

The Effects of a Multimodal Intervention Program on Performers: II. Training the Butterflies to Fly in Formation

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The purpose of this study was to examine the effects of a multimodal intervention on swimmers debilitated by anxiety. A staggered single-subject multiple-baseline across-subjects design was used over 10 competitive races for 4 swimmers. Baseline observations on cognitive and somatic anxiety "direction" (facilitative/debilitating) scores were collected for three, four, and five races for Participants 2, 3, and 4, respectively, prior to treatment. The intervention was designed based on qualitative data from Hanton and Jones's (1999) study and included the skills of goal setting, imagery, and self-talk. These psychological skills emerged as particularly important from Hanton and Jones's investigation as a means of maintaining facilitative interpretations of precompetition anxiety symptoms. Preintervention, all participants reported debilitating interpretations of cognitive and somatic anxiety symptoms. However, postintervention, the 3 participants who received treatment reported facilitative interpretations. Performance improvements were also evident for these swimmers. A postintervention follow-up showed that swimmers' interpretations were still facilitative.

Recent developments in research addressing the measurement of competitive anxiety has forwarded the notion of "direction" into the sport psychology literature. The focus of this research challenged the traditional assumption that elevated anxiety is debilitating toward performance (see Jones, 1995, for a review). Recent empirical studies have incorporated a modified version of the Com-

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petitive State Anxiety Inventory-2 (CSAI-2) (Martens, Burton, Vealey, Bump, & Smith, 1990), which includes a direction scale, developed by Jones and Swain (1992) to measure facilitative and debilitating interpretations of anxiety symptoms. Findings from these studies have unearthed interesting differences between elite or successful performers and nonelite or less successful athletes (Jones, Hanton, & Swain, 1994; Jones & Swain, 1995; Jones, Swain, & Hardy, 1993). Specifically, in each study, the more elite or better performers in competition interpreted the intensity of their anxiety symptoms as more facilitative compared to less elite or poorer performers, despite no differences in anxiety intensity levels. However, these studies have not addressed the mechanisms via which facilitative interpretations have been learned and developed by elite performers.

Attempting to address this question, Hanton and Jones (1999) examined the acquisition of cognitive skills and strategies that enable elite performers to interpret anxiety symptoms as facilitative. Interviews and inductive analytical procedures were conducted with 10 elite male competitive swimmers who consistently interpreted anxiety symptoms as facilitative. The performers reported negative experiences associated with prerace anxiety when they were young, but learned that nerves could be positive. Further, they developed and now follow refined precompetition and prerace routines that aid them in maintaining facilitative interpretations of their anxiety symptoms. Within these routines, the psychological skills of goal setting, imagery, and self-talk emerged as particularly important in the maintenance of facilitative interpretations. Consequently, the positive interpretation of the participants' prerace thoughts and feelings was acquired through natural learning experiences associated with competition and via educational methods, such as taking advice from more experienced individuals. An important question arising from Hanton and Jones's study related to whether these psychological strategies can help athletes consistently debilitated by their anxiety symptoms interpret them as being facilitative and "fly in formation" toward performance (Orlick, 1986).

Two intervention studies have been conducted to examine the effects of various anxiety reduction techniques on soccer players debilitated by competitive anxiety (Maynard, Hemmings, & Warwick-Evans, 1995; Maynard, Smith, & Warwick-Evans, 1995). In contrast to the findings of Jones et al. (1994) and Jones and Hanton (1996), results indicated that the reduction in anxiety intensity levels via relaxation techniques was associated with more facilitative interpretations of the precompetition symptoms and increased self-confidence. Indeed, the differences between Jones et al.'s and Maynard et al.'s findings may have been a function of their differing research designs or the nature of the sports examined. However, the important issues emanating from these studies involve the fact that it may not be necessarily appropriate or possible to reduce symptoms via stress management techniques in certain sports. Therefore, sport psychologists need to unearth alternative methods of enhancing precompetition preparation. Clearly, future research is required within this area.

A large amount of intervention research adopting a nomothetic design has been conducted in sport psychology wherein relationships have been examined across relatively large groups of participants. However, depending on the research question, it may not be possible or appropriate to utilize a group design, and researchers should consider adopting a more idiographic approach, such as single-subject designs (Borg & Gall, 1989; Murphy, 1990). These designs monitor an individual's responses pre- and postintervention. Behavioral differences between

the baseline (pretreatment) and intervention phases (posttreatment) can then be observed. Kazdin (1982) explained that the rationale behind both research designs is essentially the same, where both aim to explore differences in behavior or social cognitions under differing conditions, but nomothetic designs expose groups of individuals to different conditions.

An important variation on multiple-baseline research is that of a staggered-baseline design, where treatment is introduced only when baseline observations have stabilized (Barlow & Hersen, 1984). Participants receive the intervention at different times depending on their individual baseline responses. This provides the researcher with a degree of flexibility for the designated time when treatment will be introduced. Cohn, Rotella, and Lloyd (1990) successfully applied a staggered design to sport when they examined the effects of a cognitive-behavioral intervention on 3 male elite intercollegiate golfers and established improvements in adherence to mental and behavioral preshot routines and performance posttreatment.

Criticisms of single-subject designs focus on potential problems with low external validity where researchers cannot generalize to how others might respond to the intervention (Borg & Gall, 1989; Sharpley, 1986). However, this can be minimized by replicating the results in further studies (Seidentop, 1981) and adopting the across-subjects design. A further criticism relates the subjective nature of visual inspection when interpreting the findings from single-subject designs. However, following defined criteria and guidelines when examining the treatment effect can protect against this weakness.

Several studies in sport psychology have utilized a single-subject design (e.g., Hamilton & Fremouw, 1985; Heyman, 1987; Kendall et al., 1990; Koop & Martin, 1983; Shambrook, Bull, & Douglas, 1994; Swain & Jones, 1995). The majority of studies have reported performance improvements and usually use relaxation as an integral part of the intervention treatment. Recently, Swain and Jones (1995) examined the effects of a goal-setting intervention on subcomponents of basketball performance of 4 elite college athletes. The intervention, based on Smith's (1988) goal-attainment scaling recommendations, involved generating numerical targets for subcomponent performance goals (e.g., turnovers, steals, rebounds, shot percentage, or assists). Results revealed that 3 of the 4 participants showed performance improvements in their targeted areas and that only the subcomponent targeted by the intervention improved, with no outcome changes in the other performance subcomponents. Despite encouraging findings from these studies, where researchers make assumptions that the interventions may be beneficial for certain performers, it is difficult to make theoretical conclusions about which performers may be most facilitated.

One further criticism of intervention research, as reported by Greenspan and Feltz (1989), relates to the lack of follow-up assessments after the posttest to address retention effects of the treatment. Therefore, although collecting data after the study may not be practical, follow-up assessments should be incorporated in future study designs.

Social validation assessment, which refers to collecting subjective evaluations of participants' performance or behavior from individuals who were involved in the investigation, has been advised as part of data collection in single-subject designs (Kazdin, 1982; Kendall et al., 1990; Wollman, 1986). This procedure enables a manipulation verification by assessing how each participant actually

experienced the intervention. Consequently, a more accurate assessment of the internal validity of findings can be presented. Kendall et al. (1990) recommended that the social validation should be assessed in how participants interpret the aims of the study; any significant behavior changes; and whether procedures used in the study were acceptable.

The purpose of the present study was to examine how a multimodal intervention program (comprising imagery, goal setting, and self-talk) affected the directional perceptions of competitive swimmers debilitated by precompetition anxiety symptoms via a staggered single-subject multiple-baseline design, where the intervention components were generated from interviews conducted by Hanton and Jones (1999). A total of 4 competitive swimmers participated, of which 3 received the treatment and 1 acted as a control. Specifically, the intervention was directed toward restructuring debilitating interpretations to facilitative ones and not on reducing the anxiety intensity levels.

Based on findings from previous direction literature, it was expected that the 3 swimmers receiving the intervention would report more facilitative interpretations of their precompetition anxiety and would experience higher self-confidence postintervention, and that the control participant would consistently report debilitating interpretations of precompetition anxiety and indicate stable self-confidence levels throughout the study. Intensity levels of cognitive and somatic anxiety would remain stable throughout for all participants. Also, based on the findings of Jones et al. (1993), it was expected that more facilitative interpretations would be associated with better swimming performances.

Method

Participant Selection Criteria

Initially, 8 potential participants were contacted and invited to participate in the study. Swimmers ranged in skill level from regional (equivalent to state honors) to national standards and were targeted from competitive swimming clubs from the surrounding vicinity for practical reasons of working one-on-one with the authors. Only males were targeted for the study in order to match the elite sample interviewed in Hanton and Jones's (1999) study. To address the research question, performers receiving the intervention needed to interpret both precompetition cognitive and somatic anxiety as clearly and consistently debilitating to performance.

To ensure that participants were debilitators, a two-step procedure was implemented. First, state measures of intensity and direction of cognitive and somatic anxiety were recorded via the modified CSAI-2 (Jones & Swain, 1992) from at least two competitive races during the previous competitive season. A total of 4 participants reported consistent debilitating interpretations of anxiety and were asked to proceed. The remaining 4 participants reported a combination of facilitative and debilitating interpretations and were eliminated from further participation in this study. Step 2 involved completing a modified trait version of the CSAI-2 (Albrecht & Feltz, 1987), including the direction scale to assess the swimmers general reaction to the interpretation of prerace anxiety symptoms. This acted as an additional verification to the state measures collected. The direction scores for these participants ranged from -4 to -10 for the

interpretation of both cognitive and somatic anxiety. Intensity scores ranged from 21 to 26 for cognitive anxiety, 21 to 23 for somatic anxiety, and 15 to 18 for self-confidence.

Participants. Participants who met the selection criteria comprised 4 male swimmers (M age = 21.75, SD = 2.22), who competed in 10 separate competitive races throughout the first swimming cycle of the 1995–1996 season (i.e., August to December 1995). The swimmers all provided informed consent prior to participating in the study.

Instrumentation

Race Information Questionnaire. This questionnaire, designed to profile each race, was divided into two sections, one each on race and swimming performance. One potential problem with this type of ecological research design is the absence of experimental control relating to competition situational variables. Specifically, consideration was given to ensure that each competitive race for each swimmer was as equivalent as possible in terms of personal importance. Therefore, in Section 1, swimmers were asked to rate the importance of the race on a scale of 1 (*not at all important*) to 9 (*extremely important*). Results of this scale revealed that the lowest score for race importance was 6; however, 80% of races were reported as 7 or above, indicating considerable importance.

Section 2 addressed the swimmers' performances in the race where split times and the overall performance times were recorded. In view of the fact that a researcher was present for the participants' races, these measures were recorded from the official results.

Modified CSAI-2. The CSAI-2 was used to measure preperformance cognitive anxiety, somatic anxiety, and self-confidence. The scale comprised the original 27 items, with nine items in each subscale. The response scale had participants rate the intensity of each symptom on a scale of 1 (*not at all*) to 4 (*very much so*), resulting in scores ranging from 9 to 36 for each subscale.

Jones and Swain's (1992) direction scale was included for the cognitive and somatic anxiety items in which each participant rated the degree to which the experienced intensity of each symptom was either facilitative or debilitating to subsequent performance, on a scale from -3 (*very debilitating*) to 3 (*very facilitative*). Thus, possible direction scores on each subscale ranged from -27 to 27, where a negative score denoted a state of debilitation and a positive one facilitation.

Social Validation Questionnaire. A social validation questionnaire, divided into two parts and based on Kendall et al.'s (1995) recommendations, addressed all parts of the study in detail. For reasons of brevity, only selected items are reported here. Part 1 included open-ended questions about whether participants knew the purpose of the study and why they were asked to participate. Using a 7-point Likert scale of 1 (*not at all*) to 7 (*very much so*), participants responded to questions about whether they understood what was expected of them, adhered rigidly to the recommended order of practices, perceived that any performance changes in swimming had occurred and if these were significant, and thought the procedure was acceptable.

Part 1 included questions about whether swimmers perceived that cognitive and somatic anxiety intensity and direction levels and self-confidence had altered

during the study, and why they thought this was the case. Questions centered around goal setting and whether participants set goals differently postintervention.

Study Design and Procedure

A single-subject multiple-baseline across-subjects design was adopted in this study. Participant 1, selected at random, acted as a control and did not receive the intervention program.¹ The intervention was introduced to Participants 2, 3, and 4 after Races 3, 4, and 5 (staggered baseline), respectively, in the 10-race series. The decision to implement the treatment at the respective points in time was based on two factors: the stability of the direction scores (i.e., that the participants remained clearly and consistently debilitating prior to treatment) and agreement with each participant's individual competition schedule. Each participant completed the modified CSAI-2 and Race Information Questionnaire within 1 hr before each race. The specific procedures completed by the participants were divided into four stages: provision of general information; intervention; social validation data collection, and follow-up assessment.

Stage 1: Provision of General Information

Each participant was approached separately and provided with general information about the study. The content was discussed until each performer fully understood what was expected of him. To avoid respondent bias, the purpose of the study was not discussed, and participants were informed that they would be following some mental preparation strategies reported by elite swimmers. Each participant was informed that an intervention would be implemented at some time over the course of the swimming season. The control participant received identical information but was not informed of the intervention and was asked to be a participant in a large data collection exercise.

Stage 2: Multimodal Intervention Program

At the respective times in the stagger, the intervention² was implemented into the program. The treatment, structured into two phases, was explained to the 3 participants. Specifically, the intervention included a precompetition routine (Phase 1), to be practiced in the days leading up to the race day, and a prerace routine (Phase 2), to be completed immediately before each competitive race. To reiterate, the intervention, including goal setting, imagery, and self-talk, was designed based on the information generated from Hanton and Jones's (1999) interview study. These were strategies that emerged as particularly important in the maintenance of facilitative interpretations.³

Phase 1: Precompetition Routine

Part 1: Goal-Setting Education Session. The aim of this session was to provide information on the rationale, practice, and principles of good goal setting. The different types of goals that can be set (i.e., outcome, performance, and process) were explained in detail to participants. The importance of setting intrapersonal

goals was emphasized, that is, goals that are within the individual's control, such as performance times and race processes, and not solely outcome targets. This was in view of the fact that performers with a more internal control perspective in Jones and Hanton's (1996) study reported more facilitative interpretations of their anxiety symptoms. This practice also emerged as integral to the goals set from the elite facilitators in Hanton and Jones' (1999) study.

Part 2: Mental Imagery. Detailed information packs, including imagery scripts and audio tapes, were provided to guide the swimmers through imagery sessions. The sessions were designed based on research in sport psychology and included stimulus and response propositions (Lang, 1984), internal and external perspectives (see Murphy, 1994), different temporal aspects (Andre & Means, 1986), physical simulation (Meacci & Price, 1985), emphasis on vividness and controllability (see Murphy & Jowdy, 1992), successful execution of skills (Paivio, 1985), and images of competition mastery (Moritz, Hall, Martin, & Vadocz, 1996). The first section of the imagery training focused on rehearsing the typical thoughts and feelings experienced before a competitive race and then rationalizing these from a debilitating interpretation to a more facilitative perspective. The session focused on how the thoughts and feelings are natural and can be enjoyed and work positively for performance.

The second section of the imagery training required mentally rehearsing race processes that are entirely within the participant's control (e.g., rehearsal of race processes such as starts, turns, and stroke technique). Participants were encouraged to practice these imagery skills at least three times every week.

Phase 2: Prerace Routine

Part 1: Decision Time. The prerace routine started when the swimmers decided that the time was right to become activated before the race. Prior to this time, it was recommended that they attempt to forget about the race via certain dissociation strategies.

Part 2: Positive Thinking and Self-Talk. The second part involved positive thinking and self-talk strategies, where swimmers were advised to spend a few minutes thinking positively, for example, recalling previous good training sessions and races and congratulating themselves on these.

Part 3: Mental Imagery. Prerace imagery focused on a routine similar to the sessions completed in the precompetition routine. Specifically, focus was directed toward two separate aspects of the imminent race: (1) the process goals within personal control, such as completing efficient turns, and (2) imaging positive aspects of the race, such as the feel and power of an efficient flowing stroke.

Part 4: Self-Talk and Reminder Cue Cards. Swimmers were advised to repeat phrases that rationalized their thoughts and feelings into a positive state during this period. These self-affirmation statements were written down on reminder cue cards to highlight the need to accept and enjoy the symptoms and to reiterate that they could improve performance.

Part 5: Physical Warm-Up. Finally, swimmers were advised to follow their usual flexibility and physical warm-up routines prior to each race. These exercises are typically performed almost continually after the water warm-up period, and participants were advised not to perform them following the previous four parts of the prerace routine but at any time.

Stage 3: Social Validation Data Collection

Detailed supplementary information relating to the intervention program was collected in order to investigate participants' reactions to the treatment content and study procedures. The 3 participants who received the treatment were asked to complete this questionnaire at home 48 hr following the last race in the 10-race series. The control participant was not requested to complete this questionnaire.

Stage 4: Follow-Up Assessment

To assess the retention effects of the intervention, the Race Information Questionnaire and modified CSAI-2 were completed by the 3 participants who received the intervention. These measures were completed prior to at least two competitive races after a 5-month period following the study. Responding to the lack of posttest assessments in intervention research, we designed this stage of the study to establish if the desired behavior changes were temporary or permanent.

Data Analysis

The data analysis was divided into four main stages. Stage 1 involved reporting detailed individual profiles of state anxiety intensity and direction scores across the 10-race series. These are plotted separately for each participant. The overlapping data points between the pre- and postintervention phases reveals the impact of the behavior change, where the greater the frequency of overlapping data, the lower the impact of the treatment.⁴ A summary table of pre- and postintervention mean scores is also presented. Stage 2 involved examining swimmers' performances. Then, findings from the social validation data are reported (Stage 3). Finally, follow-up assessment results are presented (Stage 4).

Results

Participant 1

Figure 1 illustrates the modified CSAI-2 scores recorded for Participant 1 (control) for each competitive race in the series.⁵

Intensity Scores. Figure 1a depicts the cognitive anxiety intensity scores where responses remained stable with a 7-point fluctuation throughout. Response stability is evident by comparing the first two scores (20 and 18) with the last two (20 and 19), denoting minimal change in the cognitive anxiety level. Somatic anxiety intensity (Figure 1b) displayed little variation, with a maximum 5-point fluctuation throughout. No difference was evident between the first two data points (18 and 20), and responses in the last two races were 18 and 20. Self-confidence levels (Figure 1c) fluctuated more than cognitive and somatic anxiety; however, only a small difference was apparent between the first (18 and 20) and last two observations (16 and 18).

Direction Scores. Figure 1d illustrates cognitive anxiety direction scores⁶ where Participant 1 consistently reported debilitating interpretations in all but Races 3 and 7. In these two, interpretations still failed to be facilitative, with scores of 0

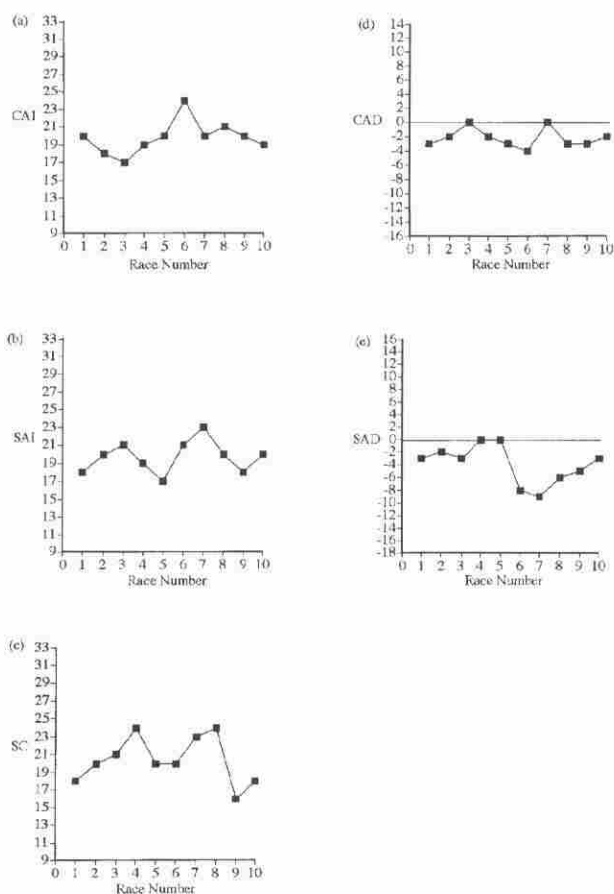


Figure 1 — Modified CSAI-2 scores across the race series (Participant 1).

denoting neither debilitating nor facilitative interpretation of symptoms for the upcoming race. The first and last two responses reiterate that cognitive anxiety remained debilitating throughout with scores of -3 and -2 for Races 1 and 2 and 9 and 10, respectively. A similar trend was evident for somatic anxiety (Figure 1e), with debilitating scores in 8 of the 10 races and Races 4 and 5 interpreted as neither debilitating nor facilitative. Somatic anxiety was perceived as more debilitating than cognitive anxiety, but as with cognitive anxiety direction, little variation was palpable between the first and last two responses.

Participant 2

Intensity Scores. Figure 2a illustrates the effects of the intervention (implemented after Race 3) on the cognitive anxiety intensity levels, where responses remained stable.⁷ The frequency of overlapping data points was high, with scores in Races 2 and 3 replicated postintervention. A similar stable trend was visible for somatic anxiety intensity (Figure 2b), with two overlapping observations pre- to

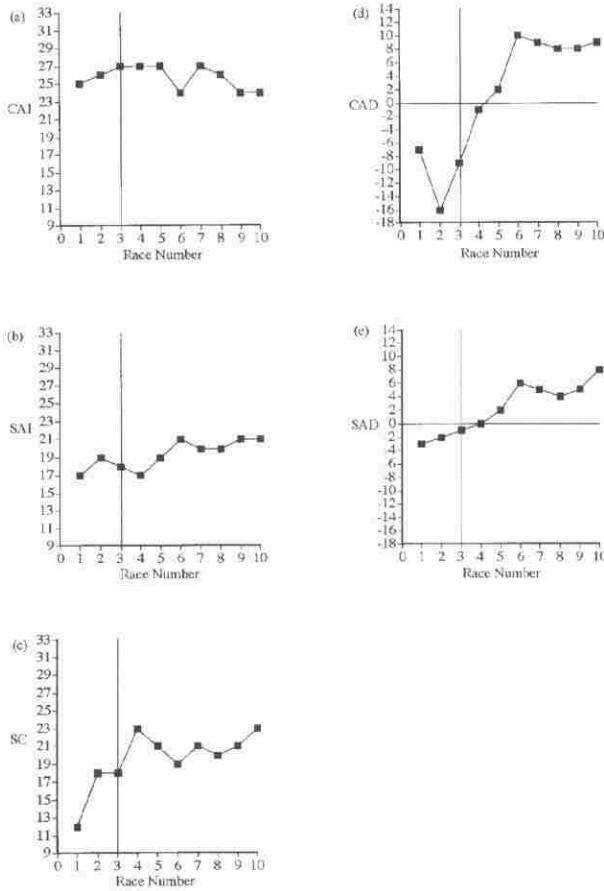


Figure 2 — Modified CSAI-2 scores across the race series (Participant 2).

postintervention. The trend for self-confidence revealed greater fluctuation (Figure 2c), where intensity levels increased considerably posttreatment, with no overlapping data.

Direction Scores. Figure 2d presents the intervention effects on cognitive anxiety direction, where preintervention, Participant 2 interpreted cognitive anxiety as clearly debilitating. Immediately postintervention, Participant 2 reported a debilitating response (−1), but thereafter cognitive anxiety was interpreted as facilitative, with no overlapping data points. The intervention effects on the directional perceptions of somatic anxiety symptoms are represented in Figure 2e, where a similar pattern of results to cognitive anxiety direction was reported. Preintervention, the interpretation of somatic anxiety symptoms was debilitating, but with less severity than cognitive anxiety. Postintervention, the interpretation of somatic symptoms in Race 4 was reported as neither facilitative nor debilitating, but after this race somatic symptoms were perceived as facilitative, with no overlapping observations.

Participant 3

Intensity Scores. Figure 3a shows a slight decrease in cognitive anxiety intensity postintervention, but overlapping data points were recorded for the first two races postintervention, with Observations 1, 2 and 4 prior to treatment. Intensity responses for somatic anxiety tended to fluctuate more than cognitive anxiety (Figure 3b), with overlapping data for Races 7 and 1. Confidence levels preintervention and for the two races immediately postintervention displayed minimal fluctuation (Figure 3c); however, participants' confidence in the four races following Race 6 was considerably increased.

Direction Scores. Figure 3d presents the intervention effects on cognitive anxiety direction, where all preintervention observations were debilitating. Post-treatment, there was a gradual increase toward interpreting cognitive anxiety as facilitative, with one data point < 0 (Race 5), immediately postintervention. The rise into facilitation occurred at Race 6, and subsequent responses were facilitative, with no overlapping observations between the two phases. No overlapping

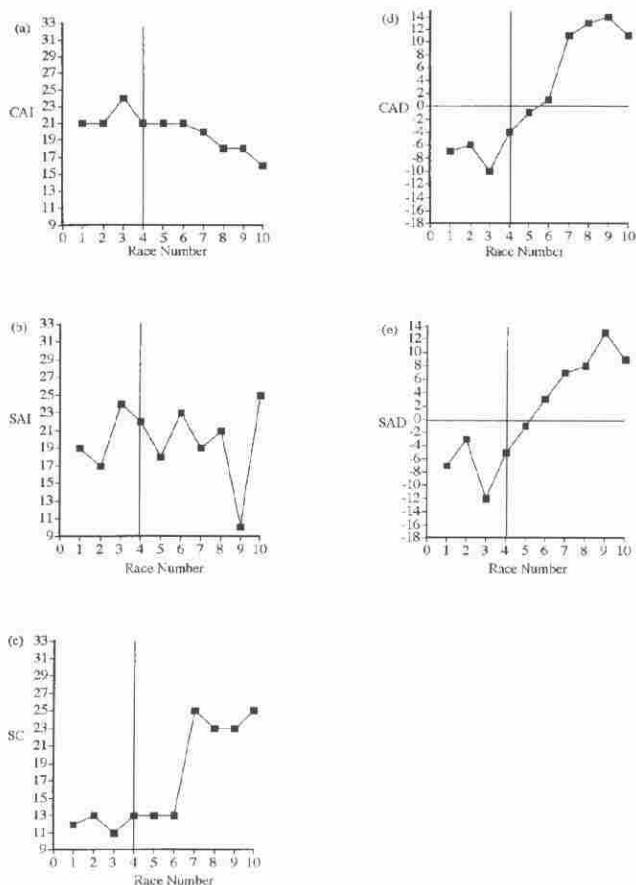


Figure 3 — Modified CSAI-2 scores across the race series (Participant 3).

observations were apparent for somatic interpretations, which remained debilitating prior to treatment. However, a gradual restructuring was visible postintervention, eventually peaking in the penultimate event (Figure 3e).

Participant 4

Intensity Scores. With the exception of Races 3 and 10, responses remained stable for cognitive intensity (Figure 4a) in Participant 4, with scores of 20 being reported in two pre- and three postintervention events. Observations remained stable for somatic anxiety intensity, with overlapping data points of 17 and 18 in both study phases (Figure 4b). The confidence level increased postintervention (Figure 4c), with one overlapping response.

Direction Scores. The intervention effect on the direction of cognitive anxiety for Participant 4 supports the trend from previous participants (Figure 4d). All directional interpretations preintervention were debilitating, but posttreatment, all responses were facilitative, with no overlapping observations. A similar trend for somatic anxiety direction was evident (Figure 4e),

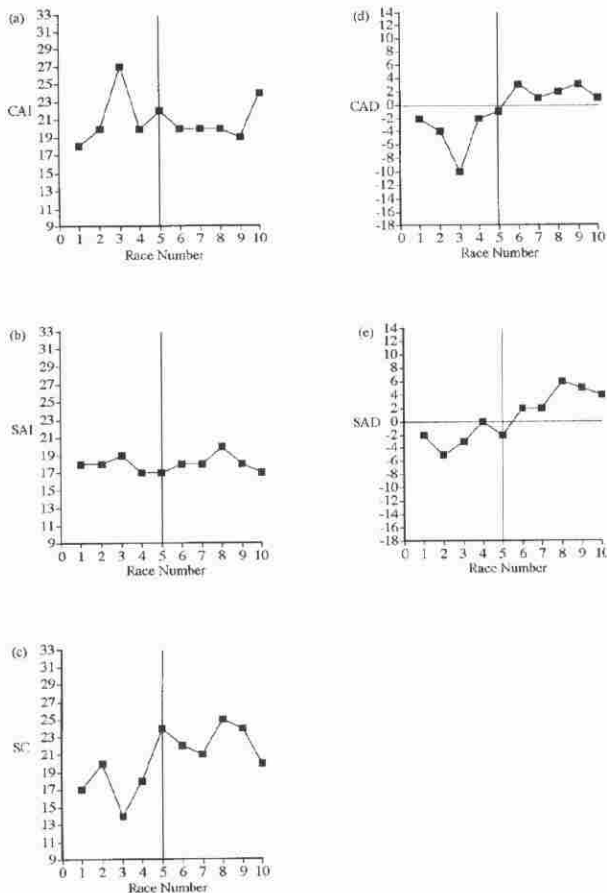


Figure 4 — Modified CSAI-2 scores across the race series (Participant 4).

where all interpretations preintervention were debilitating, with the exception of Race 4, where somatic symptoms were perceived as unimportant (again, with no overlapping data).

Modified CSAI-2 Data Summary

Table 1 illustrates the pre- and postintervention means and standard deviations of the CSAI-2 intensity and direction scores. For comparison purposes, mean scores for the first and second five races for Participant 1, who did not receive the intervention treatment, are presented. The scores reveal that Participant 1 remained clearly debilitating for both cognitive and somatic anxiety throughout the study. Also, levels of cognitive and somatic anxiety and self-confidence remained stable. For Participants 2, 3, and 4, postintervention scores for prerace cognitive and somatic anxiety direction show considerably more facilitative interpretations postintervention, which was also accompanied by increased self-confidence. The intensity scores for cognitive and somatic anxiety remained stable between the pre- and postintervention phases.

Swimming Performance

Table 2 illustrates the percentage improvement in race times from the start of the study to completion of the 10-race series. This measure was based upon each swimmer's personal best performance time for their respective competitive event. Participant 1 showed no performance improvement and, during the study, recorded a performance 1.23% short of his personal best. This equated to 0.73 s. For the 3 swimmers who received the intervention, performance improvements of 3.23, 2.40, and 3.01% were evident, translating to 2.05-, 1.33-, and 2.15-s improvements, respectively.

Social Validation Data

All participants indicated that they thought that they understood the purpose of the study. However, when asked to elaborate in their own words, participants had varied

Table 1 Modified CSAI-2 Data Summary

CSAI-2 subscale		P1		P2		P3		P4	
		1st 5 Races	2nd 5 Races	Pre	Post	Pre	Post	Pre	Post
CAI	Mean	18.8	20.8	26.0	25.57	21.75	19.0	21.4	20.6
	SD	1.3	1.92	1.0	1.51	1.5	2.0	3.46	1.95
SAI	Mean	19.0	20.4	18.0	19.86	20.5	19.33	17.8	18.2
	SD	1.58	1.82	1.0	1.46	3.11	5.24	0.84	1.10
SC	Mean	20.6	20.2	16.0	21.14	12.25	20.33	18.6	22.4
	SD	2.19	3.45	3.46	1.46	0.96	5.75	3.72	2.07
CAD	Mean	-2.0	-2.4	-10.67	6.43	-6.75	8.17	-3.8	2.0
	SD	1.23	1.52	4.73	4.13	2.5	6.75	3.63	1.0
SAD	Mean	-1.6	-6.2	-2.0	4.29	-6.75	6.5	-2.4	3.8
	SD	1.52	2.39	1.0	2.63	3.86	4.89	1.82	1.79

Table 2 Performance Data Summary

Participant	Improvement	Time equivalent (s)	Event (m)
1	- 1.23	0.73	100 Butterfly
2	3.23	2.05	100 Backstroke
3	2.40	1.33	100 Freestyle
4	3.01	2.15	100 Breaststroke

responses (e.g., “to improve prerace imagery techniques and to try and alter my prerace thoughts” and “to change the way that I think about the feelings that arise before a race and then learn how to manipulate them to work in your favor”). In addition, participants were not aware of the reasons why they were selected for the study: “Perhaps I have a lot of negative thoughts.” Another stated: “I qualified for the study as I am a participant who has not experienced this approach to prerace preparation and therefore can improve my own ability by using the techniques.”

Responses to the 7-point Likert scales indicated that all participants understood what was expected of them, two participants responding with the maximum score of 7 (*very much so*), the other with a score of 6. In response to sticking rigidly to the order of practices and recommendations in the study, 2 participants again reported a maximum value of 7, with the other participant stating a 5. All participants perceived that there had been swimming performance changes throughout the study (7, 7, and 6, respectively) and that these were significant (6, 6, and 7). All swimmers felt that the procedure had been acceptable (6, 7, and 7), in terms of the way they were treated, and useful, all reporting maximum scores of 7.

The second part of the questionnaire revealed that all participants felt that the intensity of cognitive anxiety had remained stable, with two indicating the same for somatic anxiety. Participant 3 suggested that he thought the intensity of somatic anxiety had fluctuated in view of the fact he was not physically nervous prior to one of the final races: “I knew I was swimming well.” All participants reported that they now felt that they interpret cognitive and somatic anxiety as more facilitative, with Participant 3 explaining: “I believe I feel more at ease with the fact that I feel butterflies or nervous before a race. These are good and will help me to perform better and makes me feel more confident.” All participants reported that postintervention, they did feel more self-confident because they now accepted their prerace anxiety symptoms as natural and were at ease with the way they felt before a race. All participants stated that the intervention had altered the way that they set goals for their upcoming races: “I used to set good attainable goals beforehand, but now this study has helped me to advance my use of goal setting, especially focusing more on processes.”

Posttest Follow-Up Data

To assess the retention effects of the treatment, two separate follow-up measures of state anxiety intensity and direction were collected approximately 5 months after the posttest assessment phase (Table 3).

Participants 2, 3, and 4, who received the intervention, were still reporting facilitative interpretations of anxiety and similar intensity levels, as previously

Table 3 Follow-Up Modified CSAI-2 and Performance Scores 5 Months Following the Posttest

Participant		Intensity		SCI	Direction		Performance improvement	
		CAI	SAI		CAD	SAD	%	s
2	Race 1	28	19	23	5	7	0.32	0.20
	Race 2	25	23	28	2	3		
3	Race 1	24	24	22	10	6	0.22	0.25
	Race 2	18	19	28	5	14		
4	Race 1	20	19	26	1	2	0.27	0.19
	Race 2	23	17	27	2	6		

observed. Further, the control participant was provided with the intervention treatment following the completion of the main study. Findings for Participant 1 revealed that after four competitive races, the treatment was effective, and the participant started to report facilitative interpretations of both cognitive and somatic anxiety. Encouragingly, this shift in anxiety interpretations was also accompanied by a 1.87% performance improvement, equating to 1.12 s. Performances of the 3 swimmers who initially received the treatment demonstrated further improvements of 0.32, 0.22, and 0.27%, equating to 0.2, 0.25, and 0.19 s, respectively.

Discussion

This study attempted to implement the information generated from Hanton and Jones (1999), who provided practical implications for dealing with debilitating precompetition anxiety. This was achieved via a cognitive restructuring intervention and employing a staggered single-subject design, which enabled collecting the data in an ecologically valid competitive sports situation.

Turning to the central focus of this study, the major hypotheses were supported in that although intensity levels remained stable and did not decrease, participants who completed the intervention did report more facilitative interpretations of precompetition anxiety and greater confidence posttreatment. Performance improvements were also evident. Further, the control participant, who also reported stable intensity levels, consistently reported debilitating interpretations of both cognitive and somatic anxiety symptoms, and stable confidence levels. The control participant also failed to demonstrate the performance improvements illustrated by the swimmers who received the treatment. Although researchers have advocated that single-subject designs eliminate the need for no-treatment control groups (Bryan, 1987), in view of the exploratory nature of this investigation we decided to initially include one control participant. Our aim was to ensure that no external factors or circumstances, such as sudden unexplained performance improvement, resulted in a change of directional perceptions and, had this been the case, to further investigate these changes. A closer look at our findings shows that

the control participant reported stable intensity levels for cognitive anxiety, somatic anxiety, and self-confidence. Importantly, at no time throughout the 10 races were facilitative interpretations of prerace symptoms reported.

The program appears to have been successful in restructuring negative interpretations. Scores indicate that intensity levels remained stable for both anxiety components throughout the study. Two fluctuating scores were evident in Participant 3 on the intensity level of anxiety. Specifically, Participant 3 reported a very low intensity of somatic anxiety in Race 9, which is difficult to explain. However, close observation of the social validation data revealed that this participant expressed that he was not particularly nervous by this stage of the season: "I knew I was swimming well." Participant 4 reported a high level of cognitive anxiety in Race 3, which was interpreted as debilitating and accompanied by low self-confidence, but this was preintervention.

Turning to the direction scores, all 3 participants who received the treatment reported considerably more facilitative interpretations of both cognitive and somatic anxiety following the intervention. This was particularly successful in the case of Participant 2, whose cognitive anxiety intensity scores were very high. Specifically, compared with the norms for competitive swimmers reported by Martens et al. (1990), the preintervention mean (26.0) equates to approximately the 96th percentile and postintervention mean (25.57) with the 95th percentile. As expected, the treatment was not effective immediately in Participants 2 and 3, with a realistic gradual change occurring in anxiety interpretations posttreatment. In Participant 4, directional perceptions altered from debilitating to facilitative in the first race postintervention, which was unexpected. However, on close observation of the anxiety scores, Participant 4's interpretations of anxiety were not as severely debilitating preintervention as the other swimmers. Importantly, none of the 3 participants regressed back into interpreting symptoms as debilitating once the developmental breakthrough had occurred.

This restructuring from negative to positive interpretations of anxiety symptoms was also accompanied by a considerable increase in confidence levels in these 3 participants. Indeed, in Participants 2 and 3 the mean confidence scores increased from 16 to 21.1 and 12.25 to 20.33, respectively. In comparison to swimmers' CSAI-2 norms as reported by Martens et al. (1990), the preintervention means are extremely low, equating to approximately the 7th and 1st percentile in Participants 2 and 3, respectively. However, postintervention, the mean scores were considerably higher, equating to approximately the 30th and 31st percentile, respectively. This increase in confidence supports the findings of Jones et al. (1994), who established that facilitative interpretations of anxiety symptoms were associated with higher levels of self-confidence. Socially validating the data was particularly important in this respect to help explain this finding, where responses indicated that participants thought that confidence had increased primarily because they felt more at ease with their prerace thoughts and feelings. A second possible explanation relates to the fact that in social validation, swimmers felt that their performances had improved postintervention. Supporting Jones et al.'s (1993) findings, self-confidence could have increased due to the performance success that these swimmers were experiencing toward the end of the study.

The evidence from the modified CSAI-2 responses is encouraging, and even more so when considered in conjunction with the social validation data. Specifically, all of the participants believed, as expressed in their own words, that intensity

levels had remained generally stable throughout the study, but confidence had increased. They believed that they had developed the ability to interpret both cognitive and somatic anxiety symptoms as more facilitative toward their races. Further, results from this questionnaire also revealed that the goal-setting education had altered the way in which the participants set goals for their races, primarily by emphasizing process goals that are internally controlled in addition to setting performance and outcome goals (see Hardy, 1997).

Turning to the issue of the swimmers' performances, it was also encouraging that improvements were reported following the introduction of the intervention. These improvements in competition times were further supported in social validation, where the swimmers expressed that there had been improvements in performance throughout the study and that these changes were perceived as significant. However, the central focus of this paper was not directed toward examining the anxiety-performance relationship but rather the restructuring of debilitating anxiety interpretations. This explains the somewhat simplistic performance measure reported. Specifically, swimmers progress through several training cycles, which have a direct influence upon athletic performance due to factors such as fatigue. It was therefore considered appropriate to compare the best performance time achieved at the end of the study with the previous personal best time preintervention. This is a complex and challenging conceptual and applied area within anxiety research, and readers are directed to Hardy, Jones, and Gould (1996) and Jones (1995) for a review and research recommendations.

The collection of social validation data proved to be a study strength, not only to substantiate and explain the central tenets of the study but also as a manipulation check on how the treatment affected participants. Specifically, they were unaware of the exact purpose or why they had been asked to participate, thus strengthening the internal reliability, validity, and objectivity of the study. Participants assumed that the aim was to help improve their prerace mental preparation. Regarding the procedures used in the study, all participants expressed that they understood fully what was expected of them and adhered rigidly to the order of practices. Further, participants felt they were treated well throughout the study, had benefited greatly from the program, and would continue to practice the skills.

Two main limitations were evident in the study design. First, the lack of information about which part of the intervention contributed most to behavior change (i.e., the restructuring of negative interpretations of anxiety) was not a direct concern in this study since the central aim was directed toward restructuring debilitating interpretations via information generated by interviews with elite swimmers. Because the elite swimmers expressed indicating using a combination of skills to this end, this was the approach successfully followed in this study. This is an important issue to be addressed in future studies. Second, we address the relatively small number of observations from which to visually inspect and interpret the findings. When examining a sport such as competitive swimming, where for standardization purposes all competitive events needed to fulfill the criteria of high personal importance, 10 competitive races was the maximum number that could be assessed within a complete training and competition cycle.

Finally, there is a possible Hawthorn effect (Drew, 1976), which refers to participants behaving differently as a result of the attention they receive in an investigation. Drew (1976) highlighted that this effect will decrease as participants become accustomed to the new routines implemented in the treatment, and

therefore study length is an important factor. As evident in Figures 1–4, the intervention effects did not diminish with time. Greenspan and Feltz (1989) further argued that a weakness of previous intervention research was the failure to conduct follow-up assessments of the central measures. To address this concern, a follow-up assessment was included in the design 5 months after the posttest phase was completed. Encouragingly, the retention effects of the intervention maintained the desired restructuring of anxiety interpretations. Also encouraging was the maintenance of performance levels during the posttest assessment. Specifically, all performers maintained the higher levels of performance that were previously achieved. Also, the control participant demonstrated performance improvements associated with facilitative anxiety interpretations following the introduction of the intervention. Findings from the posttest examination therefore strengthen the utility and effectiveness of the intervention program.

These findings provide evidence that the treatment was successful when working with performers in the “real” world of competitive sport in that interpretations of precompetitive anxiety symptoms can be restructured as more facilitative interpretations via intervention strategies. The content of such treatments is, however, crucial for positive behavior changes. The components of this intervention package were derived from previous research. The intervention centered around perceptions of control (goal setting), rationalizing thoughts and feelings, and images and thoughts of successful skill execution (self-talk and imagery). Therefore, generating general principles from group designs, and investigating these using in-depth interviews (see Hanton & Jones, 1999) can yield appropriate information for applied intervention research in sport psychology. The applied implications generated from the research highlight that sport psychologists should ensure that performers learn a wide range of psychological skills that can be used as part of a complete and integrated structured psychological program. Further, current findings show that negative perceptions can be treated without using techniques to reduce anxiety symptoms, as has been the traditional method in anxiety intervention research. However, this type of restructuring program occurs gradually as a process and therefore requires development over time.

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Notes

¹For ethical reasons the control participant was provided with the intervention package following the completion of the main study.

²Details of the intervention package are available from the first author.

³A full discussion of how all parts of the intervention were constructed and integrated into the complete package is beyond the scope of this paper. Readers are directed to Hanton and Jones's (1999) inductive content analyses for greater detail.

⁴In view of the inter- and intrasubject variability in this type of research design, readers are advised to exercise caution when interpreting these findings.

⁵Intensity scores for all participants are presented on a scale of 9 to 33 and direction scores on a scale of -18 to 14 as opposed to the traditional 9 to 36 and -27 to 27 for intensity and direction, respectively. CAI, SAI, and SC denote cognitive anxiety intensity, somatic anxiety intensity, and self-confidence. CAD and SAD denote cognitive anxiety direction and somatic anxiety direction.

⁶The horizontal line denotes the criterion above which facilitative scores are reported and below which debilitating scores are reported.

⁷The vertical line signifies the start of intervention.

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