Developing Decision Making in Rugby Union Match Officials Using Rational Emotive Behavior Therapy (REBT)

Craig Maxwell-Keys[1], *Andrew G. Wood[2], & Martin J. Turner[2]

Submitted 30th of March 2021.

Resubmitted 20th September 2021.

2nd Resubmission 26th October 2021.

Accepted into *Psychology of Sport and Exercise* 4th November 2021.

Author Affiliations:

[1] Rugby Football Union, Rugby House, Twickenham Stadium

[2] Faculty of Heath, Psychology, and Social Care, Manchester Metropolitan University

Author Footnotes

*Corresponding author: andrew.wood@mmu.ac.uk Faculty of Heath, Psychology, and Social Care, Manchester Metropolitan University, United Kingdom.

The authors have complied with APA ethical standards in the treatment of the sample.

The authors have no conflicts of interest.

Abstract

There is a dearth of applied research to inform psychological provision for match-officials. The application of Rational Emotive Behavior Therapy (REBT; Ellis, 1957) is becoming established as an effective psychological intervention with elite performers. This paper examined the effects of four one-to-one REBT sessions on irrational beliefs, anxiety, decision rumination and reinvestment, and match officiating performance with two elite rugby match officials. Using an idiographic single-case, staggered multiple-baseline across participants research design, visual and statistical analyses showed that the intervention brought about significant, immediate and maintained (12 week follow-up) reductions in irrational beliefs. Furthermore, participants also reported reductions in anxiety, and decision making reinvestment, alongside increased match official performance for one participant. The current study lends some initial support for the application of REBT with match officials, and develops understanding into potential links between irrational beliefs and decision making performance. The results are discussed in terms of theory, applied implications, limitations and future research.

Keywords: Applied sports psychology; rugby union; match-officials; intervention; CBT

Developing Decision Making in Rugby Union Match Officials Using Rational Emotive Behavior Therapy (REBT)

Introduction

Adversity (e.g., failure, rejection, or ill-treatment) is ubiquitous in elite sport, and thus psychological approaches that can help those engaged in elite sport respond adaptively are of particular importance. One psychological approach that has garnered interest in sport (Turner, 2016) is rational emotive behavior therapy (REBT; Ellis, 1957). REBT is based on the central proposition that, on approach and in response to adversity, we have some responsibility for our emotional and behavioral responses, and we can exercise this responsibility through cognitive change (Turner, 2019). In REBT, the extent to which people exhibit functional or dysfunctional emotions and behaviors depends upon the extent to which they hold rational and irrational beliefs. Rational beliefs are flexible, logical, and non-extreme, and are conducive to long-term mental health and goal attainment. In contrast, irrational beliefs are rigid, illogical, extreme, and hinder long-term mental health and goal attainment (Dryden & Branch, 2008).

The theory and practice of REBT is best articulated through its GABCDE framework, where G stands for goals, A stands for adversity (which are counter to G), B is for beliefs (about A), C is for consequences (emotional, behavioural, cognitive), D stands for disputation (rigorously challenging irrational beliefs), and E is for effective new beliefs (developing and strengthening rational beliefs). Athletes are helped to recognize that when faced with an adversity (A) that is counter to their goals (G), it is their beliefs (B) about the adversity (A), rather than the adversity per se, that governs the functionality of their emotional, cognitive, and behavioral consequences (C; Chadha et al., 2019). If A is met with *irrational beliefs*, dysfunctional C's prevail, whilst in contrast, if A is met with *rational beliefs*, functional C's prevail. The irrational beliefs are then disputed (D) following which new effective rational

beliefs (E) are instantiated and reinforced. Though originally conceived as a psychotherapeutic model (Ellis, 1957), the introduction of REBT within sport and exercise is often referred to as REB Coaching (REBC; Turner, 2019) and includes informed professional guidance on its application for use with sport and exercise participants (see Turner & Bennett, 2018).

The detrimental effects of irrational beliefs on mental health are widely known (Visla et al., 2016) and have been demonstrated in athletic populations (e.g., Turner et al., 2019). Though all humans have the propensity for holding rational and irrational beliefs (Ellis, 1987), those operating in an elite athletic environment could be especially vulnerable to the maladaptive effects of irrational beliefs (Turner & Barker, 2013). Elite sport is characterised by a win at all costs mantra, the prevalence of irrational language (e.g., "must win") by key stakeholders (e.g., media, fans) and an inherent fixation on success, failure, and perceived self-worth (Turner, 2016; Wood et al., 2018). The application of REBT is fast becoming recognised as an effective approach to enhancing psychological outcomes associated with performance (e.g., Turner & Bennett, 2018) such as: increased resilient qualities (Deen et al., 2017), increased self-efficacy and perceived control (Wood et al., 2017a), increased self-determined motivation (Chrysidis et al., 2020; Turner & Davis, 2018), reduced anxiety (e.g., Turner, Ewen, & Barker, 2018), a more adaptive physiological state (i.e., reduce resting systolic blood pressure; Wood et al., 2017b), and enhanced performance (Mesagno et al., 2020; Turner et al., 2019; Wood et al., 2017b). In their systematic review of REBT in sport, Jordana et al. (2020) indicated that REBT delivered via one to one counselling is especially effective in reducing athlete anxiety.

Of the many individuals who operate in elite sport environments, one group that has been under-researched are sport officials (Slack et al., 2014). In the current paper, instead of 'sport officials' we use the term match officials (MOs) to fit with the rugby context. Despite the occupational pressures that MOs are faced with (e.g., mass media coverage, abuse from

spectators as a consequence of decisions made; Webb et al., 2021) there remains limited research into the effects of psychological strategies that can help MOs adapt to the ever-changing performance environment. MOs have never been more in the public eye, and more meticulously scrutinized than they are in the modern age (Dawson, 2012; O'Reilly, 2017); perpetuated by live broadcasts, match commentary, and social media. MOs routinely experience complex and ambiguous situations in which they are required to interpret, judge and communicate effectively (Cunningham et al., 2014).

Particularly, rugby union has seen a rise in attention and scrutiny at the elite level which has elevated the pressure on MOs, leading to moral panic (Garland, 2008). Indeed, MOs within Rugby union receive abuse from players, coaching staff and fans alike, which has substantial implications for psychological well-being, performance and retention (Ridinger et al., 2017). The match official abuse reflects a wider trend mirrored in other sports such as cricket and association football (Webb et al., 2019). Whilst stressors such as interpersonal conflict, performance errors, and game importance are commonly reported by officials across sports (Goldsmith & Williams, 1992) there appears to be stressors particularly pertinent to refereeing at the elite level of Rugby union. In particular, self-presentational concerns, match importance, and unfamiliarity (facing a game situation they had not faced before) were highlighted as significant stresses for elite Rugby union referees (Hill et al., 2016). Uncertainty can be viewed as highly threatening to referees and can lead to debilitative negative emotions and choking (Hill et al., 2016). The management of self-presentational concerns and unfamiliarity is critical to match officials in order to assuage choking under pressure in part due to distractions (Mesagno et al., 2011).

Decision making skills are vital to the performance and function of an official (Larkin et al., 2011) and it has been recognised that more evidence is needed for evidence-based and efficacious decision-making training methods (e.g., MacMahon et al., 2007). Given the

demands on Rugby union MOs, their coping strategies have a large part to play in helping them make accurate decisions during critical moments of a game (Hill et al., 2016). The complexity of decision-making in officiating can differ between sports and have been separated into three categories. These include monitors (e.g., gymnastics judges), reactors (e.g., tennis line judge), and interactors (e.g., Rugby union referees; MacMahon et al., 2014). Rugby union MOs fall under the 'interactor' type, having to contend with highly physical, perceptual, and in game decision-making demands (Kittel et al., 2021). Considering the unique demands that rugby union MOs are face with, it is important that they are able to deal with the demands to maintain and uphold the integrity of the game they are officiating.

Indeed, decision-making is perhaps the most important skill for sports officials (Kittel et al., 2019b; Morris & O'Connor, 2016), in part due to the expectations of players, coaches, sporting organizations, and spectators, that the official can (or 'should') make accurate decisions. Tasks to develop decision-making have previously included simulation related scenarios, often under physical stress, and classroom or video-based approaches. These approaches are used to replicate the ecological validity of real game situation in order to contribute to deliberate practice and training opportunities for match officials (e.g., Kittel et al., 2021). Nevertheless, within the decision-making literature there is little attention given to the psychological preparation, and specifically the emotion regulation, required to make important and accurate decisions when faced with an array of performance related stressors (e.g., uncertainty, player interaction, mental fatigue).

Researchers suggest that rugby union MOs who are able to maintain performance standards during challenging moments of a game, do so by adopting problem and emotion-focused coping strategies, whereas poor performance and choking are associated with avoidance-coping strategies (Hill et al., 2016). To this end, REBT, with its emphasis on emotion and behavior regulation via cognitive change, offers an efficacious and unexamined

way through which MOs could maintain their performance whilst officiating challenging moments of a game. REBT can also be applied 'off-field', for which is there is a particular need to develop decision-making development methods (Kittel et al., 2021).

The purpose of the current study is to examine the effects of REBT on the anxiety, decision making, and officiating performance of Rugby Football Union MOs. Whilst past research has demonstrated the effects of REBT on the anxiety (Turner et al., 2018) and performance (Wood et al., 2017b) of athletes, REBT's effects on decision making is unknown. Elite level MOs are reported to experience significantly higher levels of anxiety compared to amateur MOs (Johansen & Haughen, 2013), and researchers have linked the debilitative effects of anxiety to poorer decision making (e.g., Hill et al., 2016) and MO performance (Kamata et al., 2002). A MO's decision making ability under pressure is valuable area of investigation, because it captures one of the core aspects of their role. One framework that can be used to examine decision making under pressure is the self-focus framework as assessed by decision rumination and reinvestment (Kinrade et al., 2010). The Decision Specific Reinvestment Scale (DSRS; Kinrade et al., 2010) measures one's propensity to reinvest explicit knowledge when under pressure, via consciously monitoring decision making and ruminating on previous decisions; both of which are predictive of a maladaptive cognitive consequence (e.g., greater bias to home teams; Pool et al., 2011) and poorer decision making when under pressure (Kinrade et al., 2015).

From an REBT viewpoint, it is possible that MOs holding greater irrational beliefs will experience greater performance anxiety (e.g., Chadha et al., 2019), and more likely to reinvest and ruminate (Artiran et al., 2019) over their decision making, resulting in poorer MO performance (Maxwell et al., 2006). Therefore, applying REBT, MOs could develop rational beliefs with a view to managing their anxiety, and consequent decision reinvestment to enable more accurate decision making (performance) as part of an adaptive state of mind.

In order to investigate these evidence-based and theory-driven presuppositions, in the current study we examine the effects of REBT on anxiety, decision making reinvestment, and MO performance with two MOs, through a single-case experimental design (SCED; e.g., Davis & Turner, 2019). SCEDs allow for the intensive and in-depth investigation of a psychological intervention (Barker et al., 2020), which is often a complex and multi-faceted process that is susceptible to contextual interference (Dryden, 2012). Also, SCEDs allow the detailed investigation of individuals using a breadth of repeated measurements (e.g., self-reported, objective, and social validation), to help form a more enhanced picture of the individual (i.e., changes in performance scores, psychological variables; Normand, 2016).

The present study adds to existing literature in two ways. First, this study will contribute to the dearth of research documenting the application of interventions to support high-level MOs who, much like elite athletes, are increasingly placed under pressure to perform. Second, the present study elucidates the mechanisms by which REBT may lead to enhanced performance, which is largely missing from the extant literature (Turner, 2019), namely decision making reinvestment. Based upon previous research and REBT theory, it is hypothesised that REBT will bring about immediate and maintained reductions in irrational beliefs and anxiety, alongside enhanced decision making and officiating performance in MOs.

Method

Participants

The author's approach to participant recruitment was to meaningfully study few participants in the interest of discovering the detailed responses of each participant in particular, then determine what, if anything, these particulars have in common (Thorngate, 1986). Using this person-centred approach we were able to report participant-specific views and circumstances that would not be typically seen in larger sample studies (Normand, 2016). Indeed, working individually with fewer participants accurately reflects how one would

typically apply REBT in practice, and is in line with Barlow and Nock's (2009) assertion that, "…it is the individual organism that is the principle unit of analysis in the science of psychology" (p. 19). In approaching the study in this way, we are able to furnish practitioners with details that would not be possible if we had more participants (e.g., Turner & Barker, 2013, recruit four participants and offer sparse details concerning intervention procedures and individual data). With the novel nature of the participant group, we felt that it was more advantageous to be able to describe methods procedures in more detail, so that practitioners are clear about what was done, why, and how.

An initial screening process was carried out with 30 members of the Rugby Football Union's (RFU) Professional Game Match Officials Team (PGMOT). The respondents were aged between 24 and 52 years old (M = 38.5; SD = 8.04) whose MO experience ranged from 2 to 15 years (M = 5.00; SD = 3.86). All members of the PGMOT had optional access to a sport psychologist, and may have engaged with a sport psychologist in the past. The screening process involved participants completing the irrational Performance Beliefs Inventory (iPBI; Turner et al., 2016) using the Qualtrics online survey software (Qualtrics, Provo, UT). Two participants with the highest irrational performance beliefs scores were selected to take part in the intervention. Similar to previous research (Outar et al., 2018), this selection was based on participants' average iPBI scores as compared to normative data put forth by Turner et al., (2018; 23.36 = demandingness beliefs, 23.05 = low frustration tolerance beliefs, 21.28 = awfulizing beliefs, 16.03 = deprecation beliefs). Participant A was aged 28 and had 4 years of experience, whist Participant B was aged 36 and had 2 years of experience within the PGMOT, whereby officiating appointments included European and International matches. Institutional ethics approval was granted from the university, whilst consent was provided by participants prior to the data collection and intervention process.

Experimental Design

In this study a single-case, staggered multiple-baseline across participants research design was used, offering an ecologically valid setting in which to observe the intervention effects (Barker et al., 2013). A pre-intervention (A), post-intervention (B) and follow-up (FU: 12 week post-intervention onset) design allowed for the short and longer-term assessment of intervention effects on all outcome measures. Seven and eight baseline data points were collected for Participants A and B respectively (irrational beliefs) to ensure that stable self-report data were ascertained prior to the introduction of the REBT intervention (Barker et al., 2020; Nock et al., 2007). A stable baseline allowed for the establishment of change between pre-intervention (A) and post-intervention (B = post-intervention phase, FU = 12 week follow-up time-point) phases. Guided by the GABCDE framework, the intervention was separated into three sections: education, disputation, and reinforcement, with the sessions following guidelines as laid out in the literature (e.g., Turner, 2019). Using a multiple baseline across participants design, the pre-intervention phase and intervention were delivered sequentially (one week apart) to Participants A and B, in turn, increasing the ability to attribute data change to the intervention rather than extraneous factors (Barker et al., 2020). Internal validity was enhanced by replicating the intervention effects across all participants (Barker et al., 2013) and the Hawthorne effect controlled for by illustrating that only when the intervention is introduced is there a data shift in the hypothesised direction (Deen et al., 2017).

Measures

Irrational beliefs. The iPBI (Turner et al., 2016) comprises 28-items for which participants indicate their agreement to irrational statements on a 5-point Likert-scale from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). The iPBI assesses the four core beliefs (demandingness, awfulizing, low frustration tolerance, and self-depreciation) of REBT with 7-items per core belief. Mean subscale scores were calculated to provide an overall composite

250 score. Turner et al. (2016) demonstrate that the iPBI has good criterion, construct and
251 concurrent reliability (Cronbach's α = .87 for the composite score).
252 **Decision-Specific Reinvestment Scale.** Participants decision making was assessed
253 using the Decision-Specific Reinvestment Scale (DSRS, Kinrade et al., 2010). The DSRS has
254 participants rate 13-items on a 5-point Likert scale ranging from 0 (*not characteristic*) to 4 =
255 (*very characteristic*). Of the 13, seven items assessed decision rumination (i.e., conscious
256 monitoring of processes involved in decision making) and six items assessed decision
257 reinvestment (i.e., tendency to focus on past and inaccurate decisions). Acceptable internal
258 consistency estimates have been shown for decision reinvestment (α = .91) and decision
259 reinvestment (α = .89; Kinrade et al., 2010).
260 **Sport Anxiety Scale-2.** The Sport Anxiety Scale-2 (SAS-2; Smith et al., 2006) was
261 used to assess the total anxiety scores of participants across three sub-scales of worry, somatic
262 anxiety, and concentration disruption. The SAS-2 had the participants score 15-items according
263 to a 4-point Likert scale; 1(*not at all*) to 4 (*very much*). Higher total across all items were
264 indicative of the higher levels of anxiety. The SAS-2 proved good internal consistency (α =
265 .91), test-retest reliability, and construct validity. The same study also proved that SAS-2 was
266 an appropriate measure for assessing intervention efficacy at state levels (Smith et al., 2006).
267 **Match official performance.** On-field performance was assessed using a recognised
268 and multi-sports analysis platform called Athlete Management System (AMS), currently
269 employed at international, European, and leading domestic rugby competitions. The AMS
270 system assigns ratings of dark green (4) = excellent to red (1) = unacceptable, given by the
271 officially appointed match performance reviewer. The match reviewers were not aware of the
272 research study being undertaken, and conducted the match reviews as they normally would.
273 The appointed performance reviewer is a trained individual who has received extensive
274 training in coherence exercises and demonstrates exceptional game understanding allowing

them to consistently judge match official performance on a weekly basis against a set of pre-determined Key Performance Indicators (KPIs). Four reviewers rated each performance which helped to mitigate variability as much as practically possible. This is standard practice and could not be changed for the purposes of the study as this would introduce an unnatural, artificial element to the performance review that would not be reminiscent of how the process normally works. It was not possible to have the same four reviewers rate each match for both participants, because again, this would not be in keeping with standard practice. Each colour within the AMS system is assigned a single point weighting, whereby overall performance is calculated on the mean points accrued across five key aspects of the game. The five key game aspects include the decision accuracy and management of; the breakdown, scrums, lineout to mauls, space and foul play/values. For the purposes of data analyses, we used the mean performance scores across all matches officiated in the baseline phase, and all matches officiated in the intervention phase, and created two scores reflecting amalgamations of performance within each phase.

Social Validation. Typical to SCEDs social validation data was collected using an online questionnaire to capture participants perceptions and feelings of both the intervention delivery and effectiveness (Page & Thelwell, 2013). Questions were orientated to changes in dependent variables (e.g., irrational beliefs, feelings of anxiety, decision making process & performance), the intervention process, and participants satisfaction with the intervention results. Participants reported their answers on a 7-point Likert scale ranging from 0 (*strongly disagree*) to 7 (*strongly agree*) as well as providing written feedback to a number of questions in terms of the overall study and applied intervention effects.

Intervention

Based upon the GABCDE framework, the intervention consisted of four one-to-one sessions each lasting between 45 to 60 minutes, and two homework assignments (after sessions

one & two). The use of homework tasks are important to the REBT process (Dryden & Branch, 2008) and focused on cognitive and behavioral elements. The cognitive assignment was based on self-help worksheets presented by Ellis & Dryden (1997, p. 52-53) that works to reinforce the principles of ABC. The behavioral assignment was based upon the 'acting as-if' concept as advocated by Dryden & Branch (2008, p. 176) where participants were encouraged to act 'as-if' they already had a strong conviction in their newly established rational belief. The REBT sessions closely adhered to guidelines advocated within the literature (e.g., Dryden & DiGiuseppe, 1990; Ellis & Dryden, 1997) and specifically followed the process detailed by Turner (2019) for the use of REBT with athletes. Turner's process includes six stages:

(1) Recognize: Educate the participant about the GABC framework and help them to gain access to, and understand the effects of their irrational beliefs.

(2) Evidence: Help the participant to dispute (D) their irrational beliefs on empirical grounds (e.g., "where is the evidence that you 'must' perform well?").

(3) Logic: Help the participant to dispute (D) their irrational beliefs on logical grounds (e.g., "is it consistent with reality that just because you 'want' to perform well, then you 'must'?").

(4) Pragmatics: Help the participant to dispute (D) their irrational beliefs on functional grounds (e.g., "how is the belief that you 'must' perform well serving you? Is this belief helping you to achieve your goals?").

(5) Replace: Develop new rational beliefs with the participants, and enable them to weaken their irrational beliefs and strengthen the new rational beliefs.

(6) Commit: Facilitate the client in integrating their new beliefs into their lives, encouraging commitment to rationality and independent disputation.

The above process is underpinned by the development of rapport between practitioner and participant (Wood et al., 2020) and disputation is achieved via Socratic dialogue rather

than didactic instruction (DiGiuseppe et al., 2014). The six stage process was distributed across the four sessions, session 1: recognize; sessions 2 and 3: evidence, logic, and pragmatics; session 4: replace and commit. Throughout, due to the deeply held nature of core beliefs (DiGiuseppe et al., 2014), the practitioner was cognizant of the participants' use of irrational language, respectfully reminding the participants to be aware of this. The intervention strikes a balance between being didactic when helping the participants to challenge their thinking, whilst maintaining the working alliance by also including elements of Socratic questioning and taking a client-centered approach (Wood et al., 2020). Due to this, naturally, there were differences in the interactions between the practitioner and each participant. Whilst the process of REBT was the same for each participant, the ways in which the practitioner-participant interactions played out were idiosyncratic to each participant in order to maintain a client-centered approach to the work. However, REBT content was always the focus of the sessions, and REBT theory was closely adhered to throughout.

Logistically, the four sessions took place every two weeks starting from the first week of intervention for each participant (weeks 1, 3, 5, and 7 of the intervention phase). Sessions took place face to face in a private meeting room convenient to each participant to ensure participant comfort and environmental familiarity. All session were delivered by the first author under the close guidance and supervision of the second and third authors, who are Health Care Professions Council registered practitioner psychologists and trained in REBT (Primary and Advanced Practicum at the Albert Ellis Institute). The first author is also a trained professional referee, and qualified referee trainer, enabling greater buy-in from participants than what might be possible by a psychologist without referee training. This offers a unique aspect to the current study, whereby the delivery of the intervention was conducted by a practitioner with a shared professional capacity with participants.

Analytic Strategy

Data were graphed and then visually analyzed in order to investigate intervention effects on participants' irrational beliefs. In order to examine data visually and statistically, it is important to first determine the extent to which data are serially dependent using autocorrelation analyses (Ottenbacher, 1986). Autocorrelation analyses is important in single-case designs, because in order to make accurate judgements about visually inspected data it is advantageous for the data points to independent (i.e., low serial dependence). To ensure data met parametric assumptions baseline total irrational belief scores for each participant were assessed for serial dependence using auto-correlation analysis (Barker et al., 2013). For the current data, non-significant auto-correlation was revealed for both participants, thus rendering data suitable for statistical analyses (Ottenbacher, 1986).

Hrycaiko and Martin (1996) suggest that if an intervention has yielded a significant effect then this will be graphically apparent based upon: a) immediacy of effects, b) effects reflected across both participants, c) minimal number of overlapping data points and d) magnitude of effect size between pre- and post-intervention phases. These four criterion are best determined using visual inspection of the graphed data (Kazdin, 2011) where data points and phases are clearly marked. Visual inspection of the graphs (see Figures 1 & 2) and descriptive data (see Table 1 & 2) were conducted for each participant and a Cohen's *d* was calculated between pre-intervention and post-intervention phases in order to gauge the magnitude of the intervention effect. Data was interpreted in reference to small (<0.87), medium (0.87-2.67), and large effect sizes (>2.67; Parker & Vannest, 2009). Statistical analysis was used to compliment visual inspection of the irrational belief data.

In line with previous research and typical of single case research (Barker et al., 2020) an independent samples *t*-test was used to examine the statistical difference in total irrational belief scores between pre (A) and post-intervention phases (B) for each participant. Descriptive statistics for irrational performance beliefs (i.e., *M* & *SD*) and magnitude of change scores (*d*)

were calculated between pre-intervention phase, post-intervention phase, and a 12 week follow-up time point (see Table 1). In addition, the mean and magnitude of percentage change scores (between pre- and post-intervention time-points) were calculated for measures of anxiety, decision reinvestment and match officiating performance. We use a blend of visual and statistical analyses in order to assess change across continuous data, and also more generally across the two main phases using mean levels (i.e., Cohen's *d* and *t*-tests). In addition, the contrasting methods of visual analysis and statistical analysis indicate that a treatment effect has occurred, it enhances confidence in the validity of the intervention (Barker & Jones, 2008). T-tests for extremely small samples sizes is feasible and even a sample size as small as 2 does not pose a problem (de Winter, 2013). For coherence and in line with the single-case nature of the study, the results section has been structured by participant, rather than by variable (Davis & Turner, 2019).

Results

Participant A

Participant A reported a large (d = 2.27) decrease (-28.56%) in composite irrational beliefs between pre- to post- intervention phases. As well, reporting medium to large reductions across each of the four core irrational beliefs. Visual analysis indicated stable baseline data during the pre-intervention phase, with only two overlapping data points between that and the post-intervention phase. Furthermore, although there did not appear to be immediate change in scores, there was some latency in the reduction of composite irrational beliefs three weeks after the intervention onset, with reductions maintained throughout the duration of the post-intervention phase. Compared to the celeration line, post-intervention data indicated larger reductions in irrational beliefs than what would be been expected without REBT. Reductions in irrational beliefs were maintained at a 12 week follow-up time point (see Table 1). An independent samples *t*-test demonstrated a significant decrease in irrational beliefs between

pre- and post-intervention phases, t (19) = 4.64, p < .001. In adjunct to changes in irrational beliefs, Participant A reported an 8.75% reduction in anxiety, and a 23.40% reduction in decision reinvestment between pre- and post-intervention time-points. Furthermore, as assessed by the Athlete Management System (AMS), Participant A's match officiating performance showed a 20.60% increase between pre- and post-intervention time-points.

Social validation data revealed that Participant A believed enhancing healthy emotions and behaviors were important and considered the REBT sessions to have had a positive influence on her psychological well-being. Participant A reported 'neutral' scores when responding to the statements "the REBT sessions were very effective" and "the REBT sessions having a positive influence on their performance" (i.e., score., 4 out of 7). Participant A also noted that they "would have liked to have chatted on more occasions", indicating that the number of sessions perhaps was insufficient to their expectations. This was despite completing all of the planned four sessions and sessions being between 45-60 minutes in length.

In sum, Participant A showed slightly delayed yet large and maintained reductions in irrational beliefs after receiving the REBT intervention. In conjunction, Participant A reported reductions in anxiety (i.e., worry, somatic anxiety, and concentration disruption) and decision reinvestment related to match officiating. Finally, referee performance as evaluated externally (i.e., decision accuracy & game management) increased. *(INSERT FIGURE 1 HERE)*

Participant B

Participant B reported a large (d = 2.80) decrease (-28.82%) in irrational beliefs between pre and post-intervention phases. As well, reporting large reductions across each of the four core irrational beliefs. Visual analysis indicated stable baseline scores, with only one overlapping data point between the phases. Participant B reported immediate reductions in irrational beliefs after the intervention onset, which largely followed a downward trend through the remaining post-intervention phase. Compared to the celeration line, post-intervention data

indicated reductions in irrational beliefs, whereas the trend had an upwards trajectory had REBT not been applied. Notably, Participant B reported an acute spike in irrational beliefs half-way through the intervention phase, which subsided in accordance to the initial downward trend the following week. Participant B's spike in irrational beliefs occurred at the time of an important job interview that would see them promoted within their organisation. An independent samples *t*-test demonstrated a significant decrease in irrational beliefs between pre- and post-intervention phases, $t\ (19) = 7.30$, $p < .001$. In conjunction to these reductions Participant B demonstrated a 14.70% reduction in anxiety and a 18.50% decrease in decision reinvestment related to match officiating. Due to a change in Participant B's circumstances - a change in job role owing to the fact that she was successfully appointed to the job that she had interviewed for - we were unable to collect performance data at a post-intervention time-point.

Social validation data revealed that Participant B agreed with the notion that enhancing healthy emotions and behaviors were important to them and that the REBT sessions had a positive influence on their psychological well-being. Participant B also reported that they were 'neutral', (score., 4 out of 7) in relation to the statement "the REBT sessions were very effective" and that their perception as to the REBT sessions having a positive influence on their performance. Despite this neutrality rating Participant B indicated the value they ascribed to the intervention, stating that: "I do think deeper about emotive thoughts and feelings… I'm always interested to understand the emotional and mental side of performance".

In summary, Participant B reported immediate, and maintained large reductions in irrational beliefs after receiving the REBT intervention. In adjunct, Participant B demonstrated reductions in anxiety (i.e., worry, somatic anxiety, and concentration disruption) and decision reinvestment related to match officiating. Further, Participants B's endorsement of irrational beliefs appeared to be contextually sensitive, that is, important and meaningful events may enhance one's propensity to endorsed irrational beliefs.

(INSERT FIGURE 2 HERE)

Discussion

In the present study, we conducted a single-case examination into the effects of REBT on irrational beliefs, decision reinvestment, and match officiating performance with two elite rugby union MOs. Overall, the data supports the study hypotheses, indicating that the application of REBT brought about reductions in irrational beliefs, decreased decision reinvestment, and enhanced matched officiating performance (i.e., decision making and management). Given the psychological demands that MOs are faced with (Hill et al., 2016), the present study offers a valuable examination into the applicability and effects of REBT within a specialised and elite sample that appears relatively absent from the extant literature.

As hypothesised, participants reported large reductions in irrational beliefs between pre- and post-intervention time-points, which were maintained at a 12 week follow-up time-point. Statements within social validation data affirmed a rational shift: "I want to perform well, not worry about it all going wrong, and the consequences. I now recognise that if a performance wasn't that great it would not be the end of the world…and I cannot be defined by a single action or performance" (Participant A). Such findings add to a growing body of work that supports REBT as an effective psychological approach for those operating in elite sport (see Jordana et al., 2020, for a systematic review). In addition, the results support the GABCDE framework as an identifiable and structured framework by which practitioners can work with clients to bring about sustained changes in their beliefs (e.g., Wood et al., 2020).

In contrast to our hypothesis (i.e., reductions in irrational beliefs) Participant A initially reported a small increase in irrational beliefs after the intervention onset, which then showed sustained reductions thereafter. This finding is not uncommon (e.g., Wood et al., 2017b) and can be explained by the following reasoning. First, the aim of sessions one and two were to recognise and consider disputing irrational beliefs, thus we may not expect reductions in

irrational beliefs as an extension of raising a client's awareness. Second, this finding may reflect a phenomenon known as cognition - emotion mismatch (Stott, 2007), which is frequently reported in the application of cognitive behavioural therapies (Dryden, 2012). That is, the participant may have experienced a disassociation between their logical, empirical, and pragmatic beliefs (cognitions), and how they felt about themselves (emotion). For example, an athlete may say: "I know that I'm not a failure if I have not met my standards, but I still feel like a complete failure". To this end, this finding suggests that the education of the GABCDE model, alone, maybe insufficient in bringing about meaningful changes in client core beliefs (Wood et al., 2018). Further, we recommend practitioners to be sensitive to the 'cognition – emotion mismatch' and manage the pace and/or length of the REBT sessions to ensure sufficient cognitive and emotional insight into their newly formed rational beliefs (Dryden & Neenan, 2015).

Unlike Participant A, Participant B reported an immediate reduction in irrational beliefs. Across the milieu of cognitive-behavioural approaches, engagement with intersession tasks are considered central to positive psychological outcomes (Dryden, 2012). Participant B's commitment to complete the intersession tasks were evident during the intervention process, which may account for the immediate reduction in irrational beliefs. Although not assessed in the study, an alternative explanation is that once Participant B was initially educated on irrational beliefs and their debilitative effects, they may have completed the questionnaire in a more socially desirable manner, in turn reporting lower irrational beliefs than they truly believed. After reporting immediate reductions in irrational beliefs, data for Participant B indicated an isolated spike between sessions two and three. Notably, at this juncture Participant B was approaching a job interview with an international sporting body that had substantial and positive ramifications on their career prospects. To explain, the job represented Participant B's motivationally relevant goal (G) and the interview itself represented the adversity (A). Both,

in combination created a perception of motivational incongruence (i.e., “this interview may allow me or prevent me from achieving my goals”; Chadha et al., 2019). All of which brought the deeply held irrational beliefs to the surface, allowing the participants to be more aware of their irrational beliefs. This acute awareness was reflected in the data. In future, practitioners should be prudent to imminent and upcoming significant events for their clients, as they will likely endorse higher levels of irrational beliefs during this period (Visla et al., 2016). Nevertheless, these significant events also provide windows of opportunity for clients to recognize, re-appraise, and behaviourally dispute their irrational beliefs in situ, about events that are contextually outside of the precise remit of the intervention work being done. That is, practitioners should recognise that events from outside of sport can influence the intervention process, and that these events are not ‘off limits’ for a humanistic practitioner.

As established in previous research (e.g., Jordana et al., 2020) reductions in both participant irrational beliefs were matched with decreases in anxiety. That is, as MOs endorsement of absolutist and dogmatic beliefs about an A (e.g., faced with an important decision) that thwarted their Goal (G; e.g., to be seen as an accomplished referee) decreased, so did their self-reported anxiety levels (i.e., worry, somatic anxiety and concentration disruption). To begin to explain the mechanisms by which reductions in irrational beliefs are coupled with improved affective states (i.e., reduced anxiety) research has drawn upon Lazarus’ (1991) cognitive appraisal theory (e.g., Chadha et al., 2019). In a study with elite golfers, researchers showed irrational beliefs to positively relate to threat appraisals (i.e., evaluation of future harm or loss, Lazarus, 1991), negative emotions (e.g., cognitive and somatic anxiety) and debilitative directional interpretation of anxiety. In the present study, this explanation would indicate that for the MOs taking part in the study, if they endorse more rational beliefs (e.g., “I really want to have a successful game, but it doesn’t mean I have to, and if I didn’t it would be bad, but certainly not terrible and certainly does not make me a

complete failure) they could be less likely to appraise a match or situation as harmful or threatening, and respond with lower levels and/or facilitative interpretations of anxiety, which may have subsequent effects on their decision making and match officiating performance.

Decision making is considered a key determinant of coping and successful officiating in rugby union (Mascarnhas et al., 2004). One mechanism that underpins successful decision making is the propensity to reinvest and ruminate over the decision-making process. As measured in the study, both participants reported reductions in decision making reinvestment as a result of the intervention. That is, reductions in irrational beliefs and anxiety were coupled with a reduced propensity to consciously monitor the processes involved in decision making (i.e., decision rumination) and the tendency to focus on previous inaccurate decisions (i.e., decision reinvestment). Indeed, data supports previous suppositions that rumination is strongly related to irrational beliefs due to their very negative and self-critical nature (Rude et al., 2007). By extension, a more flexible, logical and non-extreme belief (rational beliefs) about various adversities (A) during a game meant the participants were less likely to ruminate on and/or over the prospect of making a 'poor' decision during a game. Beyond that of the performance arena, researchers have indicated that increased self-consciousness itself can be both beneficial (i.e., adaptive reflection) and detrimental (i.e., rumination) for psychological wellbeing; as well, data implicates rumination as a mediator in the positive relationship between irrational beliefs and psychological distress (Artiran et al., 2020). Rumination reflects self-attentiveness motivated by threat, losses or injustices to the self, where instead, reflection represents self-attentiveness motivated by curiosity and or epistemic interest in the self (Trapnell & Campbell, 1999). To this end, we suggest that the application of REBT (reduction of irrational beliefs) did not completely assuage the participants self-consciousness regarding any pending/previous decisions, rather, it may have propagated an adaptive shift from rumination to reflection. Indeed, within the modern game, an MO's ability to move on from a range of adversities is

550 considered critical for their performance. MOs are faced with a range of possible and amplified
551 adversities, due to the use of technology and large screens that can often identify a referee's
552 incorrect decision to the present and televised audience, which in turn make them susceptible
553 to triggering additional irrational beliefs. Essentially, REBT may offer a plausible intervention
554 to enhance a MO's ability to make effective decisions.

555 In the present study we objectively assessed MO performance using the 'athlete
556 management system' (AMS) as adopted across domestic, European and International
557 competition. The performance data for Participant A indicated an increase between pre- and
558 post-intervention phases. Specifically, via reductions in irrational beliefs, anxiety, and decision
559 reinvestment and rumination, it is possible that MOs were then able to make better game related
560 decisions. The application of REBT may have given the MOs the ability to place decisions
561 made (correct/incorrect) into perspective, allowing a more flexible, adaptive, and pragmatic
562 view of the decision-making process. This finding, in part, contributes to extant research that
563 documents the beneficial effects of reducing irrational beliefs on behavioural outcomes (i.e.,
564 performance markers; Wood et al., 2017b; Wood et al., 2020). Whilst the objective data offers
565 promising links between the REBT intervention and performance changes, it should be noted
566 that we were unable to collect performance data for Participant B. Nevertheless, Participant B
567 was presented with an alternative and significant performance situation (i.e., interview)
568 towards the latter stages of the REBT intervention, which they were successful in achieving.
569 The application of REBT, specifically the disputation of irrational beliefs is described as an
570 elegant solution. That is, a practitioner works to help the participant dispute beliefs associated
571 with success/failure in regards to the human experience. Hence newly formed rational beliefs
572 are highly applicable to other adversities related to success and/or failure inside and outside the
573 context of on-field performance.

In addition, social validation data from both participants indicated that the REBT intervention only 'slightly helped performance'. It is clear that future studies should employ repeated and objective measures of performance to enhance our conclusions regarding irrational beliefs and athletic performance. Furthermore, recent investigations suggest that irrational beliefs are detrimental for performance, if one is highly anxious, and in an imminently anxiety provoking situation (Mesagno et al., 2020). Future research should examine the role of irrational beliefs amongst a wider range of interacting antecedents that predict decision making performance in MOs. Conclusions regarding the facilitative effects of REBT on decision making performance are promising, but remain tentative.

Limitations and Future Recommendations.

The findings of the current study offers the first data to support the use of REBT as a means to assuage MO's propensity to reinvest and ruminate over decision making. As well, in this study REBT was able to equip the MOs with a set of rational beliefs that may have facilitated and maintained optimal decision-making performance in what can be considered highly pressurised and testing circumstances. Nevertheless, it would be judicious to identify the relative strengths, limitations and future recommendations for the readership. First, the assessment of MO performance using established and independent assessment criteria provided an objective means by which to examine the effects of REBT on performance. However, due to various seasonal constraints we were unable to collate repeated and a long-term assessment of MO performance, as such, future researchers are recommended to do so. Second, and related to a temporal analysis in referees, it might be that certain game situations activate specific irrational beliefs. For example, whilst I may not be aware of my demand for fairness, in the event that I am treated unfairly (by a player, for example) the irrational belief may become more conscious. Therefore, future research should investigate ways to examine

598 situation specific irrational beliefs to understand to what extent, across different individuals,
599 particularly events are conducive to irrational beliefs activation.

600 Third, the psychological challenges for MOs are not bound to the field, but also in
601 their daily lives. For example, a recently retired top flight rugby league referee left the game
602 because of abuse (i.e., death threats) directed at him and his family (Cleary, 2018).
603 Accordingly, future researchers may wish to better understand if, and by what mechanisms
604 may the application of REBT bring about positive changes in the general psychological
605 wellbeing of an elite MO. Fourth, as we did here, the disputation of irrational beliefs is known
606 as 'elegant' REBT, nevertheless the GABCDE framework offers the practitioner a broader
607 suite of additional intervention options and/or techniques to adopt. One approach we would
608 recommend specifically for MOs which can be utilised within REBT is 'assertiveness training'.
609 Specifically, MOs would undergo an REBT programme focussed on developing their social
610 skills to express themselves, persist in the face of resistance, and standing up for themselves in
611 the middle of conflict (Obiageli, 2014). Fifth, social validation data indicated that the
612 magnitude and maintained effects of REBT appear contingent on intervention dose (Visla et
613 al., 2016). As such future studies should examine and compare the acute and maintained effects
614 of REBT between different dosages (e.g., no. of contacts, total contact time).

615 Finally, and perhaps more notably, the current paper relied on the repeated
616 administration of self-report measurements, with participants completing the iPBI 19 and 20
617 times. This of course risks test fatigue and participant boredom, as the burden on participants
618 is more than if we took one pre-intervention measure and one post-intervention measure.
619 However, it is suggested in single-case design guidelines (Ottenbacher, 1986) that researchers
620 should collect at least eight baseline data points. In a recent meta-regression of SCEDs in sport
621 (Barker et al., 2020) it is specifically recommended that researchers increase the number of
622 baseline observations. So there is a disjunction between what is necessary for rigorous SCEDs,

and what is appropriate to ask participants to do. In the current study, we were pragmatic and only repeated the measurement of the iPBI each week, and adhered to the lower guideline of eight baseline data points. But with certain clients and participants, completing eight baseline measure with nothing to show for it may not be acceptable. Also in relation to the self-report nature of the assessment we used, social desirability has to factored into the results. In the current study, to try to assuage response bias, the experimenter blinded participants from the purpose of the study, participants were unaware of the selection criteria for the study, and we reminded participants each time to be honest in their answers. Whilst variation in data indicates non-uniformity in responses (i.e., spike in data driven by contextual factors), we cannot exclude the possibility of response bias in the current study. Future research needs to formulate a reliable method of ameliorating response bias, or develop ways in which irrational beliefs can be measure non-psychometrically.

Conclusion

Match officials are seldom used as participants for sport psychology interventions despite being integral to the developed of elite sport and its integrity. Acknowledging this absence in the literature and the psychological challenges they are faced with, this study is the first to document the application of REBT to bring about facilitative changes in irrational beliefs, anxiety, decision making reinvestment, and performance in elite MOs. This study contributes more evidence that the application of REBT is an effective means by which to successfully reduce levels of irrational beliefs, anxiety, decision reinvestment, and in part facilitate performance. Considering both the centrality of decision making for MO performance, and the scrutiny officials are under (e.g., media, social media), we put forth REBT as a potentially efficacious approach to equip MOs to deal with the plethora of psychological challenges they will inevitably encounter.

References

Artiran, M., Şimşek, O. F., & Turner, M. (2019). Mediational role of rumination and reflection on irrational beliefs and distress. *Behavioural and Cognitive Psychotherapy*, *47*(6), 659–671. https://doi.org/10.1017/s1352465819000031

Barker, J. B., & Jones, M. V. (2008).The effects of hypnosis on self-efficacy, positive and negative affect and sport performance: A case study from professional English soccer. *Journal of Clinical Sport Psychology*, *2*, 127–147.

Barker, J. B., Mellalieu, S. D., McCarthy, P. J., Jones, M. V., & Moran, A. (2013). Special Issue on Single-Case Research in Sport Psychology. *Journal of Applied Sport Psychology*, *25*(1), 1–13. https://doi.org/10.1080/10413200.2012.729378

Barker, J. B., Mellalieu, S. D., McCarthy, P. J., Jones, M. V., & Moran, A. (2013). A review of single-case research in sport psychology 1997–2012: Research trends and future directions. *Journal of Applied Sport Psychology, 25*(1), 4–32. https://doi.org/10.1080/10413200.2012.709579

Barker, J. B., Slater, M. J., Pugh, G., Mellalieu, S. D., McCarthy, P. J., Jones, M. V., & Moran, A. (2020). The effectiveness of psychological skills training and behavioral interventions in sport using single-case designs: A meta regression analysis of the peer-reviewed studies. *Psychology of Sport and Exercise, 51*, 101746.

Barlow D. H., & Nock M. K. (2009). Why can't we be more idiographic in our research? Perspectives on Psychological Science,4, 19–21. 10.1111/j.1745-6924.2009.01088.x

Chadha, N. J., Turner, M. J., & Slater, M. J. (2019b). Investigating Irrational Beliefs, Cognitive Appraisals, Challenge and Threat, and Affective States in Golfers Approaching Competitive Situations. *Frontiers in Psychology*, *10*, 2295. https://doi.org/10.3389/fpsyg.2019.02295

Chrysidis, S., Turner, M. J., & Wood, A. G. (2020). The effects of REBT on irrational beliefs, self-determined motivation, and self-efficacy in American Football. *Journal*

673 *of Sports Sciences*, *38*(19), 2215–2224.
674 https://doi.org/10.1080/02640414.2020.1776924
675 Cleary, M. (2018, August 4). *Referees reach tipping point after revelations about death*
676 *threats*. The Guardian. https://www.theguardian.com/sport/2018/aug/04/referees-
677 reach-tipping-point-after-revelations-about-death-threats
678 Cunningham, I., Simmons, P., Mascarenhas, D., & Redhead, S. (2014). Skilled Interaction:
679 Concepts of Communication and Player Management in the Development of Sport
680 Officials. *International Journal of Sport Communication*, *7*(2), 166–187.
681 https://doi.org/10.1123/ijsc.2013-0098
682 David, D., Lynn, S. J., & Ellis, A. (2010). *Rational and Irrational Beliefs: Research, Theory,*
683 *and Clinical Practice* (Illustrated ed.). Oxford University Press.
684 Davis, H., & Turner, M. J. (2020). The use of rational emotive behavior therapy (REBT) to
685 increase the self-determined motivation and psychological well-being of
686 triathletes. *Sport, Exercise, and Performance Psychology*, *9*(4), 489–505.
687 https://doi.org/10.1037/spy0000191
688 Dawson, P. M. (2012). Experience, social pressure and performance: the case of soccer
689 officials. *Applied Economics Letters*, *19*(9), 883–886.
690 https://doi.org/10.1080/13504851.2011.607118
691 Deen, S., Turner, M. J., & Wong, R. S. K. (2017). The Effects of REBT, and the Use of
692 Credos, on Irrational Beliefs and Resilience Qualities in Athletes. *The Sport*
693 *Psychologist*, *31*(3), 249–263. https://doi.org/10.1123/tsp.2016-0057
694 *"People starving so I accept problems."* (2018, May 30). BBC Sport.
695 https://www.bbc.co.uk/sport/tennis/44303104
696 de Winter, J. C .F. (2013). Using the Student's "t"-Test with Extremely Small Sample Sizes.
697 *Practical Assessment, Research & Evaluation*, 18(10), 1-13.

Dryden, W. (2012). *Cognitive Behaviour Therapies* (1st ed.). SAGE Publications Ltd.

Dryden, W., & Branch, R. (2008). *Fundamentals of Rational Emotive Behaviour Therapy: A Training Handbook* (2nd ed.). Wiley.

Dryden, W., & DiGiuseppe, R. (1990). *A Primer on Rational-emotive Therapy*. Amsterdam University Press.

Ellis A. (1957). *Rational Psychotherapy and Individual Psychology*. Journal of Individual Psychology. *13*, 38-44.

Ellis, A. (1987). "On the origin and development of rational-emotive theory," in *Key Cases in Psychotherapy,* ed. W. Dryden (New York, NY: New York University Press), 148–175.

Ellis, A., & Dryden, W. (1998). *The Practice of Rational Emotive Behaviour Therapy* (2nd ed.). Free Assn Books.

Epictetus. (1948). The Enchiridion. Indianapolis: Bobbs-Merrill. Gordon, R. M. 1987. The Structure of Emotions. Cambridge: Cambridge Univ. Press.

Garland, D. (2008). On the concept of moral panic. *Crime Media Culture*, 4(1), 9-30. 24 doi: 10.1177/1741659007087270

Goldsmith, P. A., & Williams, J. M. (1992). Perceived stressors for football and volleyball officials from three rating levels. *Journal of Sport Behavior*, *15*, 106-118.

Hill, D. M., Matthews, N., & Senior, R. (2016). The Psychological Characteristics of Performance Under Pressure in Professional Rugby Union Referees. *The Sport Psychologist*, *30*(4), 376–387. https://doi.org/10.1123/tsp.2015-0109

Hrycaiko, D., & Martin, G. L. (1996). Applied research studies with single-subject designs: Why so few? *Journal of Applied Sport Psychology*, *8*(2), 183–199. https://doi.org/10.1080/10413209608406476

Johansen, B. T., & Haugen, T. (2013). Anxiety level and decision-making among Norwegian top-class soccer referees. *International Journal of Sport and Exercise Psychology*, *11*(2), 215–226. https://doi.org/10.1080/1612197x.2013.773665

Jordana, A., Turner, M. J., Ramis, Y., & Torregrossa, M. (2020). A systematic mapping review on the use of Rational Emotive Behavior Therapy (REBT) with athletes. *International Review of Sport and Exercise Psychology*, 1-26. https://doi.org/10.1080/1750984X.2020.1836673

Kamata, A., Tenenbaum, G., & Hanin, Y. L. (2002). Individual Zone of Optimal Functioning (IZOF): A Probabilistic Estimation. *Journal of Sport and Exercise Psychology*, *24*(2), 189–208. https://doi.org/10.1123/jsep.24.2.189

Kazdin, A. E. (2011). *Single-case research designs: Methods for clinical and applied settings* (2nd ed.). New York: Oxford University Press.

Kinrade, N. P., Jackson, R. C., & Ashford, K. J. (2015). Reinvestment, task complexity and decision making under pressure in basketball. *Psychology of Sport and Exercise*, *20*, 11–19. https://doi.org/10.1016/j.psychsport.2015.03.007

Kinrade, N. P., Jackson, R. C., Ashford, K. J., & Bishop, D. T. (2010). Development and validation of the Decision-Specific Reinvestment Scale. *Journal of Sports Sciences*, *28*(10), 1127–1135. https://doi.org/10.1080/02640414.2010.499439

Kittel, A., Cunningham, I., Larkin, P., Hawkey, M., & Rix-Lièvre, G. (2021). Decision-making training in sporting officials: Past, present and future. *Psychology of Sport and Exercise*.

Kittel, A., Larkin, P., Elsworthy, N., & Spittle, M. (2019b). Identification of key performance characteristics of elite Australian football umpires. *International Journal of Sports Science & Coaching*, *14*(4), 490–497.

Larkin, P., Berry, J., Dawson, B., & Lay, B. (2011). Perceptual and decision-making skills of Australian football umpires. *International Journal of Performance Analysis in Sport, 11*(3), 427–437.

Lazarus, R. S. (1991). Cognition and motivation in emotion. *American Psychologist, 46*(4), 352 -362.

MacMahon, C., Mascarenhas, D., Plessner, H., Pizzera, A., Oudejans, R., & Raab, M. (2014). *Sports officials and officiating: Science and practice*. Oxon: Routledge

MacMahon, C., Starkes, J., & Deakin, J. (2007b). Referee decision making in a video-based infraction detection task: Application and training considerations. *International Journal of Sports Science & Coaching, 2*(3), 257–265.

Maxwell, J. P., Masters, R. S. W., & Poolton, J. M. (2006). Performance breakdown in sport: the roles of reinvestment and verbal knowledge. *Research Quarterly for Exercise and Sport, 77*, 271-276.

Mesagno, C., Harvey, J. T., & Janelle, C. M. (2011). Self-presentation origins of choking: Evidence from separate pressure manipulations. *Journal of Sport & Exercise Psychology, 33*, 441- 459.

Mesagno, C., Tibbert, S. J., Buchanan, E., Harvey, J. T., & Turner, M. J. (2020). Irrational beliefs and choking under pressure: A preliminary investigation. *Journal of Applied Sport Psychology*, 1-21. https://doi.org/10.1080/10413200.2020.1737273

Morris, G., & O'Connor, D. (2016). Key attributes of expert NRL referees. *Journal of Sports Sciences, 35*(9), 852–857.

Nock, M. K., Holmberg, E. B., Photos, V. I., & Michel, B. D. (2007). Self-Injurious Thoughts and Behaviors Interview: development, reliability, and validity in an adolescent sample.

Normand, M. P. (2016). Less Is More: Psychologists Can Learn More by Studying Fewer People. *Frontiers in Psychology*, *7*, 934. https://doi.org/10.3389/fpsyg.2016.00934

Obiageli, A. J. F. (2014). Management of negative self-image using rational emotive and behavioural therapy and assertiveness training. *ASEAN Journal of Psychiatry*, *16*(1), 1-12.

O'Reilly, S. K. (2017). *Performing Under Pressure: Physiological and Psychological Attributes of the Modern Soccer Official* (Doctoral dissertation).

Outar, L., Turner, M., & Wood, A.G. (2018). Muscularity Rationality: An examination of the use of Rational Emotive Behaviour Therapy (REBT) upon Muscle Dysmorphia symptomology. *Psychology of Sport and Exercise*, *6*, 82-93. https://doi.org/10.1016/j.peh.2018.05.001

Ottenbacher, K. J. (1986). Evaluating clinical change: Strategies for occupational and physical therapists. Baltimore: Williams & Wilkins.

Page, J., & Thelwell, R. (2013). The Value of Social Validation in Single-Case Methods in Sport and Exercise Psychology. *Journal of Applied Sport Psychology*, *25*(1), 61–71. https://doi.org/10.1080/10413200.2012.663859

Parker, R. I., & Vannest, K. (2009). An Improved Effect Size for Single-Case Research: Nonoverlap of All Pairs. *Behavior Therapy*, *40*(4), 357–367. https://doi.org/10.1016/j.beth.2008.10.006

Poolton, J., Siu, C. M., & Masters, R. (2011). The Home Team Advantage Gives Football Referees Something to Ruminate about. *International Journal of Sports Science & Coaching*, *6*(4), 545–552. https://doi.org/10.1260/1747-9541.6.4.545

Qualtrics [Computer software]. (2019). Retrieved from https://www.qualtrics.com/uk/

Ridinger, L. L., Kim, K. R., Warner, S. & Tingle, J. K. (2017). Development of the 13 referee retention scale. *Journal of Sport Management, 31*(5), 514-527. 14 doi:10.1123/jsm.2017-0065

Rude, S. S., Little Maestas, K., & Neff, K. (2007). Paying attention to distress: What's wrong with rumination? *Cognition & Emotion*, *21*(4), 843–864. https://doi.org/10.1080/02699930601056732

Slack, L., Butt, J., Maynard, I., & Olusoga, P. (2014). Understanding mental toughness in elite football officiating: perceptions of English Premier League referees. *Sport and exercise psychology review*, *10*(1), 4-24.

Smith, R. E., Smoll, F. L., Cumming, S. P., & Grossbard, J. R. (2006). Measurement of Multidimensional Sport Performance Anxiety in Children and Adults: The Sport Anxiety Scale-2. *Journal of Sport and Exercise Psychology*, *28*(4), 479–501. https://doi.org/10.1123/jsep.28.4.479

Stott, R. (2007). When Head and Heart Do Not Agree: A Theoretical and Clinical Analysis of Rational-Emotional Dissociation (RED) in Cognitive Therapy. *Journal of Cognitive Psychotherapy*, *21*(1), 37–50. https://doi.org/10.1891/08898390778049331

Thorngate W. (1986). The production, detection, and explanation of behavioral patterns, in *The Individual Subject and Scientific Psychology*, ed Valsiner J. (New York, NY: Plenum Press;), 71–93. 10.1007/978-1-4899-2239-7_4

Trapnell, P. D., & Campbell, J. D. (1999). Private self-consciousness and the five-factor model of personality: Distinguishing rumination from reflection. *Journal of Personality and Social Psychology*, *76*(2), 284–304. https://doi.org/10.1037/0022-3514.76.2.284

816 Turner, M. J. (2016). Rational Emotive Behavior Therapy (REBT), Irrational and Rational
817 Beliefs, and the Mental Health of Athletes. *Frontiers in Psychology*, *07*, 7.
818 https://doi.org/10.3389/fpsyg.2016.01423
819 Turner, M. J. (2019). REBT in Sport. In, M.E. Bernard & W. Dryden (Eds.), *Advancing*
820 *REBT Theory, Research and Practice*. New York: Springer.
821 Turner, M. J., Allen, M. S., Slater, M. J., Barker, J. B., Woodcock, C., Harwood, C. G., &
822 McFayden, K. (2016). The development and initial validation of the irrational
823 performance beliefs inventory (iPBI). *European Journal of Psychological*
824 *Assessment.*
825 Turner, M., & Barker, J. B. (2013). Examining the Efficacy of Rational-Emotive Behavior
826 Therapy (REBT) on Irrational Beliefs and Anxiety in Elite Youth
827 Cricketers. *Journal of Applied Sport Psychology*, *25*(1), 131–147.
828 https://doi.org/10.1080/10413200.2011.574311
829 Turner, M. J., & Barker, J. B. (2014). Using Rational Emotive Behavior Therapy With
830 Athletes. *The Sport Psychologist*, *28*(1), 75–90. https://doi.org/10.1123/tsp.2013-
831 0012
832 Turner, M., & Bennett, R. (2018). *Rational Emotive Behavior Therapy in Sport and Exercise*.
833 Taylor & Francis.
834 Turner, M. J., Carrington, S., & Miller, A. (2019). Psychological distress across sport
835 participation groups: The mediating effects of secondary irrational beliefs on the
836 relationship between primary irrational beliefs and symptoms of anxiety, anger, and
837 depression. *Journal of Clinical Sport Psychology*, *13*, 17-40.
838 https://doi.org/10.1123/jcsp.2017-0014

839 Vîslă, A., Flückiger, C., grosse Holtforth, M., & David, D. (2016). Irrational Beliefs and
840 Psychological Distress: A Meta-Analysis. *Psychotherapy and Psychosomatics*, *85*(1),
841 8–15. https://doi.org/10.1159/000441231
842 Webb, T., Gorczynski, P., Oftadeh-Moghadam, S., & Grubb, L. (2021). Experience and
843 Construction of Mental Health Among English Female Football Match Officials. *The*
844 *Sport Psychologist*, *1*, 1-10. https://doi.org/10.1123/tsp.2020-0086
845 Webb, T., Rayner, M., & Thelwell, R. (2019). An examination of match official's perceptions
846 of support and abuse in rugby union and cricket in England. *Managing Sport and*
847 *Leisure*, *24*(1-3), 155-172.
848 Wood, A. G., Barker, J. B., & Turner, M. J. (2017a). Developing Performance Using Rational
849 Emotive Behavior Therapy (REBT): A Case Study with an Elite Archer. *The Sport*
850 *Psychologist*, *31*(1), 78–87. https://doi.org/10.1123/tsp.2015-0083
851 Wood, A. G., Barker, J. B., Turner, M. J., & Sheffield, D. (2017b). Examining the effects of
852 rational emotive behavior therapy on performance outcomes in elite paralympic
853 athletes. *Scandinavian Journal of Medicine & Science in Sports*, *28*(1), 329–339.
854 https://doi.org/10.1111/sms.12926
855 Wood, A. G., Barker, J. B., Turner, M., & Thomson, P. (2018). Exploring the Effects of a
856 Single Rational Emotive Behavior Therapy Workshop in Elite Blind Soccer
857 Players. *The Sport Psychologist*, *32*(4), 321–332. https://doi.org/10.1123/tsp.2017-
858 0122
859 Wood, A., Mack, R., & Turner, M. (2020). Developing Self-determined Motivation and
860 Performance with an Elite Athlete: Integrating Motivational Interviewing with
861 Rational Emotive Behavior Therapy. *Journal of Rational-Emotive & Cognitive-*
862 *Behavior Therapy*, *38*(4), 540–567. https://doi.org/10.1007/s10942-020-00351-6
863

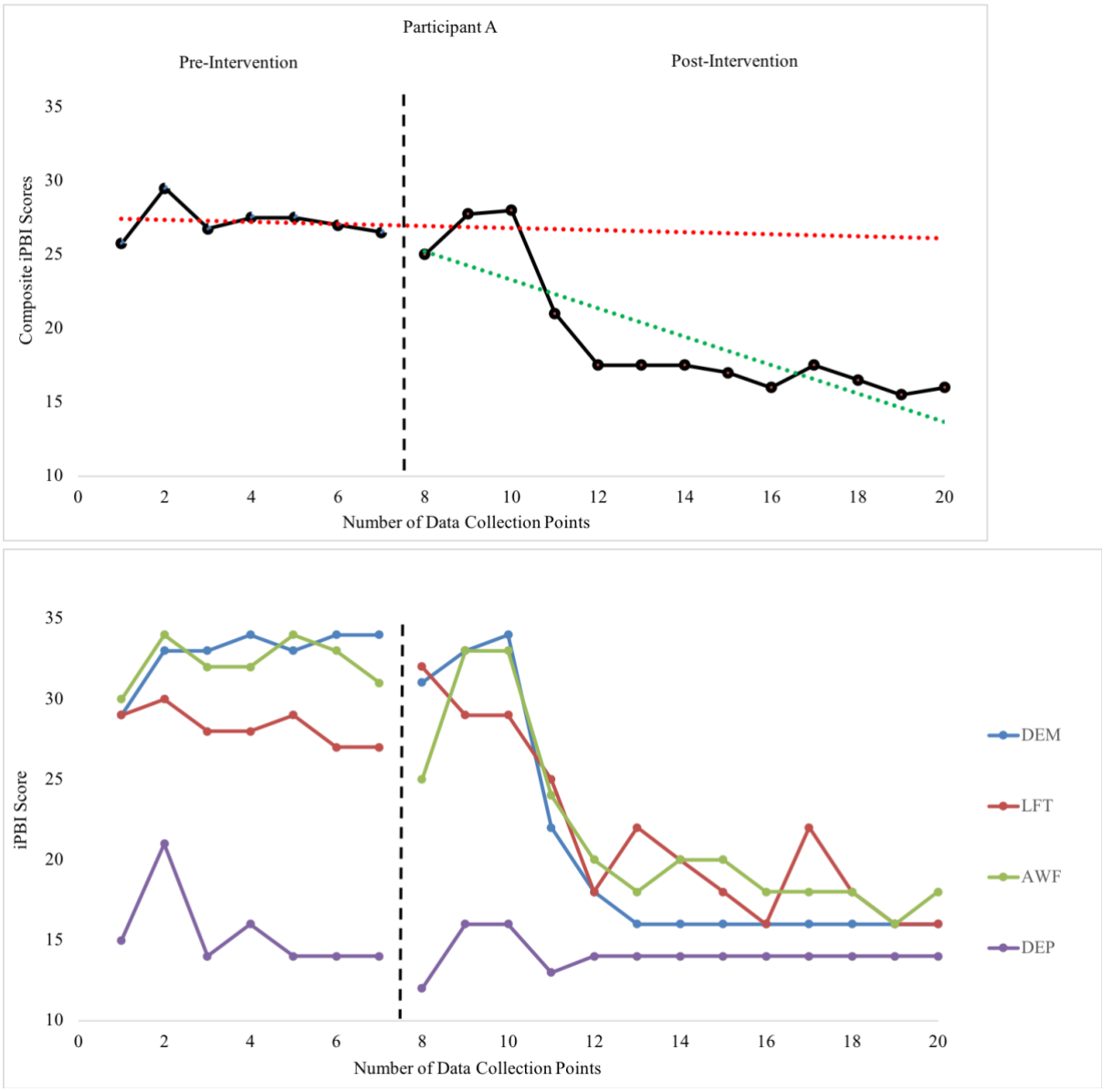
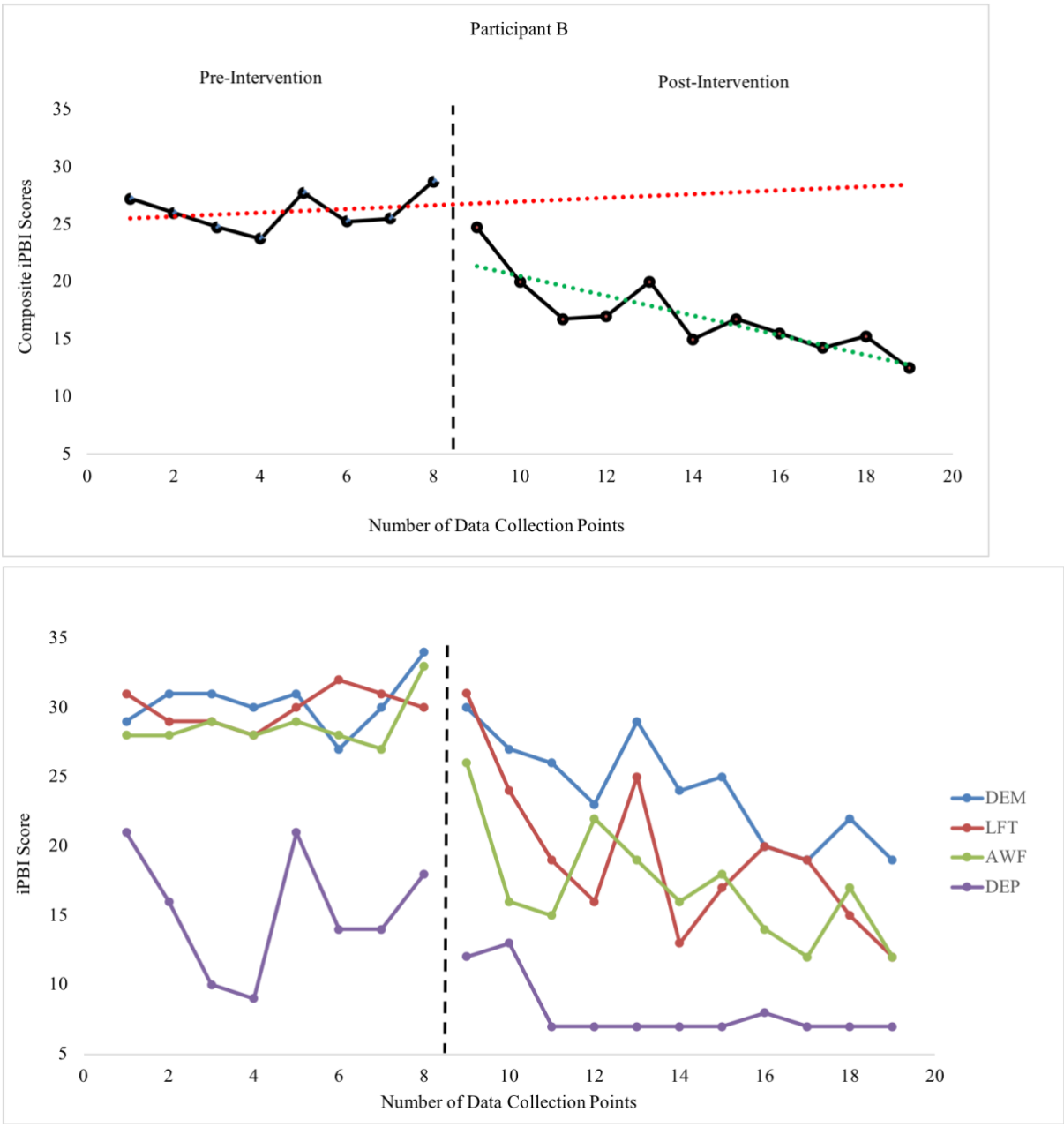


Figure 1. Composite and individual irrational performance belief scores for Participants A across pre-intervention and post-intervention phases.

Note. DEM = Demanding Beliefs, LFT = Low-Frustration Tolerance Beliefs, AWF = Awfulizing Beliefs, DEP = Depreciation Beliefs. *Graph legend.* Dashed red line represents the predicted continuation of the celeration line in the intervention phase. Dashed green line represents the trend line during the intervention phase.



874

875 Figure 2. Composite and individual irrational performance belief scores for Participants B
876 across pre-intervention and post-intervention phases.

877 *Note.* DEM = Demanding Beliefs, LFT = Low-Frustration Tolerance Beliefs, AWF =
878 Awfulizing Beliefs, DEP = Depreciation Beliefs. *Graph legend.* Dashed red line represents
879 the predicted continuation of the celeration line in the intervention phase. Dashed green line
880 represents the trend line during the intervention phase.

Table 1.
Mean values, standard deviations, percentage change and effect size scores for the core and composite irrational belief scores between pre-intervention phase (A), post-intervention phase (B) and 12 week follow-up time point (FU). Mean and percentage change scores have also been presented for the outcome measures of anxiety, decision reinvestment and match officiating performance for pre- and post-intervention time-points.

Participant A	*Pre-Intervention (A)*	*Post-Intervention (B)*	*A-B (% change)*	*A-B (Effect Size)*	*12 week Follow-up (FU)*	*A-FU (% change)*	*B-FU (% change)*
Demandingness	32.86 (1.77)	20.46 (7.18)	-37.74	-2.37	16	-51.30	-21.80
FI	28.29 (1.11)	21.62 (5.52)	-23.58	-1.68	24	-15.16	11.01
Awfulizing	32.29 (1.50)	21.62 (5.64)	-33.04	-2.61	20	-38.06	-7.49
Depreciation	15.43 (2.57)	14.08 (1.04)	-8.75	-0.69	14	-9.27	.57
Composite	27.21(1.78)	19.44 (4.51)	-28.56	-2.27	18.50	-32.01	-4.84
Anxiety	40.00	36.50	-8.75	N/A	N/A	N/A	N/A
Decision Reinvestment	31.33	24.00	-23.40	N/A	N/A	N/A	N/A
Performance	2.70	3.40	20.60	N/A	N/A	N/A	N/A
Participant B	*Pre-Intervention (A)*	*Post-Intervention (B)*	*A-B (% change)*	*A-B (Effect Size)*	*12 week Follow-up (FU)*	*A- FU (% change)*	*B-FU (% change)*
Demandingness	30.38 (2.00)	24.00 (3.82)	-21.00	-2.09	22	-27.58	-8.33
FI	30.00 (1.31)	19.18 (5.65)	-36.07	-2.64	19	-36.67	-.09
Awfulizing	28.75(1.83)	17.00 (4.20)	-40.87	-3.63	14	-51.30	-17.65
Depreciation	15.38 (4.53)	8.09 (2.21)	-47.40	-2.05	7	-54.49	-13.47
Composite	26.13 (1.70)	18.60 (3.40)	-28.82	-2.80	15.50	-40.68	-16.67
Anxiety	36.33	31.00	-14.70	N/A	N/A	N/A	N/A
Decision Reinvestment	50.33	41.00	-18.50	N/A	N/A	N/A	N/A
Performance	2.90	N/A	N/A	N/A	N/A	N/A	N/A