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Psychological skills training and perfectionism: A single-subject multiple baseline study

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ABSTRACT

Psychological skills training (PST) is a common and effective form of support provided by sports psychologists. Nevertheless, its use in helping support athletes with perfectionism and some of the problematic issues they can face is unknown. The purpose of the present study was to assess the effectiveness of PST in reducing perfectionistic cognitions and improving emotional experiences in athletes. Using a single-subject multiple baseline research design, we recruited five national-level basketball players ($M = 21.8$ years) based on their concerns over mistakes (a key dimension of perfectionistic concerns). All participants received eight, one-to-one PST sessions over a four-week period. Participants completed self-report measures of perfectionistic cognitions, cognitive appraisals, pre-competition emotions, and performance satisfaction on a weekly basis, before, during, and after the intervention, as well as 3-months later. Results suggested that PST improved at least some of the cognitive appraisals, pre-competition emotions, and performance satisfaction in most participants. Minimal changes were observed for perfectionistic cognitions. The findings support the general use of PST but other interventions may be required to reduce perfectionistic cognitions.

Lay summary: Perfectionistic concerns are related to performance and well-being difficulties in athletes. We used a short PST intervention to examine if it can improve the experiences of athletes selected based on their concern over mistakes. The intervention was effective for some aspects of their experiences, such as pre-competition emotions and performance satisfaction but less effective for the perfectionistic cognitions they reported.

IMPLICATIONS FOR PRACTICE

- Sport psychologists are better informed as to the effectiveness of PST when working with athletes.
- The effectiveness of PST varies based on the individual and the intended outcome.
- There is a need for more expert guidance on perfectionism for training sports psychologists.

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To maximize the ability to perform at their best consistently, athletes need to develop their psychological skills. Psychological skills training (PST) does so through the formalized practice of key skills (e.g., imagery, goal-setting, self-talk, and physical relaxation) that enhance confidence, attentional focus, and regulation of emotions. PST is a routine part of the practice of many applied sports psychologists and something they would commonly use with the athletes they work with. Although research attests to the general use of PST in supporting athletes, it may be less effective for some athletes, and even ineffective for those that may need it most. Here, we are interested in the use of PST when working with athletes who exhibit more problematic aspects of perfectionism—a personality characteristic that can pose a number of performance, motivation, and well-being difficulties. These difficulties include the experience of frequent and disruptive thoughts about perfection as well as more negative emotional experiences. The study is intended to better inform sports psychologists of the effectiveness of PST for these athletes and whether PST is useful for addressing common issues they experience.

Perfectionism

Trait perfectionism comprises a combination of unrealistically high personal standards accompanied by overly critical evaluations of behavior (Frost et al., 1990). In keeping with this definition, one of the most popular frameworks to study perfectionism is the two-factor model of perfectionism (Stoeber & Otto, 2006). This model includes two higher-order dimensions: Perfectionistic strivings (PS) and perfectionistic concerns (PC). PS captures the excessively high personal standards and a self-oriented striving for perfection, whereas PC captures the overly critical evaluations, negative reactions to imperfection, and the discrepancy between one's personal standards and performance (see Stoeber & Otto, 2006, for a review). When studying this model, the focus is typically on the separate and interactive effects of the two higher-order dimensions and how different levels and combinations of the two correspond to different outcomes.

Research suggests that athletes with higher PC are more likely to experience a range of problems (see Hill et al., 2018, for a review). Leading up to competition, for example, there is evidence that PC is related to higher appraisals of threat and lower appraisals of challenge (Crocker et al., 2014). There is also evidence that PC is related to worry, anxiousness, and difficulty concentrating in athletes (e.g., Carter & Weissbrod, 2011; Stoeber et al., 2007; Thienot et al., 2014). More recent research suggests that difficulties appear to continue the following performance, too, with PC related to more negative evaluations of performance, meaning athletes experienced less pleasure from performance, lower mood, and increased tension (e.g., Waleriańczyk et al., 2022).

Many of the negative effects of perfectionism are thought to be explained by its cognitive component—known as perfectionistic cognitions (Flett et al., 1998). Perfectionistic cognitions are automatic ruminative thoughts and images about the need to be perfect (Flett et al., 1998). As a type of rumination, these thoughts are activated following failure to achieve important goals and represent an ongoing commitment to goals once behavioral pursuit has ended (Martin & Tesser, 1989). As those higher in perfectionism often perceive failure, the frequent occurrence of perfectionistic cognitions is characteristic of the internal experience of perfectionism. Unlike trait aspects of

perfectionism, though, such as PS and PC, perfectionistic cognitions are less stable and can fluctuate over time (Flett et al., 1998). In addition, for these reasons, perfectionistic cognitions are presumed to be more amendable to change (Hill & Donachie, 2020).

Like with PC, research in sports has found that more frequent perfectionistic cognitions are related to several problems for athletes. Recently, for example, Donachie et al. (2019) found that perfectionistic cognitions predicted pre-competition emotions and mediated the relationship between trait perfectionism and negative pre-competition emotions over time. Specifically, socially-prescribed perfectionism (a dimension of PC) and self-oriented perfectionism (a dimension of PS) were related to more frequent perfectionistic cognitions which, in turn, was related to higher anxiety and anger before the competition. As such, the experience of perfectionistic cognitions is central to the effects of perfectionism, and their management is likely to be key to providing effective psychological support to athletes with higher perfectionism.

Managing perfectionism

Given the negative consequences of perfectionism, it is unsurprising that there have been many calls for research to test the effectiveness of interventions aimed at supporting those higher in perfectionism. There is a growing body of research outside of sports that has responded to those calls. This research has recently been summarized by Galloway et al. (2022) who conducted a meta-analysis of 15 randomized control trials which used cognitive behavioral therapy (CBT) to reduce perfectionism, anxiety, depression, and eating disorders. They reported the effects were positive and typically medium-to-large in size in reducing personal standards (a dimension of PS) and concern over mistakes (a dimension of PC). The effect sizes didn't vary between face-to-face or self-help interventions, with both types of delivery showing large effect sizes. Furthermore, there was no statistically significant difference between whether the intervention was guided or unguided. As such, general interventions have a reasonable evidence base on which to draw.

As for perfectionistic cognitions, research is more limited and to our knowledge includes only two intervention studies. In the first study, Radhu et al. (2012) tested a 12-week web-based CBT intervention with university students. They found that perfectionistic cognitions significantly decreased pre- to post-intervention (along with concern over mistakes), but, overall, changes were not significant when compared to the wait-list control group. In the second study, Arpin-Cribbie et al. (2012) tested a slightly shorter 10-week web-based CBT and general stress interventions in university students. They found that perfectionistic cognitions significantly decreased pre- to post- for both interventions (along with other decreases for trait perfectionism particularly for the CBT-intervention) and changes were significant when compared to a no treatment group. Examination of interventions focused on perfectionistic cognitions, then, is a more emerging and novel area of research.

Inside of sports is a small number of intervention studies focused on perfectionism. Two of especial notes are provided by Donachie and Hill (2022) and Mosewich et al. (2013) as they both included rigorous randomized-controlled designs. Mosewich et al. examined the effects of a short, one-week, self-compassion-based

intervention on self-criticism, rumination, and concerns over mistakes. They found significant reductions in all three. More recently, Donachie and Hill (2022) examined the effects of an eight-week CBT-based self-help intervention in reducing perfectionism. They found significant reductions in socially-prescribed perfectionism (a dimension of PC) and, importantly for the current study, also found significant reductions in perfectionistic cognitions. Despite these promising indications from a very small number of studies, intervention work focused on perfectionism is extremely sparse in sports with more research needed. This is particularly the case for research that focuses on perfectionistic cognitions and, in our view, interventions likely to be used more routinely by practitioners, such as PST.

Psychological skills training

PST is training that focusses on learning and improving cognitive and behavioral skills. It is a widely recognized intervention to support athletic development and is especially useful as a means to manage common problems (e.g., anxiety, confidence, and concentration; Birrer & Morgan, 2010). Imagery, goal-setting, self-talk, and physical relaxation are the four most common skills included in PST programmes and are the primary focus of our intervention in the current study. Different definitions and descriptions of these skills are used in research and practice. For the purpose of this study, we view imagery as the ability to control, create and re-create internal experiences from memory (Morris et al., 2005), goal-setting as the ability to direct effort and attention effectively toward an activity (Healy et al., 2018), self-talk as the purposeful use of verbalized or internalized statements directed to the self (Hardy, 2006), and physical relaxation as the ability to manage muscle tension to help regulate stress (Neil et al., 2011).

To better understand the effectiveness of PST for athletes, Barker et al. (2020) recently reviewed intervention studies using single-case experimental designs. Their review included over seventy studies and spanned 30 years. They provided two important conclusions that are important for the present study. Firstly, PST is typically effective at enhancing behavioral and performance outcomes in athletes. These outcomes include increased performance satisfaction, increased confidence, and lower levels of anxiety. Secondly, single-case research designs can detect meaningful psychological changes that follow PST interventions. With these two conclusions in mind, we adopted a single-case design in the current study to test the effectiveness of PST intervention in reducing perfectionistic cognitions and a range of other important outcomes.

It is clear that PST has many benefits for athletes. What is less clear, however, is how effective PST is when supporting athletes who may have higher PC and who are experiencing some of the issues that these can pose. We believe that examining the effectiveness of PST in these athletes is important for several reasons. First, PST is a common approach that sports psychologists routinely use. Second, it is possible that sport psychologists will encounter athletes higher in PC frequently with evidence that perfectionism may be a common characteristic for athletes, particularly those at higher competitive levels (e.g., Dunn et al., 2005). Thirdly, there have been several suggestions

that aspects of PST might be useful for addressing perfectionism with goal-setting (Kearns et al., 2007) highlighted in particular, as well as relaxation, imagery, and self-talk identified as a means of moderating the perfectionism-distress relationship (Hall et al., 2012).

Cognitive appraisals, pre-competition emotions, and performance satisfaction

In addition to perfectionistic cognitions, we focused on cognitive appraisals, pre-competition emotions, and performance satisfaction. Cognitive appraisals are part of the stress process and are an evaluation through which individuals construct relational meanings about the stressors they encounter (Lazarus, 1999). There are three transactional appraisals that athletes can experience whilst evaluating a stressful environment. *Threat* and *loss* arise when an individual believes that they do not have the resources to cope with a situation and are associated with negative emotions. By contrast, *challenge* arises when someone feels they can cope with a situation and are associated with positive emotions (Lazarus, 1999). Here, we measure all three cognitive appraisals with research on perfectionism and more problematic appraisals in mind (e.g., Crocker et al., 2014), and to examine whether PST can have a positive influence on the evaluation of the anticipatory experiences in athletes higher in perfectionism.

Appraisals give rise to emotions. Here we focus on pre-competition emotions—that is those that occur immediately before competition. Athletes can report a range of emotions before the competition. These can be positive emotions (e.g., excitement and happiness) and negative emotions (e.g., dejection and anger). Although emotions are complex and their consequences vary depending on the individual and situation, positive emotions have an underlying relational theme of benefit (e.g., goal progress), whereas negative emotions have an underlying theme of harm (e.g., sense of possibly being demeaned; Lazarus, 1999). As such, we can understand the experience of positive emotions as typically being desirable for athletes and negative emotions as typically being undesirable. We note, too, the aforementioned research that found trait dimensions of perfectionism, particularly those indicative of PC, are related to negative pre-competition and that perfectionistic cognitions mediate this relationship over time (Donachie et al., 2019).

The final outcome we focused on was performance satisfaction. Performance satisfaction is the perception an athlete has of the adequacy of their own performance (Nicholls et al., 2012). It is underpinned by evaluative processes that include personal expectations and perceptions of accomplishment (Chelladurai & Riemer, 1997). When athletes meet or exceed expectations, they will experience greater satisfaction. Nevertheless, unrealistic personal expectations or expectations from others, or tendencies to view efforts pessimistically or more negatively will contribute to lower satisfaction (Gotwals & Spencer-Cavaliere, 2014). These issues are particularly relevant to perfectionism and suggest that athletes higher in perfectionism are more likely to experience lower performance satisfaction. Previous research in sports is supportive of this suggestion and has found that PC is negatively related to satisfaction both in regards to goal progress and performance (e.g., Lemyre et al., 2008).

The present study

The aim of the present study is to examine whether PST can reduce perfectionistic cognitions as well as appraisals, pre-competition emotions, and performance satisfaction in athletes with higher PC. To do so, we recruited a group of athletes based on their concern over mistakes (a key dimension of PC) and provided a four-week PST intervention. We hypothesized that the PST intervention would reduce perfectionistic cognitions, threat and loss appraisals, negative emotions, and increase challenge appraisals, positive emotions, and performance satisfaction for each athlete.

Methods

Participants and procedures

Recruitment for the present study had two phases, screening (Phase 1) and intervention (Phase 2). The study was approved by the university's ethics committee. Informed consent was obtained from all participants in both phases.

Phase 1 (screening)

Thirty-five participants, from a basketball club in the UK, were invited to complete a perfectionism questionnaire for the purpose of screening and selecting participants to take part in phase 2. Participants were national-level basketball players, made up of females ($n = 15$) and males ($n = 20$), aged between 18 and 26 ($M = 20.6$ years, $SD = 2.2$). All participants completed one subscale from the Sport Multidimensional Perfectionism Scale-2 (SMPS-2; Gotwals & Dunn, 2009)—concerns over mistakes. There are currently no normative values or cutoff values available for this or other measures of perfectionism in sports. As such, we used a value of ≥ 29 on the concern over mistakes subscale as a minimum criterion to take part in phase 2. Kothari et al. (2019) used this same criterion when selecting participants to take part in a perfectionism intervention outside of sport. Of the participants who were eligible ($n = 10$), five agreed to take part in phase 2.

Phase 2 (intervention)

The five participants were labeled A–E. They were aged between 18 and 23 years ($M = 21.8$ years, $SD = 3.5$) and trained between nine and 27 h a week ($M = 18.2$, $SD = 6.6$). Participants A, D, and E were male and participants B and C were female. Scores on the Concerns Over Mistakes subscale were 32 (A), 32 (B), 30 (C), 29 (D), and 31 (E). As a point of reference, the validation of the S-MPS and S-MPS-2 included six samples of different ages, sports, and competitive levels, and reported means scores for the subscales for five of them. The scores of concerns over mistakes of the five participants in this study are above the mean in all five samples (Dunn et al., 2006; Gotwals & Dunn, 2009). Four of the participants have scores that would be in the highest 16% of scores (i.e., $+1 SD$) in all of these samples.

Design

The study used a single-case, staggered multiple baseline design. Each participant received the intervention at a different starting point. Participant A received the

intervention at week three, participant B at week four, participant C at week five, participant D at week six, and participant E at week seven. This type of design offers an experimental and ideographic platform to observe intervention effects in an ecologically valid setting (Barker et al., 2011). All outcome variables (perfectionistic cognitions, cognitive appraisals, pre-competition emotions, and performance satisfaction) were measured at pre-intervention, during the intervention, post-intervention, and at a 3-month follow-up. Participants completed each measure once a week on the morning of the competition.

Measures

Trait perfectionism

To measure trait perfectionism, we used the Sport Multidimensional Perfectionism Scale-2 (SMPS-2; Gotwals & Dunn, 2009). We used the subscale capturing Concerns Over Mistakes (8-items; e.g., “People will probably think less of me if I make mistakes in competition”). Participants are asked to score each item on a 5-point Likert scale (1 = “strongly disagree” and 5 = “strongly agree”). Several previous studies have provided evidence of its reliability and validity (e.g., Gotwals et al., 2010).

Perfectionistic cognitions

To measure perfectionistic cognitions, we used the Perfectionistic Cognitions Inventory-10 (PCI-10; Hill & Donachie, 2020). Participants indicated how frequently they experienced different perfectionistic thoughts (e.g., “Why Can’t I be perfect?”). Participants are asked to score each item on a 5-point scale (0 = “not at all” and 4 = “all of the time”). The validation of the PCI-10 provided evidence of its reliability and validity, including its superiority to the original PCI (Flett et al., 1998).

Cognitive appraisals

To measure cognitive appraisals, we used the Appraisal of Life Events scale (ALE; Ferguson et al., 1999). The ALE is an adjective checklist that assesses an athletes’ perception of their environment using threat (6 items, e.g., “Threatening”), challenge (6 items, e.g., “Exciting”), and loss (4 items, e.g., “Pitiful”). The ALE includes 16 items scored on a 6-point Likert scale (0 = “not at all” and 5 = “very much so”). Several previous studies have provided evidence of its reliability and validity (e.g., Dixon et al., 2017).

Pre-competition emotions

To measure pre-competition emotions, we used the Sport Emotion Questionnaire (SEQ; Jones et al., 2005). The SEQ measures five emotions: anxiety (5 items), dejection (5 items), anger (4 items), happiness (4 items), and excitement (4 items). Participants are asked to indicate how they feel about an upcoming sports competition on a 5-point scale (0 = “not at all” and 4 = “extremely”). Evidence of the reliability and validity of the scale is provided by previous studies, including work with perfectionism (e.g., Donachie et al., 2019).

Performance satisfaction

Participants rated their performances out of 10 using a self-report measure after each match/performance (Didymus & Fletcher, 2017). Based on the procedure outlined by Levy et al. (2011), the participants rated their performance satisfaction on a 10-point Likert rating scale (1 = “totally dissatisfied” and 10 = “totally satisfied”). The performance satisfaction measure instructed players to record how satisfied they were with their most recent individual performance, rather than the performance of the team.

Social validation

Social validation data was collected at the 3-month follow-up period, using brief informal interviews. The interviews were intended to serve as a short evaluation of the PST intervention and provide an account of their experiences of the intervention. Participants were asked three questions: “How do you feel now compared to before the intervention?” “Which of the techniques did you find most useful and why?” and “What would you change about the intervention?” These questions were selected because they provided deep insight into the specific components of the intervention and were largely based on Hrycaiko and Martin’s (1996) and Wolf’s (1978) recommendations. Similar questions have been used by others (e.g., Pates et al., 2002; Pates & Maynard, 2000). This approach was intended to help understand the participant’s perceptions and feelings toward the intervention, developing a greater personal understanding of the effectiveness (Barker et al., 2011). Responses were not formally analyzed due to the informal nature of the interviews and the brevity of responses.

Intervention

Participants received a 4-week long PST intervention, receiving two sessions a week, each lasting 45–60 minutes. Brief interventions using PST have been previously used in the broader literature ranging from 4-weeks (Röthlin et al., 2020) to 5-weeks (Meggs & Chen, 2019). During the first week of the intervention, each participant received two sessions specifically aimed at reducing the stigma of sport psychology and raising help-seeking behaviors (Watson et al., 2021). In the following three weeks of the intervention, each participant received individual sessions on physical relaxation (e.g., cue controlled relaxation and rapid relaxation), imagery (e.g., developing imagery skills and best performance imagery), and self-talk (e.g., reframing situations and positive self-talk). Participants also received content focused on goal-setting that was used to supplement and support each session (e.g., process goals). Details of the aims, content, and homework assignments are provided in the [Supplementary Materials](#).

Visual and statistical analysis

Visual analysis

We began with a visual analysis of the data (Lane & Gast, 2014). The visual analysis emphasizes practical rather than statistical significance (Barker et al., 2011) and helps identify step changes from pre- to post-intervention. We used the following four

assumptions to visually analyze the data. (1) the last few data points of the baseline should be stable, or in the opposite direction to the predicted effects of the intervention; (2) there are a minimal number of overlapping data points between baseline and intervention phases, (3) there is an immediate effect following the intervention, and (4) there is a larger effect size in comparison to the baseline.

Statistical analysis

We also provide descriptive statistics, % change, Cohen's *d* (using pooled standard deviations; Cohen, 1992), and the percentage of non-overlapping data (PND; Scruggs & Mastropieri, 2001) to compare pre-intervention and post-intervention scores (post-intervention scores did not include the 3-month follow-up score). As there can be interpretation difficulties associated with the use of Cohen's *d* in the context of single-case designs (see Scruggs & Mastropieri, 2001), we use the PND as the primary metric to evaluate the effectiveness of the intervention. Effect sizes are provided as [supplementary information](#) and should be interpreted with caution. PND is the proportion of data points in a given treatment condition that exceeds the extreme value in the baseline condition (Scruggs & Mastropieri, 2001). We apply PND to compare post-treatment scores to pre-treatment scores and use $>.90$ to infer very effective treatment, $.70$ to $.89$ to indicate moderate effectiveness, $.50$ to $.69$ to indicate debatable effectiveness, and scores $<.50$ as not effective (Scruggs & Mastropieri, 1998).

Results

The results are presented in two parts. First, we provide the intervention effects for each participant for all variables. Second, we provide social validation data to account for participants' perceptions of the intervention. Follow-up scores are excluded from post-intervention means, SDs, and effect size calculations. Results are reported in [Tables 1](#) and [2](#), and in [Figures 1](#) and [2](#). An increase or decrease was determined by the % change from pre- to post-intervention and effectiveness was based on PND.

Participant A

Participant A reported a decrease in perfectionistic cognitions (14%); a decrease in threat (93%) and loss (76%), and an increase in challenge (9%); a decrease in all negative pre-competition emotions (between 18 and 83%) and an increase in happiness (34%) but a decrease in excitement (1%); and an increase in performance satisfaction (40%). Changes (based on PND) were suggestive of no effectiveness (threat, challenge, anxiety, anger, and excitement), debatable effectiveness (perfectionistic cognitions), and moderate effectiveness (loss, dejection, happiness, and performance satisfaction).

Participant B

Participant B reported an increase in perfectionistic cognitions (27%); a decrease in threat (94%) and loss (89%), but also a decrease in challenge (19%); a decrease in all pre-competitive negative emotions (between 71 and 73%) and also a decrease in

Table 1. Changes in perfectionistic cognitions, cognitive appraisals and performance satisfaction pre- and post-intervention.

	Cognitive appraisals																																		
	Perfectionistic cognitions					Threat					Challenge					Loss					Performance satisfaction														
	Pre		Post		d	%	PND	Pre		Post		d	%	PND	Pre		Post		d	%	PND	Pre		Post		d	%	PND							
	M	SD	M	SD				M	SD	M	SD				M	SD	M	SD				M	SD	M	SD				M	SD	M	SD	M	SD	M
A	2.10	0.26	1.81	0.34	0.96	-14	.50	0.94	0.92	0.06	0.09	2.97	-93	0	3.17	0.34	3.44	0.36	-0.78	9	.38	1.17	0.95	0.28	0.21	1.28	-76	.88	6.33	1.53	8.88	0.64	-2.17	40	.75
B	1.25	0.24	1.59	0.23	-1.46	27	0	0.79	0.53	0.05	0.08	1.96	-94	0	1.12	0.58	0.90	0.52	0.40	-19	.14	1.31	0.75	0.14	0.28	2.09	-89	.86	5.00	2.00	6.71	0.95	-1.09	34	.71
C	2.20	0.16	2.63	0.15	-2.89	20	0	1.10	0.89	0.14	0.16	1.51	-87	.50	2.77	1.38	4.11	0.17	-1.37	49	.67	0.85	1.24	0.13	0.21	0.81	-85	0	4.00	1.22	8.00	0.89	0.31	100	1
D	2.90	0.30	2.34	0.18	2.24	-19	.60	2.56	0.99	1.87	0.25	0.96	-27	0	2.39	0.56	3.76	0.08	-2.01	57	1	3.04	0.49	1.71	0.49	2.72	-44	.40	4.17	2.00	8.60	0.55	-3.02	106	1
E	3.06	0.21	2.31	0.22	-0.19	1	0	0.43	0.79	0.09	0.10	0.60	-80	0	1.69	0.46	1.71	0.32	-0.05	1	0	0.54	0.73	0.44	0.13	0.19	-18	0	6.67	1.63	7.00	0.71	-0.26	5	0

Table 2. Changes in pre-competition emotions pre- and post-intervention.

	Negative pre-competition emotions										Positive pre-competition emotions																								
	Anxiety					Dejection					Anger					Excitement					Happiness														
	Pre M	Post M	SD	d	%	PND	Pre M	Post M	SD	d	%	PND	Pre M	Post M	SD	d	%	PND	Pre M	Post M	SD	d	%	PND											
A	1.73	1.33	0.93	0.54	0.79	-47	.25	0.87	0.42	0.15	0.21	2.17	-83	.88	0.42	0.38	0.34	0.30	0.21	-18	0	2.75	0.00	2.72	0.36	0.12	-1	.25	2.08	0.52	2.78	0.31	-1.62	34	.75
B	2.00	0.75	0.54	0.32	2.51	-73	1	0.10	0.20	0.03	0.08	0.48	-71	0	0.38	0.75	0.11	0.20	0.49	-71	0	2.44	1.05	1.79	0.92	0.66	-27	0	1.75	1.04	1.07	0.61	0.80	-39	0
C	1.48	0.61	0.60	0.13	2.00	-59	.17	0.52	0.95	0.33	0.16	0.27	-36	0	0.45	0.67	0.17	0.20	0.57	-63	0	2.90	0.84	3.17	0.38	-0.41	9	0	2.25	0.47	2.92	0.38	-1.59	30	.67
D	1.90	0.73	1.56	0.38	0.58	-18	0	1.90	0.63	1.44	0.17	1.00	-24	0	1.79	0.66	1.20	0.27	1.16	-33	20	1.96	0.56	3.25	0.31	-2.87	66	.80	1.54	0.29	3.35	0.58	3.93	117	1
E	0.94	0.88	0.85	0.25	0.14	-10	0	0.34	0.30	0.10	0.20	0.97	-71	.75	0.36	0.63	0.00	0.00	0.81	-100	0	1.21	0.59	0.38	0.25	1.87	-69	0	2.21	0.27	1.81	0.24	1.61	-18	.25

M: means; *SD*: standard deviations; *d*: Cohen's *d*; %: percentage change; PND: percentage of non-overlapping data.

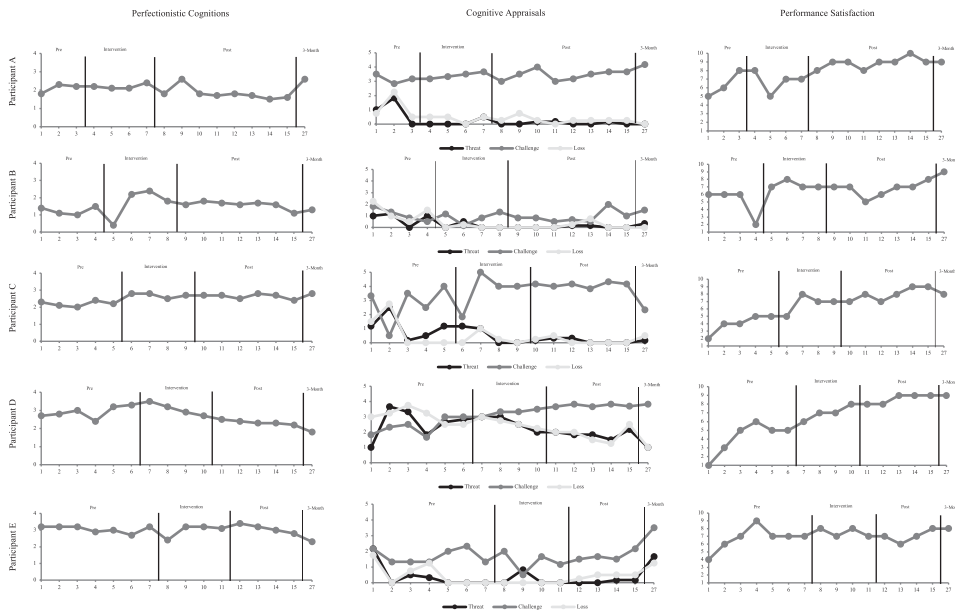


Figure 1. Perfectionistic cognitions, cognitive appraisals, and performance satisfaction, for pre, intervention, post, and 3-month follow up.

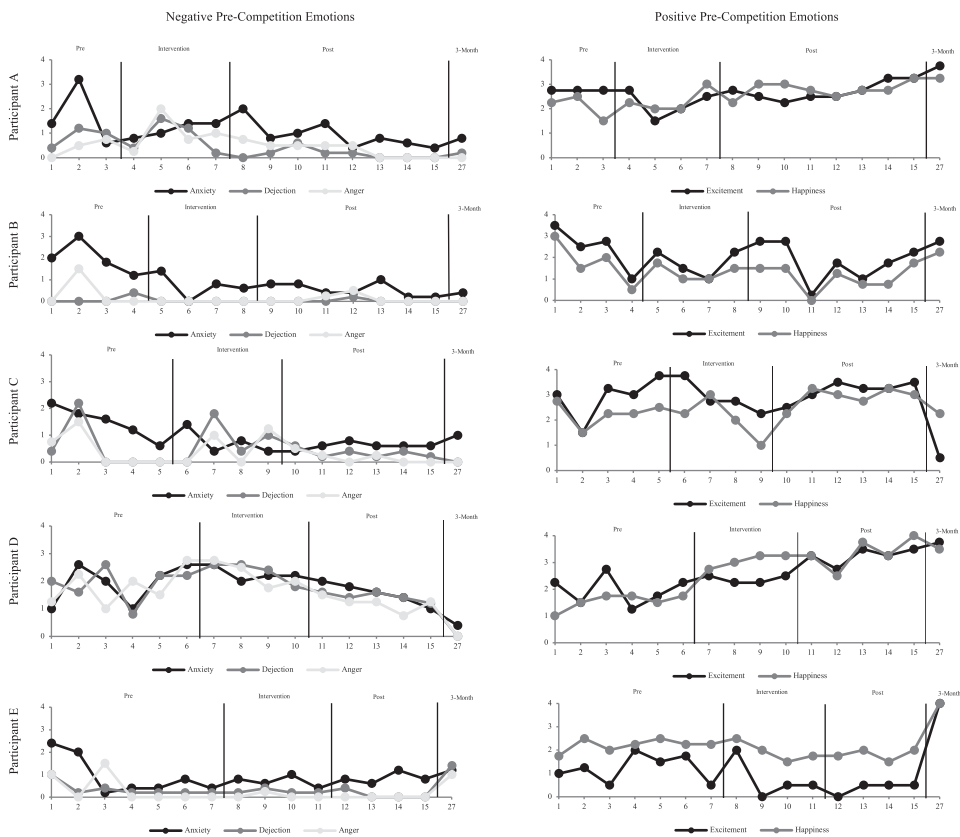


Figure 2. Negative pre-competition emotions and positive pre-competition emotions, for pre, intervention, post, and 3-month follow up.

excitement (27%) and happiness (39%); and an increase in performance satisfaction (34%). Changes (based on PND) were suggestive of no effectiveness (perfectionistic cognitions, threat, challenge, anxiety, dejection, anger, excitement, and happiness) and moderate effectiveness (loss and performance satisfaction).

Participant C

Participant C reported an increase in perfectionistic cognitions (20%); a decrease in threat (87%) and loss (85%), and an increase in challenge (49%); a decrease in negative pre-competitive emotions (between 36 and 63%) and an increase in positive emotions (between 9% and 67%); and an increase in performance satisfaction (100%). Changes (based on PND) were suggestive of no effectiveness (perfectionistic cognitions, loss, anxiety, dejection, anger, and excitement), debatable effectiveness (threat, challenge, and happiness), and very effective (performance satisfaction).

Participant D

Participant D reported a decrease in perfectionistic cognitions (19%); a decrease in both threat (27%) and loss (44%), and an increase in challenge (57%); a decrease in all negative pre-competition emotions (between 18 and 33%) and an increase in positive emotions (66% and 117%); and an increase in performance satisfaction (106%). Changes (based on PND) were suggestive of no effectiveness (threat, loss, anxiety, dejection, and anger), debatable effectiveness (perfectionistic cognitions), moderate effectiveness (excitement), and very effective (challenge, happiness, and performance satisfaction).

Participant E

Participant E reported an increase in perfectionistic cognitions (1%); a decrease in threat (80%) and loss (18%), and an increase in challenge (1%); a decrease in all negative pre-competition emotions (between 10 and 100%), but also a decrease in all positive emotions (between 18% and 69%); and an increase in performance satisfaction (5%). Changes (based on PND) were suggestive of no effectiveness (perfectionistic cognitions, threat, challenge, loss, anxiety, anger, excitement, happiness, and performance satisfaction) and moderate effectiveness (dejection).

Social validation

These interviews revealed that the PST intervention was received positively, that they were happy with the delivery of the intervention, as well as the content. In response to performance satisfaction, all participants reported improved evaluation and self-reflection about how they are performing. For example, participant A noted that “I feel more relaxed during my warmup, I think has helped me start games quicker. I don’t then have all these nagging thoughts. I can focus on using more of the positive self-talk.” Participants also reported appraisal improvements due to the PST intervention. These included being less negative and more positive. To illustrate, participant C suggested

that “I am certainly enjoying different performance situations more now, than I did before. I feel like I want to challenge myself and feel excited about that mindset.” All participants also reported that the PST contributed to how negative they are toward themselves. For example, participant B said “I’m so much happier with how I’m performing now. Everything seems to be feeling better.” Participants A and D reported feeling less critical and more constructive in their evaluation of themselves and how they performed. To show this, participant D said “I don’t think I am as critical towards how I perform. If I make a mistake, I think about what we did (the PST intervention), try and reset and move on.” Finally, all participants reported that they found to benefit from using and engaging with the weekly homework tasks. For example, participant C said “I really feel the homework helped me understand each session in more detail.”

Discussion

The purpose of the present study was to examine whether PST can reduce perfectionistic cognitions as well as appraisals, pre-competition emotions, and performance satisfaction in athletes with higher PC. We expected to see a reduction in perfectionistic cognitions, threat and loss appraisals, negative emotions, and an increase in challenge appraisals, positive emotions, and performance satisfaction for each athlete. The PST intervention brought about improvements for most of the participants in at least some of the outcomes and suggested some benefits of PST. Nevertheless, of especial note, across participants, perfectionistic cognitions did not show any clear or consistent signs of improvement. In two of the five participants, perfectionistic cognitions increased.

Managing appraisals, pre-competition emotions, and performance satisfaction

The present findings provide the first evidence that PST can support athletes with higher PC in regard to their cognitive appraisals. Two of the athletes reported a moderate decrease (based on PND) in loss appraisals and a further participant reported a very effective increase in challenge appraisals. The findings are encouraging in these regards and the use of PST for athletes with higher PC. Research suggests that these athletes are more likely to find participation stressful (e.g., Garinger et al., 2018). This is because of the investment in self-worth and especial meaning they can attach to accomplishment (Hill et al., 2015). Our findings suggest that PST might help some athletes with higher PC better manage anticipatory experiences and help them appraise stressors more positively or at least as less harmful or damaging.

In a related way, the findings also indicate how PST can support athletes with higher PC in regard to pre-competition emotions. Four athletes reported moderate to very effective changes in at least one pre-competition emotion. Linking to appraisals, we believe that more positive anticipatory appraisals may have helped facilitate positive subsequent emotional experiences for these athletes. The changes were a mix of increased excitement and happiness, as well as decreased anxiety and dejection. As such, the benefits appear to entail both increasing positive emotions and decreasing negative emotions. Again, these are promising findings when one considers that the typical emotional experiences of athletes with higher PC can include prominent fears of

shame and embarrassment (Sagar & Stoeber, 2009) and negative pre-competitive emotions, such as anxiety and dejection (e.g., Donachie et al., 2019).

The last positive change we observed was a moderate to very effective increase in performance satisfaction in four of the five participants. Athletes with higher perfectionism engage in evaluative processes that make the experience of satisfaction less likely, more fleeting, and less stable over time (Hill et al., 2015). In doing so, athletes are denied an important source of positive experiences in sports and may be more vulnerable to motivation problems as a consequence. It is possible that the positive changes in performance satisfaction were due to the use of more flexible and realistic goals (better goal-setting) or reducing self-critical elements of their evaluation (more positive self-talk). Alternatively, it may be a more indirect consequence, with athletes feeling generally psychologically better prepared, in control, and at ease—all factors associated with “best” or better performances and a sense of satisfaction (Harmison, 2011). A chronic negative evaluation is such a key part of perfectionism that the possibility that athletes with higher PC might be supported in this regard using PST is especially important and noteworthy.

Reducing perfectionistic cognitions

Evidence for the effectiveness of PST in managing perfectionistic cognitions was much more mixed and limited. Two participants had moderate decreases in their perfectionistic cognitions (but fell short of clear effectiveness for PND). In addition, three of the participants had small increases in the frequency of perfectionistic cognitions following the intervention. Perfectionistic cognitions are more dependent on the context and situation, amendable to change, and have been found to reduce following short interventions in sports (e.g., Donachie & Hill, 2022). Nevertheless, our findings perhaps serve as a reminder that they are also engrained ways of thinking that are characteristic of perfectionism and stem, at least in part, from perfectionism traits that are more difficult to change. As such, it may be that this aspect of perfectionism is more entrenched than previously thought. Certainly, the current study suggests that alternative interventions to PST may be needed to address perfectionistic cognitions in athletes.

In regards to what alternative approaches may be most successful in reducing perfectionistic cognitions, research suggests several options. The two studies outside of sports and the one study in the sport that found evidence of effectiveness all used CBT. As such, it would be valuable to revisit this work and explore the use of this technique again in a work similar to the current study. There is also emerging evidence inside and outside of sports that Acceptance and Commitment Therapy-based interventions (e.g., Ong et al., 2019) and compassion-based interventions (e.g., Mosewich et al., 2013) may also be effective. These other techniques also warrant further examination and rigorous testing as we seek to improve the evidence-base and tools practitioners have to support athlete’s problematic experiences associated with perfectionism.

Applied recommendations

The present study provides several applied recommendations. Firstly, sports psychologists are better informed as to the effectiveness of PST when working with athletes to

address perfectionism and associated issues. This includes its positive impact in managing some of the negative consequences of perfectionism, but also its limitations in regard to perfectionistic cognitions. In regards to the latter, sport psychologists will need to seek out and provide supplementary or additional strategies to support their athletes (e.g., CBT-based self-help guides; Donachie & Hill, 2022).

Second, the study highlights that there needs to be more expert guidance on perfectionism for training sports psychologists. Including the topic in formal education and training will improve “perfectionism literacy” and help avoid mismanagement of perfectionism in sports. Given the complexity of perfectionism, and mixed messages regarding its usefulness or “adaptiveness” there is considerable risk that this might be the case. As a result, athletes may not receive the most appropriate support and be more vulnerable to perfectionistic problems. This includes sub-clinical and clinical outcomes like burnout and depression (Hill et al., 2018).

Finally, the study signals how the effectiveness of PST varies based on the outcome and individual. The most effective support will be tailored to the individual athlete and their experiences. This includes accounting for an athlete’s perfectionistic characteristics that can vary considerably and include personal (concern over mistakes) and interpersonal (imposing the need to be perfect on others) elements that have different consequences and require different types of support. It also includes the particular issues they are seeking support for—confidence, anxiety, concentration—which may necessitate the use of different combinations of psychological skills.

Limitations and future research

The present study has several limitations. Firstly, the rigor of single-case designs is associated with the number of assessment points in the baseline and post-intervention phases. The baseline observation phase of the current study ranged between 3 and 7 weeks, which is common but relatively small (Barker et al., 2020). Future research would benefit from extending the baseline phase of these types of interventions. This would also increase confidence in the way we accounted for and assessed change and effectiveness. For example, PND is influenced by extreme scores during the baseline that influences inference of treatment effects, and this is more likely with a smaller number of observations. This may have been an issue in the current study in regard to variables, such as threat appraisals and anger which were typically very low. Secondly, the intervention was delivered over a shorter intense period (4 weeks with two sessions a week). Future research may want to examine the differences in delivery in regard to the length (weeks) and intensity (sessions), and how this impacts effectiveness. Thirdly, the social validation interviews, which served as a short evaluation of the intervention, provided limited insight into the athlete’s perspective. Future research could use a more thorough interview process, which may provide a greater understanding of their experience of the intervention. Lastly, there was no recognition as to which of the sessions within the PST intervention were more or less effective. Future research may consider identifying which of these techniques are more helpful to develop a more robust and effective intervention, as well as include more performance and behavioral outcomes.

Conclusions

Motivation, performance, and welling issues will be common for athletes with higher perfectionism, particularly PC. The present study provided the first evidence that PST can be used to improve cognitive appraisals, pre-competition emotions, and performance satisfaction for some of these athletes. However, we found limited evidence for the success of PST in reducing perfectionistic cognitions so practitioners will need to find alternative means of doing so.

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