

**A quasi-experimental investigation into the efficacy of rational emotive
behaviour therapy (REBT) in the enhancement of soccer performance**

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Abstract

Aims: The current research sought to examine the efficacy of rational emotive behaviour therapy (REBT) in improving soccer performance, reducing irrational beliefs, promoting rational beliefs, and reducing pre-performance anxiety; in comparison to a conventional sports psychological intervention (i.e. motor imagery).

Method: Participants were 16 ($N=16$) undergraduate students. The sample was comprised of 15 males and 1 female, who ranged in age from 18 to 31 years, mean age (M) = 20.94 and standard deviation (SD) = 3.09. Participants were conveniently sampled and randomly assigned to either one of two REBT ($n = 5$) and ($n = 5$) groups, or a motor imagery ($n = 6$) group. Irrational and rational beliefs were measured using the Sports-Related Beliefs Scale (SRBS). Anxiety was measured using the Visual Analogue Scale-Anxiety (VAS-A): With sports performance being quantified using penalty kick conversion averages.

Results: REBT intervention was shown to have a non-significant counter-effect on performance. There was a large significant effect ($\eta^2 = .42$) observed in the reduction of anxiety from pre ($M = 2.10$, $SD 2.29$) to post ($M = .75$, $SD .80$) REBT intervention. This reduction remained significant when compared to the motor imagery intervention, $F(1, 13) = 5.23$, $p < .05$, partial eta squared = .28. Although not significant, there was a large effect ($\eta^2 = .18$) observed in the reduction of irrational demanding beliefs from pre to post-intervention

Conclusion: Short-term application of REBT may be a successful method of reducing irrational demands for success and anxiety. However, the application of REBT to athletes displaying low-levels of anxiety may inhibit performance.

Table of contents

<u>Introduction</u>	1
REBT theory	1
Cognitive structure of REBT	2
REBT and emotion	4
Anxiety and sport performance	4
Motor imagery and sport performance	7
Rational	10
Research aims	12
<u>Methods</u>	13
Participants	13
Measures	13
Design	16
Procedure	17
<u>Results</u>	20
Descriptive statistics	20
Table1	22
Table 2	23
Inferential statistics	24
REBT intervention analysis	24
Table 3	26
Motor imagery intervention analysis	27
Table 4	28
Pre-interventions dependent variable analysis	29
Table 5	30
Intervention comparison analysis	31
Table 6	32
<u>Discussion</u>	33
REBT and performance	33
REBT and anxiety	34
REBT and irrational beliefs	35
REBT and rational beliefs	37
Implications	38
Strengths and limitations	39
Future research	42
Conclusion	43
<u>References</u>	

Appendixes

Appendix A: Sports Related Beliefs Scale

Appendix B: Information sheet supplied to participants

Appendix C: Informed consent document

Introduction

At present, there is a growing interest in the efficacy of implementing rational emotive behaviour therapy (REBT; Ellis, 1957) in sporting settings. However, the literature remains relatively scarce (Cunningham & Tuner, 2016; Turner, 2016; Turner & Barker, 2013; Turner & Barker, 2014; Turner, 2016; Turner, Slater, & Barker, 2014). Indeed, a single research article denotes the impact REBT could potentially have on sport performance. Here, Wood, Barker, and Turner (2016), demonstrated meaningful improvements in archery performance, following REBT intervention, thus supporting its efficacy as a sports performance enhancing technique.

REBT was conceptualised in 1955 by Albert Ellis, as a cognitive-experiential-behavioural model, which is underpinned by the philosophical paradigm of constructivism: That is, negative emotions can be dispelled by constructing rational, logical and practical appraisals of adversity (Ellis & MacLaren, 2002).

Currently, REBT is a cognitive behavioural model predominantly utilized in clinical settings, which proposes that beliefs one holds regarding failure, rejection, and maltreatment, influence emotional responses through the mediation of event perceptions (Dryden, 1997; Turner et al., 2014). REBT suggests that dysfunctional emotions, such as depression, anxiety and unhealthy anger, are a result of rigid and extreme beliefs in relation to adverse events, and are thus classified as irrational. Conversely, rational beliefs are characterised by flexibility and are non-extreme, which elicit functional emotional responses such as sadness, concern, and healthy anger (Dryden, 2009).

According to the literature, REBT is comprised of four irrational and four rational beliefs, with each category consisting of a primary belief, and three secondary beliefs.

Additionally, interaction between secondary and the primary beliefs is suggested to underpin psychological distress (David, Lynn, Ellis, 2010; Hyland, Shevlin, Adamson, & Boduszek, 2014). This process is hypothesised to be mediated by the escalation of reasonable, flexible beliefs (“I would like to perform well today”; rational belief), to dogmatic, rigid beliefs (“I must perform well today”; irrational belief; Hyland et al., 2014).

Importantly, irrational and rational beliefs are considered as independent psychological processes in REBT theory, rather than polarisations along a shared spectrum (DiLorenzo, David, & Montgomery, 2011; Dryden & David, 2008; Hyland, Fox, Treacy, Maguire, Boduszek, & Vallières, 2016). Hyland and Boduszek (2012) acknowledged the binary theoretical underpinning that REBT adopts in relation emotional event responses: That is, emotions are not conceptualised in response to intensity of experience (i.e. concern is but low intensity of anxiety), as seen in cognitive behavioural therapy (CBT), and conventional psychological measurement approaches (Beck & Dozois, 2011; Beck, Steer, & Brown, 1996); but rather as distinct results of independent cognitive appraisals. In sum, individuals can experience both functional and dysfunctional emotional responses to a particular event, with differing levels of intensity, and dysfunctional and functional emotional responses are independently mediated by irrational and rational beliefs (Hyland & Boduszek, 2012).

Irrational beliefs consist of: (1) Demandingness--rigid/dogmatic beliefs regarding event outcomes (“I must score this penalty”); (2) Catastrophizing--extreme negative event outcome evaluations (“It is awful to perform badly”); (3) Low frustration tolerance--extreme underestimations of one’s ability to cope with adversity (“I cannot stand it if I perform badly”); (4) Self/other deprecation--negative generalisations

regarding the self and others (“I did not perform well today, therefore I am a complete failure”). Conversely, rational beliefs are outlined as: (1) Preference beliefs--flexible/non-dogmatic beliefs regarding event outcomes (“I would like to win, but I do not have to”); (2) Anti catastrophizing--evaluations of adverse events which are non-extreme (“I would like to score this penalty, but it would not be disastrous if I do not”); (3) High frustration tolerance--reasonable coping expectations in relation to adverse events (“I want to perform well, but I will cope if I do not”); (4) Universal self/other acceptance--recognition of one’s and others’ fallibility, with the acceptance that individual actions do not define a person (“If I lose and do not perform well, it is bad, but this does not mean I am a bad footballer”; see Hyland et al., 2016).

The fundamental aim of REBT is the disputation of irrational beliefs and their replacement with rational alternatives (Ellis & Dryden, 1997; Turner et al., 2014).

Clinicians encourage individuals to adopt an ABC structure when analysing dysfunctional emotions. (“A”) is an abbreviation for an activating event; (“B”) is the belief one holds regarding this event; (“C”) indicates the consequence of holding such a belief (i.e. anxiety; Dryden & Branch, 2008). Individuals are encouraged to comprehend that it is irrational beliefs, in relation to poor treatment, failure, and rejection that are the underlying cause of their dysfunctional emotion, and not solely the event itself (Turner et al., 2014). The disputation process (“D”) follows a three-pronged analysis to assess the validity, logic, and helpfulness of a belief (i.e. is it true; is it logical; is it helpful?). Upon effective disputation of irrational beliefs, rational alternatives are then scrutinised following the same structure. If this belief construction is deemed valid, logical, and helpful, individuals are encouraged to maintain this rational alternative, which is understood as effective thinking (“E”) within the ABC structure (Dryden, 2009).

Appraisal theory, (Lazarus, 1991; Smith & Lazarus, 1993), posits that emotion is formed via the process of initial information processing to determine the capacity of an event to harm, benefit, threaten, or challenge (Cold cognition); and the subsequent evaluation of one's efficacy to endure or cope with the event and event consequences (Hot cognition). In essence, cold cognitions are descriptions of stimuli, which are in turn interpreted to assess their salience to the individual. Importantly, cold cognitions do not elicit emotional reactions, until evaluation occurs, according to appraisal theory (Hyland & Boduszek, 2012; Lazarus, 1991). REBT therefore, can be suggested to encompass appraisal theory, as irrational and rational beliefs are both cognitive mechanisms through which appraisals of events occur, and in particular, the event's personal significance (Hyland & Boduszek, 2012; Turner et al., 2014).

Anxiety and sport performance

Anxiety has been demonstrated to yield a deleterious effect on sport performance, particularly through its influence on attentional control. In brief, anxiety can be defined as an experiential, self-focusing, future orientated emotion, which is comprised of a state of diffuse arousal in response to perceptions of threat (Amstadter, 2008). Specifically, anxiety is suggested to mediate negative attentional biases via directional favouring of perceived threatening stimuli rather than positive or neutral stimuli (Jones, 2003; Ohman, Flykt & Esteves, 2001; Vast, Young, & Thomas, 2010; Wilson, Wood, & Vine, 2009). Furthermore, in response to perceived threatening stimuli, attention can become internally orientated towards cognitions and emotions (Matthews & Wells, 1999; Nideffer & Sagal, 2006; Vast et al., 2010).

However, sport scientific research suggests that anxiety may also enhance sporting performance (Edwards & Hardy, 1996; Woodman & Hardy, 2003). The three-

dimensional model of performance anxiety proposes that anxiety may serve performance in a facilitative manner, depending on cognitive appraisal of control (Cheng, Hardy, & Markland, 2009). Perception of control for coping with environmental threats, and one's self-efficacy to achieve goal attainment in the face of adversity, underpins anxiety's facilitative influence on performance (Cheng, Hardy, & Woodman, 2011).

According to Wood and colleagues (2016), REBT may facilitate both an improved perception of control and self-efficacy via a reduction in rigid, irrational cognitions. Harwood, Drew, and Knight, (2010), demonstrated that a culture which exalts winning above other areas of performance exists in sporting settings, which may heighten anxious responses to competition (Turner et al., 2014). Irrational beliefs have an interrelated domino effect on dysfunctional emotion, such as anxiety (David et al., 2010; Hyland et al., 2014). The demand to 'win' (i.e. 'I must beat my opponent today, at all costs'; primary belief) is incongruent with the notion of failure, thus possibly eliciting an anxious response. Such cognitions may compound further irrational beliefs and emotional responses, such as catastrophizing and self-deprecating (i.e. 'if I do not beat my opponent it is an absolute disaster and I am useless'). Thus, one's perception of control and self-efficacy are hindered by rigid, irrational beliefs.

Conversely, rational beliefs reduce the demand to win ('I would like to beat my opponent, but I do not have to'), and its subsequent interaction with following beliefs ('it's bad that I did not win, but not awful, and my worth as an athlete is not based on today's performance'). This reduction in demand for success facilitates a heightened perceived efficacy of control (see Wood et al., 2016 for full review). Therefore, REBT appears to be consistent with, and applicable to, the cognitive and evaluative

aspects of the three-dimensional model of performance anxiety; a validated predictor of sport performance (Cheng et al., 2011).

Similarly, REBT complements the theory of challenge and threat in athletes (TCTSA; Jones, Meijen, McCarthy, & Sheffield, 2009). The TCTSA proposes that demand evaluations regarding the propensity of an event to cause danger, effort, and uncertainty to the athlete via damage physically, psychologically, or to one's esteem, can cause an event to be deemed as threatening. Events are deemed threatening, when resource evaluations consisting of; self-control, self-efficacy, and achievement goals, are perceived as inadequate to meet the demands of competition (Jones et al., 2009; Turner, Jones, Sheffield, Slater, Barker, & Bell, 2013). Threat evaluations negatively affect sport performance through inefficient cardiovascular functioning and energy consumption, which hinder cognitive function, decision-making and self-regulation (Jones et al., 2013). Indeed, demand/threat evaluations have been demonstrated to impair motor performance in golf, baseball and cricket settings (Blascovich, Seery, Mugridge, Norris, & Weisbuch, 2004; Moore, Vine, Wilson, & Freeman, 2012; Turner & Barker, 2013).

Irrational beliefs may influence both demand and resource evaluations, and thus influence the conceptualisation of an event as threatening. For example, the rigid demand for success ('I must win and if do not people will think I'm a terrible player' or 'if I do not perform well I will be de-selected from the squad') and self-deprecating beliefs regarding others' perception of an athlete's performance, and the perceived consequences of failure, may elicit the perception of an event as a danger to esteem and uncertainty regarding the future. Interestingly, social evaluation has been implicated in negatively impacting on golf performance via alterations in force output (Yoshie, Nagai, Critchley, & Harrison, 2016). Indeed, research with mixed martial

arts (MMA) athletes has indicated that the prospect of failing in front of friends and family generated high levels of anxiety, and was attributed to a reduction in performance (Cunningham & Turner, 2016). Additionally, Turner and Colleagues (2014) conveyed that the prospect of de-selection from the squad in response to poor performance, conceptualised soccer matches as threatening, eliciting high levels of anxiety, and again this was associated with the hindering of performance in an elite youth soccer sample.

In terms of irrational beliefs influencing resource evaluations, low-frustration tolerance ('I will not be able to stand it if I am de-selected from the squad') may yield a deleterious effect on an athlete's evaluations of their efficacy to cope with failure. Moreover, as previously mentioned, irrational beliefs may hinder the perception of self-control to cope with adversity. Thus, it is reasonable to assume that irrational beliefs may negatively affect performance through the conceptualisation of events as threatening and the subsequent influence on emotional responses, such as anxiety.

Motor imagery and sport performance

Motor imagery (MI) has been demonstrated to enhance motor performance, and thus it has been implemented in a number of applied settings. Indeed, mental rehearsal of task specific activities has yielded improvements in golf, tennis, and surgical performance (Arora et al., 2011; Brouziyne & Molinaro, 2005; Guillot, Desliens, Rouyer, & Rogowski, 2013). Motor imagery can be broadly defined as the mental rehearsal of motor specific actions without the presence of physical movement (Wakefield, Smith, Moran, & Holmes, 2013). More specifically, in relation to sport, motor imagery is the experientially orientated recreation or creation of events from memory, utilizing sensory, perceptual, and affective systems that are open to

manipulation by the individual, and is conducted in the absence of event-relevant external physical stimuli (Morris, Spittle, & Watt, 2005).

The efficacy of MI in the enhancement of skilled motor performance is accredited to the overlap or functional equivalence of MI with the actual physical execution of movement (Wakefield et al., 2013). The functional equivalence hypothesis holds that mental representations of events or stimuli are functionally equivalent to reality (Finke, 1979). This paradigm has garnered much support across a broad range of psychological research, including cognitive neuroscience and rehabilitation settings. Indeed, f-MRI images indicated that both experienced and inexperienced imagers activated neural motor regions, including both the lateral and medial premotor cortex, the cerebellum and putamen, during motor imagery tasks (Guillot, Collet, Nguyen, Malouin, Richards, & Doyon, 2008). Additionally, the contralateral premotor cortex has also been implicated as mediator of MI in the improvement of motor performance. Blefari, Sulzer, Hepp-Reymond, Kollias, and Gassert (2015), revealed that a positive relationship existed between contralateral primary motor cortex activation and MI in the enhancement of grip performance, thus further supporting the functional equivalence hypothesis (Finke, 1979).

Similar support can be observed in the efficacy of MI in the rehabilitation of neurodegenerative-induced physical disabilities. Stroke-induced physically disabled participants, who received MI training over a six-week period demonstrated a marked improvement in ability to walk compared to muscle relaxation therapy, in a randomly controlled trial (Oostra, Oomen, Vanderstraeten, & Vingerhoets, 2015). This recovery is proposed to be mediated by the functional and structural reorganisation of neural connectivity to remaining undamaged regions (i.e. primary motor cortex) of existing neural structures involved in motor execution (Di Rienzo, Collet, Hoyek, & Guillot,

2014; Wang, Zhang, Zhang, Yan, Liu, & Qiu, 2016). Neural functional reorganisation is facilitated by information garnered from sensorimotor efferent-afferent feedback loops (De Vries & Mulder, 2007): That is, MI facilitates the stimulation of existing sensorimotor neural networks in the absence of physical execution, and in turn enhances functional reorganisation and eventual physical recovery (Wang et al., 2016).

However, it must be noted that the underlying paradigm of motor imagery intervention (i.e. functional equivalence) has received criticism. Recent f-MRI data undermines the notion of imagined movement manipulating shared neural networks as physical execution (Miller, Schalk, Fetz, den Nijs, Ojemann, & Rao, 2010). This has led to the coining of ‘functional correspondence’, that is MI stimulates similar, but not the equivalent, neural networks involved in motor execution (Wakefield et al., 2013). Nonetheless, the efficacy of MI in improving motor performance is strongly supported, even in light of controversy surrounding its mediating factors.

Given the extant literature demonstrating the effectiveness of MI in the improvement of motor performance (Arora et al., 2011; Brouziyne & Molinaro, 2005; Di Rienzo et al., 2014; Guillot et al., 2013; Oostra et al., 2015; Wang et al., 2016), MI is a popular sport psychological intervention, with an estimated 70%-90% prevalence amongst athletes (Ridderinkhof & Brass, 2015). Indeed, it is suggested that MI intervention immediately prior to basketball free throws has an 84% likelihood of improving accuracy, of up to two throws (Kanthack, Bigliassi, Vieira, & Altimari, 2014). Meta-analytical research, scrutinising 18 studies consisting of 584 athletes, ranging from 7-39, indicated that motor imagery was an effective motor performance enhancer to utilize during training (Slimani et al., 2016). This suggests that MI is effective across developmental phases. The effectiveness of MI intervention in soccer contexts is

further supported by Ramsey, Cumming, Edwards, Williams, & Brunning's (2010) findings, where a motor imagery training significantly improved penalty kick performance in soccer players, compared to an active stretching intervention.

Rationale

Although growing, there remains a relative dearth of research examining the implementation of REBT in sporting settings (Cunningham & Tuner, 2016; Turner, 2016; Turner & Barker, 2013; Turner & Barker, 2014; Turner, 2016; Turner, Slater, & Barker, 2014). This is particularly evident in the sport performance literature, where as of January 2017 there exists a sole research article dedicated to this purpose (Wood et al., 2016). These previous studies support the efficacy of implementing REBT in applied sporting settings. Indeed, REBT has been demonstrated to reduce pre-performance anxiety (Turner & Barker, 2013) and increase self-efficacy and self-control; two proposed mediators of anxiety in the sporting theoretical literature (Wood et al., 2016).

Previous studies administered REBT over a longitudinal setting, which is consistent with REBT practice (Dryden & Branch, 2008). However, there remain specific sporting contexts where performance may be benefited by brief sport psychological intervention. Moreover, other sport psychological interventions such as motor imagery have successfully utilized brief (i.e. 3 minutes) cognitive training prior to performance (see Kanthack et al., 2014). Penalty shoot-outs in soccer are usually preceded by a brief time period, where players can gather their thoughts prior to performance. Penalty kick performance can potentially have a significant effect on football clubs' annual turnover and future budgets. In light of this, such events remain both highly pressurised and financially significant.

Anxiety has been demonstrated to yield a particularly deleterious effect on penalty kick performance (Horikawa & Yagi, 2012; Wilson, Wood, & Vine, 2009; Wood & Wilson, 2011). Therefore, it is important to examine the influence of cognitive behavioural techniques in the reduction of anxiety and the possible enhancement of performance. Additionally, it is also of potential interest to football clubs to examine the effects of brief intervention on performance, as this may be a more cost-effective method.

Although REBT has demonstrated promise in the enhancement of sport performance (Wood et al., 2016), this research was conducted with a singular athlete, thus prompting questions regarding the generalisability of the findings to other athletes in the field, and indeed the wider sporting community. Interestingly, as part of a wider analysis on psychological skills training in a group of 15 elite archers, REBT influenced a reduction in irrational beliefs and performance anxiety. However, REBT intervention was not shown to have an enhancing effect on sport performance (Dhillon, Arumugam, Kaur, & Gambhir, 2016).

However, this null finding may be explained by methodological error in the application of REBT. Up to five PST techniques were applied in hourly sessions (i.e. mental imagery; modified Jacobson's progressive relaxation technique; rational emotive behavior therapy; attention control techniques; positive self-talk; see Dhillon et al., 2016), thus it reasonable to assume that the potency of REBT may have been diluted, with the volume of information the athletes had to process in this time period. Therefore, it is prudent to examine the effects of sole REBT intervention on performance in a larger sample size, to assess its validity and generalisability.

Research aims

The primary aim of this study is to examine the efficacy of REBT intervention on penalty kick performance, as to extend the scant literature, which has previously denoted its potential sports performance enhancing qualities. An important aspect of this aim is to assess REBT'S influence on performance in relation to a conventional sports performance enhancing technique (i.e. motor imagery). Additionally, given that anxiety has been strongly implicated in the hindrance of sport performance, it is important to ascertain if REBT is an effective method of reducing pre-performance anxiety. According to REBT, the reduction of irrational beliefs and the promotion of rational beliefs is key to reducing anxiety. Thus, it is important to assess this process in the analysis of the overall REBT intervention. Secondly, this research seeks to add to the existing literature demonstrating the applicability of REBT in sporting settings. Thirdly, this experiment aims to assess the viability of implementing brief REBT interventions prior to performance.

Method

Participants

Participants were 16 ($N = 16$) undergraduate students currently enrolled in the National College of Ireland, in Dublin, Ireland. The sample was comprised of 15 males and 1 female, who ranged in age from 18 to 31 years, mean age (M) = 20.94 and standard deviation (SD) = 3.09. The 16 participants were gathered from an overall group of 26 individuals who were contacted and invited to participate.

Participants were randomly assigned to one of three groups. Two REBT intervention groups were comprised of ($n = 5$) and ($n = 5$) participants, while the MI intervention group was populated by ($n = 6$) participants. Additionally, descriptive analyses revealed that participants had an average competitive soccer participation experience of 11 years, mean experience (M) = 11.56 and standard deviation (SD) = 4.38, which ranged from 3 to 19 years.

Participants were conveniently sampled from the National College of Ireland's soccer team and from the general student population within the institution.

Measures

Soccer-Related Beliefs Scale

Irrational and rational beliefs were measured using a soccer content-specific variation of the Exam Beliefs Scale (EBS; Montgomery, David, Dilorenzo, & Schnur, 2007).

The EBS is an 8-item scale that was constructed to measure specific exam-related irrational beliefs, derived from the Attitude and Beliefs Scale II (ABS-II; DiGiuseppe, Leaf, Exner, & Robin, 1988), in accordance with guidelines from Walen, DiGiuseppe,

and Dryden's (1992) guide to rational-emotive therapy. The EBS has previously been demonstrated to be internally reliable with a Cronbach's alpha coefficient of .74.

The current scale, (i.e. Soccer-Related Beliefs Scale; SRBS) sought to closely adhere to the structure and content of the EBS. For example, statement one in the EBS ("I absolutely must get a good grade on this exam") was adjusted to ("I absolutely must perform well on the penalty kicks task today") in the SRBS. The SRBS is similarly an 8-item scale, with four statements measuring irrational beliefs; Demandingness (i.e. "I absolutely must perform well on the penalty kicks task today"); Catastrophizing (i.e. "It will be awful if I do not perform well on the penalty kicks task today"); Self-deprecation (i.e. "If I do not perform well on the penalty kicks task today, I am not a worthwhile football player"); Low-frustration tolerance (i.e. "If I do not perform well on the penalty kicks task today, I will not be able to handle it"); and four statements measuring rational beliefs; Non-demandingness (i.e. "I really want to perform well on the penalty kicks task today, but I do not absolutely have to"); Anti-catastrophizing (i.e. "It will be really bad if I do not perform well on the penalty kicks task today, but not awful"); Universal self-acceptance (i.e. "If I do not perform well on the penalty kicks task today, it is because I had an off day, it is not because I am a worthless football player"); High-frustration tolerance (i.e. "I could handle it if I do not perform well on the penalty kicks task today").

Participants were instructed to indicate the extent to which they agreed with each statement on a ten-point scale, ranging from 1 (strongly agree) to 10 (strongly disagree), and that scores in between 1 and 10 indicated milder preferences towards each statement. Contrary to the instruction of Montgomery and colleagues' (2007) to reverse score rational beliefs items and compute an over-all beliefs total, the SRBS scores irrational and rational beliefs independently. Independent construct scoring was

deemed prudent, due to the clarification in the REBT literature that irrational and rational beliefs exist as distinct psychological constructs, which may co-occur in response to an activating event (Dryden & David, 2008; Hyland et al., 2016; Hyland & Boduszek, 2012). Scores can range from 4 to 40 on each scale, with lower scores indicating stronger irrational and rational beliefs, and higher scores indicating weaker irrational and rational beliefs. The SRBS was utilized due to the diminished time constraints with regard to completion, which complements the application of brief interventions, and its applicability to specific event-beliefs. Reliability analysis for the SRBS revealed unsatisfactory internal reliability for pre-intervention irrational beliefs (.53) and rational beliefs (.62) scales. The irrational beliefs scale at post-intervention demonstrated satisfactory internal reliability (.70). However, the rational beliefs scale (.31) demonstrated low, unsatisfactory internal reliability.

Visual Analogue Scale-Anxiety

The Visual Analogue Scale-Anxiety (VAS-A; Hornblow & Kidson, 1976) was utilized to measure anxiety. The VAS (Aitken, 1969) is a single-item scale that has been commonly administered in research as a psychological measurement of subjective phenomena such as depression, fatigue, quality of life, panic, pain and worry, in a valid and reliable manner (Hasson & Arnetz, 2005). Conventionally, the VAS is presented as a 10cm horizontal line, with each end punctuated by opposing statements. In the current research, the VAS-A was polarized by (“Not anxious at all” i.e. 0cm) and (“Extremely anxious” i.e. 10 cm).

Participants were instructed to mark the point along the 10cm line which they felt accurately described their current subjective feeling of anxiety. These indications were then transformed into quantitative variables to be utilized in statistical analysis.

Higher scores indicate higher subjective perceptions of anxiety and lower scores indicate reduced perceptions of anxiety. The VAS-A has been demonstrated to be a valid and reliable measure of anxiety, with a Cronbach's Alpha of .97 and a 69% weighted Kappa, in agreement with the Modified Dental Anxiety Scale (MDAS), a validated predictor of anxiety in clinical settings (Appukuttan, Vinayagavel, & Tadepalli, 2014).

Soccer performance

Soccer performance was measured using penalty kicks as a quantitative dependent variable. Two miniature soccer goals (Dimensions: Length: 74; Depth: 46; Height: 60) were positioned 16 feet apart. A marker was positioned 20 feet from the centre of the distance between the goals, as the designated point from which penalty kicks had to be executed. Each participant was instructed to execute an identical number of penalty kicks (i.e. 10 pre and 10 post-intervention). Equal penalty attempts allowed for counterbalancing of possible practice effects across both groups, and to reveal a quantitative average of soccer performance. Performance was measured on a scale of 0 to 10. Higher scores indicate superior soccer performance, with lower scores indicating lesser soccer performance.

Design

The current study adopted a quantitative quasi-experimental design. Participants were randomly assigned to either REBT or motor imagery intervention groups, so as to minimise possible initial differences in irrational and rational beliefs, levels of anxiety, and soccer ability. These two independent variables were manipulated through random assignment, to examine the influence on four dependent variables (i.e. irrational beliefs; rational beliefs; anxiety levels; soccer performance). Moreover,

all variables were measured within a mixed design (i.e. within and between groups), firstly to examine REBT's influence on each dependent variable, and secondly, to investigate its efficacy in comparison to a conventional sport's performance enhancing cognitive technique. Full control of conditions could not be obtained, due to the differing numbers of the crowds gathered at the different time-points across both groups.

Procedure

Prior to study commencement, informed consent was obtained via verbal and written methods. Additionally, participants were vetted to obtain confirmation of their physical and medical eligibility to engage in physical activity. See appendices for full details.

Participants in the REBT group were instructed to complete the SRBS in the intervention area. This was deemed prudent to allow each individual to process the information in the SRBS and examine their cognitions in silence.

Subjects were then escorted to the testing facility, which was located in the Students' Union (SU) area in the National College of Ireland (NCI). The SU area in NCI is a large open space where students congregate and utilize a number of recreational facilities. On the day of testing, a billiards and *FIFA* (a virtual soccer competition played on a gaming console) competition were organised. Therefore, large crowds gathered sporadically throughout the day.

Immediately prior to the commencement of the group penalty kicks task, each participant was instructed to complete the VAS-A. Given the quick and unburdensome nature of this scale, the VAS-A was utilized immediately prior to the commencement of the penalty kicks task, in an attempt to accurately capture pre-

performance anxiety. This method was chosen as participants were in the competition area and in full view of the public; two factors demonstrated to increase anxiety (Yoshie et al., 2016). Each participant executed 10 penalty kicks in sequential order, according to the participant identification numbers they had been assigned.

The REBT intervention was an 8-minute session led by the researcher, following the completion of the first penalty kicks task. This consisted of a 4-minute video outlining the ABC model of REBT, and how to utilize it in applied settings. This video was immediately followed by written instruction on the successful endorsement of rational beliefs and their replacement of irrational beliefs. The initial process of SRBS, VAS-A, and penalty kick performance data collection was then followed. Upon completion, participants were debriefed.

Subjects in the MI group followed an identical methodological structure. The MI intervention was an 8-minute session which similarly consisted of two segments. The initial segment was a 4-minute video which depicted a professional soccer player successfully executing penalty kicks. The depiction of successful penalty kick execution was used in an attempt to allow for less skilful participants to imagine successful execution. This is in accordance with Bandura's ideal comparison component of social learning theory (Bandura, 1990; Kanthack et al., 2014).

Upon completion of the video, participants were instructed, through written format, as follows: "With your eyes closed, try to imagine the entire penalty kick. Imagine the body movements involved, the mechanical image of the leg and foot, from the initial movements, to the leg and foot travelling through the ball in a smooth fashion. Imagine the trajectory of the ball successfully travelling into the net".

Statistical analysis

Upon inspection of the descriptive statistics, a number of violations of the assumptions of normality were detected within the data set. Therefore, it was deemed prudent to analyse the data using non-parametric statistical analyses, as per Gravetter and Wallnau's (2012) and Peat's (2001) instructions regarding non-normally distributed data. Further analysis revealed initial noteworthy differences in mean pre-intervention scores between the groups on a number of dependent variables. It was deemed necessary to control for these initial differences, when examining the differences between the groups on the four post-intervention dependent variables, via the utilization of multiple analyses of covariance (ANCOVA). As there is no non-parametric alternative to the ANCOVA within the statistical package for social sciences (SPSS; Pallant, 2013), in the interest of consistency of reporting, it was deemed prudent to report the results of parametric tests examining the differences between time-points and groups.

Results

Descriptive statistics

Table 1 and Table 2 below display the descriptive analyses for irrational beliefs, including its four comprising cognitive constructs (i.e. demandingness; catastrophizing; low-frustration tolerance; self-deprecation); for rational beliefs and its four encompassing constructs (i.e. non-demandingness; anti-catastrophizing; high-frustration tolerance; universal self-acceptance); for anxiety and performance in both the REBT and MI intervention groups.

The descriptive data for the REBT-intervention group indicates moderate to moderately-strong initial endorsements of each irrational belief, with similar results observed regarding rational beliefs. Additionally, initial low anxiety and moderate soccer performance results were observed.

Post intervention scores revealed minimal to small increases in irrational beliefs, however, a small decrease in demandingness was indicated. Non-demandingness indicated no change in the mean score, following intervention. Anti-catastrophizing and universal self-acceptance were demonstrated to minimally increase. However, high-frustration tolerance was shown to minimally decrease. Anxiety and performance results both suggest small to minimal decreases in mean scores.

Mean scores for the MI intervention group suggest initial strong to weak endorsements of each irrational belief, and strong associations with each rational belief. Pre-intervention low anxiety and high soccer performance results were also observed.

Post MI intervention results indicate a minimal increase in demandingness and small to minimal reductions in catastrophizing, low-frustration tolerance and self-

deprecation. Additionally, moderate to small decreases in each rational belief were observed. Anxiety results were demonstrated to increase in post-intervention testing; whereas soccer performance means appeared to minimally reduce.

Each variable was also assessed to gather an understanding as to the normality of distribution amongst the scores, via histogram inspections for skewness and kurtosis, as per Tabachnick and Fidell's (2013) recommendations, and further examinations of Kolmogorov-Smirnov tests, normal probability plots, and boxplots.

A number of variables including, demandingness, self-deprecation, low-frustration tolerance, high-frustration tolerance, universal self-acceptance, low-frustration tolerance, anxiety, and soccer performance, at either pre or post-intervention time-points, appeared to violate the assumption of normality within the REBT cohort.

Additionally, analysis of normality within the MI cohort scores suggested non-normal distributions in non-demandingness, self-deprecation, high-frustration tolerance and soccer performance, at either pre or post-intervention time-points.

Table 1

Descriptive statistics for REBT pre and post-intervention continuous variables

REBT-group	<u>Pre</u>				<u>Post</u>		
Variable	<i>N</i>	Mean (95% Confidence Interval)	SD (Std Error Mean)	Range	Mean (95% Confidence Interval)	SD (Std Error Mean)	Range
Demandingness	10	4.60 (2.07-7.13)	3.53 (1.11)	1-10	5.90 (3.30-8.50)	3.63 (1.14)	1-10
Catastrophizing	10	6.40 (3.76-9.04)	3.68 (1.16)	1-10	5.20 (2.55-7.85)	3.70 (1.17)	1-10
LFT	10	6.40 (3.55-9.25)	3.97 (1.25)	1-10	6.00 (3.02-8.98)	4.16 (1.31)	1-10
Deprecation	10	6.90 (3.93-9.87)	4.14 (1.31)	1-10	6.30 (3.15-9.45)	4.39 (1.39)	1-10
Overall IRB's	10	24.30 (16.69-31.90)	10.63 (3.36)	5-37	23.40 (14.25-32.54)	12.78 (4.04)	4-40
Non-demandingness	10	4.80 (2.40-7.20)	3.36 (1.06)	1-10	4.80 (2.65-6.95)	3.01 (.95)	1-10
Anti-catastrophizing	10	5.60 (3.46-7.74)	2.98 (.94)	1-10	5.20 (3.13-7.27)	2.89 (.91)	1-9
HFT	10	5.10 (1.98-8.22)	4.35 (1.37)	1-10	5.50 (2.35-8.65)	4.40 (1.39)	1-10
USA	10	4.90 (2.73-7.07)	3.03 (.96)	1-9	4.20 (1.59-6.81)	3.64 (1.15)	1-10
Overall RB's	10	20.40 (14.26-26.53)	8.57 (2.71)	9-35	19.70 (13.59-25.80)	8.53 (2.70)	7-35
Anxiety	10	2.10 (.45-3.74)	2.29 (.72)	.0-5.9	.75 (.17-1.32)	.80 (.25)	.0-2.1
Performance	10	6.60 (5.83-7.37)	1.07 (.34)	5-9	6.00 (4.65-7.35)	1.88 (.59)	3-10

Note: LFT = Low frustration tolerance; IRB = Irrational beliefs; HFT = High frustration tolerance; USA = Universal self-acceptance; RB = Rational beliefs

Table 2

Descriptive statistics for motor imagery pre and post-intervention continuous variables

MI-group	<u>Pre</u>				<u>Post</u>		
	Variable	<i>N</i>	Mean (95% Confidence Interval)	SD (Std Error Mean)	Range	Mean (95% Confidence Interval)	SD (Std Error Mean)
Demandingness	6	3.33 (1.27-5.40)	1.96 (.80)	2-7	2.50 (.04-4.96)	2.34 (.95)	1-7
Catastrophizing	6	3.67 (.72-6.61)	2.80 (1.14)	1-8	4.17 (.76-7.58)	3.25 (1.32)	1-9
LFT	6	7.67 (3.99-11.34)	3.50 (1.43)	1-10	8.33 (5.97-10.70)	2.25 (.91)	5-10
Deprecation	6	8.00 (4.30-11.70)	3.52 (1.43)	1-10	9.33 (7.62-11.05)	1.63 (.66)	6-10
Overall IRB's	6	22.66 (15.34-29.98)	6.97 (2.84)	10-30	24.33 (17.57)	6.43 (2.62)	17-33
Non-demandingness	6	2.17 (.02-4.31)	2.04 (.83)	1-6	4.83 (1.62-8.05)	3.06 (1.24)	1-10
Anti-catastrophizing	6	3.83 (1.80-5.87)	1.94 (.79)	2-7	5.33 (1.72-8.95)	3.44 (1.40)	2-10
HFT	6	2.83 (-.89-6.55)	3.54 (1.44)	1-10	3.33 (-.52-7.18)	3.67 (1.49)	1-9
USA	6	3.33 (1.17-5.50)	2.06 (.84)	1-7	3.17 (1.02-5.31)	2.04 (.83)	1-6
Overall RB's	6	12.16 (4.50-19.83)	7.30 (2.98)	7-26	16.66 (10.27-23.05)	6.08 (2.48)	9-26
Anxiety	6	1.76 (-.25-3.79)	1.92 (.78)	.1-4.9	2.05 (-.14-4.24)	2.09 (.85)	.1-5.0
Performance	6	8.50 (5.63-11.37)	2.73 (1.11)	3-10	8.00 (7.34-8.66)	.63 (.25)	7-9

Note: LFT = Low frustration tolerance; IRB = Irrational beliefs; HFT = High frustration tolerance; USA = Universal self-acceptance; RB = Rational beliefs

Inferential statistics

As previously discussed, initial statistical analyses consisted of non-parametric statistical testing, due to the non-normal distribution of scores observed in a number of variables. However, although not significant, noteworthy discrepancies were observed between the groups on scores of demandingness, catastrophizing, non-demandingness, anti-catastrophizing, high-frustration tolerance, universal self-acceptance, overall rational beliefs and soccer performance. Due to these discrepancies, it was deemed prudent to conduct an analysis of covariance (ANCOVA) to control for these initial differences when examining intervention distinctions on each dependent variable. As there is no non-parametric alternative to the ANCOVA within SPSS (Pallant, 2013), it was necessary to conduct parametric mean comparisons, in the interest of consistent result reporting. Moreover, the decision to report parametric results was further informed by comparisons between non-parametric and parametric outputs, which revealed similar findings.

Intervention effects

Multiple paired samples t-tests were conducted to examine the differences between mean scores for each irrational belief, overall irrational beliefs, each rational belief, overall rational beliefs, anxiety, and soccer performance for both the REBT and motor imagery intervention groups. Results for these tests are presented in Table 3 and Table 4.

REBT intervention

There was a non-significant decrease in demandingness scores from pre ($M = 4.60$, $SD = 3.53$) to post-intervention ($M = 5.90$, $SD = 3.63$), $t(9) = -1.43$, $p > .05$ (two-tailed). The mean decrease in demandingness scores was -1.30 (95% confidence

interval ranging from -3.53 to .75). However, the eta squared statistic (.18) indicated a large effect size.

There was also a non-significant increase in catastrophizing scores from pre ($M = 6.40$, $SD = 3.68$) to post-intervention ($M = 5.20$, $SD = 3.70$), $t(9) = 1.20$, $p > .05$ (two-tailed). The mean increase in catastrophizing scores was 1.20 (95% confidence interval ranging from -1.05 to 3.45). However, the eta squared statistic (.13) indicated a medium to large effect size.

There was a significant decrease in anxiety scores from pre ($M = 2.10$, $SD = 2.29$) to post-intervention ($M = .75$, $SD = .80$), $t(9) = 2.58$, $p < .05$ (two-tailed). The mean decrease in anxiety scores was 1.35 (95% confidence interval ranging from .16 to 2.53). The eta squared statistic (.42) indicated a large effect size.

Additionally, there was also a non-significant decrease in soccer performance scores from pre ($M = 6.60$, $SD = 1.07$) to post-intervention ($M = 6.00$, $SD = 1.88$), $t(9) = 1.15$, $p > .05$ (two-tailed). The mean decrease in soccer performance scores was .60 (95% confidence interval ranging from -.57 to 1.77). The eta squared statistic (.12) indicated a large effect size.

Table 3

Differences in dependent variables between pre and post REBT intervention

Variable	<i>N</i>	Pre		Post		<i>t</i>	η^2
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Demandingness	10	4.60	3.53	5.90	3.63	-1.43	.18
Catastrophizing	10	6.40	3.68	5.20	3.70	1.20	.13
LFT	10	6.40	3.97	6.00	4.16	.71	.05
Deprecation	10	6.90	4.14	6.30	4.39	.59	.03
Overall IRB's	10	24.30	10.63	23.40	12.78	.37	.01
Non-demandingness	10	4.80	3.36	4.80	3.01	.00	.00
Anti-catastrophizing	10	5.60	2.98	5.20	2.89	.55	.03
HFT	10	5.10	4.35	5.50	4.40	-.32	.01
USA	10	4.90	3.03	4.20	3.64	.57	.03
Overall RB's	10	20.40	8.57	19.70	8.53	.27	.007
Anxiety	10	2.10	2.29	.75	.80	2.58*	.42
Performance	10	6.60	1.07	6.00	1.88	1.15	.12

Note: LFT = Low frustration tolerance; IRB = Irrational beliefs; HFT = High frustration tolerance; USA = Universal social acceptance; RB = Rational beliefs; η^2 = eta squared; Statistical significance: * $p < .05$

Motor Imagery intervention

There was a significant increase in demandingness scores from pre ($M = 3.33$, $SD = 1.96$) to post-intervention ($M = 2.50$, $SD = 2.34$), $t(5) = 2.71$, $p < .05$ (two-tailed). The mean increase in demandingness scores was .83 (95% confidence interval ranging from .04 to 1.62). The eta squared statistic (.59) indicated a large effect size.

There was a non-significant decrease in non-demandingness scores from pre ($M = 2.17$, $SD = 2.04$) to post-intervention ($M = 4.83$, $SD = 3.06$), $t(5) = -1.83$, $p > .05$ (two-tailed). The mean decrease in non-demandingness scores was -2.66 (95% confidence interval ranging from - 6.40 to 1.06). However, the eta squared statistic (.40) indicated a large effect size.

There was also a non-significant decrease in anti-catastrophizing scores from pre ($M = 3.83$, $SD = 1.94$) to post-intervention ($M = 5.33$, $SD = 3.44$), $t(5) = -1.28$, $p > .05$ (two-tailed). The mean decrease in anti-catastrophizing scores was -1.50 (95% confidence interval ranging from - 4.52 to 1.52). However, the eta squared statistic (.24) indicated a large effect size.

There was also a non-significant increase in anxiety scores from pre ($M = 1.76$, $SD = 1.92$) to post-intervention ($M = 2.05$, $SD = 2.09$), $t(5) = -.34$, $p > .05$ (two-tailed). The mean increase in anxiety scores was -.28 (95% confidence interval ranging from -2.40 to 1.83). The eta squared statistic (.02) indicated a small effect size.

There was also a non-significant decrease in soccer performance scores from pre ($M = 8.50$, $SD = 2.73$) to post-intervention ($M = 8.00$, $SD = .63$), $t(5) = .45$, $p > .05$ (two-tailed). The mean increase in anxiety scores was .50 (95% confidence interval ranging from -2.37 to 3.37). The eta squared statistic (.03) indicated a small effect size.

Table 4

Differences in dependent variables between pre and post Motor Imagery intervention

Variable	<i>N</i>	Pre		Post		<i>t</i>	η^2
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Demandingness	6	3.33	1.96	2.50	2.34	2.71*	.59
Catastrophizing	6	3.67	2.80	4.17	3.25	-.32	.01
LFT	6	7.67	3.50	8.33	2.25	.44	.03
Deprecation	6	8.00	3.52	9.33	1.63	.84	.12
Overall IRB's	6	22.66	6.97	24.33	6.43	-.37	.02
Non-demandingness	6	2.17	2.04	4.83	3.06	-1.84	.40
Anti-catastrophizing	6	3.83	1.94	5.33	3.44	-1.28	.24
HFT	6	2.83	3.54	3.33	3.67	-.22	.007
USA	6	3.33	2.06	3.17	2.04	.54	.05
Overall RB's	6	12.16	7.30	16.66	6.08	-1.54	.32
Anxiety	6	1.76	1.92	2.05	2.09	-.34	.02
Performance	6	8.50	2.73	8.00	.63	.45	.03

Note: LFT = Low frustration tolerance; IRB = Irrational beliefs; HFT = High frustration tolerance; USA = Universal social acceptance; RB = Rational beliefs; η^2 = eta squared; Statistical significance: * $p < .05$

Pre-intervention dependent variables analysis

Multiple independent samples t-tests were conducted to determine if initial differences existed between the groups on mean scores of each irrational belief, overall irrational beliefs, each rational belief, overall rational beliefs, anxiety, and soccer performance, prior to intervention.

Although non-significant, initial differences were observed in scores of catastrophizing, non-demandingness, anti-catastrophizing, high frustration tolerance, overall rational beliefs, and performance, prior to intervention. The eta squared statistics revealed medium to large effects sizes in these differences between the groups. See Table 5. Due to the initial differences observed, it was necessary to examine the efficacy of both interventions, when controlling for these discrepancies.

Table 5

Pre-intervention group differences in dependent variables

Variable	<i>N</i>	REBT		MI		<i>t</i>	η^2
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Demandingness	16	4.60	3.53	3.33	1.96	.92	.05
Catastrophizing	16	6.40	3.68	3.67	2.80	1.55	.14
LFT	16	6.40	3.97	7.67	3.50	-.64	.02
Deprecation	16	6.90	4.14	8.00	3.52	-.54	.02
Overall IRB's	16	24.30	10.63	22.66	6.97	.33	.00
Non-Demandingness	16	4.80	3.36	2.17	2.04	1.72	.17
Anti-Catastrophizing	16	5.60	2.98	3.83	1.94	1.28	.10
HFT	16	5.10	4.35	2.83	3.54	1.13	.08
USA	16	4.90	3.03	3.33	2.06	1.11	.08
Overall RB's	16	20.40	8.57	12.16	7.30	1.95	.21
Anxiety	16	2.10	2.29	1.76	1.92	.29	.005
Performance	16	6.60	1.07	8.50	2.73	1.98	.21

Note: LFT = Low frustration tolerance; IRB = Irrational beliefs; HFT = High frustration tolerance; USA = Universal social acceptance; RB = Rational beliefs; η^2 = eta squared; Statistical significance: **p* < .05

Intervention effect comparisons

Multiple one-way between groups analyses of covariance were conducted to examine the efficacy of cognitive interventions, to promote cognitive and emotional factors which influence sport performance. The independent variable was the intervention administered (i.e. REBT, MI), and the dependent variables were comprised of scores on irrational beliefs, rational beliefs, anxiety, and soccer performance. Participants' scores for each of the aforementioned dependent variables prior to intervention, were utilized as the covariates in the analyses.

Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement of the covariate. After adjusting for pre-intervention scores, there was no significant difference between the two intervention groups on post-intervention scores on demandingness, $F(1, 13) = 3.96$, $p > .05$, partial eta squared = .23. There was a strong relationship between the pre-intervention and post-intervention demandingness scores. This was indicated by a partial eta squared value of .52.

Additionally, for anxiety, preliminary checks were also conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement of the covariate. After adjusting for pre-intervention scores, there was a significant difference between the two intervention groups on post-intervention scores on anxiety, $F(1, 13) = 5.23$, $p < .05$, partial eta squared = .28. There was a strong relationship between the pre-intervention and post-intervention anxiety scores. This was indicated by a partial eta squared value of .32.

Table 6

Post-intervention group differences in dependent variables

Variable	<i>N</i>	REBT		MI		<i>F</i>	η^2
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Demandingness	16	5.90	3.63	2.50	2.34	3.96	.23
Catastrophizing	16	5.20	3.70	4.17	3.25	.06	.005
LFT	16	6.00	4.16	8.33	2.25	1.22	.08
Deprecation	16	6.30	4.39	9.33	1.63	2.31	.15
Overall IRB's	16	23.40	12.78	24.33	6.43	.21	.01
Non-demandingness	16	4.80	3.01	4.83	3.06	.33	.02
Anti-catastrophizing	16	5.20	2.89	5.33	3.44	1.10	.07
HFT	16	5.50	4.40	3.33	3.67	.34	.02
USA	16	4.20	3.64	3.17	2.04	.01	.001
Overall RB's	16	19.70	8.53	16.66	6.08	.06	.005
Anxiety	16	.75	.80	2.05	2.09	5.23*	.28
Performance	16	6.00	1.88	8.00	.63	3.06	.19

Note: LFT = Low frustration tolerance; IRB = Irrational beliefs; HFT = High frustration tolerance; USA = Universal social acceptance; RB = Rational beliefs; η^2 = partial eta squared; Statistical significance: **p* < .05

Discussion

Scant research depicts the efficacy of rational emotive behavioural therapy (REBT; Ellis, 1957) on sport performance (Wood et al., 2016). However, REBT has demonstrated efficacious promise in the possibility of reducing irrational cognitions and dysfunctional emotion, and facilitating improved performance in sporting contexts (Cunningham & Tuner, 2016; Turner, 2016; Turner & Barker, 2013; Turner & Barker, 2014; Turner, 2016; Turner, Slater, & Barker, 2014). Thus, this study wished to preliminarily investigate the facilitative role of REBT on performance in a soccer context, under the scrutiny of quasi-experimental examination.

The primary aim of the current research was to investigate the potential effects of REBT intervention on penalty kick performance, in a bid to expand on previous aforementioned research, which denoted the efficacious influence of the cognitive-behavioural technique on sport performance. REBT's influence on performance has previously been demonstrated to be mediated by reductions in irrational cognitions and anxiety (Wood et al., 2016). Thus a key element of the primary aim was to map this pathway across pre and post-intervention time-points. Moreover, an additional key aspect of this investigation was to examine REBT's influence in comparison to a conventional sports performance enhancing technique (i.e. motor imagery).

Secondarily, this study sought to further add to the limited but growing literature which has supported the applicability of REBT as a sports psychological technique.

Thirdly, this quasi-experiment aimed to examine the viability of brief REBT intervention prior to competition.

The results indicated that brief REBT intervention did not enhance penalty kick performance. Indeed, Table 3 depicts a minimal reduction in performance from pre to

post intervention scores. The present findings are not consistent with previous research, which has demonstrated improvement in archery performance following REBT intervention (Wood et al., 2016). Moreover, REBT intervention appears to have had somewhat of a counter-effect on performance, when examining the strength of the reduction in performance, in comparison to MI intervention.

This perceived reduction in penalty kick accuracy may be perhaps greater understood when examined in the context of the broader sports performance literature. Anxiety has been demonstrated to facilitate performance when controlled to an optimal level, which is considered the mid-point between low and high levels of arousal (Cheng et al., 2011; Edwards & Hardy, 1996; Woodman & Hardy, 2003). However, inspection of the mean score prior to REBT intervention revealed initial low levels of anxiety. REBT intervention can be suggested to have influenced a strong reduction in anxiety levels, upon inspection of the statistical analysis. This meaningful reduction to pre-existing low levels of anxiety may have had a counter-influence to the desired effect of the intervention. Pre-performance somatic anxiety can be considered as a regular occurrence in many sports, which some athletes perceive as adaptive and necessary (Jones et al., 2009; Martens, Vealey, & Burton, 1990; Turner & Barker, 2013).

Indeed, leading models within the domain of sport psychology, such as the three-dimensional model of performance anxiety and the theory of challenge and threat in athletes, are premised on the assertion that irrational cognitions can engender debilitating high levels of anxiety, prior to competition (Cheng et al., 2011; Jones et al., 2009). Thus it can be argued that the proposed benefits of REBT intervention on sport performance are somewhat dependent on higher levels of anxiety, as opposed to those observed in the current REBT group. In light of this, it appears that

administering REBT to individuals who display low-levels of state anxiety may actually inhibit performance, rather than improve it.

This notion of selective application is consistent with previous research which investigated the cognitive-behavioural technique in sporting settings. Indeed, prior studies conducted initial interviews to assess individual athletes' levels of irrational beliefs before administering REBT intervention, with a selection criteria partly comprised of initial strong irrational beliefs (Turner et al., 2014; Turner et al., 2013). The salience of failure, to participants within the REBT cohort in the current study, was not an ecologically valid representation of an important sporting event. This is perhaps evident upon inspection of pre and post-mean scores on catastrophizing, low-frustration tolerance and self-deprecation. In comparison, catastrophizing, low-frustration tolerance and self-downing were high prior to important sporting events, within semi-professional and professional cohorts, in previous studies (Cunningham & Turner, 2016; Tuner & Barker, 2013; Turner et al., 2014). Therefore, the cognitive-behavioural intervention may not have been afforded the necessary scope to enhance performance.

This is not to say that REBT intervention is not necessary, nor potentially effective within the domain of soccer. To the contrary, results suggest that REBT intervention, although not statistically significant, strongly influenced reductions in demandingness; the core irrational belief within the cognitive-behavioural model (Ellis & Dryden, 1997). This inference can be reasonably assumed, when inspecting the magnitude of the difference between pre and post-intervention mean scores. Moreover, this reduction in the irrational demand for success was in contrast to a post-intervention increase in demandingness scores of the MI group, and similarly appears meaningful when examining the strength of the difference. These findings are

consistent with the extant literature, which has demonstrated demand for success to be the foremost irrational belief within the soccer context (Harwood et al., 2010). Indeed, Turner and colleagues (2014) similarly displayed a meaningful reduction in this particular irrational cognition following REBT intervention. The efficacy of positively manipulating rigid demands for success in reducing anxiety has also previously been successfully demonstrated, in a population of elite youth cricketers (Turner & Barker, 2013). The current findings bolster the existing literature in that, as of March 2017, this is the only study to display REBT's efficacy in altering irrational demands for success and subsequently reducing anxiety, in comparison to an active control intervention. Furthermore, the data suggest that brief REBT intervention may be potentially effective, if utilized on a needs analysis basis.

However, an increase in catastrophizing was also observed from pre to post-intervention scores within the REBT group, which is incongruent with the conventional literature and the theory as a whole (Dryden 2009; Dryden & Branch, 2008). Previous research has indicated an indirect effect of demandingness cognitions on anxiety, via the mediation of secondary beliefs, such as catastrophizing, following REBT intervention (Hyland et al., 2014). Thus it appears the mechanisms through which anxiety was reduced in the current study, did not occur within the conventional parameters of REBT theory.

Previous research has implemented REBT intervention across far greater time periods, which perhaps allowed for this mediatory relationship to develop (Cunningham & Turner, 2016; Turner & Barker, 2013; Turner et al., 2014; Wood et al., 2016). Indeed, a conventional requirement of this treatment is to frequently practise this mediatory relationship over extended periods of time (i.e. "I would like to win, but it is not awful if I do not"; Ellis & Dryden, 1997). It is possible that, in

brief time periods, individuals may encounter difficulties in fully incorporating the entirety of the intervention. Turner and colleagues (2014) have previously recommended that REBT be implemented over a time-scale of 5-12 sessions, so that athletes may comprehend, practise and solidify its principles and disputation process. Although difficult to assert with any great certainty, given the exploratory nature of this study, perhaps in this instance demandingness may have had a direct effect on levels of anxiety. It is reasonable to suggest that the mediatory relationship between secondary beliefs and demandingness on emotion regulation, was not afforded sufficient time to mature. Additionally, upon examination of the data, it appears that the reduction of primary irrational demands may have yielded a greater influence on levels of anxiety than the secondary catastrophizing belief.

Further scrutiny of the results depicts a lack of meaningful change in rational beliefs from pre to post-intervention, which potentially supports this hypothesis of REBT having reduced levels of anxiety, through unconventional methods. See Table 3. REBT theory seeks to simultaneously reduce irrational, and promote rational, beliefs (Ellis & Dryden, 1997). Indeed, previous research implementing this cognitive-behavioural technique yielded increases in rational cognitions, following intervention (Turner & Barker, 2013; Turner et al., 2014; Wood et al., 2016). However, the current findings appear incongruent with this notion, as no change in the mean scores on non-demandingness were observed from pre to post-intervention. Although considered as an independent cognitive process, and therefore not inter-dependent on demandingness in the reduction of levels of anxiety (Dilerenzo et al., 2011; Hyland & Boduszek, 2012), the promotion of rational beliefs still remains a fundamental goal of REBT (Dryden, 2009). Thus, the lack of change in non-demandingness scores observed following the current intervention is a further notable inconsistency with the

conventional theoretical and empirical understanding of REBT theory (Dilerenzo et al., 2011; Dryden, 2009; Hyland et al., 2014).

The lack of meaningful increases in rational beliefs may be better understood when considered in a similar light to the previously discussed methodological limitations of the intervention time-scale. The incorporation of rational beliefs is considered particularly dependent on extended time scales and diligent application (Dryden & Neenan, 2015). This practice, according to Wood and colleagues (2016), facilitates a transition from an educational approach, to collaboration between practitioner and client, where the individual begins to formulate rational alternatives to dysfunctional cognitions of their own initiative. When interpreting the current findings in light of the methodology utilized, it can be suggested that participants were not afforded sufficient time to fully incorporate rational beliefs.

Additionally, the rational beliefs component of the SRBS revealed unsatisfactory internal reliability at pre and post-intervention time-points. In light of this, the incongruence observed between the current data and conventional REBT theory, may also be partially explained by measurement inconsistencies.

Implications

Although a minimal reduction in performance was observed, the data presented and discussed may have possible implications for the future application of REBT within the context of sport. It can be tentatively suggested that the application of REBT to individuals who display low pre-existing levels of anxiety, may actually have an inhibitory effect on performance. Thus, REBT practitioners should endeavour to apply a prior needs analysis before conducting proposed interventions. Moreover, the observed reductions in demandingness and anxiety may have additional implications

for future methods of sport psychological intervention. It has been conventionally understood, and it is still accurate, that REBT's effect on dysfunctional cognitions and emotion is best facilitated through longitudinal application, and frequent practise (Ellis & Dryden, 1997; Turner & Barker, 2013; Wood et al., 2016). However, in situations where resources are limited, the results suggest that short-term application of REBT may perhaps be of benefit to athletes displaying high rigid demands for success, and possibly reduce levels of anxiety.

Additionally, the current findings could perhaps inform future research. To accurately capture the effects of REBT on sports performance, it may be prudent to select professional athletes who have previously demonstrated high sport-related irrational beliefs and levels of anxiety (Cunningham & Turner, 2016; Wood et al., 2016). In this vein, future research could perhaps benefit by creating a more pressurised atmosphere, where there are consequences to performance (i.e. cost/ benefit), which has been previously demonstrated to influence irrational cognitions (Cunningham & Turner; Tuner & Barker, 2013; Turner et al., 2014; Wood et al., 2016).

Strengths and Limitations

This study was the first to examine the influence of REBT on performance, pre-performance anxiety and irrational/rational beliefs in a quasi-experimental manner, within the domain of sport. Indeed, the current findings similarly advance the literature, as previous research had examined the effect of REBT intervention on sport performance with a single athlete. Moreover, the presence of crowds throughout testing allowed for somewhat of a realistic atmosphere, and added a factor previously associated with the eliciting of pre-performance anxiety responses in competitors (Yoshie et al., 2016).

However, the methodology utilized was intended as an initial exploratory endeavour and not as a definitive answer regarding the impact of REBT intervention on performance, anxiety, and beliefs in sport. This paper should be examined in this context, and it is the author's intention that the narrative throughout allows for further discussion surrounding the efficacy of REBT within the domain of sport. Therefore, it is prudent to outline its limitations, so that similar studies may refine their methodologies to gain a more accurate understanding of the effects of REBT intervention.

A significant caveat worthy of mention is the limited sample size with which this study was conducted. Given the low population of the groups, the statistical analyses utilized were underpowered. Two consequences of this are distortions in statistical significance and effect size estimations. Thus, the findings presented herein should be interpreted within this context.

Furthermore, the present research is limited in its generalisability, due to the low numbers that populated the groups. To strongly support the generalisability of the current findings to the wider soccer, and indeed, general sporting communities, a greater quantity of participants are required. This is perhaps evident when examining the confidence intervals in mean changes on pre to post-intervention demandingness, catastrophizing and soccer performance scores. Moreover, given the nature of the sample (i.e. non-professional athletes), it is unclear whether the observed reductions in anxiety are applicable to professional soccer players, given the salience of performance to this cohort observed in previous research (i.e. Turner et al., 2014). Although methodological provisions were made to formulate a pressurised atmosphere, incorporating previously demonstrated anxiety inducing factors, it is

doubtful that this atmosphere is fully representative of professional settings, where the cost of under-performance is far greater (Tuner et al., 2014).

An additionally notable limitation of the current study is the parameters within which performance was measured. A conventional soccer goal dimensions are 24x8 feet, while the point from which a penalty kick is executed is positioned 36 feet from the centre of the goal-line. However, due to resource limitations, the current study measured penalty kick performance within the parameters of two miniature goals positioned 16 feet apart, with the designated point of penalty execution positioned 20 feet from the mid-point of the two goals.

Moreover, unlike an actual penalty shoot-out between opposing teams, there was no active competitor attempting to obstruct the ball from passing over the line in the present test. It was originally envisioned that, although not an authentic replication of the demands of a penalty shoot-out, a significant element of skill would be required to successfully execute each penalty kick. This is not to propose that there was little skill involved in each penalty kick, however. It is entirely possible that the inclusion of the aforementioned methodological limitations may have perhaps elicited greater levels of pre-performance anxiety. Thus, with these inclusions REBT intervention may have been afforded greater scope within which to wield a more meaningful effect on performance.

The domain in which testing was conducted, although it may be partially considered as a strength, possibly also limits this study. As other activities were sporadically attended simultaneously to each test throughout the day in the Students' Union area, differing quantities of spectators were present for each test. Thus, differing volume levels, speech content (i.e. positive/negative) and personal bonds with spectators

present, a factor previously demonstrated to increase irrational beliefs (Cunningham & Turner, 2016; Yoshie et al., 2016), may have confounded the results observed in both groups.

Future research

In light of the aforementioned methodological limitations, the current study proposes a number of possibilities for future research, in the hope that a greater understanding of REBT application in sport, and in particular its influence on performance, may be garnered. Future research should endeavour to examine the influence of REBT in more ecologically valid testing conditions. Although this may reduce control over extraneous variables, a more realistic setting may facilitate greater levels of anxiety and thus afford REBT greater scope to improve performance.

Given the inconsistencies with the current findings and conventional REBT theory and research, further research is warranted to examine the efficacy of short-term intervention in sport. The results suggest that REBT was efficacious in reducing levels of anxiety. Moreover this reduction was meaningful in comparison to motor imagery intervention. However, the cognitive mechanisms through which this occurred are open to criticism. Further contextualised in the light of the limited sample size, future studies should examine the interaction of primary and secondary beliefs on pre-performance anxiety in a larger sample.

Finally, soccer, and sport in general, is a multi-cultural collaboration and thus many professional teams are comprised of a broad range of cultures. Currently, little is known about the application of REBT in sporting contexts outside of the United Kingdom and Ireland. Future research should investigate its efficacy on sport

performance and reduction of pre-performance anxiety in the wider global community.

Conclusion

In conclusion, this paper contributes to the extant REBT literature as it was the first to investigate the influence of the cognitive-behavioural technique on sport performance in a quasi-experimental manner. In addition, this study also advances the literature, as it extends the research of REBT on sport performance beyond a sole case study. The results suggested that performance was not benefited by REBT intervention. To the contrary, it was proposed within, that administering REBT to athletes who display low levels of anxiety may have a counter effect on performance. The intervention was demonstrated to wield meaningful reductions in anxiety, in a cohort displaying low levels of pre-performance anxiety. This remained meaningful in comparison to motor imagery intervention. REBT was suggested to reduce the primary irrational belief of demandingness from pre to post-intervention and in comparison to MI intervention. However, the data also suggests little positive influence was exerted on secondary irrational beliefs and rational beliefs. Thus, although successful in reducing anxiety, the cognitive mechanisms through which this occurred were not congruent with conventional REBT theory and research.

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Appendices

Appendix A

Sport-Related Beliefs scale

Indicate by answering the following questions how true each of these statements is in relation to your sports beliefs.

Answers are scored on a scale of 1-10, a score of 1 indicates that you strongly agree with a statement, whereas a score of 10 indicates that you strongly disagree. Scores in between 1-10 indicate milder preferences towards each statement.

1. I absolutely must get a score on my putting average today.
2. I really want to get a good score on my putting average, but I do not absolutely have to.
3. It will be awful if I do not get a good score on my putting average today.
4. It will be really bad if I do not get a good score on my putting average, but not awful.
5. If I do not get a good score on my putting average today, I am not worthwhile.
6. If I do not get a good score on my putting average today, it is because I had an off day, not because I am worthless.
7. If I do not get a good score on my putting average today, I will not be able to stand it.
8. I could stand it if I do not get a good score on my putting average today.

Appendix B

Information sheet

Research topic: Does rationalising our thoughts improve sport performance

Researcher: David Murphy, Student researcher, **Contact:** davemurphy770@gmail.com or 0852713525.

Supervisor Dr Philip Hyland; Contact: Philip.hyland@ncirl.ie

Background and purpose of study

In my research I am interested in testing how rationalising one's thoughts in relation to sport may improve sport performance. Rationalising one's thoughts has been shown to reduce anxiety in clinical settings. Therefore, I would like to examine if this is the case in relation to sport and if this reduction in anxiety could possibly improve performance. Also, this study will include a visualisation intervention (which has been shown to improve performance in sport). I am interested in viewing whether rationalising one's thoughts is as effective in improving sports performance as visualisation. I am doing this research as part of my final year thesis in the National College of Ireland (NCI) under the supervision of Dr xxxxx, whose contact details are above.

Estimated time of participation

The overall time envisioned for research participation is approximately 70 minutes

What happens if I agree to participate?

You will be asked to attend NCI on a specific date and time. I will then distribute forms asking for your written consent to participate in the study, including a health assessment waiver, to determine if you're fit to engage in physical exercise. I will then randomly assign each individual into one of three groups:

Thought rationalising group, Visualisation group and Control group. Each participant will then be asked to complete a questionnaire regarding their beliefs about sport competition and take ten putts on an artificial golf green. Groups will then be asked to enter separate rooms for either a discussion on rationalising one's thoughts regarding sport performance, visualisation practice or to watch a short golf related video. Following this, you will be asked to take another ten putts. Upon conclusion of participation, each participant group will be debriefed regarding the implications of irrational beliefs in their daily lives. If you decide at any point that you do not wish to continue in the study, it is your right to leave without an explanation.

Participant's rights

You have the right to discontinue participation at any point in the study; it is your right to leave without an explanation. You have the right to request that any data that you have supplied up to this point be destroyed.

You have the right to refuse to answer any question that you do not wish to answer. You have the right to have any questions regarding research procedure answered by the researcher. If you have any queries after reading this information sheet you should ask the researcher before the study begins.

Benefits/Risks of participation

Participation in this study involves the completion of standardised measures regarding irrational beliefs in sport. Irrational beliefs are measured in some clinical settings in an attempt to assess the underlying psychological constructs of dysfunctional emotion, i.e. anxiety and depression, of which you may be aware. Scores on these measures are not a sufficient basis for clinical intervention or diagnosis, and are not used in this study for diagnostic purposes. High scores in these measures might suggest mental health problems that some individuals would perhaps like to discuss with a mental health practitioner. However, it must be noted that these evaluations of irrational beliefs are cross-sectional in nature, i.e. one point in time and therefore do little to tell us about an individual's overall beliefs.

What will happen to the results of the study?

The information gathered in this study will tell us about how the beliefs we hold regarding sport competition impact on our performance. Hopefully these results will allow sports psychologists to improve the performance of athletes around the world. The findings of this study could be potentially published online via the National College of Ireland website. No information that you provide will be identifiable in this publication.

Confidentiality/Anonymity

All the information you provide during this study will remain confidential. You will be given an identification number at the beginning of testing and all the information you provide after this will be assigned to this ID number. Information provided during this study will remain in a secure location in NCI for a period of five years after which all information will be destroyed appropriately. The information gathered in this study may be published in various academic sources and presented in presentation. However, at all times, strict anonymity of participants will be upheld.

Consent

On the day of testing you will be asked to read the information provided on this notice and indicate through your signature that you would like to participate in this study, and that you understand the implications of participation. It is important that you sign this form if you wish to participate in this study, as you will not be able to do so without written consent.

Appendix C

Informed consent form

Project title

A quasi-experimental investigation into the efficacy of rational emotive behaviour therapy (REBT) in the enhancement of sport performance

Project summary

This study will begin with randomly assigning each individual into one of three groups: Thought rationalising group, Visualisation group and Control group. Each participant will then be asked to complete a questionnaire regarding their beliefs about sport competition and take ten putts on an artificial golf green. Groups will then be asked to enter separate rooms for either a discussion on rationalising one's thoughts regarding sport performance, visualisation practice or to watch a short golf related video. Following this, you will be asked to take another ten putts. Upon conclusion of participation, each participant group will be debriefed regarding the implications of irrational beliefs in their daily lives. If you decide at any point that you do not wish to continue in the study, it is your right to leave without an explanation.

By signing below, you are agreeing that: (1) you have read and understood the Participant Information Sheet, (2) questions about your participation in this study have been answered satisfactorily, (3) you are aware of the potential risks (if any), and (4) you are taking part in this research study voluntarily (without coercion).

.....

(Participant's name printed)

.....

.....

(Participant's signature)

(Date)

.....

.....

(Person obtaining consent)

(Signature of person)

Appendix D

Health screening form

Participant ID

Age.....

Sex.....

Please answer the following questions regarding your physical health.

Are you currently suffering from any of the following medical conditions?

- | | | |
|------------------------------------|-----|----|
| 1. Diabetes | YES | NO |
| 2. Asthma/respiratory illness | YES | NO |
| 3. High blood pressure | YES | NO |
| 4. Heart disease | YES | NO |
| 5. Epilepsy, fainting or dizziness | YES | NO |
| 6. Arthritis | YES | NO |
| 7. Neck or back pain | YES | NO |
| 8. Any muscle or joint pain | YES | NO |

Are you pregnant? YES NO

Has your doctor ever advised against any form of exercise? YES NO

If YES, please provide details:

.....
.....

REBT participation

Have you ever or are you currently participating in rational emotive behavioral therapy?

YES NO

Name:

Signature:

Date:

