance of assessing these constructs as processes that unfold over-time.

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Introduction

The stressful nature of elite sport, and the competitive environment surrounding it, places many demands on participating athletes (Jones, 1995). The examination of athlete's behavioural, and emotional responses to such stressors has developed into a focal area of sport psychology with many researchers interested in assessing anxiety responses of athletes to competitive events (Woodman & Hardy, 2001). Accordingly, the multidimensional conceptualisation of competitive anxiety and the development of the competitive state anxiety inventory-2 (CSAI-2; Martens, Burton, Vealey, Bump, & Smith, 1990) have been identified as major developments within the field. These developments have led to a plethora of research assessing athletes levels (i.e. intensity) of competitive anxiety in relation to factors such as situational antecedents, the temporal patterning of the subcomponents and the anxiety performance relationship (see Woodman & Hardy, 2001 for a review).

Although this vein of research has contributed greatly to our understanding, additional dimensions of competitive anxiety have been proposed, such as directional perceptions (i.e. the interpretation of the symptoms associated with competitive anxiety as being either facilitative or debilitative towards performance; Jones, 1995; Jones & Hanton, 2001). Empirical research supporting this distinction has been provided in studies examining variables such as skill level (Jones, Hanton, & Swain, 1994; Jones & Swain, 1995), competitiveness (Jones & Swain, 1992), antecedents of competitive anxiety (Hanton & Jones, 1997), sporting performance (Jones, Swain, & Hardy, 1993; Swain & Jones, 1996), gender differences (Perry & Williams, 1998), hardiness (Hanton, Evans, & Neil, in press), and the temporal patterning of anxiety subcomponents (Wiggins, 1998). Specifically, the direction scale of the modified CSAI-2 has shown greater sensitivity in identifying the above individual and situational variables in comparison to the intensity dimension. Further, qualitative research (Hanton & Jones, 1999; Hanton & Connaughton, 2002) has provided additional justification for the notion of directional perceptions.

Although the identification of such dimensions is encouraging, further areas within the study of responses associated with competitive anxiety require attention. Specifically, stress researchers note that "The essence of stress, coping and adaptation is change…unless we focus on change we cannot learn how people come to manage stressful events and conditions" (Folkman & Lazarus, 1985; p. 150; cf. Lazarus, 1999). Therefore, if stress is embodied as a process that unfolds over time, researchers should be aware that the emotional responses to it (e.g. competitive anxiety) are likely to be characterised by change due to the ever fluctuating environment the athlete faces (Cerin, Szabo, Hunt, & Williams, 2000; Cerin, Szabo, & Williams, 2001; Lazarus, 1999). This proposal emphasises the importance of examining athletes' responses to competitive stress through process-orientated (i.e. change-over-time) research designs (Cerin et al., 2000; Lazarus, 1999).

Although researchers have examined the 'intensity' of stress responses in the time leading up to competition (Hall, Kerr, & Matthews, 1998; Jones, Swain, & Cale, 1991; Martens et al., 1990), limited research attention has been given to assessing how the different dimensions of anxiety unfold over time. Investigation on such a theme was initiated by Wiggins (1998) through a pre-

competition period of 24 h. Using a somewhat limited pre-event phase, it was noted that athletes' interpretations (i.e. direction scores) of both cognitive and somatic anxiety tended to remain stable in the time leading up to the event. This led Wiggins to conclude that once athletes had interpreted their symptoms associated with competitive anxiety as facilitative or debilitative towards performance this perception did not change. However, there are limitations to this assertion. As noted by Wiggins a temporal period of 24 h constrains the degree of change that can occur in any dimension of anxiety symptoms, and also seems at odds with previous intensity based temporal designs (Jones et al., 1991; Martens et al., 1990). The use of a greater precompetition time period could allow a more in-depth insight into the changes that may occur within the direction dimension as athletes near a competitive event.

In addition to examining anxiety perceptions as responses that may change over time, there is scope for researchers to consider a frequency component to the response (i.e. the amount of time spent attending to symptoms experienced concerning competition; Swain & Jones, 1993), a point that becomes particularly relevant through time-to-event research. Emotion researchers (Diener, Sandvik, & Pavot, 1991; Kardum, 1999) suggest that the frequency and intensity of responses, although related, should be measured and viewed as separate dimensions which independently contribute to affective experiences. Further, it has been suggested that individuals are able to report frequency components of emotional responses with greater accuracy and less recall bias than intensity components of the same emotional experience (Diener et al., 1991; Hasher & Zacks, 1984; Thomas & Diener, 1990). However, there remains a distinct lack of temporal based research which alludes to a frequency component of the response (Cerin et al., 2000; Woodman & Hardy, 2001). Swain and Jones (1993) initiated one line of research by adding a frequency scale to each item of the CSAI-2 asking 'How frequently do you experience this thought or feeling at this stage?' Investigating through a temporal period of 48 h, the findings showed cognitive frequencies were more variable than cognitive intensities, and that cognitive and somatic frequency increased progressively as the competition neared. Although informative, further advances on this research approach are limited. More recently, Cerin et al. (2001) included a single global percentage thinking item asking 'To what extent is the competition occupying your mind at this stage?' in a study assessing two aims; the validity of the experience sampling method (ESM) for data collection in temporal designs, and the temporal patterning of a conglomerate of precompetitive emotions. Although increases in the frequency component were noted (i.e. one day and 1 h before competition), variability in the dimension was limited in comparison to that expressed by Swain and Jones. This could be attributed to the global nature of Cerin et al.'s frequency item, and the lack of specificity relating it to actual emotional responses (i.e. cognitive or somatic). However, at the very least, the variation serves to enhance the view that athletes emotional responses should be assessed with reference to a frequency component.

It was the aim of the present research to draw several of these issues together. First, the study answered the call for anxiety researchers to consider dimensions of intensity, direction and frequency of intrusion collectively (Woodman & Hardy, 2001). Second, the study assessed the relative independence of these dimensions as separate components of the athlete's emotional response. Based respectively on research from sport psychology (Jones & Hanton, 2001) and general psychology (Diener et al., 1991; Kardum, 1999), it was hypothesised that the intensity and directional perceptions, and the intensity and frequency of intrusions of competitive anxiety, would be relatively independent dimensions. Third, the research extended the process-oriented view of emotion

into these additional dimensions by attempting to assess their change as competition moved closer (Cerin et al., 2000, 2001). As an extension to the investigations of Wiggins (1998) and Swain and Jones (1993), the use of a longer temporal period was deemed appropriate to fully allow possible fluctuations in symptomotology (i.e. cognitive and somatic) across each of the dimensions to be expressed. For the intensity dimension, the hypotheses were based on the original multidimensional anxiety theory work of Martens et al. (1990). Specifically, it was proposed that cognitive anxiety and self-confidence would remain stable in the time leading up to competition where as somatic anxiety would increase as the competition approached. For directional perceptions, predictions were based on the initial findings of Wiggins and proposed that no time-to-competition effects would be found. For frequency of intrusions, the hypotheses were based on the initial work of Swain and Jones and proposed that cognitive and somatic frequency would increase as the competition moved closer but that self-confidence frequency would remain stable. Finally, the temporal patterns of the dimensions were assessed with reference to the between-subjects variable of skill level. In short, research has noted that athletes high in skill level can experience lower intensities (Campbell & Jones, 1997; Gal-Or, Tenenbaum, & Shimrony, 1986), and more facilitative interpretations (Jones et al., 1994), of the symptoms associated with competitive anxiety for time periods immediately before competition. Based on these studies it was predicted that national level athletes would experience lower intensities of cognitive and somatic anxiety, and display higher intensities of self-confidence than the club level athletes and that these differences would remain throughout the precompetition period. Further, it was hypothesised that national level athletes would interpret the symptoms associated with cognitive and somatic anxiety as more facilitative towards future performance than the club level performers and that these differences would remain throughout the precompetition period. To the authors' knowledge no previous research has examined skill level differences in the frequency of intrusions of anxiety and self-confidence. Thus, tentative predictions were offered based on the skill level differences that have been noted in the intensity and direction dimensions. Specifically, it was hypothesised that national level athletes would experience less frequency of intrusions for cognitive anxiety and somatic anxiety, and greater frequency of intrusions for self-confidence in comparison to the club level athletes and that these differences would remain throughout the precompetition period.

Method

Participants

Competitive male athletes ($N = 82$) with an age range of 19 to 26 ($M = 21.63$, $SD = 3.04$) gave written consent to participate. The athletes were derived from team sport backgrounds with the disciplines of rugby union ($N = 53$), soccer ($N = 22$), and field hockey ($N = 7$) represented. Based on classifications used in previous directional perceptions research (Jones et al., 1994), the sample was separated by the between-subjects variable of skill level. Participants noted their current performance skill level under the categories of club performer, collegiate performer, county performer, regional performer, national U21, national emerging, national B squad and full national. Athletes were separated into two groups characterised by club performers ($N = 45$) vs. national level performers ($N = 37$). To avoid overlap between the two skill level groups the club

performers classification only contained athletes noting their current competitive status as either club or collegiate. In comparison, the national performers classification only included athletes noting their current competitive status as national U21, national emerging, national B squad or full national status. Hence athletes recoding their status as county or regional performers were not included in the data analysis. All participants completed the inventory set prior to a competitive fixture relevant to their current competitive status level.

Instrumentation

Modified CSAI-2

The CSAI-2 (Martens et al., 1990), modified to include scales for direction (Jones & Swain, 1992) and frequency of intrusions (Swain & Jones, 1993), was used as the measure of competitive anxiety. Participants rated their anxiety responses over the multidimensional constructs of cognitive anxiety, somatic anxiety and self-confidence through a total of 27 items with nine items representative of each construct. Symptom intensity levels were rated on a scale ranging from 1 ('not at all') to 4 ('very much so') leading to intensity scores ranging from 9 to 36 for each anxiety and confidence construct. Internal consistency scores (Cronbach's alpha coefficients) for the intensity scale have been reported to be acceptable (range 0.79 to 0.90; Martens et al., 1990).

Participants also rated the degree to which symptom intensities were regarded as facilitative (positive) or debilitative (negative) to subsequent performance on the direction scale developed by Jones and Swain (1992). Specifically, the direction continuum for each item ranged from −3 ('very debilitative': negative) to +3 ('very facilitative': positive) with 0 indicating an 'unimportant' interpretation. Therefore, symptom perceptions ranged from –27 to +27 for each of the constructs of anxiety and confidence. Cronbach's alpha coefficients have demonstrated internal consistency for the direction scale yielding values from 0.80 to 0.89 for cognitive anxiety and 0.72 to 0.84 for somatic anxiety (Hanton, Jones, & Mullen, 2000; Jones & Hanton, 1996). Finally, the frequency of intrusions scale, developed by Swain and Jones (1993), was included in the modified CSAI-2. This scale assesses the degree to which symptom related thoughts or experiences occurred on a scale ranging from 1 ('not at all') to 7 ('all the time') for each item of the inventory. Therefore, symptom frequencies ranged from 9 to 63 across each construct of anxiety and confidence. Although the frequency scale has been subjected to primary investigation, no internal reliability scores are currently available.

Procedure

Athletes were approached prior to a regular training session following initial discussions with coaches and/or club representatives. At these sessions potential participants were advised of the structure and timetabling of the data collection and were informed that the researcher was interested in understanding more about their precompetition mental routines. Following this, volunteers were identified who agreed to participate in the study. These individuals were introduced to the modified CSAI-2 and familiarised with the response format of the inventory.

Participants were informed that data were to be collected at five temporal stages of 1 week, two days, one day, 2 h, and 30 min prior to competition. These stages reflected the time scales used in the validation of the original CSAI-2 and were synonymous with previous intensity based

temporal research (Gould, Petlichoff, & Weinberg, 1984; Jones et al., 1991). Participants were referred to the standardised instructional set of Martens et al. (1990), highlighting the need for honesty and to respond to feelings they were experiencing 'right now'.

Data analysis

Data analysis was separated into four stages. First, data were pre-screened and statistical assumptions were tested. The second stage emphasised the importance of measuring the different dimensions of anxiety and self-confidence through a correlation analysis between the intensity and direction, and intensity and frequency dimensions at each precompetition stage. Third, pre-competition means were presented, followed by calculation of temporal changes of symptoms through a series of multivariate analysis of variance tests testing for interaction and main effects of experimental group (skill level) by time-to-competition (repeated measures on the second factor) for each inventory construct and dimension.

Results

Data pre-screening

Data were tested for missing cases, distributions and assumptions of univariate and multivariate analyses (Field, 2000; Tabachnick & Fidell, 1996). No missing cases and no univariate or multivariate outlying cases ($p = 0.001$) within each dependent variable (Mahalanobis distance test) were identified. Following the guidelines of Field (2000) and Tabachnick and Fidell (1996), normality assumptions were tested at the univariate level along with assessments of linearity, multicollinearity and singularity, with all deemed to be satisfactory. The assumption of equality of covariance matrices, although satisfactory at the univariate level (Levene's test and $F_{\max}$ ratios), was violated in some cases at the multivariate level (Box's test). Therefore, Pillia's trace was chosen as the appropriate multivariate test statistic due to its robustness over test violations (Field, 2000; Tabachnick & Fidell, 1996).

Correlational analyses

Correlations between the intensity and direction scales of anxiety emphasised the importance of examining these separate dimensions. The values obtained between intensity and direction dimensions of cognitive and somatic anxiety indicated a shared variance proportion of 9% ($r = 0.30$) and is consistent with previously reported findings (Hanton et al., 2000; Jones & Hanton, 2001). However, the variance proportions displayed for the self-confidence construct were of interest. Previous directional perceptions research has tended to discard the self-confidence direction subscale based on the notion that it essentially measures the same state as the intensity scale (Jones et al., 1993; Jones & Hanton, 2001). This conclusion was inferred from Jones et al.'s (1993) study through the attainment of a correlation coefficient of 0.80 between the two variables. Although the values reported here reflect a level of shared variance between the two scales ($r = 0.49$), the proportions indicate a degree of independence between the two constructs.

The correlation analysis between the intensity and frequency dimensions again emphasised the importance of measuring these separate dimensions of the emotional response. In short, cognitive intensity and frequency indicated a shared variance of 15% ($r = 0.39$), somatic intensity and frequency also revealed a shared variance of 15% ($r = 0.39$), where as self-confidence intensity and frequency shared 8% ($r = 0.28$) variance during the precompetitive period. These results support the view that although related, both intensity and frequency should be considered as separate dimensions of the emotional response, and as such warrant separate measurement (Diener et al., 1991; Kardum, 1999).

Multivariate analysis of variance

Three 2 (skill level) ×5 (time-to-competition) MANOVAs, with repeated measures on the second factor, were computed. One MANOVA was conducted on each anxiety dimension (intensity, direction and frequency of intrusions), with skill level acting as the independent variable and cognitive anxiety, somatic anxiety and self-confidence acting as the dependent variables over all time periods in each analysis. Across all analyses no interaction effects were noted ($p > 0.05$) suggesting that any change-over-time patterns were consistent (or parallel) across the two skill level classifications. This resulted in data being collapsed across skill levels for the change-over-time analysis (Table 1). The identification of significant main effects for skill level or time-to-competition main effects was followed with one-way ANOVAs testing for between-subject skill level effects or within-subject repeated measures effects for time-to-competition[1] followed by *t*-test with the Bonferroni correction factor applied were appropriate (Field, 2000; Tabachnick & Fidell, 1996).

Table 1
Anxiety and confidence means and SDs over all time periods collapsed across all skill levels

Component	Seven days *M* (*SD*)	Two days *M* (*SD*)	One day *M* (*SD*)	1 h *M* (*SD*)	30 min *M* (*SD*)
CA-I	22.48 (6.94)	22.59 (6.83)	24.06 (5.98)	22.98 (6.24)	25.83 (5.74)
SA-I	19.40 (6.15)	18.82 (6.47)	20.92 (6.29)	22.11 (7.45)	26.05 (5.49)
SC-I	25.57 (5.83)	24.93 (7.27)	24.11 (5.89)	24.85 (6.09)	22.85 (5.56)
CA-D	5.10 (13.12)	7.16 (13.94)	8.82 (11.38)	8.04 (12.72)	7.63 (12.07)
SA-D	2.42 (13.41)	6.61 (12.40)	9.32 (9.00)	7.85 (11.66)	7.83 (12.19)
SC-D	5.89 (14.72)	9.54 (11.93)	8.45 (11.10)	7.66 (13.24)	8.37 (12.15)
CA-F	25.63 (11.50)	35.22 (12.47)	35.55 (12.42)	40.10 (13.28)	45.15 (12.18)
SA-F	25.23 (10.95)	33.60 (12.70)	33.98 (13.09)	34.73 (14.38)	39.77 (13.79)
SC-F	29.56 (13.70)	40.20 (11.21)	39.72 (12.07)	40.32 (12.29)	39.00 (11.86)

CA: cognitive anxiety; SA: somatic anxiety; SC: self-confidence; I: intensity; D: directional perception; F: frequency of intrusions.

[1] Assumption of sphericity was violated; the green-house Geiser correction factor was applied to the degrees of freedom for subsequent *F* statistic calculation (Field, 2000; Tabachnick & Fidell, 1996).

Intensity of anxiety

No main effects were noted in the intensity dimension for skill level classification (Pillia's trace = 0.067, $F_{3,78} = 1.86$, $p > 0.05$). However, main effects were noted for time-to-competition (Pillia's trace = 0.746, $F_{12,69} = 16.88$, $p < 0.001$), with follow-up ANOVAs indicating changes for cognitive anxiety ($F_{3,226} = 5.95$, $p < 0.001$, $\eta^2 = 0.07$), somatic anxiety ($F_{3,250} = 23.32$, $p < 0.001$, $\eta^2 = 0.25$), and self-confidence ($F_{3,264} = 3.84$, $p < 0.01$, $\eta^2 = 0.09$). Specifically, cognitive and somatic anxiety intensity increased between 2 h and 30 min before competition, with self-confidence intensity decreasing between such times (Fig. 1).

Perceptions of anxiety direction

Main effects were noted for anxiety direction for skill level classification (Pillia's trace = 0.193, $F_{3,78} = 6.22$, $p < 0.001$) with follow-up between-subject ANOVAs indicating skill level differences were evident for cognitive anxiety ($F_{1.80} = 13.75$, $p < 0.001$, $\eta^2 = 0.15$) and somatic anxiety ($F_{1.80} = 10.45$, $p < 0.001$, $\eta^2 = 0.12$). Specifically, national performers were more facilitative than their club counterparts for their interpretation of the symptoms associated with cognitive anxiety ($M = 10.20$ vs. 5.01, respectively) and somatic anxiety ($M = 9.27$ vs. 4.78, respectively) through the overall precompetition time period. However, no time-to-competition main effects were noted (Pillia's trace = 0.209, $F_{12,69} = 1.52$, $p > 0.05$).

Frequency of intrusions

No main effects were noted for frequency of intrusions for skill level classification (Pillia's trace = 0.021, $F_{3,78} = 0.57$, $p > 0.05$). However, main effects were observed for time-to-competition (Pillia's trace = 0.774, $F_{12,69} = 19.66$, $p < 0.001$) with follow-up ANOVAs noting changes for cognitive anxiety ($F_{3,264} = 45.59$, $p < 0.001$, $\eta^2 = 0.36$), somatic anxiety

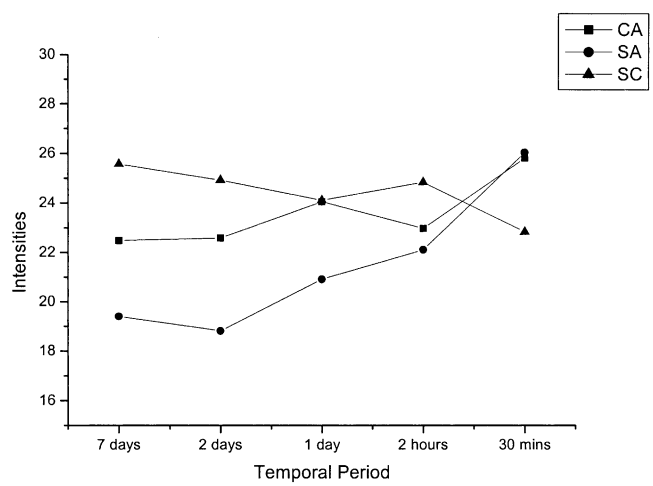

Fig. 1. Change-over-time patterns for intensity of responses.

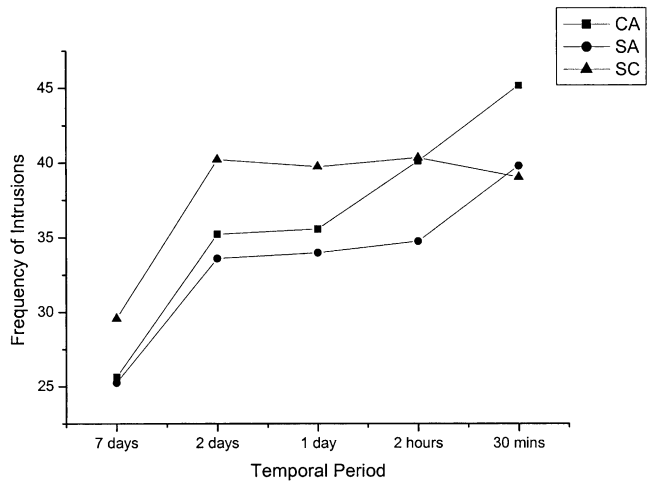

Fig. 2. Change-over-time patterns for frequency of intrusions of responses.

($F_{3,199} = 22.45$, $p < 0.001$, $\eta^2 = 0.22$) and self-confidence ($F_{2,188} = 20.14$, $p < 0.001$, $\eta^2 = 0.20$). Specifically, cognitive anxiety frequency displayed an increase between seven and two days before competition followed by progressive increases within one day of the event. Somatic anxiety frequency indicated increases from seven to two days and from 2 h to 30 min before the competition. Finally, self-confidence frequency indicated an increase from seven to two days before the competition followed by a stable profile over the remainder of the temporal stages (Fig. 2).

Discussion

This study attempted to advance previous competitive anxiety research by being the first to address all three dimensions within one research design (Jones, 1995; Woodman & Hardy, 2001). Symptoms associated with the intensity, direction and frequency of intrusions of competitive anxiety were examined through a temporal design capable of assessing symptoms as responses that unfold over time (Cerin et al., 2000; Lazarus, 1999). The importance of measuring the different dimensions was emphasised through the levels of shared variance expressed between intensity, direction and frequency dimensions of anxiety in support of the proposed hypotheses. Although previous research has recognised the differences between the intensity and direction of responses (Hanton et al., 2000; Jones & Hanton, 2001), the relative independence between intensity and frequency dimensions has remained uncovered. The shared variances expressed support emotion researcher's beliefs that intensity and frequency are related, but should be considered as, and therefore measured as, separate dimensions that independently contribute to the individual's affective experience (Diener et al., 1991; Kardum, 1999).

The findings for the between-subjects factor of skill level supported the notion that higher skilled performers interpret the symptoms associated with competitive anxiety as more facilitative towards performance (Jones et al., 1994). However, in comparison to the single time point analysis

(i.e. immediately before competition) adopted by Jones et al., the temporal basis of the present study extends these differences across a wider precompetition period encompassing the week leading up to competition. Taken in conjunction with Jones and Swain's (1995) similar results for trait anxiety, it appears that these differences remain relatively stable across the two groups. It should be noted, however, that no differences were obtained in our study for self-confidence intensities between the two groups. This finding contradicts Jones et al.'s state level research where elite performers showed higher levels (intensities) of self-confidence immediately before competition in comparison to non-elite athletes. Such differences were not noted in the trait anxiety research of Jones and Swain, whose findings were synonymous with those reported here. Possible explanations could relate to the populations used. Specifically, as with this study, Jones and Swain utilised a team sport sample, in comparison to the individual based sport of swimming used by Jones et al. Further, the type of analysis used in this study took group scores and assessed differences over results combined across the precompetition period. This process may lead to a more stable type of group response (i.e. akin to trait symptoms) being displayed than the use of just one state sampling point immediately prior to the onset of competition, the type of method employed in Jones et al.'s original research.

In addition to no skill level differences being observed for the intensity of responses, no skill level differences were observed for frequency of intrusions of symptoms, a finding that does not support the hypotheses and emphasises the notion that directional interpretation remains an important distinguishing variable of the anxiety response between athletes with high and low skill levels (Hanton & Jones, 1997; Jones & Swain, 1995).

The change-over-time data further indicated the importance of measuring the separate dimensions of the anxiety response. Patterns displayed for the intensity of symptoms showed increases in both cognitive and somatic anxiety between the two stages on the day of competition, whereas self-confidence levels decreased at such times. Although not wholly consistent with either our predictions nor Martens et al.'s (1990) original work, this pattern of results for state cognitive anxiety and self-confidence has previously been realised in intensity based temporal research (Jones et al., 1991; Swain & Jones, 1993). Further, the increase in somatic anxiety intensity observed on the day of competition fits well with the predictions of multidimensional anxiety theory and supports previous research within the field (Gould et al., 1984; Martens et al., 1990; Swain & Jones, 1993). However, the additional measurement of frequency of intrusion data provides further information on the processes of competitive anxiety in the time leading up to competition.

It appears that the frequency dimension of both cognitive and somatic anxiety are more sensitive to changes-over-time. Specifically, frequency of cognitive intrusions increased successively through the precompetition period except between the two- and one-day stage. These results support the data obtained by Swain and Jones' (1993) initial frequency based study and further the precompetition time period to 1 week rather than 48 h before an event. Additionally, the use of the dimensional approach furthers the idea that the intensity and frequency of cognitive symptoms follow a dissociative pattern in the time leading up to competition. Although cause and effect cannot be inferred here, the pattern of results intimates that changes in frequency of cognitive anxiety are more sensitive, and occur earlier, in the precompetition period than changes in intensity. The need to explore the relationships between these two dimensions is apparent; it could be that changes in frequency of intrusions act as a precursor to heighten the anxiety levels experi-

enced by athletes. This may have implications for the way sport psychologists intervene with athletes in the times leading up to competition.

Further, the findings for somatic anxiety also suggest that the frequency of athletes' experiences are more sensitive to temporal changes than intensity. This was emphasised by the increase in frequencies between the seven and two day and 2 h to 30 min precompetition stages. However, the somatic frequency data are not totally congruent with the changes noted in Swain and Jones' (1993) study. Specifically, they observed progressive increases in somatic frequency from within two days of competition (two days, one day, 2 h, 30 min) whereas here these mid-point stages remained relatively stable (Fig. 2). Explanations for this discrepancy could rest with the proposal of Swain and Jones that the somatic frequency dimension and temporal changes within it appear to be synonymous with the fluctuations observed in the intensity dimension. The consensus between the fluctuations (i.e. lack of change-over-time) in somatic intensity and somatic frequency at these mid-point stages emphasises this suggestion. Additionally, it was noteworthy to observe the increase in the frequency of self-confidence thoughts between seven and two days before the event. Unfortunately, comparisons to Swain and Jones' (1993) research cannot be made due to the limited (i.e. within 48 h) time periods they considered. However, it should be noted that, as hypothesised, following this initial increase self-confidence frequency remained stable in the time leading up to competition. This increase could possibly be attributed to the length of temporal period considered. The 1-week before competition data point was very close to many athletes' previous weeks' performance and therefore could have been affected by thoughts related to their last contest. Although measures of last game accomplishments were not taken, the frequency with which athletes think about self-confidence could be mediated by defeat or experiences of a perceived poor performance, especially at measurement times just after such competitions.

As hypothesised, the directional perceptions of athletes did not fluctuate in the time leading up to competition. Therefore, it appears that once athletes have interpreted their symptoms of anxiety as either positive or negative towards performance, these interpretations remain relatively stable before competition. These results reinforce the research of Wiggins (1998) and extend the findings to a 1 week precompetition period. However, both the research here and the work of Wiggins used sample populations that were facilitative in nature. Further temporal based research assessing change in perceptions of anxiety direction in athletes who view the symptoms associated with competitive anxiety as debilitating may evoke patterns different to those reported here.

In summary, this study emphasises the importance of examining the symptoms associated with competitive anxiety across three dimensions through a design that embodies stress and the reactions to it as processes that unfold over time, proposals evidenced through differences in skill level and patterns in change-over-time within the relevant dimensions of the anxiety response. However, the relative infancy of this approach necessitates further research probing different moderators of anxiety symptoms. Although skill level has emphasised the differences that exist in the perceptions of anxiety direction of elite vs. non-elite performers, the moderator appears less important for distinguishing responses of intensity and frequency. Possibly the use of anxiety direction itself (i.e. positive or negative) as the moderator variable may help to identify differences across the range of anxiety dimensions. To date, research assessing temporal changes in the additional dimensions of anxiety direction and frequency of intrusions (Swain & Jones, 1993; Wiggins, 1998) has only used athletes with facilitative interpretations. The incorporation of individuals who view anxiety as debilitative may further our understanding of such responses through-

out athletes' precompetition preparation times. Further, in light of the relative independence observed between the intensity and frequency dimensions of anxiety (Diener et al., 1991; Kardum, 1999), and the degree of temporal fluctuations noted for the frequency dimension (Swain & Jones, 1993), further research examining this under investigated concept is required. Finally, it is our belief that such research programmes should occur through a time-to-event paradigm to fully explore the reactions of athletes to the stress response. We suggest that researchers undertaking such programmes should attempt to apply the ESM into their research design. The recent work of Cerin et al. (2001), and their successful adaptation of ESM into the time-to-event literature, provides a method that can elicit a more dynamic image of athletes precompetition emotions. Indeed, the use of ESM could have strengthened this investigation with such approaches now being adopted within the overall research programme. The use of such measures and the undertaking of further temporal based research could prove invaluable to the applied sport psychologist regarding intervention programmes for athletes. At present the literature base is proliferated with studies examining athletes stress responses at times immediately before competition. This obviously provides a very limited knowledge base regarding the optimum time for the implementation of possible interventions. The use of research through time-to-event paradigms has the potential to provide a stronger rationale for the practitioner to intervene and implement planned change during the preparatory phases leading up to competitive events.

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