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Effectiveness of an Online Acceptance and Commitment Therapy Programme for Perfectionism in Soccer Players: A Randomized Control Trial

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Abstract

There is currently limited understanding of how to reduce perfectionism in sport. With research outside of sport as impetus, in the current study we evaluated the effectiveness of an online ACT-based intervention for reducing perfectionism and improving pre-competition emotions in soccer players. Following a pre-registered protocol, eighty-one female soccer players (*M* age = 24.28 years, *SD* = 6.77) were randomly allocated to either an intervention group (*n* = 41) or a waitlist control group (*n* = 40). The intervention group had access to a set of online ACT-based modules for 8-weeks. Athletes completed measures of trait perfectionism, perfectionism cognitions, and pre-competition emotions pre-intervention and post-intervention. A 2 (group) x 2 (time) ANOVA revealed significant interaction effects for trait perfectionism, perfectionism cognitions, and pre-competition emotions. Following the intervention, the two groups displayed significant mean differences for trait perfectionism, perfectionism cognitions, and almost all pre-competition emotions. However, due to lower reliability of some instruments, findings regarding post-competition emotions were discounted. The findings suggest that online ACT-based interventions may be a viable and effective way to reduce perfectionism in soccer players (but not necessarily improving pre-competition emotions).

Keywords: practice, applied, health

Effectiveness of an Online Acceptance and Commitment Therapy Programme for Perfectionism in Soccer Players: A Randomized Control Trial

Research suggests that athletes who are perfectionistic are more vulnerable to a range of difficulties. In soccer academy players, for example, perfectionism has been implicated in more negative pre-competition emotions and both higher burnout symptoms and higher depressive symptoms (Donachie et al., 2019; Smith et al., 2018). However, we know very little about effective interventions to reduce perfectionism in sport. The current study builds on a small but growing body of work that has assessed the effectiveness of different types of interventions to reduce perfectionism in athletes. We do so by evaluating the effectiveness of a novel online Acceptance and Commitment Therapy (ACT)-based intervention in soccer players. Our hope is to increase the evidence-base for researchers and practitioners working with perfectionistic athletes and provide a better basis for working with perfectionistic athletes in an applied setting.

Trait perfectionism and perfectionism cognitions

Perfectionism is a personality characteristic that includes traits, cognitions, and presentational components. Athletes display different patterns of these components to create complex profiles that exert an influence over their experiences in sport. The current study is concerned with trait perfectionism and perfectionism cognitions. Trait perfectionism is defined as a combination of unrealistically high standards and overly self-critical evaluations (Frost et al., 1990). The two broad dimensions are normally labelled perfectionistic strivings (PS) and perfectionistic concerns (PC) and are measured using different indicators or sub-dimensions from different models (see Stoeber & Otto, 2006). Some of the typical indicators are concerns over mistakes, doubts about performances, and negative reaction to imperfections, as well as the very high, exceptionally high, and unrealistically high standards for themselves and from others that people report they have when they are perfectionistic. To

understand the implications of being more perfectionistic in sport, researchers typically study these sub-dimensions of perfectionism separately or in different combinations with one another (see Hill & Madigan, 2017).

In addition to displaying general perfectionistic qualities, athletes who are perfectionistic will also experience specific types of thoughts. These are called perfectionism cognitions and are ruminative automatic thoughts and images that related to the need to be perfect (Flett et al., 2018). According to Perfectionism Cognitions Theory (PCT; Flett et al., 2018), perfectionism cognitions are the result of the way in which self-relevant information is processed. In particular, how deep lying schemas pertaining to the "ideal self" create sensitivity to notions of imperfection, dysfunctional attitudes, and irrational beliefs that make people vulnerable to overthinking (e.g., worry) and cognitive interference (e.g., mind wandering). Unlike trait perfectionism, perfectionism cognitions tend to be more state-like, variable, and amenable to change (see Donachie & Hill, 2020). In studying perfectionism cognitions, researchers record the frequency with which athletes report these types of thoughts, often alongside any trait perfectionism they exhibit.

Most research in sport has focused on trait perfectionism and has done so by comparing the correlates of PS and PC. In a meta-analysis of research in sport, PS was shown to be complex and ambiguous, and related to a mix of outcomes (Hill et al., 2018). For example, higher PS was related to higher positive affect and self-esteem, but also to higher anxiety and fear of failure. There was also evidence that higher PS is related to better athlete performance but this relationship, too, appears complex (e.g., Curran & Hill, 2018). In contrast to PS, PC was shown to be consistently problematic for motivation and wellbeing. For example, higher PC was related to higher external regulation, self-criticism, and depressive symptoms. It was also unrelated to athlete performance (but in other work it seems to have the potential to be related to lower performance via an interaction with PS; Lizmore

et al., 2019). As such, while the effects of PS are more contentious, there is consensus among researchers that PC is problematic and therefore a valuable focus for intervention in sport.

Research examining perfectionism cognitions in sport is more limited, but findings are indicative of some of the issues athletes can face as perfectionism cognitions become more frequent. In one study, for example, more frequent perfectionism cognitions were related to higher burnout symptoms and predicted burnout symptoms after taking into account trait perfectionism in youth rugby players (Hill & Appleton, 2011). In two other studies that are especially relevant here, perfectionism cognitions were found to predict more negative pre-competition emotions in youth soccer players and mediate the relationship between trait perfectionism and pre-competition emotions over time (Donachie et al, 2018; Donachie et al., 2019). Evidence suggests, therefore, that efforts to support perfectionistic athletes will need to include a focus on reducing perfectionism cognitions, as well as their trait perfectionism.

Reducing perfectionism inside and outside of sport

To date, five studies have evaluated the effectiveness of interventions aimed at reducing perfectionism in sport in athletes. Interventions have been delivered in different sports (running, archery, golf, and soccer), using different types of interventions (mindfulness-based, compassion-based, cognitive behavioral therapy [CBT]-based, and psychological skills training [PST]), and using different designs (pretest-posttest, randomized control trials [RCT], and single-subject multiple baseline). Generally, this research has provided evidence that, to varying degrees, perfectionism in athletes can be reduced using these interventions. For example, in one of the two studies using an RCT design, following a one-week self-compassion-based intervention varsity athletes reported significantly lower concerns over mistakes (Mosewich et al., 2013). In the only other study that used an RCT design, too, following a seven-week CBT-based self-help intervention, soccer players

reported significantly lower self-oriented perfectionism (expecting yourself to be perfect), socially-prescribed perfectionism (believing others expect you to be perfect), and perfectionism cognitions (Donachie & Hill, 2020).

These studies are encouraging in regards to the potential to intervene and reduce perfectionism in athletes. However, overall, research in sport lags behind other settings. We continue to know very little about the effectiveness of different types and modalities of intervention for perfectionism in sport; ultimately, what works (and to what degree) and what does not work. In this regard, a recent study using a single-subject multiple baseline design is illustrative of some of the issues sports psychologists might face when working with perfectionism and how typical practice may not be effective. Specifically, Watson et al. (2022) found that while PST appeared to help reduce some of the adverse effects of perfectionism international basketballers reported (negative pre-competition emotions), there was little evidence PST reduced their perfectionism cognitions. In addition, in research so far on perfectionism, there has been a general reliance on traditional CBT-based interventions with far fewer studies exploring other types of intervention (see Galloway et al., 2022). This study addresses this limitation by examining, for the first time, the effectiveness of an online ACT-based intervention to reduce perfectionism.

Acceptance and Commitment Therapy and perfectionism

ACT is a third wave form of Cognitive Behavioural Therapy with a distinctive philosophical (Functional Contextualism) and theoretical (Relational Frame Theory) basis (Hayes, 2004). One of its key features is that rather than seeking to change thoughts and feelings (something you would expect to see from traditional CBT), ACT seeks to help individuals change their relationship with these thoughts and feelings (Hayes, 2004). The main aim of ACT is to increase psychological flexibility – the ability to be in the moment, aware, and able to act on personal values (Doorley et al., 2020). Psychological flexibility is

made up of a mix of multiple, interlinked facets ("being present", "opening-up", and "doing what matters"), and arises through core processes of change that are the typical focus of applied interventions (Hayes et al., 2006; described in methods section). In support of its general use, ACT has been found to be an effective approach in a range of settings and for different outcomes including promoting mental health (e.g., wellbeing; Howell & Passmore, 2019).

ACT may also be especially useful when addressing perfectionism. In describing why this is the case and the distinctive way in which ACT operates, Ong et al. (2019) note that from an ACT perspective perfectionism is an avoidant response to unwanted inner experiences and overregulation of rules. Moreover, within ACT, the unwanted inner experiences and overregulation of rules are not considered to govern behaviours in and of themselves. As such, both can be treated as separate and disarmed without need to change their content. This is a notable difference from other CBT approaches that necessitate change to underlying processes and may prove more difficult for perfectionism as irrationality attitudes, beliefs and thoughts are so deeply ingrained (Hewitt et al., 2017). Perhaps, then, the approach and practices of ACT may be a more realistic way of working with perfectionism for athletes and offer achievable respite and relief from many of its unhelpful internal experiences (e.g., self-criticism and images of failure).

Research using ACT-based interventions to reduce perfectionism outside of sport is beginning to emerge. One study of especial note is provided by Ong et al. (2019). Using an RCT design, they examined the effectiveness of a 10-week ACT-based intervention for perfectionism. They found that, following the intervention, the ACT group reported lower concerns over mistakes, and increased self-compassion and quality of life, in comparison to a control group. Other more recent ACT-based interventions for perfectionism have also found support for its use in reducing perfectionism and, at the same time, increasing resilience in

different clinical groups (Esmaeili et al., 2021). Overall, then, early indications are that ACT-based interventions are promising for perfectionism. However, the utility of ACT-based interventions has yet to test whether they are effective at reducing perfectionism inside of sport.

In regards to the current study, there are two previous interventions inside of sport that are noteworthy and included elements of ACT. Both studies used a 4-week long mindfulness intervention – which is an aspect of ACT – to reduce athlete perfectionism. The first of these studies found that parental expectations (something linked to the development of perfectionism and sometimes used as an indicator of PC) and somatic anxiety (a negative consequence of perfectionism) significantly reduced following the intervention (Kaufman et al., 2009). In the second study, De Petrillo et al. (2009) found that personal standards, parental criticism (again, something also linked to the development of perfectionism and sometimes used as an indicator of PC), and worry (a negative consequence of perfectionism) all significantly reduced following the intervention. These findings are tempered somewhat by the lack of rigour in the designs of the two studies, with both using pretest-posttest designs. However, alongside the research outside of sport, the findings are indicative of the possible benefits of ACT-based interventions for athletes.

The present study

The present study aimed to assess the effectiveness of an online ACT-based intervention for reducing perfectionism in soccer players. Based on previous research, we hypothesized that the intervention group will report (H1) significantly lower trait perfectionism (all indicators of PS and PC), (H2) significantly lower perfectionism cognitions, and (H3) significantly lower negative pre-competition emotions (anxiety, dejection, anger) and significantly higher positive pre-competition emotions (excitement, happiness), than the control group following the online ACT-based intervention.

Method

Participants

Eighty-one female soccer players were recruited from multiple soccer clubs (*M* age = 24.28 years, *SD* = 6.77, range 18-44 years). They reported that they trained on average for 6.46 hours a week (*SD* = 2.67) and were from a range of backgrounds including White (*n* = 76), Black, African, Caribbean or Black British (*n* = 3), and mixed or multiple ethnic groups (*n* = 2). Athletes ranged from recreational (*n* = 15), regional (*n* = 35), national (*n* = 29), and international (*n* = 2) level. Recruitment took place during the season and all athletes were training and playing competitively at the time of the study. Of the 81 athletes, 41 were randomly allocated to the intervention group (*M* age = 26.00 years, *SD* = 7.88), and 40 were allocated to the control group (*M* age = 22.53 years, *SD* = 4.90). For a description of the flow of athletes from each stage of the study see Figure 1. We adhered to the CONSORT checklist for reporting the randomized control trial (Shultz et al., 2010; supplementary materials, S1).

Power Calculation

Our minimum target sample size is based on an a priori power analysis. G.Power (Faul et al., 2009) for sample size estimation for a two-tailed test, alpha (*p*) = .05, power = .80, and an anticipated effect size of Cohen's *d* = 0.75, provided a target sample size of 58. The anticipated effect size is based on Donachie and Hill (2020) who, following a perfectionism intervention, found a difference between intervention and control groups immediately following their intervention (time 2) of Cohen's *d* = 0.75 for PCI (the largest effect observed at that time point). However, we aimed to recruit at least an additional 20% to account for possible dropout (dropout was 13% in Donachie and Hill, 2020). Therefore, our final target sample size was 70 athletes (58*1.2): intervention group *n* = 35 and control group *n* = 35.

Design and Procedure

Following ethical approval from the research committee, athletes were recruited from female soccer teams across the UK. We recruited females only because one of the authors had connections and links in female sport. Recruitment was done by communicating with gatekeepers and talking to coaches and players. The gatekeeper letter and participant information sheet stated our desire to recruit female soccer players (aged 18+ years) who self-identified as perfectionists and wanted to learn ways to manage their perfectionism (Donachie & Hill, 2020). If athletes were interested in taking part, they accessed an online survey that included information on the study, a consent form, and a questionnaire. Once athletes had signed and agreed to take part in the study and had completed their initial questionnaire, they were randomly assigned to either the intervention group or to a waitlist control group using block randomization.

We used block randomization because it balances the allocation of athletes into the intervention and control groups (Efird, 2011). Block randomization is useful when the entire sample of the study is not yet recruited as it can help maintain equal allocation of participants into the intervention and control groups (Matts & Lachin, 1988). In the present study, we had three rounds of recruitment, each lasting for roughly two-weeks, and three blocks. Block randomisation allowed us to ensure an approximately equal number of participants in the intervention and control group though the recruitment period. During this process, block sizes were determined by recruitment each round and researchers were not blind to group allocation (rather than random block sizes or blinded allocation).

In designing the intervention, different options for delivery were considered. An online approach was selected as a pragmatic and scalable means of delivering an intervention over a short period of time, in multiple locations, to a large number of athletes. We were also aware that there is evidence that online delivery can be just as effective as face-to-face delivery for perfectionism interventions (see Suh et al., 2019). The intervention group had

immediate access to eight online ACT-based modules. The athletes accessed the modules via an online platform. They were told to start with module one (an introduction to sport psychology and ACT) but thereafter could complete the modules in any order and at their own speed. Apart from module one, the modules were designed around the Hexaflex model (Hayes et al., 2006). The modules included sessions on being present with a focus on how each participant reacts to mistakes. There were also modules on opening-up which included accepting thoughts and allowing thoughts to pass. Finally, there were modules on doing what matters which included living towards one's values. The aims and content of each session for the schedule of work is provided in the supplementary materials (supplementary materials, S2).

Each module was developed, pre-recorded, and narrated by the lead author, who is a HCPC registered practitioner psychologist and ACT practitioner. Each module included worksheets and metaphors (athletes were asked to stop and start the pre-recorded video to access these). With the exception of module one, each module started by asking the participant to think about what they had learnt from the homework of the previous module. Thereafter, each module explained the topic, outlined several key skills to support with a particular aspect or dimension of perfectionism, and provided homework that the participant was expected to complete between modules. Homework was then reviewed at the start of the next module. Athletes in the intervention group were emailed at week four and six to check in and find out if they had any questions or concerns.

After the control group completed the first questionnaire, they were emailed and told that they would receive a further email when they can access the online modules. The waitlist control group did not have access to the intervention during the 8-week block. Once the 8-weeks had passed, both the intervention group and the control group completed the online questionnaire for a second and final time. The control group was then given access to the

modules to complete at their leisure. There were no known or reported adverse effects from the intervention.

Intervention

Module 1 – Introduction to Sport Psychology and ACT. All the athletes were instructed to start with module 1 first. The module focussed on stigma, specifically helping athletes overcome any stigma they may have had towards sport psychology. It is worth mentioning that the athletes self-identified and self-enrolled for the intervention, so they may not have typically high levels of stigma associated with perfectionism (Watson et al., 2021). The module contained a large educational component, to help the athlete better understand sport psychology and how ACT will help with their perfectionism. Athletes were then set homework which was to set goals for what they wanted to achieve from the intervention.

Module 2 – Contacting the Present Moment. In this module, athletes focussed on staying present, with a particular focus on being present in training and games. This module linked with concerns over mistakes, which described how being overly concerned with making mistakes leads to a loss in concentration. Athletes were educated on what being present looks and feels like. This included several practical elements (e.g., ‘dropping the anchor’). The homework from this session was a mindfulness tracker, which the athletes used as a practice tool for being present.

Module 3 – Mindfulness. In this module, the athletes were tasked with controlling their body and mind through breathing. This module provided support for the athletes in overcoming a fear of failure, and reducing the stress and anxiety associated with this. Again, athletes were educated on what mindfulness is, before being taken through practical techniques (e.g., ‘spotting the pink elephant’). There were also several metaphors used throughout the module (e.g., ‘leaves on a Stream’). The homework was a diary to log mindful breathing and to notice difficult thoughts that they were experiencing.

Module 4 – Acceptance. In this module, the athletes were educated on how to accept mistakes, as well as themselves. This module also focussed on how self-critical the athletes were to themselves and others, providing support in reducing this self-criticism. The basis of the module taught the athletes how to accept, which included the idea of struggling (i.e., not accepting and continuing to wrestle with their thoughts) vs opening-up (i.e., accepting and allowing thoughts to come and go). The homework for the module was to log the frequency of negative experiences, and to assess whether the athletes were able to open-up and accept them or not.

Module 5 – Defusion. The aim of the module was to help the athlete 'unhook' from their thoughts. This included several practical techniques (e.g., 'hands Infront of the face'). This module also supported the athletes with dealing with doubt about themselves and their abilities. To do so, they used metaphors (e.g., the sushi train) and desensitising techniques (e.g., saying thoughts in different voices). The homework for this module was a getting hooked diary. The athletes practiced desensitising certain thoughts they were having.

Module 6 – Values. The aim of this module was to help the athletes lead a values-led life. This means focussing on who they are rather than who they think they need to be. To further support this, the module linked together with reducing and managing personal expectations. It was important to educate the athletes on the differences between values and goals (a common mistake for many athletes). The athletes then explored their own values using a life compass. In addition, the athletes explored how they might overcome expectations, using values to do this. The homework for the module was for the athlete to continue to explore how expectations from coaches and parents' effect how they train and compete. They were asked to assign their values to help reduce these expectations.

Module 7 – Self. In this module, the athletes were educated on their observer self. That is the self that can observe, be aware, and be innately calm and tranquil. In comparison

to the thinking self, which is constantly problem solving, evaluating, and pre-occupied with past or future events. This module was linked to overcoming negative reactions to imperfections. To help the athletes with this module, several metaphors were used including the chess board metaphor. Finally, the athletes wrote an obituary about themselves providing a sense of how they want to be viewed by others. The homework for this session was a reflection on the meaning of a picture. The picture was a person laid on the ground and looking up at the clouds, which had emotions written on each one.

Module 8 – Committed Action. In this module, the athletes were supported in maintaining any positive changes they may experience due to the intervention. This included educational components of goal setting. The aim here was to set healthy and realistic goals. Something that most athletes with higher levels of perfectionism struggle to do. Rather than striving for perfection, the athletes were encouraged to seek healthy striving. The session also included some what if planning, in preparation for any relapse. The homework for this session was to create an action plan, to describe why the goals are meaningful to the athlete, and what challenges they may be faced with over time.

Transparency and Openness Statement

We have cited any data, code, and methods, provided by others in this study. Data and code used in the study are publicly available for institutional repository, as are all materials (Watson et al., 2023). Further intervention materials can be accessed by contacting the corresponding author. The design, hypotheses, and analysis plan for this study were pre-registered and is publicly available (Watson et al., 2021). In regards to deviations from the pre-registered study, we (1) added consideration of partial eta η^2 to interpret the size of the interactions, (2) adhered to CONSORT guidelines (not originally stated in the pre-registration document), and (3) provide ancillary analyses (as requested by reviewers).

Measures

Trait Perfectionism. To measure trait perfectionism, we used six subscales from three measures of perfectionism in sport: the Sport Multidimensional Perfectionism Scale-2 (SMPS-2; Gotwals & Dunn, 2009), the Multidimensional Inventory of Perfectionism in Sport (MIPS; Stoeber et al., 2007) and the Performance Perfectionism Scale-Sport (PPS-S; Hill et al., 2016). Following the recommendations of Stoeber and Madigan (2016), to measure PS we used (a) the SMPS-2 subscale capturing Personal Standards (7 items; e.g., "I have extremely high goals for myself in my sport"), (b) the MIPS subscale capturing Striving for Perfection (5 items; e.g., "I strive to be as perfect as possible") and (c) the PPS-S subscale capturing Self-Oriented Perfectionism (4 items; e.g., "I put pressure on myself to perform perfectly"). To measure PC, we used (a) the SMPS-2 subscale capturing Concerns Over Mistakes (8 items; e.g., "People will probably think less of me if I make mistakes in competition"), (b) the MIPS subscale capturing Negative Reactions to Imperfection (5 items; e.g., "I feel extremely stressed if everything does not go perfectly") and (c) the PPS-S subscale capturing Socially-Prescribed Perfectionism (4 items; e.g., "People always expect more, no matter how well I perform"). The SMPS-2 and the MIPS had a response format of 1 (*strongly disagree*) to 5 (*strongly agree*) and for the PPS-S had a response format of 1 (*strongly disagree*) to 7 (*strongly agree*). All three instruments have previous evidence of reliability and validity (e.g., factor structure, internal consistencies; Hill et al., 2016; Madigan, 2016; Dunn et al., 2016). Finally, it has been previously reported that there is adequate intra-class correlation (ICC), which determines the amount of variance between variables, for PS (.81) and PC (.75) (Madigan et al., 2016).

Perfectionism Cognitions. To measure perfectionism cognitions, we used the Perfectionism Cognitions Inventory–10 (PCI-10; Hill & Donachie, 2020). Athletes indicated how frequently they experienced different perfectionistic thoughts on 10 items (e.g., 'I should be perfect'). Athletes are asked to score each item on a 5-point scale (0 = 'not at all' and 4 =

'all of the time'). The PCI-10 was developed by Hill and Donachie (2020) using athletes. It has strong evidence to support its validity and reliability, including internal consistency and (unidimensional) factor structure. In addition, it has acceptable ICC (.74) and is strongly correlated with the longer version of the instrument (r = .94; Hill & Donachie, 2020).

Pre-Competition Emotions. To measure pre-competition emotions, we used the Sport Emotion Questionnaire (SEQ; Jones et al., 2005). The SEQ measures five emotions that are grouped into two higher order dimensions: negative emotions (anxiety, 5 items, dejection, 5 items, and anger, 4 items) and positive emotions (happiness, 4 items and excitement, 4 items). The SEQ is made up of 22 items. Athletes are asked to indicate how they feel right now, at this moment to their upcoming sports competition on a 5-point scale (0 = 'not at all' and 4 = 'extremely'). In support of the reliability and validity of the SEQ, evidence has been provided in regards to factor structure and internal consistency (e.g., Arnold & Fletcher, 2015; Jones et al., 2005), as well acceptable ICC for anxiety (.72), dejection (.60), anger (.53), happiness (.73), and excitement (.77) (Donachie & Hill, 2020).

Adherence. As part of the T2 assessment, athletes in the intervention group were asked two additional questions: (1) How many hours did you spend on the modules altogether? and (2) How many modules did you complete? This type of assessment has been used previously (Pleva & Wade, 2007) and found to be a useful way of assessing intervention effectiveness by correlating adherence with residual change scores (Donachie & Hill, 2020).

Statistical Analyses

All statistical analyses were performed with SPSS version 23.0 (Statistical Package for Social Sciences; IBM, USA). As recommended by Galloway et al. (2022), we used intention-to-treat analysis (ITT) (i.e., participant scores are carried forward from baseline if they drop out), which meant that all 81 athletes were included in the statistical analyses. A 2 (group) x 2 (time) analysis of variance (ANOVA) was used followed by independent samples

t-tests. Partial η^2 statistics were used to determine the size of the interaction effects. A partial η^2 =.01 signifying a small effect, a partial η^2 =.06 a medium effect and a partial η^2 = .15 a large effect (Richardson, 2011). Cohen's *d* was used for between-group comparisons with 0.30, 0.50, and 0.80 denoting a small, medium, and large effect (Cohen, 1992).

Results

Reliability of scores from instruments and preliminary analyses

Prior to the primary analyses, internal reliabilities (Ω) and test-retest reliability (intra-class correlations) were calculated for all instruments and both time points (see supplementary materials, S3). Internal reliabilities and test-retest reliabilities were adequate in most cases (Ω > .70 and ICC > .50). However, there was also lower internal reliability for all pre-competition emotions at T2 for the intervention group (Ω < .70). We present findings in full here but note caution for effects pertaining to these variables and when discussing findings. It was also noteworthy that, based on the control group, ICCs indicated lower test-retest reliability in some dimensions of perfectionism (negative reactions to imperfection and perfectionism cognitions) and pre-competition emotions (happiness and excitement) (ICC <.50). Again, this is important information in considering the findings. Prior to conducting the primary analyses, we also inspected the distributions of the data via boxplots and z-skewness. These were considered acceptable with a small number of outlier scores evident for perfectionism cognitions and socially-prescribed perfectionism. Retaining these scores were considered preferable to other strategies in context of an intervention study (e.g., removal or transformation).

Assessment of intervention

Main and interaction effects are presented in Table 1 and comparison of intervention group and control group at T1 and T2 are presented in Table 2.

Trait Perfectionism and Perfectionism Cognitions

In regards to the group, time, and interaction effects, there was a statistically significant group effect for athletes participating in the online ACT-based intervention group for all dimensions and elements of perfectionism, except self-oriented perfectionism. There was also a statistically significant time effect for self-oriented perfectionism, socially-prescribed perfectionism, and perfectionism cognitions for those athletes in the online ACT-based intervention group. Finally, there was an interaction effect (group x time) for all dimensions of perfectionism except socially-prescribed perfectionism for those athletes in the online ACT-based intervention group. In examining post-intervention differences, there was a statistically significant mean difference between the intervention group and the control group at T2 for all dimensions of perfectionism. In sum, athletes in the online ACT-based intervention group clearly had more benefit in receiving the online ACT-based modules for their perfectionism, than the athletes who did not receive anything. Effects typically exceeded criteria for being large (Cohen's $d = 0.80$). This was not the case for self-oriented perfectionism (medium-to-large effect) and socially-prescribed perfectionism (marginally above a large effect) which were smaller.

Pre-Competition Emotions

In regards to the group, time, and interaction effects, there was a statistically significant group effect for all pre-competition emotions for athletes participating in the online ACT-based intervention group. There was also a statistically significant time effect for anxiety, demonstrating the importance of the online ACT-based modules for athletes in the intervention group. Finally, there was an interaction effect (group x time) for all pre-competition emotions except excitement. Athletes who received the online ACT-based intervention had more benefit for their pre-competition emotions. In examining post-intervention differences, there was a statistically significant mean difference between the

athletes in the intervention group and the control group at T2 for all of the pre-competition emotions. All effects exceeded criteria for being large (Cohen's d = 0.80).

Ancillary analyses

Unplanned ancillary analyses are provided in the supplementary materials (supplementary materials, S4). Specifically, we provide a series of analysis of covariance (ANCOVA) focusing on differences between intervention and control groups in each dependent variable at T2 adjusted for the dependent variable at baseline (T1). These analyses show statistically significant differences for all dependent variables. We note the possible benefits of providing this type of analysis alongside non-adjusted analyses (e.g., De Boer et al., 2015) but also that CONSORT guidelines stress the potential for this type of analysis to bias the estimate of the treatment effect (Schultz et al., 2010).

Adherence

To further assess the link between the intervention and observed changes, we examined whether the adherence measures (the number of hours spent on the modules and the number of modules completed) were correlated to change in outcome variables (see Table 3). To do so, we conducted a regression analysis in which T2 scores were regressed on T1 scores and then correlated the resulting unstandardized residual scores with measures of adherence. To conduct these analyses, we used completers in the intervention group only. Results are reported in Table 3 and show that the number of hours athletes spent on the modules was significantly correlated with reductions in their self-oriented perfectionism, perfectionism cognitions, and anxiety over time. The number of modules the athletes completed was also significantly correlated with reductions in their striving for perfection, negative reactions to imperfection, perfectionism cognitions, anxiety, and anger over time. On average the athletes spent 7.51 (SD = 1.63) hours on the modules and completed 6.00 (SD = 1.64) modules in total.

Discussion

The present study aimed to assess the effectiveness of an online ACT-based intervention for reducing perfectionism and improving pre-competition emotions in soccer players. Based on previous research, we hypothesized that the intervention group will report (H1) significantly lower trait perfectionism (PS and PC), (H2) significantly lower perfectionism cognitions, and (H3) significantly lower negative pre-competition emotions (anxiety, dejection, anger) and significantly higher positive pre-competition emotions (excitement, happiness), than the control group following the online ACT-based intervention. Support was found for all hypotheses with the exception of one dimension of trait perfectionism (socially-prescribed perfectionism) and one pre-competition emotion (excitement).

Trait Perfectionism and Perfectionism Cognitions

Our findings suggest athletes can be supported in reducing their perfectionism using an online ACT-based intervention. This was the case when examining almost all indicators of PS and PC, barring socially-prescribed perfectionism. In terms of contextualising these findings, we note that other studies have found similar support for ACT outside of sport (Ong et al., 2019). Our findings suggest similar beneficial effects are evident for athletes. In addition, previous studies have also found support for the use of elements of ACT for reducing perfectionism in athletes; namely, mindfulness (Kaufman et al., 2009). Our findings are supportive in this regard, too, and suggest broader coverage of ACT techniques may also be effective. Finally, the two most rigorous intervention studies in sport so far found athletes reported lower perfectionism after CBT-based and self-compassion-based interventions (Donachie & Hill, 2020; Mosewich et al., 2013). Adopting a similar design, the current study extends these findings to an online ACT-based intervention.

In comparing the findings to the two previous studies in sport using rigorous designs, we note a number of similarities and differences. Donachie and Hill (2020) found a significant interaction effects (group by time) and improvements for socially-prescribed perfectionism and self-oriented perfectionism with medium sized differences post intervention (Cohen's d = 0.29). We found a significant interaction effect for self-oriented perfectionism (but not socially-prescribed perfectionism) and larger effects for both (Cohen's d = 0.46 and 0.87). As such, ACT appears somewhat more effective than CBT in reducing. As such, the evidence suggests that both CBT- and ACT-based interventions appear to be effective methods for athletes to improve aspects of trait perfectionism. Differences are less clear in regards to socially-prescribed perfectionism. It may be that ACT is less effective in addressing socially-prescribed perfectionism. However, due to differences between the studies beyond the type of intervention, it is not possible to make such conclusions confidently. To do so, future studies are required to directly compare the effects of equivalent CBT-based and ACT-based interventions (and others) to better understand these differences.

Our findings are more consistent with those of Mosewich et al. (2013). They found a significant interaction effect (group by time) and improvements for concern over mistakes (a dimension of PC) and significant differences between groups immediately after the intervention (and at follow-up). The size of their effects exceeded the criteria for being considered large (Cohen's d = 0.63 and 0.78). Similarly, we found a significant interaction effect for concern over mistakes and significant differences between groups immediately after the intervention. The effect we observed was larger still (Cohen's d = 1.06). In this case, it appears that a self-compassion-based intervention and ACT-based interventions yield similar effects in regards to the dimensions of perfectionism they influence. Note, too, the ACT intervention outside of sport by Ong et al. (2019) had an effect on concern over mistakes as observed in the current study (Hedges' g = 1.03). The larger effects observed in

the current study when compared to Mosewich et al's study may reflect a range of factors including differences between the two types of intervention (ACT versus self-compassion-based), but also factors such as the longer length of the ACT interventions. Again, research comparing the effectiveness of equivalent interventions is needed to explore these differences further.

The effect of the intervention was largest for helping athletes reduce perfectionism cognitions. This was also the case in Donachie and Hill (2020) who observed effects that were nearly twice the size of the effect for any other dimension of perfectionism (Cohen's *d* = 0.75 and 1.15). As they argued, it may be that as perfectionism cognitions are more state-like, it is more amendable to change. In the current study, the effect for perfectionism cognitions was exceptionally large (Cohen's *d* = 2.17). So it may be that ACT is also especially effective at addressing perfectionism cognitions. A distinctive aspect of the online ACT-based intervention was taking a step back from thoughts, allowing thoughts to pass by, and to not engage with each individual thought. In this sense, athlete's may have come to notice or acknowledge their perfectionistic thoughts less. Alternatively, by increasing psychological flexibility, athletes may have learned to spend more time, cognitively, in the present, rather than ruminating about the past – an important feature of perfectionism cognitions. We offer a note of caution, however, in regard to this particular finding as our assessment of the reliability of perfectionism cognitions scores over time suggests it generally fluctuates more so than other aspects of perfectionism. This feature might also explain the large effects.

In observing possible differences between ACT and other interventions for perfectionism, we are mindful of evidence of differences for other outcomes, too (e.g., chronic pain; Ruiz, 2012). Whether our findings reflect general support for ACT or support the especial use of ACT for perfectionism is still unclear. However, the notion of promoting

psychological flexibility appears to align well with many of the problems associated with perfectionism which reflect a severe form of psychological rigidity (see Flett & Hewitt, 2023). In this sense, the approach may lend itself to more effective work with perfectionism in athletes than others. However, direct evidence to support his possibility is needed. Evidence of the particular value of ACT for perfectionism cognitions for athletes, though, appears consistent with the underlying principles of the approach and is aligned with meta-analytical work that has shown mindfulness-based interventions reduce more general ruminative thoughts (e.g., Perestelo-Perez et al., 2017). In context of this other work, we believe there is sufficient evidence to consider the use of ACT when working with perfectionism in sport and appears to be an effective method by which athletes can reduce their trait perfectionism and perfectionism cognitions.

Pre-Competition Emotions

In further support of intervention, along with perfectionism athletes reported improvements in pre-competition emotions. However, internal reliability for measures of pre-competitive emotions were not adequate at T2 in the intervention group ($\Omega < .70$). In some cases, due to the very low internal reliability (dejection, happiness, and excitement), we recommend discounting the findings. In the other cases, where internal reliability is approaching acceptable levels for smaller instruments (anxiety and anger), we recommend that these finding are interpreted with caution. It is unclear why internal reliabilities were acceptable at T1 and not T2 in the intervention group. In this regard, it is noteworthy that the scores remained reliable at T2 for the control group. As such it is possible that some items of the scales were affected by the intervention but not others, for example. Regardless, in the absence of this form of reliability, inferences regarding the effectiveness of the intervention for the athletes pre-competition emotions are not advised.

Notwithstanding this caution, results pertaining to the more reliable scores for anxiety and anger are consistent with the wider benefits of online ACT-based interventions. We note, for example, that ACT has previously been shown to be effective in improving emotion regulation of athletes (e.g., anger; Chang & Hwang, 2017). We also note that research examining perfectionism and pre-competitive emotions over time in soccer players has shown strong links between both trait aspects of perfectionism and perfectionism cognitions with negative emotional experiences, anxiety, and anger, in particular (Donachie et al., 2019). Therefore, our findings are also consistent with the notion that addressing perfectionism could have additional benefits for athletes. Whether these effects are a direct consequence of ACT or are an indirect consequence of reducing perfectionism would be an insightful avenue for future research. Of course, so is revisiting these observed effects to secure more reliable measurement.

Practical Implications

The present study offers several important practical implications for sport psychologists, coaches, organisations, and athletes. The current study suggests that ACT may be beneficial for athletes and may help them reduce their perfectionism. We therefore recommend considering the merits of ACT as a type of intervention when working to reduce perfectionism in athletes. It appears at least as effective as other interventions tested in sport to date in regards to observed effects on perfectionism. ACT may also be useful more generally and offer opportunities for athletes to become more psychologically flexible and address some of the wider difficulties associated with perfectionism. This may or may not include pre-competition emotions, but based on other research, could possibly include stress, self-esteem, and depressive symptoms (Räsänen et al., 2016).

We also consider the findings to provide support for considering the use of online delivery of interventions. Online interventions for perfectionism have shown to be largely

successful in previous research (see Suh et al., 2019). As such, we cautiously advocate for practitioners to consider using online interventions as part of their work. Online interventions can allow athletes greater flexibility, opportunity, and accessibility in engaging with psychological support (Price et al., 2021). Online resources also provide a means of reaching a large audience, supporting more athletes, and can be cost-effective. Provision of this kind is likely achievable for most sports organisations, particularly if resources are shared or provided in partnership with others. However, practitioners should be reminded that we are waiting on more extensive evidence of the effectiveness of online interventions for perfectionism in sport.

Finally, practitioners should also consider using or complementing their applied practice with self-help style, or minimally guided, self-paced interventions to support perfectionistic athletes. Self-help guides have found themselves to be an important source of support for those high in perfectionism (Steele & Wade, 2008). This type of intervention may help overcome some of the stigma or reluctance to seek out support that is related to perfectionism (Watson et al., 2021). This type of work may therefore be especially beneficial for perfectionistic athletes and an initial way of engaging and supporting them prior to introducing more tradition ways of working. Some degree of monitoring and contact may be required, though, and will likely enhance adherence and quality of these types of intervention (Suh et al., 2019).

Limitations and Future Directions

The study provided novel and important findings. However, there are a number of limitations. Firstly, as noted throughout, some of the instruments in the intervention group showed less than adequate internal reliability. Therefore, findings relating to these variables should be discounted or considered with caution. Secondly, the lack of blinding in the study is a methodological weakness. While contact was minimal between experimenter and the

athletes, athletes knowing they were in an intervention study aimed at reducing perfectionism may have created expectancy or desirability effects that impacted the findings. It is also the case that we cannot guarantee that members of intervention group did not interact with members of the control group providing at least some cross-contamination of effects. Blinding is difficult in this context and a common limitation, but additional active control groups would make for a more stringent test of the intervention and are needed in future work. Thirdly, we did not include a follow-up phase beyond post-intervention. Therefore, the degree to which the effects of the intervention are maintained over time is unknown. Some effects may be lost or reduced (or even emerge) over time. Future research should consider utilising one or more follow-up measurements. Fourthly, we did not take process measures to identify mechanisms of change in the intervention. As such, while there is evidence that ACT may be effective in reducing perfectionism, we do not know why. We presume it is an increase in psychological flexibility. This will need to be measured in future studies, though, to examine if this is the case (as Ong et al., 2019, did). Finally, although our adherence measures provide some insight into engagement with the intervention, they are self-report measures so closer and more objective tracking of adherence would be useful in future research (e.g., system recorded hours), as would exploring participant experiences on the intervention (e.g., social validation).

Conclusion

The present study was the first to examine the effectiveness of an online ACT-based intervention for reducing perfectionism in soccer players. Discounting effects that included measures with lower reliability, athletes reported significantly reduced trait perfectionism and perfectionism cognitions following the intervention. As such, online ACT-based interventions may therefore be an effective and viable option when seeking to support athletes reduce their perfectionism.

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Table 1
Main group, time, and interaction effects (group x time)

Measure	Group effect	Partial η^2	Time effect	Partial η^2	Group*Time effect	Partial η^2
Perfectionistic Strivings						
PES	$F(1,79) = 15.89$, $p < .001$	.17	$F(1,79) = 0.45$, $p = .505$	.01	$F(1,79) = 12.37$, $p < .001$	.14
SOP	$F(1,79) = 1.46$, $p = .230$	.02	$F(1,79) = 33.82$, $p < .001$	.30	$F(1,79) = 34.54$, $p < .001$	.30
SP	$F(1,79) = 10.86$, $p < .001$	.12	$F(1,79) = 0.95$, $p = .333$	.01	$F(1,79) = 9.12$, $p = .003$	.10
Perfectionistic Concerns						
CM	$F(1,79) = 12.06$, $p < .001$	.13	$F(1,79) = 0.23$, $p = .633$	.00	$F(1,79) = 5.67$, $p = .020$	.07
SPP	$F(1,79) = 15.41$, $p < .001$	.16	$F(1,79) = 6.29$, $p = .014$	.07	$F(1,79) = 0.28$, $p = .602$	.00
NR	$F(1,79) = 15.81$, $p < .001$	.17	$F(1,79) = 0.02$, $p = .879$	.00	$F(1,79) = 10.42$, $p = .002$	.12
Perfectionism Cognitions						
PCI	$F(1,79) = 32.45$, $p < .001$	.29	$F(1,79) = 5.52$, $p = .021$	.07	$F(1,79) = 39.09$, $p < .001$	.33
Pre-Competition Emotions						
Anxiety	$F(1,79) = 33.45$, $p < .001$	.30	$F(1,79) = 47.86$, $p < .001$	.38	$F(1,79) = 56.30$, $p < .001$	.42
Dejection	$F(1,79) = 40.36$, $p < .001$	.39	$F(1,79) = 0.91$, $p = .342$	.01	$F(1,79) = 8.00$, $p = .006$	.09
Anger	$F(1,79) = 40.40$, $p < .001$	.34	$F(1,79) = 0.61$, $p = .438$	.01	$F(1,79) = 7.77$, $p = .007$	.09
Happiness	$F(1,79) = 51.82$, $p < .001$	.40	$F(1,79) = 0.00$, $p = .980$	.00	$F(1,79) = 4.17$, $p = .044$	.05
Excitement	$F(1,79) = 40.95$, $p < .001$	.34	$F(1,79) = 1.82$, $p = .181$	.02	$F(1,79) = 0.38$, $p = .541$	.01

Note. PES = personal standards, SOP = self-oriented perfectionism, SP = striving for perfection, CM = concerns over mistakes, SPP = socially-prescribed perfectionism, NR = negative reactions to imperfection, PCI = perfectionism cognitions.

Table 2

Analysis of simple effects on all measures between intervention and control group at each time point

Measure	Time 1					Time 2				
	Intervention M (*SD*)	Control M (*SD*)	M difference	*P values*	*d*	Intervention M (*SD*)	Control M (*SD*)	M difference	*P values*	*d*
Perfectionistic Strivings										
PES	3.58 (0.85	3.88 (0.78)	0.30	.103	0.37	3.23 (0.74)	4.12 (0.70)	0.89	<.001	1.24
SOP	5.51 (1.16)	5.58 (0.88)	0.07	.764	0.07	5.12 (1.12)	5.58 (0.85)	0.47	.037	0.46
SP	3.65 (0.92)	3.86 (0.76)	0.21	.263	0.25	3.28 (0.77)	4.05 (0.69)	0.77	<.001	1.05
Perfectionistic Concerns										
CM	3.50 (1.12)	3.83 (0.87)	0.33	.143	0.33	3.30 (0.82)	4.13 (0.75)	0.84	<.001	1.06
SPP	4.09 (1.59)	5.00 (1.45)	0.92	.009	0.60	4.43 (1.17)	5.53 (1.34)	1.10	<.001	0.87
NR	3.53 (0.95)	3.81 (0.85)	0.28	.168	0.31	3.19 (0.77)	4.13 (0.73)	0.94	<.001	1.25
Perfectionism Cognitions										
PCI	2.60 (0.98)	2.75 (0.86)	0.15	.480	0.16	1.66 (0.75)	3.17 (0.64)	1.51	<.001	2.17
Pre-Competition Emotions										
Anxiety	2.73 (0.90)	2.91 (0.88)	0.17	.384	0.20	1.25 (0.86)	2.97 (0.83)	1.71	<.001	2.04
Dejection	1.31 (1.24)	2.31 (1.17)	1.00	<.001	0.83	0.88 (0.59)	2.51 (1.11)	1.63	<.001	1.83
Anger	1.28 (1.29)	2.29 (1.19)	1.01	<.001	0.81	0.85 (0.64)	2.54 (1.17)	1.69	<.001	1.79
Happiness	2.46 (0.75)	1.74 (0.77)	0.72	<.001	0.95	2.65 (0.54)	1.54 (0.76)	1.10	<.001	1.68
Excitement	2.61 (0.76)	1.88 (0.76)	0.74	<.001	0.96	2.55 (0.49)	1.71 (0.61)	0.84	<.001	1.52

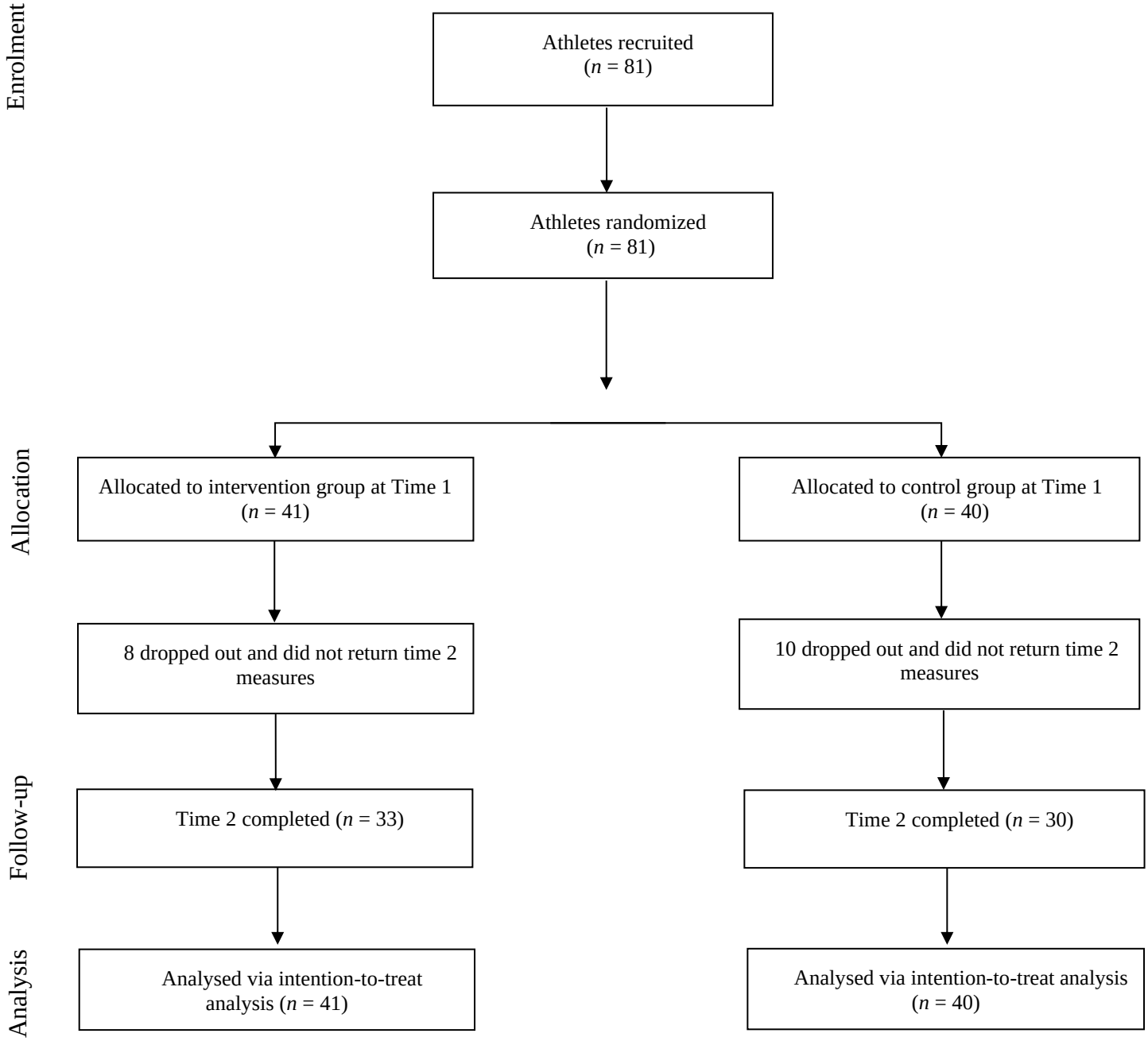
Note. PES = personal standards, SOP = self-oriented perfectionism, SP = striving for perfection, CM = concerns over mistakes, SPP = socially-prescribed perfectionism, NR = negative reactions to imperfection, PCI = perfectionism cognitions.
Intervention group (n = 41) and the control group (n = 40).

Table 3
Pearson's correlations of adherence with residual change

	Hours Spent on the Modules		Number of Modules Completed	
	r	*P values*	*r*	*P values*
Perfectionistic Strivings				
PES	-.027	.882	-.238	.182
SOP	.405	.019	.192	.284
SP	-.196	.274	-.373	.032
Perfectionistic Concerns				
CM	-.174	.331	-.343	.051
SPP	-.133	.459	-.130	.472
NR	-.210	.241	-.349	.047
Perfectionism Cognitions				
PCI	-.599	<.001	-.617	<.001
Pre-Competition Emotions				
Anxiety	-.363	.038	-.641	<.001
Dejection	-.024	.896	-.016	.932
Anger	-.283	.111	-.359	.040
Happiness	.133	.459	.265	.136
Excitement	-.033	.853	.227	.203

Note. PES = personal standards, CM = concerns over mistakes SOP = self-oriented perfectionism, SPP = socially-prescribed perfectionism, SP = striving for perfection, NR = negative reactions to imperfection, PCI = perfectionism cognitions. Sample size (n = 33) includes all completers from the intervention group.

Figure 1 *CONSORT diagram representing the flow of athletes for each stage of the intervention*



S1
CONSORT Checklist of information to include when reporting a randomised trial

Section/Topic	Item No	Checklist item	Reported on page No
Title and abstract			
	1a	Identification as a randomized trial in the title	1
	1b	Structured summary of trial design, methods, results, and conclusions	2
Introduction			
Background and objectives	2a	Scientific background and explanation of rationale	3
	2b	Specific objectives or hypotheses	8
Methods			
Trial design	3a	Description of trial design (such as parallel, factorial) including allocation ratio	8
	3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	8
Participants	4a	Eligibility criteria for participants	9
	4b	Settings and locations where the data were collected	10
Interventions	5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	10
Outcomes	6a	Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed	11-12
	6b	Any changes to trial outcomes after the trial commenced, with reasons	NA
Sample size	7a	How sample size was determined	9
	7b	When applicable, explanation of any interim analyses and stopping guidelines	13
Randomization:			
Sequence generation	8a	Method used to generate the random allocation sequence	9
	8b	Type of randomization; details of any restriction (such as blocking and block size)	9
Allocation concealment mechanism	9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	9
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	9

Blinding	11a	If done, who was blinded after assignment to interventions (for example, participants, care providers, those assessing outcomes) and how	NA
	11b	If relevant, description of the similarity of interventions	NA
Statistical methods	12a	Statistical methods used to compare groups for primary and secondary outcomes	13
	12b	Methods for additional analyses, such as subgroup analyses and adjusted analyses	13
Results			
Participant flow (a diagram is strongly recommended)	13a	For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analyzed for the primary outcome	33
	13b	For each group, losses and exclusions after randomization, together with reasons	33
Recruitment	14a	Dates defining the periods of recruitment and follow-up	NA
	14b	Why the trial ended or was stopped	NA
Baseline data	15	A table showing baseline demographic and clinical characteristics for each group	31
Numbers analyzed	16	For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups	31
Outcomes and estimation	17a	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)	30-31
	17b	For binary outcomes, presentation of both absolute and relative effect sizes is recommended	30-31
Ancillary analyses	18	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory	NA
Harms	19	All important harms or unintended effects in each group	10
Discussion			
Limitations	20	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses	19-20
Generalizability	21	Generalizability (external validity, applicability) of the trial findings	13-14
Interpretation	22	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	15-18
Other information			
Registration	23	Registration number and name of trial registry	NA
Protocol	24	Where the full trial protocol can be accessed, if available	10
Funding	25	Sources of funding and other support (such as supply of drugs), role of funders	NA

S2
Online ACT-based intervention plan and session overview

Module	ACT	Perfectionism	Aim	Module Components
1	Introduction to ACT	Stigma	Reduce stigma and provide overview of ACT	1.1 What is sport psychology? 1.2 Welcome to ACT 1.3 Goals of the programme
2	Contacting the present moment	Concerns Over Mistakes	Staying focused in competition/training	2.1 What is being present? 2.2 Contacting the present moment 2.3 Using senses (e.g., dropping anchor)
3	Mindfulness	Fear of Failure	To be able to control the body and mind	3.1 What is mindfulness? 3.2 Emptying the mind 3.3 Pink elephant
4	Acceptance	Self-Criticism	To be able to accept mistakes/the self	4.1 How do I accept? 4.2 Struggling vs opening up 4.3 Thoughts – emotions – actions
5	Defusion	Doubt About Actions	To disconnect thoughts	5.1 Removing doubt (e.g., hands Infront of face) 5.2 Being more compassionate to the self 5.3 Getting hooked
6	Values	Managing Expectations	Leading a values led life	6.1 Values vs goals 6.2 Exploring values 6.3 Overcoming expectations
7	Self	Negative Reactions to Imperfections	Increase awareness of the self	7.1 How do you want to be seen? 7.2 Overcoming imperfections 7.3 Obituary
8	Committed action	Healthy Striving	Setting realistic and healthy goals	8.1 Committing to the plan 8.2 What If planning 8.3 Overcoming FEAR

S3

Internal reliabilities and intra-class correlations

Measure	T1	T2	T1-T2	T1-T2		
	ω	ω	*r*	ICC	CI	*F (df)*
Control group						
PES	.92	.88	.68*	.64	.40, .80	5.08 (39, 39)***
CM	.94	.89	.60***	.56	.29, .74	3.87 (39, 39)***
SOP	.82	.84	.96***	.96	.93, .98	51.17 (39, 39)***
SPP	.91	.95	.63***	.60	.33, .77	4.42 (39, 39)***
SP	.87	.84	.58*	.57	.32, .74	3.75 (39, 39)***
NR	.90	.86	.48**	.45	.17, .66	2.83 (39, 39)***
PCI	.93	.90	.35*	.30	.01, .55	2.02 (39, 39)**
Anxiety	.91	.85	.78***	.78	.62, .88	7.96 (39, 39)***
Dejection	.95	.92	.79***	.78	.62, .88	8.51 (39, 39)***
Anger	.94	.93	.80***	.79	.62, .88	8.89 (39, 39)***
Happiness	.88	.86	.38*	.37	.08,.61	2.22 (39, 39)**
Excitement	.84	.70	.42**	.40	.11, .63	2.37 (39, 39)**
Intervention group						
PES	.84	.87	.40*	.36	.08, .60	2.28 (40, 40)**
CM	.93	.90	.32*	.31	.01, .56	1.89 (40, 40)*
SOP	.86	.84	.95***	.90	.36, .97	39.29 (40, 40)***
SPP	.86	.90	.11	.10	-.21, .39	1.23 (40, 40)
SP	.88	.84	.35*	.32	.04, .56	2.05 (40, 40)**
NR	.85	.84	.31*	.29	.00, .54	1.88 (40, 40)*
PCI	.93	.81†	.24	.15	-.08, .40	1.61 (40, 40)
Anxiety	.87	.62	.12	.05	-.08, 22	1.27 (40,40)
Dejection	.94	.58	.28	.20	-.08, .47	1.56 (40, 40)
Anger	.94	.69	.17	.12	-.16, .40	1.30 (40, 40)
Happiness	.79	.53	.19	.17	-.13, .45	1.43 (40, 40)
Excitement	.81	.24†	.37*	.34	.04, .59	2.03 (40, 40)*

Note. ω = McDonald's Omega, ICC = intra-class correlation (two-way mixed effects, single measures, absolute definition), CI = confidence interval, PES = personal standards, CM = concerns over mistakes, SOP = self-oriented perfectionism, SPP = socially-prescribed perfectionism, SP = striving for perfection, NR = negative reactions to imperfection, PCI = perfectionism cognitions. † = Omega would not compute so Cronbach's alpha is provided.

*p < .05. **p < .01. ***p < .001, two-tailed.

S4

Results of Analysis of Covariance (ANCOVA) for dependent variables

Measure	Intervention M	Control M	*F (df)*	*P values*
Perfectionistic Strivings				
T2 PES	3.30	4.05	29.05 (1,78)	<.001
T2 SOP	5.15	5.55	38.14 (1,78)	<.001
T2 SP	3.32	4.01	21.72 (1,78)	<.001
Perfectionistic Concerns				
T2 CM	3.35	4.08	20.65 (1,78)	<.001
T2 SPP	4.43	5.53	12.45 (1,78)	.004
T2 NR	3.23	4.08	29.46 (1,78)	<.001
Perfectionism Cognitions				
T2 PCI	1.68	3.15	97.11 (1,78)	<.001
Pre-Competition Emotions				
T2 Anxiety	1.29	2.93	92.70 (1,78)	<.001
T2 Dejection	1.09	2.30	47.59 (1,78)	<.001
T2 Anger	1.05	2.33	44.28 (1,78)	<.001
T2 Happiness	2.56	1.64	35.27 (1,78)	<.001
T2 Excitement	2.44	1.82	24.03 (1,78)	<.001

Note. PES = personal standards, CM = concerns over mistakes SOP = self-oriented perfectionism, SPP = socially-prescribed perfectionism, SP = striving for perfection, NR = negative reactions to imperfection, PCI = perfectionism cognitions.
Intervention group (n = 41) and the control group (n = 40). Time 1 variable is included as covariate with corresponding adjusted means displayed.