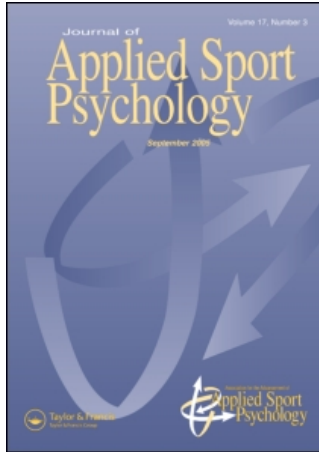


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Intervening with Athletes During the Time Leading up to Competition: Theory to Practice II

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This study presents part two of a series of investigations examining, temporal anxiety responses and the use of psychological skills during the time preceding competition within elite level sport. Based on information from Part 1 (Thomas, Hanton, & Maynard, 2007), imagery, rationalization and restructuring, goal-setting, and self-talk skills were applied differentially throughout a 3-phase temporal intervention using a single-subject multiple-baseline design with three elite field hockey players. Intervention effects were tested over a 10-match cycle in relation to associated anxiety symptoms throughout a 7-day cycle (6 days, 2 days, 1 day, 1 hour pre-competition), and competitive field hockey performance as measured through performance (i.e., notational) analysis. Results indicated the intervention successfully restructured players' interpretations of anxiety and confidence symptoms, increased the intensity and frequency of experienced self-confidence symptoms, decreased the frequency of experienced cognitive anxiety symptoms, and decreased the frequency of experienced somatic anxiety symptoms for two of the players. Performance improvements were also evident for the hockey players.

Examination of anxiety responses as temporal events that unfold as time to competition moves closer has emerged as a topical area for research within the theoretical domains of sport psychology (Cerin, Szabo, Hunt, & Williams, 2000). This issue has recently been embraced in a research program examining the symptoms associated with competitive anxiety during the 7-day competitive cycle commonly associated with team sports (Hanton, Thomas, & Maynard, 2004; Thomas, Maynard, & Hanton, 2004; Thomas, Hanton, & Maynard, 2007). This program adopted a fine-grained measurement approach to the dimensions of competitive anxiety through the inclusion of information pertaining to intensity, direction, and frequency. Findings from these studies have revealed detailed information on the temporal changes of the dimensions. Further, in the case of Thomas et al. (2004) interesting differences

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emerged in the symptom responses of *facilitators* and *debilitators* throughout the seven days preceding competition. Specifically, in comparison to the debilitators, facilitators interpreted their associated cognitive and somatic anxiety symptoms as positive towards performance, experienced higher intensities of self-confidence symptoms, higher frequencies of self-confidence symptoms, and lower frequencies of cognitive anxiety symptoms throughout a 7-day competition cycle.

However, although this research body has developed sport psychologists' knowledge of when associated anxiety responses change, it has provided limited information in relation to informing the structure and content of temporal psychological skills programs. The first study of this series utilized in-depth qualitative inquiry and attempted to address this issue through exploring the perceived causal mechanisms behind the group differences observed within Thomas et al.'s (2004) work. Findings from the study indicated succinct differences in the use of psychological skills by the debilitators and facilitators as the highly probable causal explanations for the different psychological states that the groups experienced during a 7-day competitive cycle (Thomas et al., 2007). The current study utilized the qualitative information provided by the facilitators as the empirical foundation to construct a theory-to-practice temporal psychological skills program for individuals debilitated by their pre-performance anxiety symptoms. The specific aim of this study was to examine the efficacy of the temporal program over competitive sporting performance and the psychological state (i.e., anxiety responses) of the performer during the 7-day competitive cycle commonly associated with competitive team sport.

To the authors' knowledge, no previous study has tested the efficacy of an evidence-based temporal psychological skills program on competitive performance and the psychological state of the performer during a 7-day competitive cycle. However, a small number of studies have assessed the effects of interventions designed for use immediately prior to competition with performers debilitated by their associated anxiety symptoms. Underpinned by the matching hypothesis, Maynard and colleagues have examined the impact of various anxiety reduction techniques on the intensity and direction of anxiety symptoms (Maynard, Hemmings, Greenlees, Warwick-Evans, & Stanton, 1998; Maynard, Hemmings, & Warwick-Evans, 1995; Maynard, Smith, & Warwick-Evans, 1995). These studies suggested that interventions designed to reduce anxiety intensity can illicit a more positive interpretation of the symptoms associated with anxiety. However, empirical research testing cognitive, somatic, and combined multimodal interventions on the intensity and direction of anxiety symptoms has produced only limited support for the matching hypothesis. This has led researchers to propose that practitioners should strive to restructure the interpretation of associated anxiety symptoms rather than just focusing on techniques that reduce the intensity of symptoms experienced (cf. Hanton & Connaughton, 2002; Hanton & Jones, 1999a).

These proposals were given empirical support through the applied research of Hanton and Jones (1999b). Using a single-subject multiple-baseline design Hanton and Jones assessed the efficacy of a multimodal psychological skills intervention on the intensity and direction of anxiety symptoms and competitive performance in elite swimmers debilitated by their associated anxiety symptoms. Goal-setting, imagery, and self-talk skills were combined into a pre-race routine for use immediately before each competitive race. The intervention provided a beneficial impact on the interpretation of the symptoms associated with both cognitive and somatic anxiety, the intensity of self-confidence symptoms experienced, and competitive swimming performance.

Although the studies conducted by Hanton and Jones (1999a, b) provided a theory-to-practice design for the construction of psychological interventions, they are limited in relation to the temporal preparation-based philosophy adopted by the current authors. In short, Hanton

and Jones' intervention focused upon times immediately prior to performance; further, their work did not assess the impact of psychological skills on the frequency of anxiety-related symptoms. This second paper of the current series attempted to address these issues. The purpose of the study was to examine the efficacy of a temporal intervention program over players' psychological state (i.e., intensity, direction, and frequency of competitive anxiety responses), and the competitive performance of elite female field hockey players debilitated by their associated anxiety symptoms. The empirical base for the intervention was achieved through applying the information provided by the facilitators in the first paper of the series to inform the structure, timing, and content of the intervention program (Thomas et al., 2007). To address the use of global performance measures, or self/coach analysis of performance when testing the efficacy of psychological interventions, the current study developed and validated a performance analysis system (notation) as an accurate intra-individual measure of performance (cf. Hughes & Bartlett, 2002). The efficacy of the intervention was tested using a single-subject multiple-baseline design across a ten-match program. Based on the findings of previous literature, it was expected that following the intervention players would interpret the symptoms associated with cognitive and somatic anxiety as facilitative towards performance, experience higher intensities and frequencies of self-confidence, experience lower frequencies of cognitive anxiety symptoms, have more positive perceptions of their self-confidence symptoms, and that the intervention would have a positive effect on performance.

METHOD

Participant Selection Criteria

Five elite female hockey players were invited to participate in the study. Elite female hockey players were targeted to match the sample characteristics of the participants used in the first study of the series (Thomas et al., 2007). All the potential participants competed in the English Hockey League (EHL) National Premier League with four of the five having international experience. All potential participants were distinct from those used in the first study of the series. The criteria used to classify participants as a debilitator were identical to those used in the first paper of the series (Thomas et al., 2007). Following the screening process, two participants displayed mixed interpretations at the trait-state level across cognitive and somatic symptoms and did not take further part in the study. Three participants displayed a consistent debilitative profile and continued with the study.

Participants

The participants were all female elite field hockey players who competed in the EHL National Premier League, two of the three players had international experience. The age of the players ranged from 20 to 27 ($M = 24.33$, $SD = 3.78$), and they had competed within elite level hockey for between 3 to 9 years ($M = 5.39$, $SD = 2.67$). All participants provided written informed consent to undertake the research and an institutional ethics committee approved the procedures of the study.

Instrumentation

Modified Competitive State Anxiety Inventory-2 (CSAI-2)

The CSAI-2 (Martens, Burton, Vealey, Bump, & Smith, 1990) modified to account for direction (Jones & Swain, 1992) and frequency (Swain & Jones, 1993) was used to measure

the cognitive, somatic, and self-confidence symptoms associated with competitive anxiety. The original 27 items were included and intensity scores were rated on a 1 (*not at all*) to 4 (*very much so*) scale, directions on a -3 (*very debilitating: negative*) to +3 (*very facilitative: positive*; 0 = *unimportant interpretation*) continuum, and frequencies on a 1 (*never*) to 7 (*all of the time*) scale. Therefore, intensities ranged from 9 to 36, directions from -27 to +27 and frequencies from 9 to 63 across each construct. Internal reliability scores (Cronbach alphas) for the intensity scale range from .79 to .90 (Martens et al., 1990), from .72 to .89 for the direction scale (Jones & Hanton, 1996) and from .70 to .93 for the frequency scale (Thomas et al., 2004).

Preparation Booklets

Preparation booklets were created for each phase of the intervention (the procedures section indicates the distinct phases of the temporal intervention). Participants were required to record specific information that would underpin the content of the psychological skills used in each phase to help create a client-centered intervention. For example, in preparation for the imagery skills used in Phase II of the intervention, the preparation booklet asked each participant to record examples of recent best performances that could be integrated into an imagery routine for use during this phase. The detail recorded for the imagery skills within this phase included information about the game (i.e., opposition), venue (i.e., home or away), the quality of the performance (i.e., what they did well, for example successful team routines and planned moves), and the symptoms (i.e., thoughts and feelings) they associated with the best performance. Incorporated into these booklets was an education pack providing background information on the core psychological skills (i.e., imagery, rationalization, restructuring, goal-setting and self-talk) used across the overall temporal program (participants did not obtain access to this information until the treatment phase of the intervention).¹

Performance Analysis System

An online computerized performance analysis system was developed in line with the recommendations of Hughes and Bartlett (2002). The first phase involved a focus group session with three national-level coaches to establish the key performance indicators within elite field-hockey. In addition to including a quantifiable measure of the performance outcome of individual skills (positive outcome *vs* negative outcome), the coaches emphasized the need for the system to include an option-based criteria due to the decision-based nature of field-hockey (i.e., an open classification sport). Therefore, the performance analysis system was designed to produce quantifiable intra-individual scores for correct/incorrect performance option choice and positive/negative performance outcome.

SIMI Scout analysis system (SIMI Reality Motion Systems, Unterschleissheim, Germany) was used as the template program for the system map. The system was pilot tested over five EHL National Premier League fixtures during which minor refinements were made. This realized an online computerized performance analysis system which produced quantifiable intra-individual scores for performance option choice (correct *vs* incorrect) and performance outcome of individual skills (positive *vs* negative; see Figure 1). To test the reliability of the system, interobserver reliability (IRO) scores were assessed over a three-game period between the first author and one of the three qualified coaches involved in the focus group session. IRO

¹A copy of the preparation booklets utilized within the study including the educational information distributed to the participants is available from the lead author.

values were calculated by dividing the total number of agreements between notators by the total number of agreements plus disagreements, with the dividend being multiplied by 100 (Landin & Herbert, 1999; Rogerson & Hrycaiko, 2002). IRO scores for both performance-based dependent variables ranged from 91.4% to 97.8% across the three game period; scores of greater than 80% are considered acceptable (Kazdin, 1982).

Social Validation Questionnaire

A social validation questionnaire was used to evaluate the intervention program. This was based on the work of Pates, Maynard, and Westbury (2001) and Thelwell and Maynard (2003) and incorporated the recommendations of Kazdin (1982) and Kendall, Hrycaiko, Martin, and Kendall (1990). Participants responded on a 1 (*not at all*) to 7 (*extremely*) Likert scale to the following questions: (a) How important is psychological preparation to you during the time leading up to competition?; (b) Do you consider the changes in performance to be significant?; (c) How satisfied were you with the intervention program?; and (d) Has the intervention proved useful for you?

STUDY DESIGN

Design

In line with several recent applied research studies in sport psychology, a single-subject staggered multiple-baseline-across-participants design was used in this study (cf. Callow, Hardy, & Hall, 2001; Hanton & Jones, 1999b; Pates et al., 2001). This approach was chosen as it allows participants to act as their own control and therefore negates the ethical issues associated with withholding potentially positive interventions from a participant acting as a control (Robson, 1994). The intervention was introduced across Participants 1, 2, and 3 after games 4, 5, and 6 respectively. The criteria for implementation of the intervention were: A stable profile of the direction scores (i.e., participants maintaining a debilitating profile prior to the intervention) and agreement with each player in relation to their competition schedule (Hanton & Jones, 1999b; Kazdin, 1982; Lindsay, Maynard, & Thomas, 2005).

PROCEDURE

Symptom Responses

The modified CSAI-2 was used prior to each competitive match in both the baseline and treatment phases to collect symptom response data. Four separate completions were undertaken by each participant during the 7-day competitive cycle (6 days, 2 days, 1 day and, 1 hour prior to performance). Selection of these stages was justified through the distinct temporal phases that were derived from the inductive analysis procedure provided in Study 1 of the series and previous temporal research examining anxiety symptom responses during a 7-day competitive cycle (Hanton et al. 2004; Thomas et al., 2004).

Performance Measure

Performance data were collected for each player during each match of the baseline and treatment phase. Performance data were notated online using the devised system for competitive first half performance. The rationale for only notating first half performance was based on to the preparation-based focus of the intervention; it was suggested that second half performance was more likely to be affected by the ongoing dynamics of the match rather than the psychological preparation undertaken prior to performance.

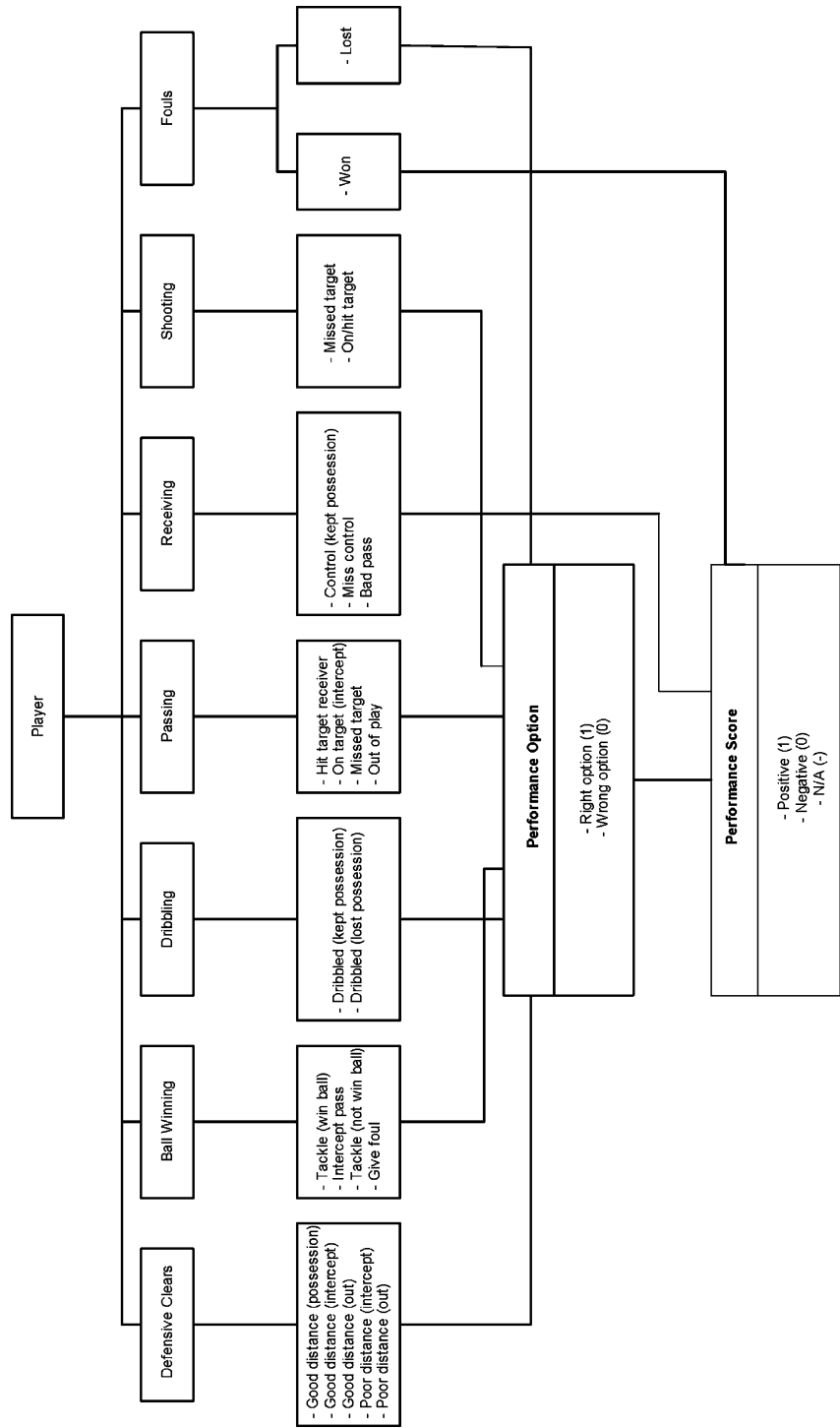


Figure 1. Performance analysis system for field hockey performance.

Intervention Procedure

The intervention was provided across three temporal phases within the rolling 7-day competitive cycle (i.e., the Saturday to Saturday performance cycle associated with competitive fixtures in the EHL National Premier League). The evidence base for the timing and psychological skills used within each of these separate intervention phases were derived from the first study of the series (Thomas et al., 2007). Phase I covered a post-match review period and stretched from Saturday to Monday (i.e., 7 to 5 days preceding next performance). Phase II covered the temporal phase of two to one day pre-competition, and Phase III covered the temporal phase of match day. Within each phase of the intervention a two-stage process was adopted: First, participants completed their preparation booklets away from a consultation environment, recording information related to their experiences of competition, and preparation for performance. Second, psychological skills booklets were created which underpinned a one-on-one consultation with each player. The use of this process helped to create an intervention program that was empirically justified but that allowed an individualized approach to the content of the psychological skills used by each separate performer. A holistic representation of the overall intervention program including preparation and one-on-one consultation contact is presented in Figure 2. All intervention sessions throughout the treatment phase were conducted by the first author, a British Association of Sport and Exercise Science Accredited Sport Psychologist². The social validation questionnaire was completed at home away from the competitive environment within 48 hrs of the final game of the 10-match competitive series.

Intervention Phase I

The psychological skills used in this phase of the intervention were imagery skills and rationalization and restructuring skills of the debilitating symptoms experienced. Justification for using these skills was derived from the first study of the series and the psychological skills outlined by the facilitators at this temporal phase. The imagery intervention was structured around replacing the negative post-performance images the players naturally experienced at this phase. The preparation booklet asked each player to record any negative performance errors they experienced post-performance, and record any positive performance situations they could use to counter their negative performance experiences. This information formed the specific response propositions that were fed into a generic imagery script created for each one-on-one consultation. Each full imagery session was tape-recorded and the participant was provided with this tape as an exemplar for the imagery routine of this phase of the intervention program. The participants were advised to practice these routines at least three times during Phase I of the 7-day competitive cycle and they were actively encouraged to use the imagery skills to replace negative naturally occurring images with countering positive accomplishment scenarios.

The rationalization and restructuring program used during Phase I was constructed to overcome the occurrence of negative post-performance cognitive and somatic symptoms. The preparation booklet asked each participant to record any negative post-performance symptoms they experienced. The one-on-one consultation used a Rational Emotive Behavior Therapy (REBT) protocol in line with the recommendations of Ellis (1994) as the vehicle to rationalize and restructure these symptoms. Specifically, players applied the fundamental questions of

²A copy of the intervention package and scripts used at each of the different temporal phases is available from the lead author.

<u>TEMPORAL PHASE I</u> <u>(Post-performance – 7 days to 5 days preceding next match)</u>		Participant Time Commitment	Consultant Time Commitment (per participant)
Preparation Booklets	• Review of individual performance errors • Review of countering performance accomplishments	~ 1 hrs	~ 1 hrs
Intervention (one-on-one consultation)	• Replacing negative post performance images with countering positive images • Rationalizing and restructuring negative post performance symptoms	~ 5 hrs (including skill practice time)	~ 3 hrs
<u>TEMPORAL PHASE II</u> <u>(2 days to 1 day preceding match)</u>		Participant Time Commitment	Consultant Time Commitment (per participant)
Preparation Booklets	• Review of recent best performances • Recording of negative pre performance symptoms	~ 1 hrs	~ 1 hrs
Intervention (one-on-one consultation)	• Best performance imagery (CG functions) • Rationalizing and restructuring of negative pre performance symptoms • Performance and process goals	~ 7 hrs (including skill practice time)	~ 4 hrs
<u>TEMPORAL PHASE III</u> <u>(Match day pre-performance)</u>		Participant Time Commitment	Consultant Time Commitment (per participant)
Preparation Booklets	• Review of key skills for position/role (examples of recent best performance of these skills) • Recording of key technical words/statements • Recording of negative pre performance symptoms	~ 1.5 hrs	~ 2 hrs
Intervention (one-on-one consultation)	• Best performance imagery (CS functions) • Rationalizing and restructuring of negative pre performance symptoms • Integrated self talk program (positive self-statements and performance and process goals)	~ 3 hrs (including skill practice time)	~ 4 hrs

Figure 2. Holistic representation of the intervention program.

REBT to 'identify,' 'dispute,' and 'replace' the negative symptoms experienced (cf. Hanton & Jones, 1999b).

Intervention Phase II

Based on the information provided by the facilitators in the first study of the series, imagery skills, rationalization and restructuring skills, and goal-setting skills were implemented during this phase of the temporal period. The imagery routine was structured around reviewing best performance and focused on the cognitive-general and cognitive-specific functions of imagery (cf. Hall, 2001). Therefore, the preparation booklet asked each participant to record examples and scenarios of recent best performance of skills and strategies (i.e., successful passages of play) associated with best performance. During the one-on-one consultation these scenarios and skills were moulded into specific response propositions that integrated into a generic imagery script for this phase of the program. This session was tape-recorded and provided to the players as a practice example of the imagery routine for this phase. The players were advised to practice the routines at least three times during this phase.

The rationalization and restructuring skills used in this phase were similar to those used in Phase I; however, the focus during Phase II was to overcome pre-performance negative symptoms. Therefore, the preparation booklet asked the player to record any negative cognitive and/or somatic symptoms they experienced during this phase. These symptoms were discussed in the one-on-one consultation and the REBT protocol was used to rationalize and restructure the symptoms experienced. Goal-setting skills were also integrated into the intervention during this phase. Specifically, participants were educated in relation to the different types of goals available and provided with an overview of best practice when setting goals (cf. Filby, Maynard, & Graydon, 1999). The one-on-one consultation session culminated with each participant setting a combination of three performance and process goals. These goals were recorded on laminated cue cards and referred to during Phase II to stimulate a performance/process goal focus.

Intervention Phase III

In line with the information provided in the first study of the series, the psychological skills used in this phase included imagery-based skills, rationalization and restructuring skills, goal-setting skills, and self-talk skills. The imagery intervention utilized best-performance imagery but was different in structure to that used in Phase II of the program. Specifically, due to the time pressures associated with this temporal phase the imagery routine focused solely on the cognitive-specific imagery function and used a "snap shot" approach to the routine. Hence, the preparation booklet asked players to record the essential performance skills for their positional role in the team, and review recent best performances of these individual skills (e.g., shooting skills, passing skills, tackling skills). During the one-on-one consultation, these specific examples were discussed and formed the player-specific response propositions incorporated into a generic imagery script created for this phase of the program. Due to the logistics associated with implementing psychological skills at this phase, the one-on-one imagery sessions were not recorded and hence the participants were not provided with a practice tape for this phase. However, based on the recommendations of the facilitators, the players were asked to utilize snap-shot cognitive-specific imagery routines at appropriate quiet times during match day preparation (e.g., travelling to venue, team talks).

The rationalization and restructuring skills used in this phase were identical to those used in Phase II. Specifically, the preparation booklet asked players to record any negative pre-performance symptoms they experienced during this phase. These symptoms were then discussed in the one-on-one consultation session and the REBT protocol used previously

in the program was undertaken to rationalize and restructure any negative symptoms experienced. The goal-setting skills utilized in this phase were synonymous with those used in Phase II (i.e., those goals remained in place for this temporal phase). However, these goals were integrated into a positive self-talk program in line with the recommendations of the facilitators from the first study in the series. For example, one midfield player set a performance goal of maintaining team possession with 80% of passes made. Based on the recommendations of Landin (1994) this goal was integrated into a self-talk program using the phonetically simple statement of "possession." This interrelated goal and self-talk program was supplemented by creating phonetically simple statements that were positive in nature that related to technical, task, or action-based statements of the player's positional role within the team. These statements were recorded in the participant's preparation booklet and discussed in the one-on-one consultation. These self-talk statements that related to both the goal-setting program and positive statements of technical, task, or action-based descriptors were made into a small series of clear key-rings and attached to the zip cord of the player's stick bag. This allowed easy access to these reminders during Phase III of the program.

Data Analysis

Data analysis was separated into two stages. First, data across symptom intensity, direction, and frequency were plotted in profile form for each time period within the 7-day competitive cycle. Scores for both option choice and performance were also plotted for each competitive match of the 10-game series. Second, visual inspection criteria based on the recommendations of Hrycaiko and Martin (1996) were used to establish a significant experimental effect. These criteria related to: (a) the number of overlapping data points between baseline and treatment phases, (b) the immediacy of any effect observed following intervention, (c) the size of any effect following intervention, and (d) the consistency of any effect across participants. When inspecting the data, there was greater confidence that an experimental effect was observed when a greater number of the above criteria were satisfied (cf. Hanton & Jones, 1999b; Hrycaiko & Martin, 1996; Lindsay, Maynard & Thomas 2005).

RESULTS³

Symptom Data

Cognitive Intensity

Limited effects were observed from baseline to treatment across the participants for cognitive intensity (see Table 1). For both Participant 2 and 3 several overlapping data points were noted pre- to post-intervention and the magnitude of the change in symptoms experienced was negligible. For Participant 1, a magnitude of change in symptom from baseline to treatment

³Due to the volume of data derived from the present study, the authors have summarized experimental effects across the dependent variables of associated anxiety symptom responses in tabular format in relation to the experimental criteria used. Figures for associated symptom responses pre- to post-intervention are only presented for one participant to provide visual representation of the results. However, the authors have formulated a complete breakdown of results for each participant with associated Figures for each of the dependent variables for each of the temporal phases of the 7-day competitive cycle. These are available from the lead author and we encourage the interested reader to request this information.

Table 1
Symptom Responses Across Performance Preparation Time for All Participants in Relation to the Criteria for an Experimental Effect

Symptom	Criteria	Participant 1				Participant 2				Participant 3			
		6 days	2 days	1 day	1 hr	6 days	2 days	1 day	1 hr	6 days	2 days	1 day	1 hr
CA-I	N° of ODP	0	2	1	2	1	3	4	4	3	3	2	0
	Delay	0	1	1	0	0	2	N/A	N/A	N/A	N/A	2	0
	Mean diff.	-6.75	-4.33	-5.83	-6.08	-4.8	-2.4	-4.6	-2.6	-2.42	+92	+1.42	-3.5
CA-D	N° of ODP	0	0	1	0	0	0	1	1	1	0	1	0
	Delay	0	0	1	0	1	0	1	1	1	0	1	0
	Mean diff.	+5	+12.33	+12.58	+16.58	+12.6	+11.4	+11.8	+11.2	+6	+10.5	+11.33	-12.25
CA-F	N° of ODP	0	0	0	0	1	3	1	1	2	1	1	0
	Delay	0	0	0	0	1	3	1	1	2	1	1	0
	Mean diff.	-6.67	-10.17	-11.25	-11.83	-5	-3	-6	-6.6	-10	-11.92	-10.91	-14.5
SA-I	N° of ODP	0	3	0	0	2	4	5	4	3	4	4	3
	Delay	0	3	0	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Mean diff.	-6.75	-5.59	-7.08	-8.58	-2	+0.8	-8	-1.2	+1	+1.08	+59	-2.25
SA-D	N° of ODP	1	0	0	0	1	1	1	0	2	0	0	0
	Delay	1	0	0	0	1	1	1	0	2	0	0	0
	Mean diff.	+4.42	+6.75	+11.25	+15.15	+8.4	+5.6	+6.2	+8.6	+11.58	+6.25	+7.91	+13.25
SA-F	N° of ODP	1	1	1	1	1	1	2	3	2	2	2	1
	Delay	1	1	1	1	0	1	N/A	N/A	2	2	2	1
	Mean diff.	-9.83	-6.17	-7.67	-12.92	+3.2	+5	+2.4	+4	-12.42	-10.08	-9.17	-11.5
SC-I	N° of ODP	1	1	1	0	0	0	0	0	1	1	1	1
	Delay	1	1	1	0	0	0	1	0	1	1	1	1
	Mean diff.	+4.17	+3.42	+4.58	+6.17	+9	+6.4	+6.6	+7.2	+5.33	+5.25	+6.58	+6.08
SC-D	N° of ODP	0	0	0	0	1	0	0	0	1	1	1	01
	Delay	0	0	0	0	1	0	0	0	1	1	1	0
	Mean diff.	+9.08	+12	+12.92	+15.83	+7	+7	+11.8	+6.4	+7.58	+2.17	+2.67	+7.75
SC-F	N° of ODP	0	0	0	0	1	0	0	0	0	2	1	0
	Delay	0	0	1	0	1	0	0	0	0	2	1	0
	Mean diff.	+9.75	+10.33	+9.83	+9.67	+20	+20.8	+19.8	+17.4	+16.83	+6.25	+9.08	+12.42

Legend: CA = Cognitive anxiety; SA = Somatic anxiety; SC = Self-confidence; I = Intensity; D = Direction; F = Frequency; N° of ODP = Number of pre- to post-intervention overlapping data points; Delay = Immediacy of effect (N° of games delay, N/A = no effect observed); Mean diff. = Difference in mean symptom response from pre- to post-intervention (+/- = direction of the change).

phase was observed; however, this effect was masked by several overlapping data points and a delay in the immediacy of the effect from pre- to post- intervention (see Figure 3).

Somatic Intensity

For Participants 2 and 3 the intervention provided little change to somatic anxiety symptoms throughout the 7-day competitive cycle. Several pre- to post-intervention overlapping data points were observed for these participants and the magnitude of change in symptoms from baseline to treatment was negligible. Somatic intensity symptoms for Participant 1 were reduced by the intervention and with the exception of the 2-day pre-performance data point the effect was immediate and no overlapping data points were observed pre- to post-intervention.

Self-Confidence Intensity

A consistent increase in self-confidence intensity was observed across the three participants from baseline to treatment. This effect was tempered by a one-match delay for several of the time periods within the 7-day competitive cycle, a delay which formed one overlapping data point for several time periods within the cycle.

Cognitive Direction

A large effect was noted across all participants pre- to post-intervention. Specifically, prior to intervention all participants displayed a consistent debilitating profile, where as, following intervention all participants interpretations were facilitative in nature; an effect consistent across all the time phases within the 7-day competitive period. For all participants', one overlapping data point and a one-game delay were observed for certain individual time phases within the 7-day competitive cycle (see Table 1 and Figure 4).

Somatic Direction

The intervention had a consistent large effect on somatic direction scores for all three participants throughout the time periods within the 7-day competitive cycle. Throughout all baseline periods participants' interpretations were debilitating in nature, whereas following intervention facilitative interpretations were reported. This effect was tempered with a one-game delay and one pre- to post-intervention overlapping data point for one pre-competition phase for Participant 1 and for three pre-competition phases for Participant 2. Participant 3 only experienced a delay in the onset of effects and overlapping data points during the 6-day pre-competition phase.

Self-Confidence Direction

Perceptions of self-confidence were more positive in nature following the intervention program, a finding consistent across all three participants where the magnitude of change was large. This effect occurred with no overlapping data points or without any game delay for Participant 1, and only one overlapping data point and games delay for Participant 2 and 3 at any one given preparation phase.

Cognitive Frequency

The intervention provided a consistent and large decrease in the frequency of cognitive symptoms across the three participants between the baseline and treatment phases of the 10-game cycle. No overlapping data points or delay in effect was reported by Participant 1. However, with the exception of the 1 hr pre-competition phase, at least one overlapping data point and/or game delay was observed in the effect for Participants 2 and 3 (see Table 1 and Figure 5).

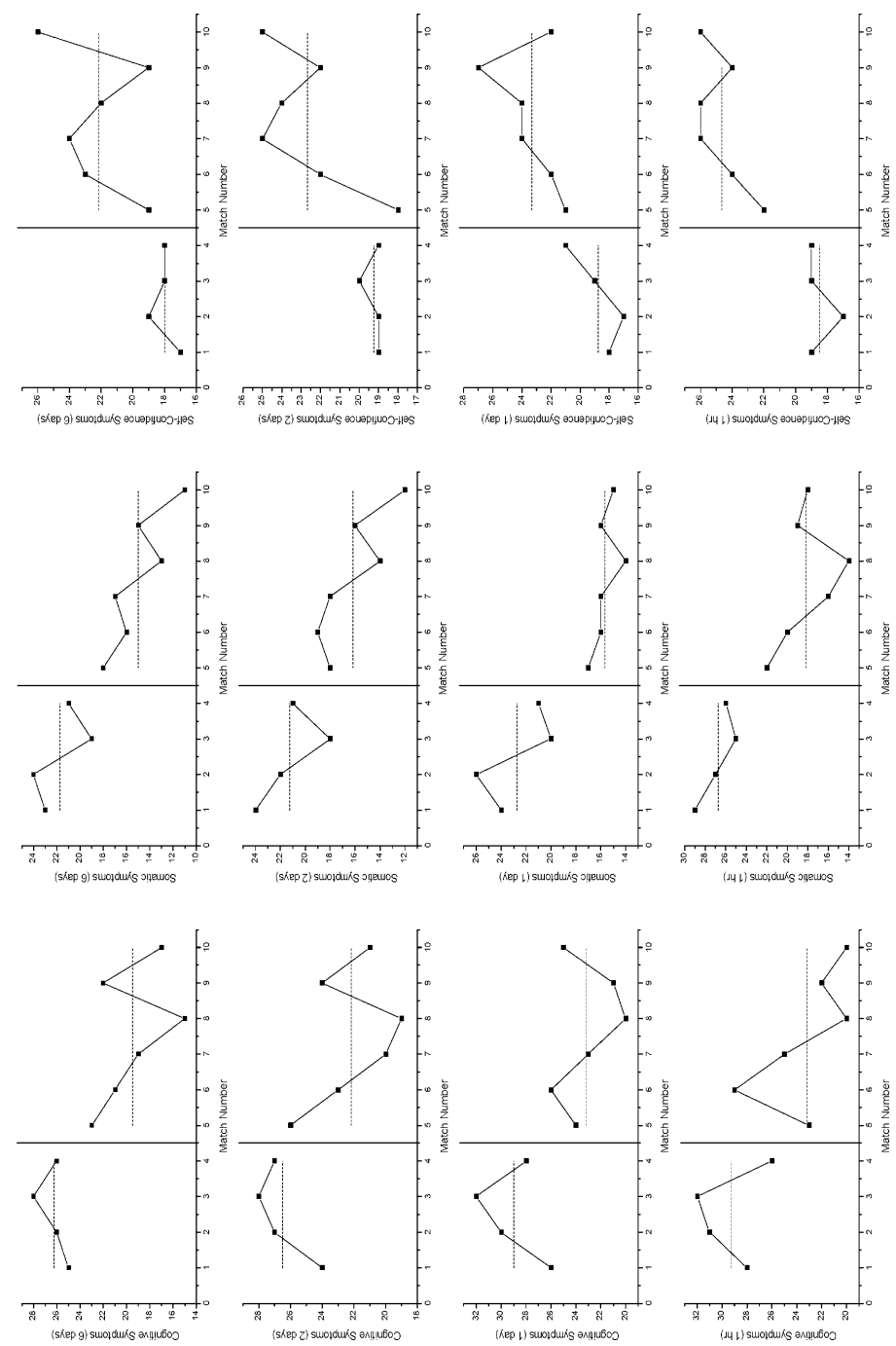


Figure 3. Intensity of symptom responses throughout the preparation time for performance for Participant 1.

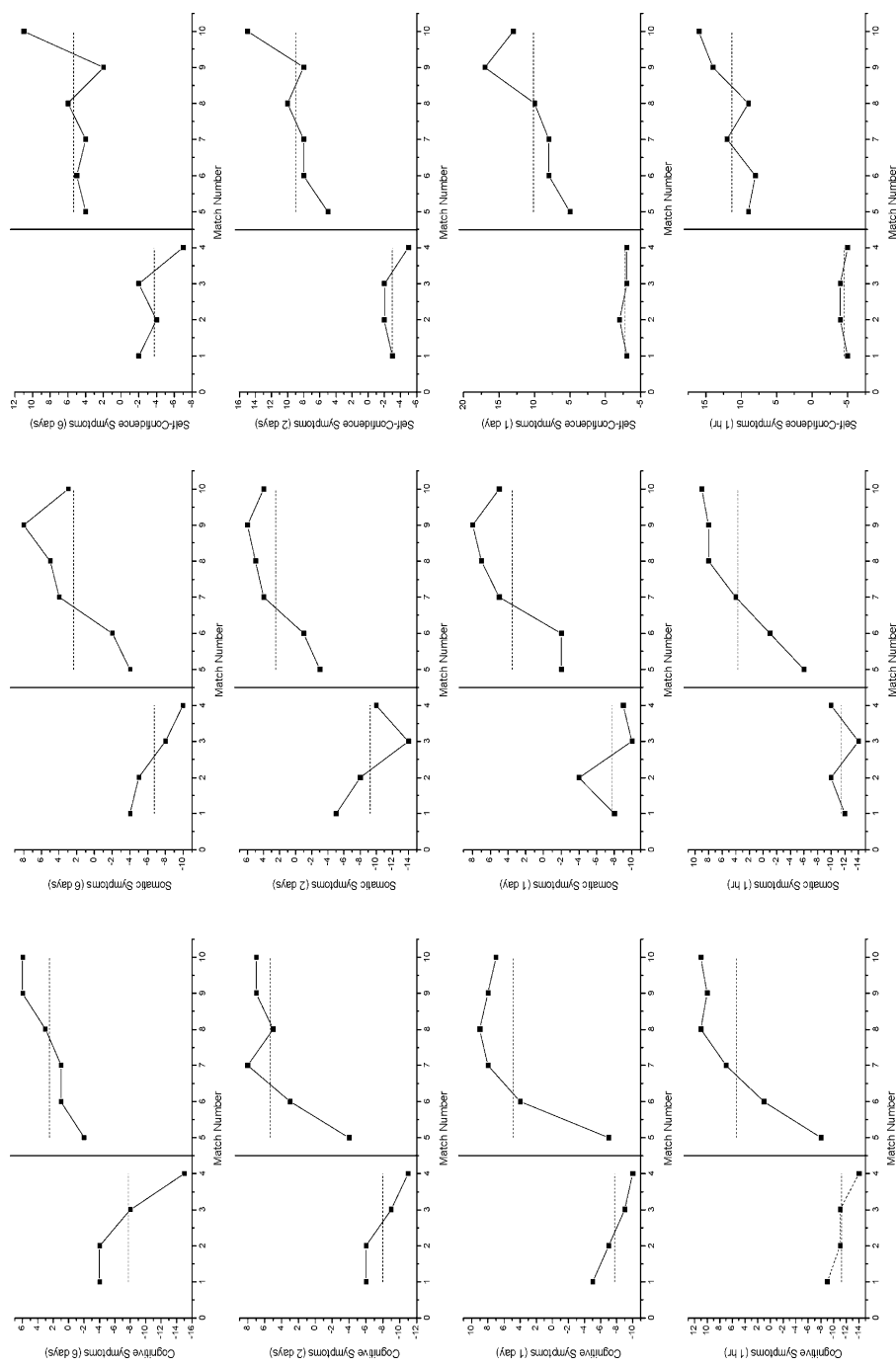


Figure 4. Direction of symptom responses throughout preparation time for performance for Participant 1.

Somatic Frequency

Frequency of somatic symptoms highlighted a large decrease following intervention for both Participants 1 and 3 (see Table 1 and Figure 5). This effect was consistent across all the pre-competition time phases for these two participants, although it was tempered with a one to two game delay following intervention creating one to two pre- to post-intervention overlapping data points. However, for Participant 2, the intervention produced a small increase in the frequency of somatic symptoms experienced.

Self-Confidence Frequency

The intervention provided a large increase in the frequency of self-confidence symptoms for all three participants. This effect was consistent across all the pre-competition time phases considered within the 7-day competitive cycle. Limited overlapping data points and delay in effect was observed: Participant 1 displayed no delay in effect or overlapping data points, Participant 2 experienced one overlapping data point and a one game delay at the 6 day pre-competition time phase and, Participant 3 exhibited two overlapping data points and a two-game delay 2 days pre-performance and one overlapping data point and a one-game delay at the 1 day pre-competition phase.

Performance Data

Option Choice

Correct option choice increased and incorrect option choice decreased following intervention for all three participants (see Figure 6). Specifically, correct option choice improved by a mean of 10.98% from baseline to treatment phase (Participant 1 = 10.67%, Participant 2 = 8.6%, Participant 3 = 13.67%). In comparison, incorrect option choice highlighted a mean decrease of 11.25% pre to post-intervention (Participant 1 = 10.42%, Participant 2 = 10.6%, Participant 3 = 14.25%). These overall changes were tempered with several overlapping data points for each participant pre to post-intervention.

Performance Outcome

Across all three participants positive performance scores increased and negative performance scores decreased between baseline and the treatment phase (see Figure 6). Positive performance scores increased by a mean of 12.31% (Participant 1 = 10.5%, Participant 2 = 7%, Participant 3 = 19.42%); where as negative performance scores decreased by a mean of 10.14 (Participant 1 = 4.67%, Participant 2 = 5%, Participant 3 = 20.75%). Although these effects were consistent across the players, several pre- to post-intervention overlapping data points were observed across the three participants.

Social Validation Data

Scores on the 7-point Likert scale supported the importance of psychological preparation during the time leading up to competition with two participants scoring 7 and one participant scoring 6, where a score of 7 indicated “extremely important.” Responses concerning the participants’ perceptions of performance change indicated scores of 5, 6, and 7, where 7 denoted “extremely significant” improvement in performance. All participants reported being satisfied with the intervention program (scores ranging from 6 to 7) and indicated the intervention had proved useful to them (responses ranging from 6 to 7).

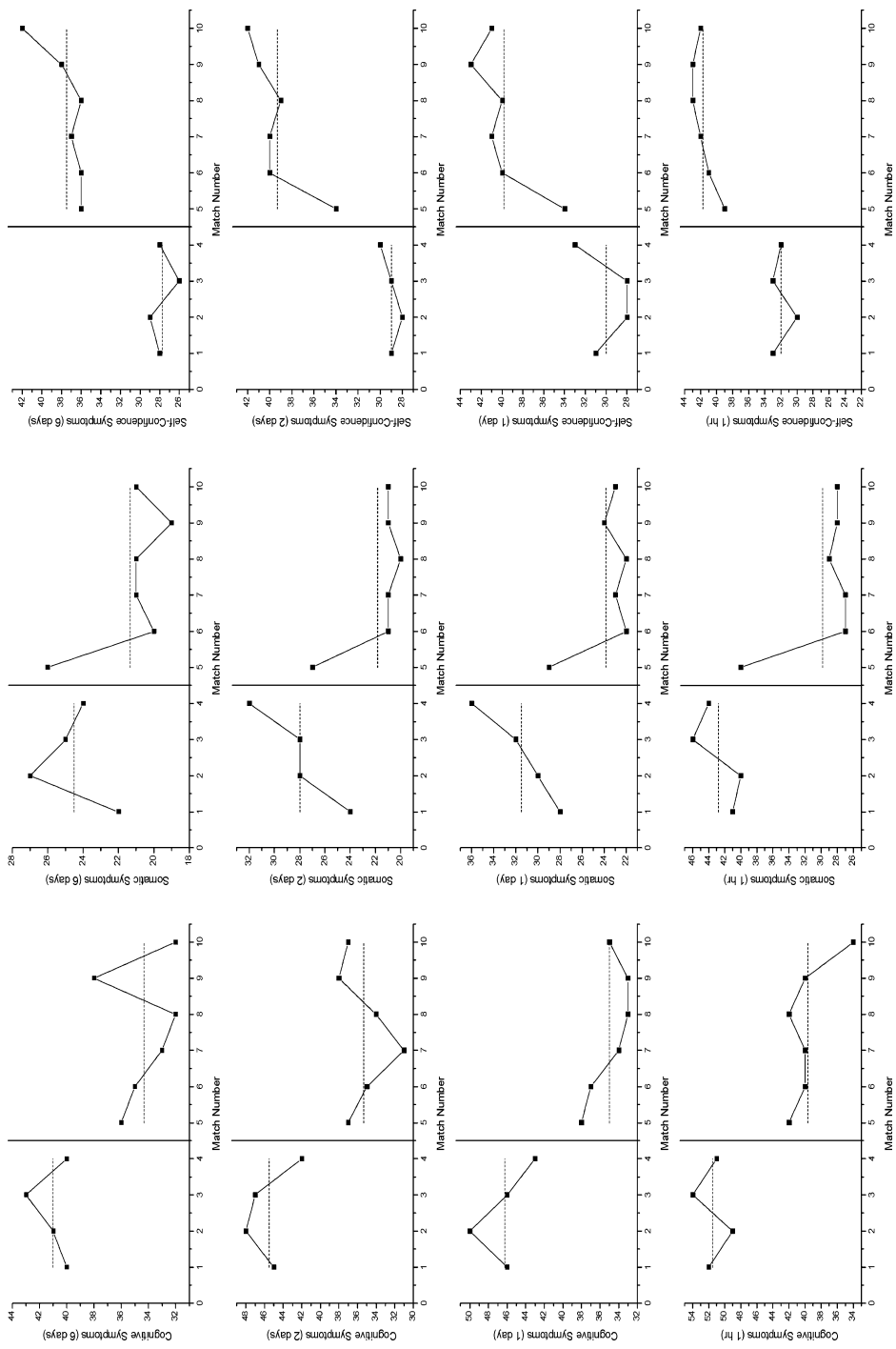


Figure 5. Frequency of symptom responses throughout preparation time for performance for Participant 1.

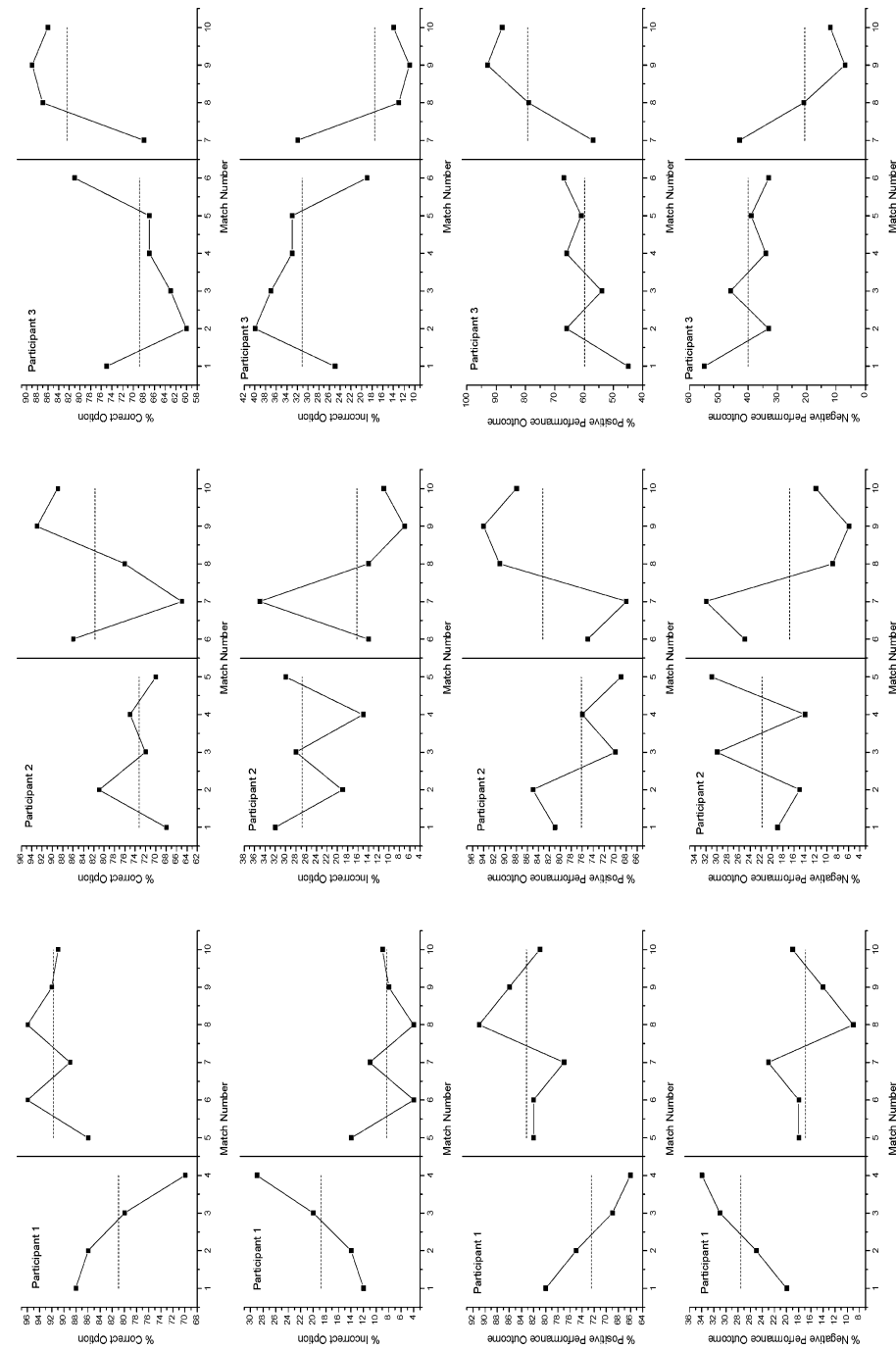


Figure 6. Performance analysis data across all participants.

DISCUSSION

This study attempted to implement and test the efficacy of a temporal multimodal psychological skills program with performers debilitated by their associated competitive anxiety symptoms. The fundamental psychological skills of imagery, rationalization and restructuring, goal-setting, and self-talk were applied differentially at three pre-performance temporal phases using the findings of Thomas et al. (2007) as the empirical foundation for the structure, timing, and psychological skill content of each phase. A further aim of the study was to assess the impact of the intervention program over competitive performance using a sensitive intra-individual measure of performance underpinned through a performance (i.e., notational) analysis.

Turning to the central focus of this study, all the hypothesized effects were supported with regard to the intervention's effectiveness over symptom responses. Specifically, the intervention induced a more facilitative interpretation of the symptoms associated with cognitive and somatic anxiety in all three players throughout the 7-day competitive cycle. Perceptions of associated cognitive and somatic anxiety symptoms were restructured from a consistent debilitating interpretation to a consistent facilitative interpretation following the treatment phase. Also, players' perceptions of their self-confidence symptoms became more facilitative following the intervention. Further, throughout the 7-day competitive cycle, the intensity (i.e., level experienced) and frequency (i.e., amount of times experienced) of players' self-confidence symptoms increased following intervention and the frequency with which they experienced cognitive anxiety symptoms decreased after the treatment phase. In addition to the predicted changes, the intervention also provided a partial effect over the frequency of the symptoms associated with somatic anxiety, leading Players 1 and 3 to experience these symptoms for less time following intervention. For the dimensions of cognitive and somatic direction, and self-confidence intensity, these findings are comparable with the work of Hanton and Jones (1999b), Maynard and Hemmings et al. (1995), Maynard and Smith (1995) and Maynard et al. (1998). Additionally, it appears that the psychological skills used in this study affected the frequency of confidence and anxiety (both cognitive and somatic) symptoms and perceptions of self-confidence; symptoms not considered in either Hanton and Jones' or Maynard and colleagues' work. Further, this study has extended the documented benefits from utilizing these skills within a competition day pre-race routine into a comprehensive temporal psychological skills intervention used throughout the 7-day competitive cycle commonly associated with team sports. The use of such a temporal approach served to affect the players' symptom responses throughout the time preceding competition rather than affecting responses solely at times immediately prior to competing.

In addition to providing an influence over the anxiety symptoms the players experienced during the 7-day competitive cycle, the intervention also provided successful effects for the players' competitive field hockey performances. Across the participants, option choice performance improved by 10.67% for Participant 1, 8.6% for Participant 2 and 13.67% for Participant 3 whereas, performance outcome scores improved by 10.5%, 7%, and 19.42% for Players 1, 2, and 3 respectively. These gains are sizable when one considers the elite nature of the sample used in the study. Interestingly, performance gains for Participant 3 for both option choice and performance outcome were greater than that noted for Participants 1 and 2. Possible explanation for these discrepancies could relate to the level of competitive experience across the three players. Specifically, Participant 3 had only competed at a national-level standard whereas Participants 1 and 2 were both international standard. Even with the use of intra-individual performance measures, this placed Participants 1 and 2 closer to the performance ceiling within

their sport; therefore, intuitively, one would expect performance improvement to be lower in athletes with higher competitive status due to the greater skill level they already possess.

Although the intervention provided a positive influence over the symptoms participants experienced during the 7-day competitive cycle and impacted positively on competitive performance, the authors note possible caution over the interpretation of these findings. Components of the inspection criteria for obtaining an experimental effect included screening for the presence of overlapping data points and noting the immediacy of any effect following initiation of the treatment (cf. Hanton & Jones, 1999b; Hrycaiko & Martin, 1996; Lindsay et al., 2005). For symptom data, there were several occasions where overlapping data points and a delay in effect were noted pre- to post-intervention. These issues were compounded in the performance data where at times numerous overlapping data points were observed. Although these criteria were sporadically abused, explanations for overlapping data points and delay in the realization of experimental effects have been forthcoming from previous single-subject research. Specifically, Callow et al. (2001) concluded that delays in the realization of effects should be expected in single-subject designs when the psychological skills intervention program used is complex.

The preparation-based nature of the intervention used in this study and the adoption of a three-phased program where combinations of psychological skills were undertaken is one of the most comprehensive programs empirically tested in applied sport psychology literature. Further, and with direct relevance to the performance data of the study, Thelwell and Maynard (2003) have recently indicated that assessing performance change in open classification sports using ecologically valid techniques is a complex process where overlapping data points should be expected. Although the current study adopted an idiographic sensitive performance measure underpinned through performance analysis there are still several variables that affect performance that cannot be considered in such systems. Finally, review of material in the learning domain indicates that when acquiring new skills, be they physical or mental, learning curves often indicate a delay in effect during the early (i.e., cognitive) phases of learning (Magill, 2001).

Two main limitations were apparent within this study. First, the authors acknowledge the breadth of intervention program used, and the formulation of a three-phase temporal program required a demanding investment of time and resource from the practitioner. Specifically, the leading sport psychologist was required to attend three one-on-one consultations per week with all three performers during the treatment phase, and attend all matches to collect performance analysis data from competitive venues across the United Kingdom. We acknowledge that this type of program may not be logistically, practically, or financially viable for all sports organizations; however, we would point to the use of *elite* sport within the study where the provision of optimal support services remains a priority.

Second, we acknowledge that the use of a multimodal intervention program limited specific knowledge about which portion of the intervention contributed most to behavior change (i.e., the creation of a positive pre-performance state). However, we would point to the role of the first study of the series to counter this limitation. The evidence base provided by the facilitators in the first study indicated the use of a refined repertoire of psychological skills within each of the temporal phases; therefore the design adopted here mirrored the findings of their approach towards psychological preparation for performance.

Several implications, both research and applied were generated from the present study. First, the application of a temporal intervention program has provided improved psychological state during the 7-day competitive cycle. Previous research has refrained from testing the efficacy of using such an approach; the results realized across the two studies indicate this is a fruitful area for attention and provides a framework for future research. Further, the sensitivity

of the frequency dimension has been emphasized throughout this and the first study of the series; this adds weight to the assertion that researchers and practitioners dealing with issues in the anxiety domain should adopt a fine-grained approach to their work (i.e., inclusion of information pertaining to intensity, direction, and frequency of experienced symptoms (cf. Hanton et al., 2004; Thomas et al., 2004).

The use of a performance analysis system as a sensitive ideographic measure of competitive performance has application to both research and practice. Although areas of individual performance still remain outside the criteria within these systems, this offers a more accurate assessment of intervention effectiveness than has previously been adopted within applied practice research in sport psychology. Finally, and perhaps most critically, the findings across this and the first study of the series indicate that the specific form and function of certain psychological skills (e.g., imagery, goal-setting, and self-talk) varies throughout the time preceding performance. This is a crucial finding within modern sport psychology research and indicates that researchers and practitioners need to consider the periodization of psychological skills and be aware that the fundamental psychological skills can be used differentially as athletes prepare for competition. The challenge facing researchers is to provide a stronger evidence base for practitioners in terms of how to apply the fundamental skills throughout longer temporal periods and across different sporting populations.

REFERENCES

- Callow, N., Hardy, L., & Hall, C. (2001). The effects of a motivational general mastery imagery intervention on the sport confidence of high-level badminton players. *Research Quarterly for Exercise and Sport*, 72, 389–400.
- Cerin, E., Szabo, A., Hunt, N., & Williams, C. (2000). Temporal patterning of competitive emotions: A critical review. *Journal of Sport Sciences*, 18, 605–625.
- Ellis, A. (1994). *Reason and emotion in psychotherapy (re. ed.)*. New Jersey: Secaucus.
- Filby, W. C. D., Maynard, I. W., & Graydon, J. K. (1999). The effect of multiple-goal strategies on performance outcomes in training and competition. *Journal of Applied Sport Psychology*, 11, 230–246.
- Hall, C. (2001). Imagery in sport and exercise. In R. A. Singer, H. A. Hausenblas, & C. M. Janelle (Eds.), *Handbook of sport psychology 2nd edition* (pp. 529–549). New York: Wiley.
- Hanton, S., & Connaughton, D. (2002). Perceived control and its relationship to self-confidence and performance: A qualitative enquiry. *Research Quarterly for Exercise and Sport*, 73, 87–97.
- Hanton, S., & Jones, G. (1999a). The acquisition and development of cognitive skills and strategies. I: Making the butterflies fly in formation. *The Sport Psychologist*, 13, 1–21.
- Hanton, S., & Jones, G. (1999b). The effects of a multi-modal intervention program on performers. II: Training the butterflies to fly in formation. *The Sport Psychologist*, 13, 22–41.
- Hanton, S., Thomas, O., & Maynard, I. (2004). Competitive anxiety responses in the week leading up to competition: The role of intensity, direction and frequency dimensions. *Psychology of Sport and Exercise*, 5, 169–181.
- Hrycaiko, D., & Martin, G. L. (1996). Applied research studies with single-subject designs: Why so few?. *Journal of Applied Sport Psychology*, 8, 183–199.
- Hughes, M. D., & Bartlett, R. M. (2002). The use of performance indicators in performance analysis. *Journal of Sports Sciences*, 20, 739–754.
- Jones, G., & Hanton, S. (1996). Interpretation of competitive anxiety symptoms and goal attainment expectations. *Journal of Sport and Exercise Psychology*, 18, 144–157.
- Jones, G., & Swain, A. B. (1992). Intensity and direction dimensions of competitive state anxiety and relationships with competitiveness. *Perceptual and Motor Skills*, 74, 467–472.
- Kazdin, A. E. (1982). *Single-case research designs: Methods for clinical and applied settings*. New York: Oxford Press.

- Kendall, G., Hrycaiko, D., Martin, G. L., & Kendall, T. (1990). The effects of imagery rehearsal, relaxation, and self-talk package on basketball game performance. *Journal of Sport and Exercise Psychology*, 12, 157–166.
- Landin, D. (1994). The role of verbal cues in skill learning. *Quest*, 46, 299–313.
- Landin, D., & Herbert, E. P. (1999). The influence of self-talk on the performance of skilled female tennis players. *Journal of Applied Sport Psychology*, 11, 263–282.
- Lindsay, P., Maynard, I., & Thomas, O. (2005). Effects of hypnosis on flow states and cycling performance. *The Sport Psychologist*, 19, 164–177.
- Magill, R. A. (2001). *Motor learning: Concepts and applications* (6th ed.). New York: McGraw-Hill.
- Martens, R., Burton, D., Vealey, R. S., Bump, L. A., & Smith, D. E. (1990). Development and validation of the Competitive State Anxiety Inventory-2 (CSAI-2). In R. Martens, R. S. Vealey, & D. Burton (Eds.), *Competitive anxiety in sport* (pp. 117–213). Champaign, IL: Human Kinetics.
- Maynard, I. W., Hemmings, B., Greenlees, I. A., Warwick-Evans, L., & Stanton, N. (1998). Stress management in sport: A comparison of unimodal and multimodal interventions. *Anxiety, Stress and Coping: An International Journal*, 11, 225–246.
- Maynard, I. W., Hemmings, B., & Warwick-Evans, L. (1995). The effects of a somatic intervention strategy on competitive state anxiety and performance in semi-professional soccer players. *The Sport Psychologist*, 9, 51–64.
- Maynard, I. W., Smith, M. J., & Warwick-Evans, L. (1995). The effects of a cognitive intervention strategy on competitive state anxiety and performance in semi-professional soccer players. *Journal of Sport and Exercise Psychology*, 17, 428–446.
- Pates, J., Maynard, I. W., & Westbury, T. (2001). An investigation into the effects of hypnosis on basketball performance. *Journal of Applied Sport Psychology*, 13, 61–84.
- Robson, C. (1994). *Real world research: A resource for social scientists and practitioner-researchers*. Oxford: Blackwell Publishers.
- Rogerson, L. J., & Hrycaiko, D. W. (2002). Enhancing competitive performance of ice-hockey goaltenders using self-talk. *Journal of Applied Sport Psychology*, 14, 14–26.
- Swain, A. B. J., & Jones, G. (1993). Intensity and frequency dimensions of competitive state anxiety. *Journal of Sports Sciences*, 11, 533–542.
- Thelwell, R. C., & Maynard, I. W. (2003). The effects of a mental skills package on ‘repeatable good performance’ in cricketers. *Psychology of Sport and Exercise*, 4, 377–396.
- Thomas, O., Hanton, S., & Maynard, I. W. (2007). Anxiety responses and psychological skill use during the time leading up to competition: Theory to practice I. *Journal of Applied Sport Psychology*, 19, 379–397.
- Thomas, O., Maynard, I., & Hanton, S. (2004). Temporal aspects of competitive anxiety and self-confidence as a function of anxiety perceptions. *The Sport Psychologist*, 18, 172–187.