The use of rational emotive behaviour therapy (REBT) to increase the self-determined motivation and psychological wellbeing of triathletes.

H. Davis., & M. J. Turner*

Submitted: 25th April 2019

Resubmitted: 19th July 2019

2nd resubmission: 28th August 2019

Accepted: 2nd September 2019

Sport, Exercise, and Performance Psychology

*corresponding author: School of Life Sciences and Education, Staffordshire University, Sport and Exercise Office, Brindley Building, Leek Road, Stoke on Trent, Staffordshire, ST4 2DF. Email: m.turner@staffs.ac.uk

Conflict of Interest: Martin J. Turner declares that he has no conflict of interest. Helen Davis declares that she has no conflict of interest.

Abstract

Rational Emotive Behaviour Therapy (REBT) and its relationship with self-determined motivation has received scant research attention despite growing interest in the motivational effects of REBT with athletes. Recent evidence suggests that reductions in irrational beliefs brought about by REBT may facilitate increases in self-determined motivation. The current study seeks to replicate and build this initial research using an idiographic single-case design to assess the effects of one-to-one REBT on the irrational beliefs, self-determined motivation, vitality, and sleep quality of four amateur triathletes. Self-report data were collected prior to, during, and after the REBT intervention. Visual analysis revealed that reductions in irrational beliefs were met with concomitant increases in self-determined motivation, vitality, and sleep quality. Social validation data supported the visual analysis findings. This current study supports and extends research by offering further advances in our understanding of the potential relationships between REBT, self-determined motivation, and athlete wellbeing.

Keywords: CBT; counselling; sport; mental health; case-study

The use of rational emotive behaviour therapy (REBT) to increase the self-determined motivation and psychological wellbeing of triathletes.

Endurance sports can consume vast amounts of leisure time in preparation and training among amateur participants. Each year thousands of athletes compete in events, tolerating physical and mental anguish for extended periods of time (Lamont & Kennelly, 2012). In their quest for desired performance outcomes, athlete's experience heavy training loads, competitive pressure, pain of defeat, and injury woes (Nixdorf, Frank, & Beckmann, 2016). The endurance sport of triathlon is at the centre of the current study. Triathlon is a multi-discipline sport comprising swimming, cycling, and running, performed consecutively in a single race. Triathlon has growth in Britain since it came to the country in 1983, with a 174% increase in United Kingdom Triathlon members since 2009, and an average of 580 people doing a triathlon per day in 2017 (British Triathlon, 2018). Training for a triathlon is very demanding and requires perseverance and adherence to a high commitment, due to the nature of training in three different sports (Bales, Bales, Deakon, & Johnson, 2012), high amount of sacrifice to deal with physical and psychological requirements of sport (Laursen, 2011), and personal commitment which can compromise social lives (Furst, Ferr, & Megginson, 1993; Mallett & Hanrahan, 2004). Many amateur triathletes study the approaches of pro-triathletes and mimic their training regimes but can be limited by athletic ability and other commitments, which can lead to overload and exhaustion (Dixon, 2019). As such, maintaining motivation in the face of adversity and being driven by the healthier and more functional motives is important for developing a successful athletic career (Galli & Vealey, 2008). Specifically, fostering self-determined motivation may help triathletes to maintain wellbeing and continue in their sport over longer period of time by reducing burnout and drop-out intention, and goal attainment (see Weiss & Ambrose, 2008, for a review).

The organismic integration theory (OIT; Ryan & Deci, 2000), that sits with the self-determination theory (SDT), considers that motivation can be classified along a linear continuum of self-determination. In OIT, motivation is classified within six main categories that fall on a continuum from intrinsic motivation (i.e., behaviour driven by internal rewards, such as satisfaction) to amotivation (i.e., lack of any motivation; Deci & Ryan, 1985). Along the continuum from less to more self-determined motivation, there are four extrinsic levels: external regulation, introjected regulation, identified regulation and integrated regulation. External regulation and introjected regulation are considered to be controlling (or less self-determined) motives, as opposed to autonomous (or more self-determined) motives captured by identified regulation and integrated regulation. External regulation and introjected regulation are considered to be controlling (or low self-determined) forms of motivation, and more controlled motives are associated with maladaptive outcomes including low levels of persistence, negative affect, and poor performance on heuristic activities (Deci & Ryan, 2008). In contrast, self-determined forms of motivation (intrinsic, integrated and identified regulation) have been found to be related to higher levels of effort, engagement, and task persistence and wellbeing (Deci & Ryan, 2000). Therefore, interventions that can help athletes to foster more self-determined types of motivation are valuable and worthy of scientific enquiry.

One approach that can help athletes overcome adversity and foster self-determined motivation, which is increasingly appearing in sport literature (see Turner, 2016 for a review), is rational emotive behaviour therapy (REBT; Ellis, 1957). REBT is the first cognitive-behavioural approach in psychological therapy and is an established form of psychological intervention supported across numerous diverse clinical and non-clinical populations (David, Lynn, & Ellis, 2010). In REBT irrational and rational beliefs are at the centre of emotional and behavioural functionality, and the theory and practice of REBT is

guided by an ABC framework (Dryden & Branch, 2008). The therapeutic process of REBT encourages individuals to understand that when facing adversity (A) it is their beliefs (B) about the adversity that directs their emotional and behavioural responses (C), not the adversity alone. In other words, it is not events (A) that directly cause emotions and behaviours (C), rather, it is one's beliefs (B) about the events that lead to emotional and behavioural reactivity. As such, an athlete's ability to respond to adversity adaptively is dependent on the mediating role of irrational and rational beliefs. In addition, there are four irrational beliefs – primary irrational beliefs (or demandingness), awfulizing, low frustration tolerance, and depreciation – that are extreme, rigid, illogical and four opposing rational beliefs -primary rational beliefs (or preferences), anti-awfulizing, high frustration tolerance, and unconditional acceptance – that are non-extreme, flexible, and logical. Irrational beliefs can lead to dysfunctional emotions, such as depression, and maladaptive behaviours (withdrawal), whereas rational beliefs lead to functional emotions (sadness) and adaptive behaviours (express feeling to others; Dryden & Branch, 2008). As such, a fundamental aim of REBT is to reduce irrational beliefs, and augment rational beliefs. To do this, the ABC framework is extended to an ABCDE framework whereby irrational beliefs are disputed (D) and alternative rational beliefs are encouraged with a view to promoting functional emotions (sadness) and adaptive behaviours (E).

Growing literature supports the application of REBT with athletes across a range of sports and levels, with some research indicating a positive effect on performance and wellbeing (e.g., Wood, Barker, & Turner, 2019). However, the mechanisms through which REBT may elicit enhanced performance and wellbeing are not well understood (Turner, 2019). Referring to the potential link between REBT and motivation, Turner (2016) suggested that one potential mechanism is motivation, which has received debate in literature (e.g., Turner, 2016). Specifically, Turner (2016) suggested that irrational beliefs may reflect

less self-determined types of motivation regulation with reference to OIT (Ryan & Deci, 2000), within SDT. Researchers have inferred that irrational beliefs could be related to introjected regulation (e.g., Turner, 2016; Van Wijhe, Peeters, & Schaufeli, 2013), that is where one has a perception that “I must” or “I have to” engage in an activity. The perception that one must or ought to engage in an activity is considered typical of introjected regulation (e.g., Gillison, Osborn, Standage, & Skevington, 2009). This language of “must” and “should” is common in REBT literature (Ellis & Dryden. 1997). In one study introjected regulation was positively related to expending more effort, but it was also related to feeling more anxiety and coping more poorly with failures (Ryan & Connell, 1989). In sport, greater self-determined types of motivation have been related to superior performance (Gillet, Berjot, & Gobance, 2009), persistence (Sarrazin, Vallerand, Guillet, Pelletier, & Curry, 2002), and greater wellbeing (Gagné, Ryan, & Bargmann, 2003). Therefore, as Turner (2016) postulated, it is possible that the similar language expressed in irrational beliefs and introjected regulation might be detrimental to affective and behavioural responding in athletes.

Only one study (Turner & Davis, 2018) has directly examined the relationship between irrational beliefs and self-determined motivation. Findings indicated that group-level REBT led to decreased irrational beliefs in amateur triathletes, and as irrational beliefs reduced, self-determined motivation increased. Whilst promising, Turner and Davis’ (2018) initial study contained some limitations including the use of an outdated self-report measurement for self-determined motivation, and the use of group-REBT instead of one-to-one REBT, which did not consider the idiosyncratic nature of how athletes responded to REBT. In addition, whilst it is interesting that self-determined motivation was increased as a result of REBT, the influence of this shift on the wellbeing of the athletes was not considered. Indeed, although research applying REBT in athletes is growing, very little of this research has focused on athlete wellbeing. This is despite evidence that irrational beliefs are a risk

factor for a vast array of outcomes relevant to mental health (Visla, Fluckinger, Grosse Holtforth, & David, 2015), and that in athlete samples, irrational beliefs are positively related to psychological distress (Turner, Aspin, & Gillman, 2019; Turner, Carrington, & Miller, 2019), and increased in burnout (Turner & Moore, 2016).

REBT is at its core a theory of human functioning (David, Szentagotai, Eva, & Macavei, 2005) and as such one of its aims is to promote wellbeing (Chen, 2006). Wellbeing has been challenging to define (Dodge, Daly, Huyton, & Sanders, 2012), but in the current study we subscribe to the idea that wellbeing in part constitutes perception of energy and vitality, with sleep being an important part of this (e.g., Schickler, 2005). Therefore, for the first time in sport research, we also examine the effects of REBT on self-reported vitality and sleep quality (wellbeing). Vitality is a positive feeling of aliveness and is functionally significant for human motivation and wellbeing (Ryan & Deci, 2008), and sleep is essential for emotional health (Nadler et al., 2003). There exists some evidence that REBT can enhance sleep quality (e.g., Newman, 2014), and a corpus of evidence linking REBT to improvements in wellbeing (see Turner, 2016, for a review). In addition, SDT research shows that the more autonomous a person's motivation, the greater their wellbeing (Ryan, 2009). Therefore, the present study explores the effects of REBT on self-determined motivation and wellbeing dimensions of vitality and sleep.

Chiefly, this study builds on the growing research evidence for the use of REBT with athletes, but also importantly addresses the dearth of literature regarding the self-determined motivation of triathletes (Grand'Maison, 2004) in which there is little consensus regarding which types of motivation are important (Lamont & Kennelly, 2012). Despite its increasing popularity triathlon has not been extensively studied (Dolan, Houston, & Martin, 2011). Researchers have suggested similar motivational profiles for both professional and amateur male and female triathletes with the exception of amotivation (López-Fernández, Merino-

Márban, & Fernández-Rodríguez, 2014), and that elite female triathletes report greater intrinsic motivation than extrinsic motivation (Waddle-Smith, 2010). In contrast, extrinsic motivation was more prevalent than intrinsic motivation in Lamont and Kennelly's (2012) study, which adopted an SDT framework. Therefore, an investigation into ways in which self-determined motivation can be promoted in triathletes may be valuable to those providing sport psychology services to triathletes. To this end, the current study seeks to extent the work of Turner and Davis (2018) by applying one-to-one REBT idiosyncratically, with a view to increasing the self-determined motivation and psychological wellbeing of amateur triathletes. The present study contributes to the increase of idiographic research approaches in sport and exercise psychology (Meredith, Dicks, Noel, & Wagstaff, 2018), a method encouraged by` scholars to seek improvements in scientific understanding to inform applied practice (Martens, 2007; Tenenbaum, Eklund, & Kamata 2012). This study also builds on the extant REBT literature by examining the use of REBT in facilitating athlete wellbeing, as marked by vitality and sleep quality. It is hypothesized that REBT will reduce irrational beliefs and increase self-determined motivation and wellbeing in four triathletes.

Method

Participants

The first author is a member of a large U.K. Triathlon club that provides specific training to more than 200 adult members, ranging from age groupers to fitness enthusiasts. As such, the triathletes recruited for the current study represented a convenience sample. Four triathlon club members (2 female, 2 male) between 32 and 53 years of age (M = 41.75, SD = 8.77) took part in the study. Club membership ranged between 6 months and 1.7 years (M = 1.6, SD = 1.05). Participants were selected from 45 members (28 male, 17 female) between 18 and 76 years old (M = 46.83, SD = 13.43). As part of a screening process for the study, participants were ranked according to their score in the irrational Performance Beliefs

Inventory (iPBI; Turner et al., 2018) and their self-determined motivation (index) scores. In line with recommendations based on norm levels of irrational beliefs amongst athletes (Turner & Allen, 2018), only respondents with high irrational performance beliefs (scores above 18 out of 35; *M* = 26.5, *SD* = 1.99) and low self-determination index scores (scores under 40; *M* = 25, *SD* = 10.42) were invited to participate in the study. Four participants were selected, who were all unknown to the researcher, and were available for the study. Participants were selected in order to facilitate the idiographic and detailed analysis of intervention effects whereby more could be learned by studying fewer participants (Normand, 2016). The university granted ethical approval, and participants completed informed consent prior to all data collection.

Design

The study employed an explanatory idiographic single-case design (e.g., Neil et al., 2013), where participants received a personalised and tailored intervention, across five one-to-one REBT sessions for each participant (Table 1). The personalisation and tailoring of each participant's intervention was reflected in the differing lengths and content of each session. This is in contrast to some past research (Turner & Barker, 2013) that standardised sessions across participants, unreflective the idiosyncrasies of using REBT with athletes. The use of an idiographic single-case design in the current study is important because accountability through intervention evaluation is one of the most essential issues underpinning professional practice (Barker, Mellalieu, McCarthy, Jones, & Moran, 2013). Single-case experimental designs are advantageous because they more readily permit the intensive investigation of each subject and data from just a few subjects tells a story (Normand, 2016). An idiographic single case research design can report the outcome of the intervention for each participant individually (e.g., Neil et al., 2013), allowing for a better understanding of interventions designed to improve performance and mental states (Voight,

2012) and can link existing theory in real-life situations (Willig, 2013). The idiographic approach enables independent variables to be manipulated within the context of carefully measured and repeatedly assessed dependent variables (Barlow & Nock, 2009); a method which is particularly useful for progress monitoring over the course of an intervention (Lyon et al., 2017). A member-checking interview was conducted, recorded and visually inspected to ensure that participants' own meanings and perspectives were represented (Birt, Scott, Cavers, Campbell, & Walter 2016; Tong, Sainsbury, & Craig, 2007).

Data were collected over a 20-week period from baseline through to post-intervention phases (see Table 2). Baseline data for all four participants revealed sufficient levels of irrational beliefs (*M* = 26.5, *SD* = 1.99; Turner et al., 2018) and low self-determination index scores (*M* = 25, *SD* = 10.42) to warrant an REBT intervention. The intensive study of participants over time, typical of idiographic studies, enables practitioners to tailor specific support to promote individual success (Barlow, Nock, & Hersen, 2008) however due to small sample size credibility of data should be viewed with caution (Anderson, Miles, Mahoney, & Robinson, 2002).

Measures

Irrational Beliefs. The iPBI (Turner et al., 2018) consists of 28-items measuring the four core irrational beliefs of REBT; demandingness (seven items), awfulizing (seven items), low frustration tolerance (seven items), and depreciation (seven items). Each item is rated on a 5-point Likert-scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicate stronger beliefs. The iPBI provides a context-specific measure of irrational beliefs in performance environments and has shown construct (alpha reliability between .90 and .96), concurrent (medium to large correlations reported) and predictive (small to medium correlations reported) validity (Turner & Allen, 2018). The iPBI has been used with triathletes in past research (e.g., Turner & Davis, 2018), and has a good factor structure

(RMSEA = .07; CFI = .93; NNFI = .92, SRMR = .06;), according to confirmatory factor analysis (Turner et al., 2018).

Motivation. The Sport Motivation Scale-II (SMS-II; Pelletier, Rocchi, Vallerand, Deci and Ryan, 2013) is an 18-item measurement instrument used to assess six types of behavioural regulations (amotivation, external regulation, interjected regulation, identified regulation, integrated regulation, and intrinsic motivation). Each item is rated on a 7-point Likert-scale ranging from 1 (*not true at all)* to 7 (*very true*). The SMSII has a good factor structure (RMSEA = .05; CFI = .93; TLI = .91), according to the confirmatory factor analysis and good Cronbach's alpha coefficients (from .70 to .88) as reported by Pelletier, Rocchi, Vallerand, Deci & Ryan, (2013). In sum, the SMS-II is a complete and valid instrument for sport motivation research (Viciana, Mayorga-Vega, Guijarro-Romero, Martinez-Baena, & Blanco, 2017). Using procedures outlined by Vallerand (2001), an index of self-determined motivation (SDI) was calculated by multiplying each subscale of the SMSII by an assigned weight in accordance with its location on the OIT (e.g., Gillet, Vallerand, Amoura, & Baldes, 2010). The product of scores is then summed to form a self-determination index (SDI), also known as a relative autonomy index (RAI), in which a higher score reflects greater self-determined (or autonomous) motivation. The SDI has been used previously in athlete samples (e.g., Hill, Curran, Hall, & Appleton, 2011) and has the advantage of reducing the number of variables included in data analyses, which is important for brevity of data reporting.

Vitality. Vitality was measured using the 6-item Subjective Vitality Scale (SVS; Ryan & Frederick, 1997), recommended by Bostic, Rubio and Hood (2000). Vitality is a positive feeling of aliveness and functionally significant for human motivation and wellbeing (Ryan & Deci, 2008). Vitality is salient to this study having been extensively validated and widely used in research on motivation and wellbeing (Kawabata, Yamazaki, Guo, & Chatzisarantis, 2017). The SVS requires athletes to respond to statements in relation to the

extent it applies to them and apply their life at the present time (e.g., “I feel alive and vital”). A single score is computed by averaging the respondents scores across the 6-items. Participants were asked to rate the extent to which they experienced vitality using a 7-point Likert-scale ranging from 1 (*not at all true*) to 7 (*very true*). The SVS has shown internal reliability with a Cronbach’s alpha value of .80 (Bostic et al., 2000).

Sleep. A shortened version (questions 1, 2, 3, 4, 6) of The Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989), was used to assess the weekly sleep habits of participants. The PSQI was selected for a variety of reasons. First, it is the most widely used sleep health assessment tool in both clinical and non-clinical populations. Second, the PSQI is considered to be “possibly the most rigorously validated tool used in sleep diagnostics” (Manzar et al., 2018). Finally, for the purposes of the current study it is a cost effective tool that is easy for athletes to complete and was easy for us to administrate. Responses were collected for difference between time spent in bed and time actually sleeping in hours and minutes. Participants also rated their sleep quality during the previous week using a scale of very good (vg), fairly good (fg), fairly bad (fb), and very bad (vb). The PSQI is the most commonly used sleep quality measure in clinical and research settings (Mollayeva et al., 2016) and can be shortened by reducing the number of questions (e.g., Famodu, et al., 2018).

Social Validation. On-line questionnaires and semi-structured member checking interviews were conducted at the end of the post-intervention time point to ascertain the participants’ perceptions and feelings of the intervention. Social validation data can also enhance researchers’ understanding of results and intervention efficacy (Page & Thelwell, 2013). Firstly, participants ($n = 4$) completed a 5-question self-report on-line questionnaire consisting of open ($n = 2$) and closed ($n = 3$) questions concerning perceived usefulness of the REBT sessions in relation to performance and wellbeing. Next, individual participant

member checking interviews were conducted and recorded to share data, explore credibility of results, and ensure that participants' own meanings and perspectives were represented (Birt, Scott, Cavers, Campbell, & Walter 2016; Tong, Sainsbury, & Craig, 2007).

Intervention procedure

The intervention was delivered by the first author who is a supervised trainee Sport and Exercise Psychologist registered with the British Psychological Society (BPS) Division of Sport and Exercise Psychology (DSEP) and accredited primary practitioner in REBT. Participants were educated in REBT following guidelines from previous literature (Ellis & Dryden, 1997; Turner & Barker, 2014) and attended five one to one sessions across the study, (M = 124.8 days). All sessions were recorded using a voice recording App (Audio Memos). Sessions were arranged on an individual basis, at a time and location convenient for the participant, with the aim of sessions being held weekly. Sessions were designed to be personal to the participant, going at their pace, supporting the idiosyncratic nature of the study, and were guided by the REBT ABCDE framework. The frequency of sessions was determined by participant need.

Broadly, the first session was designed to introduce the participant to the ABCDE framework of REBT. The therapeutic process of REBT (Dryden & Branch, 2008) encourages individuals to understand that when facing adversity (A) it is their beliefs (B) about the adversity that directs their emotional and behavioural responses (C), not the adversity alone. Here, participants practised using examples from their sporting histories to establish the A-C connection, were introduced to the four types of irrational beliefs and taught the B-C connection, the notion that the emotional problem is determined by beliefs at B rather than adversity at A. Once this ABC framework was understood, subsequent sessions focused on participants disputing or cognitively restructuring (D) their irrational beliefs and replacing them with rational alternatives (E). Here participants were given specific scenarios

on cards, they practiced disputing the belief using taught questioning methods. Next, participants were encouraged to develop and subsequently dispute rational beliefs using the scenarios given.

Following recommendations (Turner & Barker, 2014), the practitioners and participant collaboratively set homework (between sessions tasks) in order to help the participant to develop their REBT comprehension and competence. For example, completion of an ABC chart to establish A-C and B-C connection and identifying unhealthy negative emotions (adapted from Ellis & Dryden, 1997). Here, participants identified their beliefs and practiced using the ABCDE model independently. Participants 2 and 3 completed all homework, whereas participants 1 and 4 were more inconsistent, particularly near the latter stages of the study. If homework had not been completed by the participant, time in the next session was dedicated to discussing the importance of homework, and these tasks were completed during the session instead. After weekly sessions terminated, a month elapsed before social validation member checking interviews took place. Each participant completed on-line questionnaires and attended a member checking interview where visual representation of their individual data was shared giving the opportunity to explore reflection on personal experiences (Birt et al., 2016).

Analytic Strategy

Small changes in variables can lead to substantial differences for athletes in idiographic case study designs (Barker, McCarthy, Jones, & Moran, 2011) therefore data was tabulated (Table 2) for each participant and dependent variable, to determine whether intervention effects had occurred (e.g., Neil et al., 2013). This approach was used due to the exploratory nature of the study, in-line with similar studies (e.g., O'Connor, 2018) rather than statistical significance of the intervention effects on participant data (Hrycaiko & Martin, 1996). Visual inspection was conducted for all monitored variables for each participant,

including all irrational beliefs (demandingness, awfulizing, low-frustration tolerance, depreciation), the self-determination index, vitality, and sleep quality (see Table 2). This inspection occurred across five separate time points; baseline, post-first session (after one REBT session), midpoint (after 3 REBT sessions), post-final session (after five REBT sessions) and follow-up (one-month post-intervention). The visual analysis of data included four steps to determine intervention effectiveness; (a) immediacy of effect, (b) effects replicated across participants, (c) overlapping data points between baseline and follow-up, (d) magnitude of percentage change from baseline to follow-up phases (Hrycaiko & Martin, 1996). For clarity and to adhere to the idiographic nature of the study, results are structured by participant rather than by variable (e.g., Thelwell & Greenlees, 2001).

Results

Visual inspection

Participant 1. Visual inspection revealed substantive reductions in irrational beliefs; demandingness (-74.07%), awfulizing (-74.07%), low-frustration tolerance (-70.83%), and depreciation (-53.33%) from baseline to follow-up phases. Also, increases were reported in the self-determination index (156%), and vitality (200%) and sleep reported as ‘2hrs/vb’ post-first session to ‘0/vg’ at follow-up.

Across all irrational beliefs there was an immediate increase from baseline to post-first session. Thereafter, all variables decreased from post-first session to follow-up, with the exception of PIB (mid-point to post-last session: 7.14%) and depreciation remained the same (post-last session to follow-up). The self-determination index increased across all time points. Vitality increased from baseline to midpoint, and then reduced at post-last session (-21.29%), but then increased substantially to follow-up (105.48%). Sleep scores decreased for time spent in bed and actual time sleeping and quality increased from ‘vb’ to ‘vg’ from post-first session to follow-up phase. Finally, there were no overlapping data points from baseline to

follow-up across all variables. In sum, irrational beliefs decreased, the self-determination index and subjective vitality increased substantially, and sleep quality improved over the data collection phases.

Participant 2. Visual inspection revealed reductions in demandingness (-12.50%), awfulizing (-14.81%), low-frustration tolerance (-18.52%), and depreciation (-34.62%) from baseline to follow-up phases. Also, during this phase, increases were reported in the self-determination index (46.15%), and vitality (16.75%) and sleep reported as ‘0/fg’ post-first session to ‘0/vg’ at follow-up.

Across all irrational beliefs there was an immediate increase from baseline to post-first session, with the exception of depreciation, which reduced (-11.54%). Thereafter, all variables decreased from post-first session to midpoint, and all variables increased from post-last session to follow-up. The self-determination index increased across all time points, with the exception of midpoint to post-last session (-18.18%). Vitality increased from baseline to post-first session (25%), reduced from post-first session to post-last session, then increased substantially at follow-up (100.43%). Sleep scores decreased for time spent in bed and actual time sleeping and quality increased from ‘vb’ to ‘vg’ from post-first session to follow-up phase. Finally, there were no overlapping data points from baseline to follow-up across all variables. In sum, participant 2 experienced decreases in irrational beliefs to post-last session, then increases in all four irrational beliefs at follow-up, the self-determination index and subjective vitality increased across the study period but decreased at post-last session. Sleep improved over the data collection phases.

Participant 3. Visual inspection revealed immediate reductions in demandingness (-46.88%), awfulizing (-61.54%), low-frustration tolerance (-58.62%), and depreciation (-52.63%) from baseline to follow-up. Also, during this phase, increases were reported in the

self-determination index (8.57%), and vitality (8.58%) and sleep reported as ‘0/fg’ post-first session to ‘0/vg’ at follow-up.

Across all irrational beliefs there were reductions in all variables apart from awfulizing which increased (7.69%) and stabilization in depreciation (0%) from baseline to post-first session. Thereafter, all variables decreased from post-first session to follow-up, with the exception of awfulizing which increased from midpoint to post-last session (14.29%) and stabilization in demandingness (midpoint to post-last session: 0%) and depreciation (post-last session to follow-up (0%). The self-determination index decreased from baseline to post-first session (-32.86%), increased at midpoint (14.89%) and follow-up (33.85%), and remained stabilized at post-last session (0%). Vitality increased across all time points from baseline to follow-up with the exception of a reduction at post-last session (-5.51%). Sleep scores remained stable across all time points (0/fg-0/vg). Finally, there were no overlapping data points from baseline to follow-up across variables. In sum, irrational beliefs decreased, with the exception of awfulizing, across data collection phases. After an initial decrease at post-first session, the self-determination index increased, and subjective vitality fluctuated across the study period, whilst sleep improved.

Participant 4. Visual inspection revealed immediate reductions in demandingness (-51.52%), awfulizing (-39.29%), low-frustration tolerance (-22.58%), and depreciation (-33.33%) from baseline to follow-up. Also, during this phase, increases were reported in the self-determination index (457.14%), and vitality (90.97%) and sleep reported as ‘-1hr/fg’ post-first session to ‘-2/vg’ at follow-up.

Across all irrational beliefs there was an immediate decrease from baseline to post-first session, but there was a small increase in depreciation post-first session (4.76%). Thereafter, all variables decreased from post-first session to midpoint, increased from midpoint to post-last session and all decreased again at follow-up. The self-determination

index increased across all time points, with the biggest increase from baseline to post-first session (142.86%). Vitality increased across all time points from baseline to follow-up. Finally, there were no overlapping data points from baseline to follow-up across all variables. In sum, irrational beliefs decreased across the study period, and all four irrational beliefs increased at post-last session. There were substantial increases in the self-determination index and subjective vitality, and sleep improved over the data collection phases.

In sum, across all participants, irrational beliefs decreased over the data collection phases. Although some phases show slight increases, the data is highly suggestive of a downward trend in irrational belief scores from baseline to follow-up. The self-determination index and vitality increased in all four participants across the study period with the most noticeable increments in participants 1 and 4. Sleep quality improved in all four participants from post-first session to follow-up.

Social Validation

Social validation on-line questionnaires and semi-structured member checking interviews were administered. Member checking provides an interactive face-to-face method that can provide a rich data set and the opportunity for transformation of meaning (Birt et al., 2016). Member checking was used to validate, verify and assess the trustworthiness of the results, giving participants the opportunity to check for accuracy and resonance with their experiences. Here, participants reported that they had experienced changes in their thinking, having established connections between rational beliefs and healthy emotions, reflecting the content covered in the REBT intervention. For example, “I’m much more aware I’m doing this [triathlon] for fun, and actually that’s enough” (Participant 3) and “well the thinking has definitely changed, because you are applying something that you are taught – which is a positive thing” (Participant 4). In addition, there was evidence of changes in modifying irrational beliefs. Participant 1 commented “so I’ve been questioning the way things are

said…it was like yes, but you don't have to, you haven't got to do this, you want to, but you haven't got to" and Participant 2 stated "I think further down the process…question myself, are you sure? Is it really awful?" Participants also reported changes in behaviours "I do tend to change the words, I think that's…one of the big key takeaways" (Participant 1) and "your behaviour changes because you're not negative. You're positive – happier – and more confident that you can do something or go further" (Participant 4). Changes in emotions were also reported "I am enjoying it [triathlon] more" (Participant 3). Participants felt the REBT intervention shifted their motivation. Participant 3 felt "a motivational change because I went out to swim more," and Participant 2 stated "it comes down to confidence to bring back the motivation if it goes," perhaps reflecting the enhanced ability to self-manage their motivational state by questioning "why am I doing this?" Participant 4 reported, "I have got something to focus on. I have improved. And, coupled with these sessions …actually, I can do this, and it's what I want to do."

All participants reported shifts in vitality in the self-report measures, but in member checking, participant 3 said the sessions "didn't have any impact" on vitality and regarding sleep "I don't think there's been a big change." However, participant 1 stated that the sessions had "kind of helped boost energy…I wasn't being quite so stressed. I'm actually able to sleep better." Participant 2 said "My confidence has changed the energy levels" and "the sessions didn't help me sleep better or worse." Participant 4 remarked "It improves all sorts of levels. It improves sleep. It improves what you can do." Broadly, member checking allowed active involvement in the validation process and participants felt REBT had been a positive experience, "it feels like a huge, valuable tool" (Participant 3) and "it's been a good thing for me to be part of" (Participant 2). Finally, data from on-line questionnaires suggests that the REBT intervention was useful to sport performance (M = 4, SD = .82) and to wellbeing (M = 4.5, SD = .58).

All four participants commented positively on the intervention experience, with almost no suggestions for improvements or constructive criticism. Participant 1 suggested an improvement with the addition of written instructions for homework tasks, rather than just verbal instructions to aid memory outside of sessions. Participant 3 stated that although the ABC process was “helpful” and a “useful tool” the process was not “super intuitive” and was not “the first thing I think of” when undesirable emotions arose.

Discussion

This study reports an explanatory idiographic single-case examination of the effects of REBT on the self-determined motivation and psychological wellbeing (vitality and sleep) of four amateur triathletes. The chief aim of the study was to build on the study by Turner and Davis (2018) in a different sample of triathletes. It was hypothesised that REBT would decrease irrational beliefs and increase the self-determined motivation of triathletes. In addition, some authors have suggested that REBT might be an effective approach for enhancing athlete psychological wellbeing (e.g., Wood, Turner, & Barker, 2019), and as such, the current study examined the effects of REBT on subjective vitality and sleep quality, all variables that could impact on training in the very demanding sport of triathlon (Bales, Bales, Deakon, & Johnson, 2012). Methodologically, the current study adopted an explanatory idiographic single-case design and included member checking in the social validation data collection, a sparsely used method of evaluating intervention effects in sport contexts (Culver, Gilbert, & Trudel, 2003).

Results from visual analyses of data indicate that REBT was effective in reducing irrational beliefs, increasing self-determined motivation, vitality, and sleep quality, across all four participants. The results are strengthened by adherence to inspection criteria used to determine meaningful change (Hrycaiko & Martin, 1996) with findings supported by quantitative, and qualitative (social validation) methods, collected one-month post-

intervention. REBT was effective for all four participants in reducing irrational beliefs in the longer term at the follow-up phase. Data suggest that irrational beliefs decreased to a greater extent from baseline to midpoint (after 3 REBT sessions), but then there was some fluctuation in the data whereby Participant 1 continued to report decreases in irrational beliefs, participants 2 and 3 reported increases and decreases in irrational beliefs and Participant 4 reported increases in irrational beliefs. During this time period (midpoint to post-last session) participants received two REBT sessions. Here, unlike for the first three sessions, REBT sessions were not held weekly due to participant availability. These fluctuations could therefore be triggered by erratic schedules of participants 3 and 4, who experienced longer periods between sessions (13 days and 21 days respectively). In sum, in line with past research REBT was shown to be effective in reducing irrational beliefs.

The present study also demonstrated changes in self-determined motivation throughout and following REBT sessions, with all four participants reporting increases in the self-determination index from baseline to follow-up. All four participants reported increases in the self-determination index from baseline to post-first session, with the exception of Participant 3 who reported a decrease. From post-first session to midpoint, participants reported larger self-determination index increases than any other time in the study, with the exception of Participant 3 who reported greater increases at follow-up. From midpoint to follow-up, statistical analyses showed increases in the self-determination index for all four participants. However, data revealed fluctuations by Participant 2, who experienced decreases in the self-determination index at post-last session. Increments in self-determined motivation are generally in line with decreases in irrational beliefs found in the current study. For example, medium to large reductions in irrational beliefs from baseline to post-first session were complimented by small to medium increases in the self-determination index across all four participants. However, although all four participants experienced a reduction in irrational

beliefs at midpoint, whilst the self-determination index increased for participants 1 and 4 at midpoint (after three REBT sessions) it did not change for Participant 3 and decreased for Participant 2. Both participants 2 and 3 experienced fluctuations in irrational beliefs at post-last session, with Participant 2 showing an increase in awfulizing and low-frustration tolerance, and Participant 3 an increase in AWF. This suggests that for these two participants at post-last session, the increases in irrational beliefs accompanied a decrease in self-determination index scores. However, all four participants revealed increases in the self-determination index at follow-up. Notably, in the follow-up phase athletes reported further decreases in irrational beliefs, and increases in self-determination index scores, vitality, and sleep quality. This is in line with some past research (e.g., Cunningham & Turner, 2016) and may reflect the athletes' propensity to continue to implement REBT independently when the intervention contact time has ceased. Indeed, this is an important goal of REBT, helping athletes to self-manage emotions once they have been suitably trained to use REBT independently and competently (Turner, 2016). Continuing to self-manage REBT could specifically benefit triathletes, due to demanding training loads typical of endurance sports, such as triathlon (Nixdorf, Frank, & Beckmann, 2016). All participants were selected prior to the study due to their high irrational beliefs and low self-determined motivation scores, therefore overall the data suggest that REBT triggered decreases in irrational beliefs and increases in self-determined motivation in the hypothesised direction and in line with past research (Turner & Davis, 2018). Due to the demanding nature and commitment of triathlon training, (Bales et al., 2012), fostering self-determined motivation might contribute to triathletes continuing in the sport due to more effective coping strategies (see Weiss & Ambrose, 2008, for a review).

The findings in the current study that there are increases in the self-determination index, alongside complimentary decreases in irrational beliefs, suggest that in all four

participants their motivation became more autonomous and less controlling. Motivation that is more controlling reflects a sense of pressure and obligation to engage in an activity (controlled motivation; Reeve, 2012). Irrational beliefs are synonymous with more controlling motivation regulation, where motives to engage or achieve are driven by demands and self-worth is contingent on success. One particular type of motivation that is particularly salient with regards to irrational beliefs is introjected regulation (Turner, 2016). In introjected regulation the source of motivation is from a pressurised, internal voice driven by guilt, worry or shame to enact in behaviour (Ryan & Deci, 2002) not because an individual wants to, but out of self-imposed obligation ("I must"). This feeling of engaging in an activity because one "should" parallels language of "should" and "must" in REBT literature (Ellis & Dryden, 1997). In the current study, as irrational beliefs were challenged and attenuated during REBT, simultaneously there was a rise in self-determined motivation suggesting that REBT is effective in shifting motivation regulation to what is considered to be a more autonomous and beneficial motivation (Teixeira, Carraca, Markland, Silva & Ryan, 2012). This was supported in social validation data, for example, with participant 3 stating that "I'm doing it for myself, that's a relief of pressure."

Alongside increases in self-determined motivation, the current study also found complimentary increases in vitality and sleep quality. All four participants reported improvements in subjective vitality and sleep across the study period. With the exception of Participant 4, three participants reported decreases in subjective vitality at post-last session. This pattern of decreases in subjective vitality for participants 1, 2 and 3 are combined with complimentary increases in irrational beliefs at post-last session, suggesting a potential relationship between the two constructs. In contrast Participant 4, who reported increments in subjective vitality, reported no increases in irrational beliefs at post-last session. This study presents an important contribution to the exploration of REBT on the psychological

wellbeing of triathletes, as there is scant evidence of reported shifts in irrational beliefs and wellbeing outcomes in the literature.

Irrational beliefs are associated with a vast range of emotional and behavioural outcomes that undermine psychological wellbeing (Visla et al., 2016). But sparse empirical studies to date have directly examined the relationship between irrational beliefs and psychological wellbeing outcomes in athletes. Therefore, the current study presents REBT as a potentially effective approach for promoting athlete psychological wellbeing. Research examining the effects of REBT on vitality are scarce, but research suggests that REBT can facilitate psychological health (Wood, Barker, Turner, & Sheffield, 2018). There is a dearth of literature exploring the wellbeing of triathletes (Vleck, Millet, & Alves, 2014), therefore the reported effects in the current study offer some promising avenues for further research. Based on data from the current study, during REBT (sessions 1-3) self-reported vitality increased in all four participants, however when participants 1, 2 and 3 reported fluctuations in irrational beliefs, complimentary decreases in vitality occurred or remained the same, suggesting that as a result of increases in irrational beliefs, vitality was affected.

The reported sleep quality improvements were also supported by social validation data, with Participant 3 stating “I wasn't being quite so stressed, I’m actually able to sleep better” and participant 4 reporting he is “more positive and confident, because you’re not beating yourself up…I’m doing well.”. Research has consistently demonstrated presence of dysfunctional cognitions when experiencing difficulties initiating sleep, specifically catastrophising (e.g., Noone et al., 2013; Hiller, Lovato, Gradisar, Oliver, & Slater, 2014) which has relevance to REBT. Unhelpful or maladaptive beliefs about sleep involve thoughts that are rigid and involve unrealistic expectations (Carney et al, 2010). All participants learned to dispute dysfunctional thinking, supporting assertions from Cognitive Behaviour Therapy literature that challenging dysfunctional thinking is effective for sleep disturbances

(Bryson, Read, Bush, & Edwards, 2015). All participants reported improvements in sleep across the study, with participant 3 stating “my sleep has probably changed…because I’m maybe not stressing about things.” Sleep is recognised as an essential component for athlete preparation and suggested to be the single best recovery strategy to an athlete (Halson, 2013), important for the sport of triathlon which consists of three sporting disciplines.

Limitations within this study may help to guide future research. First, the findings would be strengthened with a cross-sectional approach using correlational and longitudinal methods, to give a fuller understanding of the causal relationships between irrational beliefs, self-determined motivation, and wellbeing markers. Specifically, a further exploration of how irrational beliefs interact with specific types of motivation regulation would provide a clearer understanding of how REBT and OIT may integrate. Secondly, whilst the idiographic method used in the current study can be considered a strength due to its individuality and robustness, single-case guidelines suggest 8-weeks of baseline data be collected (e.g., Barker, McCarthy, Jones, & Moran, 2011). Participants could not accommodate such a lengthy baseline phase alongside a planned REBT intervention due to significant burden on time this would pose. In addition, to strengthen the study design, nuanced fluctuations in target variables during the interview could be explored more closely using open ended questions throughout the intervention period as has been used in past research (e.g., Neil et al., 2013). More in-depth questioning may have also allowed us to gain a greater understanding about mechanisms of change reported by participants. Notably, social validation revealed almost no criticism of the intervention, which might be a result of bias, and or the kinds of questions used in member checking. Future research should endeavour to more meaningfully gauge the opinions of participants in receipt of REBT in order to form valuable insights into intervention delivery, efficacy, and veracity. A good example of how constructive criticism could be approached in applied research can be seen in the recent work of Latinjak, Hernando-Gimeno, Lorido-

Méndez, and Hardy (2019). But more broadly, much of the extant REBT research draws on single-case designs, and future research should concentrate on the use of more experimental designs such as those including control groups (e.g., Turner, Slater, & Barker, 2015) and randomised control trials (e.g., Stefan, Cristea, Szentagotai-Tatar, & David 2019).

To conclude, the present study contributes to the extant literature by providing an explanatory idiographic single-case examination of REBT on the self-determined motivation, vitality, and sleep quality of four amateur triathletes. This study supports the effectiveness of REBT with athletes and extends the existing research by replicating the finding that REBT can influence motivation (Turner & Davis, 2018). Data indicated that REBT was successful in reducing irrational beliefs, augmenting self-determined motivation, vitality, and sleep quality. It is hoped that this study will encourage further research into the relationships between irrational beliefs, motivation, and athlete wellbeing.

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Table 1. REBT day number, mean, total time and session number across the study period.

Participant	Day number through study period						Mean session length	Total REBT time	Follow up day	ASE	Total number of sessions
	Baseline	REBT 1	REBT 2	REBT 3	REBT 4	REBT 5					
1	0	32	39	46	53	65	37.27	3.06.38	123	2	5
2	0	32	39	46	53	63	40.26	3.31.28	121	1	5
3	0	35	42	52	65	70	45.39	3.26.31	133	0	5
4	0	39	46	53	60	67	49.27	4.06.34	122	0	5

Note. Total REBT time = Total length of REBT sessions in hours, minutes, seconds; ASE = additional support emails.

Table 2. Means (Standard Deviations) and percentage change for irrational beliefs, self-determined motivation, subjective vitality and sleep quality across time points.

Measure	Participant	Baseline	Post-first session	Midpoint	Post-last session	Follow up	Baseline to Post-last % change
Demandingness	1	27	28 (3.70)[a]	14 (-50)[b]	15 (7.14)[c]	7 (-53.33)[d]	-44.44
	2	32	33 (3.13)[a]	27 (-18.18)[b]	26 (-3.70)[c]	28 (7.69)[d]	-18.75
	3	32	31 (-3.13)[a]	24 (-22.58)[b]	24 (0)[c]	17 (-29.17)[d]	-25.00
	4	33	28 (-16.39)[a]	20 (-28.57)[b]	24 (20)[c]	16 (-33.33)[d]	-27.27
Awfulizing	1	27	33 (22.22)[a]	10 (-69.70)[b]	9 (-10)[c]	7 (-22.22)[d]	-66.67
	2	27	29 (7.41)[a]	18 (-37.93)[b]	21 (16.67)[c]	23 (9.52)[d]	-28.57
	3	26	28 (7.69)[a]	14 (-50)[b]	16 (14.29)[c]	10 (-37.50)[d]	-62.50
	4	28	25 (-10.71)[a]	15 (-40)[b]	21 (40)[c]	17 (-19.05)[d]	-25.00
LFT	1	24	27 (12.5)[a]	9 (-66.67)[b]	8 (-1.11)[c]	7 (-12.50)[d]	-66.67
	2	27	29 (7.41)[a]	16 (-44.83)[b]	20 (25)[c]	22 (10)[d]	-25.93
	3	29	26 (-10.34)[a]	20 (-23.08)[b]	16 (-20)[c]	12 (-25)[d]	-44.83
	4	31	28 (-9.68)[a]	17(-39.29)[b]	27 (58.82)[c]	24 (-11.11)[d]	-12.90
Depreciation	1	15	20 (33.33)[a]	11 (-45)[b]	7 (-36.36)[c]	7 (0)[d]	-53.33
	2	26	23 (-11.54)[a]	21 (-8.70)[b]	14 (-23.33)[c]	17 (21.43)[d]	-52.63
	3	19	19 (0)[a]	16 (-15.79)[b]	9 (-43.75)[c]	9 (0)[d]	-52.63
	4	21	22 (4.76)[a]	15 (-31.82)[b]	19 (26.67)[c]	14 (-26.32)[d]	-9.52
SDI	1	25	44 (76)[a]	54 (22.73)[b]	63 (16.67)[c]	64 (1.57)[d]	152
	2	39	46 (17.95)[a]	66 (43.48)[b]	54 (-18.18)[c]	57 (5.40)[d]	38.46
	3	70	47 (-32.86)[a]	54 (14.89)[b]	54 (0)[c]	76 (33.85)[d]	-22.86

	4	14	34 (142.86)[a]	63 (85.29)[b]	71 (12.70)[c]	78 (9.40)[d]	407.14
SVS	1	2	3.58 (79)[a]	3.71 (3.63) [b]	2.92 (-21.29)[c]	6.00 (105.48)[d]	46
	2	4	5 (25)[a]	3.17 (-36.6) [b]	2.33 (-26.50)[c]	4.67 (100.43)[d]	-41.75
	3	5.00	5.50 (-5.66)[a]	6.17 (12.18) [b]	5.83 (-5.51)[c]	6.33 (8.58)[d]	16.60
	4	2.88	3.17 (10.07)[a]	4.50 (41.96) [b]	5.33 (18.44)[c]	5.50 (3.19)[d]	85.07
Sleep quality	1	/	-2hrs/vb	-10mins/fg	-15mins/vg	-0/vg	/
	2	/	0/fg	0/vg	0/fg	0/vg	/
	3	/	0/fg	0/fg	0/ fg	0/vg	/
	4	/	-1hr/fg	-30mins/fg	-1hr/fg	-2/vg	/

Note. [a]Baseline to Post first session % change, [b]Post-first session to midpoint % change, [c]midpoint to Post-last session % change, [d]Post last session to Follow up % change.
LFT = low frustration tolerance; SDI = Self Determination Index, SVS = Subjective Vitality Questionnaire. Response set for sleep questionnaire is difference between time spent in bed and time actually sleeping in minutes/hours (mins/hr), ratings for sleep quality: vg = very good, fg = fairly good, vb = very bad.