Exploring the effects of Rational Emotive Behaviour Therapy (REBT) on the irrational beliefs and self-determined motivation of triathletes

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Abstract

The present study addresses proposals that Rational Emotive Behaviour Therapy (REBT) can influence self-determined motivation. Triathletes received REBT education, followed by either Rational Emotive Personal-Disclosure Mutual-Sharing (REPDMS), or PDMS. Measurements of irrational beliefs and self-determined motivation were collected prior to REBT (baseline), during the REBT education period, and after the REPDMS session (post-intervention). An ABC single-case design was adopted, allowing for statistical and visual analysis of data over time and between groups. Findings indicate that REBT led to decreased irrational beliefs and increased self-determined motivation. REPDMS appeared to have no influence on irrational beliefs over and above REBT education.

Key words: REBT; self-determination theory; REPDMS; applied sport psychology; single case design

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Athletes face many adversities in their quest for performance excellence such as heavy training loads, competitive pressure, pain of defeat, and injury woes (Nixdorf, Frank, & Beckmann, 2016; Reardon & Factor, 2010). Amidst such adversity, maintaining motivation, and indeed being driven by the right motives, is an important part of developing a successful athletic career (Galli & Vealey, 2008). One approach to helping athletes overcome adversity that is garnering growing research attention in sport literature (see Turner, 2016a, for a review) is rational emotive behaviour therapy (REBT; Ellis, 1957). In brief, REBT holds that in response to adversity, it is not the adverse event alone that causes emotional and behavioural responding, rather, it is one's beliefs about the adverse event that leads to emotions and behaviours (Ellis & Dryden, 1997). As such, the extent to which an athlete is able to deal with adversity by exhibiting adaptive emotions and behaviours is dependent on the mediating role of irrational and rational beliefs.

REBT distinguishes itself from other cognitive-behavioural approaches to psychotherapy (such as Cognitive Therapy; Beck, 1976) by proposing that irrational and rational beliefs are at the centre of emotional and behavioural functionality. In addition, in REBT there are four irrational beliefs including primary irrational beliefs (or demandingness), awfulizing, low frustration tolerance, and depreciation, which are extreme, rigid, and illogical, and four opposing rational beliefs including primary rational beliefs (or preferences), anti-awfulizing, high frustration tolerance, and unconditional self-acceptance, which are non-extreme, flexible, and logical (Dryden, 2009). Importantly, irrational beliefs are proposed to lead to dysfunctional emotions (depression) and maladaptive behaviours (withdrawal), whilst rational beliefs lead to functional emotions (sadness) and adaptive behaviours (express feelings to others;

Dryden & Branch, 2008). As such, essential in REBT is the cognitive restructuring of irrational beliefs, and the endorsement of rational beliefs.

The corpus of literature examining the use of one-to-one REBT in sport demonstrates promising findings for improved performance (e.g., Elko & Ostrow, 1991; Wood, Barker, & Turner, 2016), reduced anxiety (e.g., Turner & Barker, 2013), and increased resilience (Deen, Turner, & Wong, 2017) across a range of sports and levels. In addition, there is a growing body of research reporting the effects of group-level REBT with athletes, where short-term (Turner, Slater, & Barker, 2014) and long-term (Turner, Slater, & Barker, 2015) reductions in irrational beliefs have been yielded as a result of REBT education. Group-level REBT (or REE; Knaus, 1985) is time and cost effective, and gives participants an opportunity to learn from one another and support each other through the learning process (Ehde & Jensen, 2010).

The group-sharing aspect of group REBT has only recently been examined through combining REBT with Personal-Disclosure Mutual-Sharing (PDMS; Dunn & Holt, 2004; Holt & Dunn, 2006). In PDMS individuals consciously share an issue with a group they belong to in an attempt to find resolution through interpersonal interaction (Olarte, 2003). Rational Emotive Personal-Disclosure Mutual-Sharing (REPDMS; Vertopoulos & Turner, 2017) applies REBT principles to PDMS by asking athletes to share their experiences of applying REBT in the real-world, stating irrational and rational beliefs and how cognitive restructuring was applied. In Vertopoulos and Turner's study five group-level REBT education sessions were followed up with an REPDMS session for one group, but not the other group. Findings indicated additional reductions in irrational beliefs following the REPDMS session, which may suggest that REPDMS may bolster the effects of group-level REBT education.

The present study further explores the use of group-level REBT education and REPDMS with triathletes, but also examines motivational shifts as well as changes in irrational beliefs, following REBT and REPDMS. Recent literature concerning REBT in sport has called for a deeper understanding of the potential relationships between irrational beliefs and athletic performance (Turner, 2016a). Some studies report performance gains following REBT (e.g., Wood et al., 2016), but it is unclear as to the mechanisms for enhanced performance. One potential mechanism is motivation, which has not been examined in relation to REBT in athletes, and has also received some debate in literature. Some suggest that promoting rational beliefs through REBT may reduce athlete motivation and performance (Atkinson, 2014; Turner, 2016b) where, for example, an 'its not the end of the world' (anti-awfulizing) philosophy may reduce drive for success; but this is based on a one-dimensional conception of motivation from low to high motivation, and is a misunderstanding of REBT theory. Fundamentally, REBT is a motivational theory (e.g., David, 2003) that is considered to be part of the appraisal paradigm (see Lazarus, 1991; Smith, Haynes, Lazarus, & Pope, 1993) where motivational relevance and motivational incongruence are important prerequisites for the relationship between irrational beliefs and dysfunctional emotions (David, Schnur, & Belloiu, 2002). In other words, irrational beliefs are associated with dysfunctional emotions in situations that are deemed personally relevant to the individual, but are also considered inconsistent with one's goals. Therefore, understanding the goals of athletes when investigating irrational beliefs is important.

It is perhaps more fruitful to consider multidimensional motivation theories when trying to understand the influence of irrational beliefs on motivation, because motivation is not just about quantity, its also about quality (Hagger & Chatzisarantis,

2009). Self Determination Theory (SDT; Deci & Ryan, 1995; 2000) provides a well-grounded meta-theory of motivation that may be relevant to the study of REBT. Indeed, there are some conceptual similarities between irrational beliefs and the extrinsic motivation levels specified within *organismic integration theory* (OIT; Ryan & Deci, 2000), a sub-theory of (SDT). In OIT, motivation is classified within six main categories that fall on a continuum polarized by intrinsic motivation (i.e., undertaking an activity for its own sake) and amotivation (i.e., lack of any motivation; Deci & Ryan, 1985). Along the continuum from less to more self-determined motivation, there are four extrinsic motivation levels, namely 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. 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 sports, more 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).

The aforementioned conceptual similarities between irrational beliefs and the extrinsic motivation levels of OIT have been posited by researchers in the past (e.g., Turner, 2016a; Van Wijhe, Peeters, & Schaufeli, 2013), but have not been formally studied empirically. Because irrational beliefs reflect self-pressure (e.g., “I should always succeed”) and contingent self-worth (e.g., “I am worthless if I fail”), there is reason to postulate that higher irrational beliefs would relate to greater controlled

motives (particularly introjected regulation; Turner, 2016a), where direction for action is controlled by self-imposed sanctions such as to avoid feelings of guilt or shame, or to attain ego enhancement such as pride (Ryan & Deci, 2002). For example, Standage, Duda, and Ntoumanis (2005) state that, "an example of introjected regulation would be a student that participates in an after school physical activity programme, not because she/he wants to, but because the student feels that she/he should, because that is what 'good students' do" (p. 413). This example illustrates the potential conceptual link between irrational beliefs and controlled motives as it reflects both primary irrational beliefs ("should") and depreciation beliefs ("good students").

With researchers speculating on the motivational qualities of irrational beliefs (e.g., Turner, 2016a), and the notion that irrational beliefs appear to reflect more controlling (less self-determined) types of motivation regulation (e.g., introjected regulation), a study that examines REBT alongside OIT is warranted and is potentially valuable for athlete wellbeing and performance. Therefore, the present study investigates the use of REBT in promoting the self-determined motivation of triathletes. Whilst the chief aim of the current study is to examine the effects of REBT on self-determined motivation, this study also 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).

Triathlon is a unique multisport event consisting of three different disciplines (swim, cycle, run) performed consecutively over a single race. Triathlon is a fast-growing sport (British Triathlon, 2015), but despite its increase in popularity triathlon has not been extensively studied (Dolan, Houston, & Martin, 2011). Training and competing in triathlons requires a high amount of sacrifice to deal with the physical

and psychological requirements of the sport (Laursen, 2011; Murphy, 1999), and as such, requires great personal commitment to the sport, which can compromise participants' social life (Furst, Ferr, & Megginson, 1993; Mallett & Hanrahan, 2004). Therefore, fostering self-determined motivation may help triathletes to continue in their sport due to less burnout and drop-out intention, exhibit greater positive affect, greater flow experiences, greater concentration, and more effective coping strategies and goal attainment (see Weiss & Amorose, 2008, for a review). Some research suggests that amateur triathletes have a desire to compete with themselves, improve fitness and experience enjoyment (Bell & Howe, 1988), and that elite female triathletes report greater intrinsic motivation than extrinsic motivation (Waddle-Smith, 2010). In contrast, Lamont and Kennelly's (2012) study, which adopted the SDT framework for analysis, reported some evidence of intrinsic motivation for participating in triathlons, though extrinsic motivation was more prevalent. Therefore, the investigation into ways in which self-determined motivation can be promoted in triathletes may be valuable to those providing sport psychology services with triathletes.

In sum, there is a need to understand whether and to what extent REBT may influence the self-determined motivation of athletes. Therefore, this study aims to explore the effects of an REBT intervention, with a REPDMS or PDMS follow-up session, on the irrational beliefs and self-determined motivation of triathletes. The present study adds to the extant literature by investigating the influence of REBT on self-determined motivation for the first time in research, building on both REBT and SDT literatures. In addition, the current study offers a second examination of REPDMS (Vertolopous & Turner, 2017) thus offering a further test of this novel REBT technique. In line with previous research (e.g., Turner & Barker, 2013) it is

hypothesized that REBT education will decrease the irrational beliefs of triathletes. Based on recent postulations that irrational beliefs are theoretically akin to less self-determined (more controlling) types of motivation regulation (Turner, 2016a), it is hypothesized that REBT will increase the self-determined motivation of triathletes. Finally, it is hypothesized that further reductions in irrational beliefs and further increases in self-determined motivation will follow a post-REBT REPDMS session, but will not follow a post-REBT PDMS session, similar to past research (Vertolopous & Turner, 2017).

Method

Participants

The first author is a member of a large U.K. Triathlon club that provides specific training to over 200 adult members, ranging from elite full-time professionals to fitness enthusiasts. As such, the triathletes recruited for the current study represented a convenience sample. Twenty-four triathlon club members *(N* = 13 males, *N* = 11 females) aged between 22 and 65 years old (*M* = 40.83; *SD* = 11.13) took part in the study. Club membership ranged between 1 month and 16 years experience. Participants were selected from 84 members (*N* = 45 males, *N* = 39 females) aged between 22 and 68 years (*M* = 41.55, *SD* = 10.59). Participants were ranked according to their score in the irrational Performance Beliefs Inventory (iPBI; Turner et al., 2016). In line with recommendations (Turner & Barker, 2014), respondents with medium to high irrational performance beliefs (scores above 18 out of 35) were invited to participate in the study and two groups (REBT+REPDMS and REBT+PDMS) were formed using purposive sampling. That is, participants were ranked in order of their irrational beliefs scores from high to low. Then, participants were systematically and alternately allocated to either the REBT+REPDMS or the

REBT+PDMS group. One participant from the REBT+PDMS was reallocated to the REBT+REPDMS group due to being unable to attend at certain times. The REBT+REPDMS group consisted of 7 females and 5 males aged between 22 and 54 years (M = 40.54, SD = 11.33) and the REBT + PDMS group consisted of 3 females and 8 males aged between 28 and 65 years (M = 41.18, SD = 11.43). The University granted ethical approval, and participants completed informed consent prior to data collection.

Experimental Design

The study employed a single-case ABC (multiple component) between-groups design (Barker, McCarthy, Jones, & Moran, 2011), where A reflects the baseline phase, B reflects the REBT education phase, and C reflects either REPDMS or PDMS phases. This allows for the effects of REBT and REPDMS or PDMS to be separately determined, rather than conflating the effects of the different interventions as would be the case with a more simplistic AB design. The REBT+REPDMS group received five 45-minute REBT workshops, followed one month after by an REPDMS session. The REBT+PDMS group received five weekly 45-minute REBT workshops, followed one month after by a PDMS session, with no REBT elements. To ensure that the PDMS session included no REBT elements, separate instructions were given to participants depending on the group to which they were assigned (e.g., REBT+REPDMS vs. REBT+PDMS). Thus, it was possible to assess the effects of REPDMS over and above the effects of PDMS education. Data were collected over a twenty-two week period through baseline (five weeks), REBT education workshops (ten weeks), REPDMS vs. PDMS (one week), and post-intervention (six weeks) phases. Baseline data revealed a sufficient level of irrational beliefs (Turner et al. 2015) to warrant an REBT intervention (REBT+REPDMS group, M = 24.38, SD =

2.47; PDMS only group, $M = 22.77$, $SD = 2.80$). Participants in both groups reported above the average norms for irrational beliefs and were eligible to take part in the study.

Measures

Irrational beliefs. The iPBI (Turner et al., 2016) consists of 28-items measuring the four core irrational beliefs of primary irrational beliefs (PIB; $N = 7$ items), awfulizing (AWF; $N = 7$ items), low frustration tolerance (LFT; $N = 7$ items) and depreciation (DEP; $N = 7$ items). A composite score (CIB) of all four subscales is also computed. 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 in a professional working environment (Turner et al., 2016). The iPBI was originally validated using an occupational sample, but since its initial validation, the iPBI has been used with athletes (e.g., Deen et al., 2017), and has demonstrated good internal consistency (Turner, Carrington, & Miller, in press), and test-retest reliability in athlete samples (Turner, Slater, Dixon, & Miller, in press). Validity testing of the iPBI for use in athletes is on-going, but the iPBI represents the only performance-specific measure of irrational beliefs and thus was deemed suitable for use in the current study.

Motivation. The Sport Motivation Scale (SMS; Pelletier et al., 1995) is a 28-item measure assessing intrinsic motivation, three levels of extrinsic motivation (identified regulation, introjected regulation, external regulation), and amotivation. Each item is rated on a 7-point Likert-scale ranging from 1 (*does not correspond at*

all) to 7 (*corresponds exactly*). The SMS is widely used to measure motivation in sport (Hu & Bentler, 1999), demonstrating adequate confirmatory factor analysis (alpha reliability between .63 and .80), internal consistency (mean alpha score of .82), moderate to high indices of temporal stability (mean re-test correlation of .69), and internal consistency (was above .70 on all subscales except the 'identified' subscale). In sum, test-retest correlations and construct validity were acceptable. Despite the current authors' choice to use the SMS, its validity has been contested (Clancey, Hering, & Campbell, 2017) and as such, revisions of the SMS are available (e.g., SMS-II; Pelletier, Rocchi, Vallerand, Deci & Ryan, 2013) and should be used henceforth.

Using procedures outlined by Vallerand (2001), an index of self-determined motivation (SDI) was calculated by multiplying each subscale by an assigned weight in accordance with its' location on the OIT (e.g., Gillet, Vallerand, Amourab, & Baldesb, 2010). When calculating an SDI in the absence of an integrated regulation subscale, Vallerand (2001) recommended weights of: 2 for intrinsic motivation, 1 for identified regulation, –1 for introjected and external regulation, and –2 for amotivation. The product of scores is then summed to form an index of self-determined motivation. A higher score represents more self-determined (or autonomous) motivation and a lower score represents less self-determined (more controlled) motivation. The SDI (also known as the Relative Autonomy Index), calculated through SMS measurement of OIT levels 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 single-case designs to ensure brevity of data reporting. However, the reader should be aware that the appropriateness of the calculating the SDI has been questioned on

conceptual and statistical grounds in SDT literature (e.g., Chemolli & Gagné, 2014) and therefore should be used with caution by researchers.

Social validation. Social validation data were acquired at the post-test time-point, which can enhance researchers' understanding of results and intervention efficacy (Page & Thelwell, 2013). Participants ($N = 10$) completed a 15-question self-report questionnaire consisting of open-ended ($N = 9$) and closed questions ($N = 6$; e.g., Turner et al., 2014) concerning perceived usefulness of the REBT workshops, changes in motivation, and reported modifications of their thoughts and behaviours as a consequence of their participation. For closed questions, participants responded on a Likert-scale ranging from Yes/No/Don't know, and for open-ended questions participants were given a writing box to respond within.

Intervention procedure

REBT education. Participants were educated in REBT following guidelines from previous literature (Ellis & Dryden, 1997; Turner & Barker, 2014). In brief, participants from both groups separately attended five 45-minute sessions in total, with homework tasks assigned between each session. Athletes unable to attend a session received a video lecture via email with supporting PowerPoint presentation of the content for the session they missed, so that they did not fall behind the other participants. Each session had planned objectives and outcomes that the practitioner adhered to. Broadly, the first session was designed to introduce athletes to the ABCDE framework of REBT or the 'Smarter Thinking' approach in sport as it has been named more recently (Turner, 2014). Participants were informed that when facing adversity (A) it is their beliefs (B) about the adversity that determines their emotional and behavioural responses (C), not the adversity alone. In the second workshop athletes were introduced to the four core irrational beliefs (PIB, AWF, LFT,

and DEP). Athletes completed a sorting task identifying rational or irrational beliefs to help them identify and understand the differences between rational and irrational beliefs. The sorting task contained 20 statements, 10 of which were rational beliefs, and 10 of which were irrational beliefs. Participants were given homework. This was an ABC chart (adapted from Ellis & Dryden 1997) where participants had to identify their beliefs and practice using the ABC model independently. The third workshop further explored irrational beliefs with a triathlon-specific sorting task, where participants were again tasked with separating irrational beliefs from rational beliefs. The notion of 'disputing' (D) was introduced and participants practised challenging their beliefs with specific targeted questioning (e.g., where is the evidence that you "must" succeed) advocated in REBT literature (Turner & Barker, 2014). The fourth session formally introduced rational beliefs and athletes practiced disputing rational beliefs, following the same questioning as the irrational belief cognitive restructuring they had completed previously. In the fifth session, to help participants integrate their newly acquired REBT skills into their training and performance, athletes worked in groups of two or three and collaboratively practiced their newly acquired REBT skills. Here, participants worked through the ABCDE framework, assessed irrational thinking, disputed beliefs, and practised developing new effective rational beliefs. At the end of the fifth session, participants in the REBT+REPDMS group were given information and instruction on the final REPDMS session, and participants in the REBT+PDMS group were given information and instruction on the final PDMS session.

REPDMS session instructions. Participants were given one month to prepare a four-minute speech. Unlike general self-reflective questions advocated in PDMS

literature (e.g., Dunn & Holt, 2006), participants were given instructions containing specific REBT elements:

> Share an experience where you had an emotional reaction to something during an event (sporting or non-sporting). Can you describe what it was like to the group? Now you have completed this course, reflect on how you could use the ABCDE framework to challenge your thoughts.

Additionally, participants were encouraged to begin their talks at 'A' (activating event) or 'C' (consequences) and identify their 'B' (beliefs) during their speeches. Furthermore, participants were given a planning sheet (available from first author) to help them prepare for their talk.

PDMS session instructions. Participants in the REBT+PDMS group were given one month to prepare a four-minute speech. In contrast to the REBT+REPDMS instructions, the instructions for this group contained no REBT-specific elements. Rather, participants were given general guidelines (Dunn & Holt, 2006) and instructions with self-reflective questions to help them plan their talk and a planning sheet to help with preparation.

> Instruction 1: Tell the group why you do triathlon (or your chosen sport) and what you think it gives you personally from a psychological perspective?
>
> Instruction 2: Describe a personal story/situation in sport that illustrates something that defines your character, motives and desires.

Results

To analyse the between-group differences and within-subject changes in CIB and SDI across the timepoints, two separate mixed ANOVAs were conducted. In addition, for a more detailed analysis in keeping with single-case designs (Barker et al., 2011) visual inspection of the data was conducted for all monitored variables,

including all irrational beliefs (PIB, AWF, LFT, DEP, and CIB), and the SDI (see tables 1 and 2). This inspection occurred across five separate timepoints; baseline, timepoint 2 (after three REBT sessions), timepoint 3 (after two further REBT sessions and a two-week maintenance period), timepoint 4 (a week after REPDMS or PDMS workshop) and timepoint 5 (at the post-intervention phase). The visual analysis of data included three steps to determine intervention effectiveness, (a) comparisons of mean values, (b) immediacy of effect, and (c) magnitude of change (Cohen's *d*; $M_1 - M_2/SD_{pooled}$). Typically, in single-case research visual examination includes comparison of mean changes for each individual subject case, however, in accordance with Pain and Harwood (2009) we treat each intervention group as a single case. In accordance with Cohen's (1992) specific categories for effect size, interpretation was selected for analysis as .2 as small, .5 as medium and .8 as large. To assess whether the two groups had comparable baseline scores, important for between-groups analyses, eight independent samples *t*-tests were conducted to examine between-group baseline differences in each of the five irrational beliefs variables, and the SDI. Results revealed no significant between-groups differences ($p > .05$) in any of the variables at baseline.

Statistical analyses

The mixed ANOVAs revealed a non-significant and medium (Cohen, 1988) interaction effect for group and change overtime for CIB, Wilks $\lambda = .88$, F (4,18) $= .62$, $p > .05$, $\eta^2 = .12$, and SDI, Wilks $\lambda = .82$, F (4,18) $= .97$, $p > .05$, $\eta^2 = .18$. However, a significant and large (Cohen, 1988) within-subjects effect was revealed for both CIB, Wilks $\lambda = .12$, F (4,18) $= 33.78$, $p < .001$, $\eta^2 = .88$, and for SDI, Wilks $\lambda = .18$, F (4,18) $= 21.06$, $p < .001$, $\eta^2 = .82$.

Irrational beliefs. For CIB, post-hoc pair-wise tests showed a significant (*p*

< .05) decrease from baseline to timepoint 2 (*M*Change = -3.99), timepoint 3 (*M*Change = -7.73), and timepoint 4 (*M*Change = -3.54). There was also a significant ($p < .05$) decrease from timepoint 2 to timepoint 3 (*M*Change = -3.74). However, there was a significant increase from timepoint 3 to timepoint 4 (*M*Change = 4.18) and timepoint 5 (*M*Change = 4.75). These results demonstrate that whilst participants reported reductions in CIB from baseline across the timepoints, there is some fluctuation in the data showing that there are some increases towards baseline in the latter stages of the intervention.

Motivation. For SDI, post-hoc pair-wise tests showed a significant ($p < .01$) increase from baseline to timepoint 4 (*M*Change = 20.06) and timepoint 5 (*M*Change = 18.10), from timepoint 2 to timepoint 4 (*M*Change = 16.99) and timepoint 5 (*M*Change = 15.03), and also from timepoint 2 to timepoint 4 (*M*Change = 12.76) and timepoint 5 (*M*Change = 10.80). These results demonstrate that participants reported the greatest SDI in the latter parts of the intervention compared to the earlier parts.

Visual analyses

Irrational beliefs. After three REBT sessions, both groups followed a similar pattern of immediate reductions in PIB, AWF, LFT and DEP at timepoint 2, furthermore, these reductions continued at timepoint 3 after five REBT sessions and a subsequent two-week maintenance period with no REBT. Following a further two-week maintenance period, the REPDMS and PDMS sessions took place. One week after the REPDMS and PDMS sessions, data was collected at timepoint 4 and at a one-month post-intervention period at timepoint 5. Scores for AWF, LFT and DEP in both groups showed increases at both timepoints 4 and 5, with the REBT+REPDMS group reporting greater increases than the REBT+PDMS group. However for PIB there was an increase at timepoint 4, but a reduction at timepoint 5. The

REBT+REPDMS group reported a small-medium decrease (d = .37) and the REBT+PDMS group reported a small decrease (d = .12). From baseline to timepoint 5, for both groups CIB decreased. Further, the REBT+PDMS group participants showed greater decreases in all four irrational beliefs and CIB from baseline to timepoint 5, compared to the REBT+REPDMS group. For example, for CIB there was a small (d = .31) reduction from baseline (M = 24.38, SD = 2.47) to timepoint 5 (M = 22.25, SD = 9.36) in the REBT+REPDMS group, whereas in the REBT+PDMS group, there was a large (d = .80) reduction from baseline (M = 22.77, SD = 2.80) to timepoint 5 (M = 18.36, SD = 7.26).

Motivation. For the SDI, both groups reported a comparable pattern of increments in self-determined motivation from baseline to timepoint 4. Indeed, participants in both groups showed an immediate (small) increase in the SDI after three REBT sessions, and further increases at timepoint 3 after all five REBT sessions. Both groups then showed the largest increase in SDI at timepoint 4, following the REPDMS or PDMS session. However, at timepoint 5 at the one-month post-intervention phases, the REBT+REPDMS group showed a small decrease (d = .20) in the SDI, whilst the REBT+PDMS group demonstrated maintenance (d = .03) in SDI scores. From baseline to timepoint 5, a large increase in the SDI was reported for both the REBT+REPDMS group (d = 1.11) and the REBT+PDMS group (d = 1.13).

Social Validation

Social validation data implied that all participants (n = 10) found the REBT workshops ‘useful’ and revealed that the intervention has helped them to modify their thoughts and behaviours. For example, one participant from the REBT+REPDMS group said, “I have been able to use ABC to start to think totally differently about my worst discipline in triathlon. I actually look forward to getting in the pool or lake now,

to see it as an opportunity, not a threat." Another participant from the same group changed her belief that failing to finish a 10K swim would have caused 'devastation' whereas now "realized that I would be disappointed, but it wouldn't be the end of the world".

Eight participants reported that the REBT sessions had influenced their motivation in some way; one participant suggested "it increased my motivation, positive thinking and helped me perform to my best" and another participant claimed that the REBT course was "a reinforcement of why I participate in the sport, helping me identify what I get out of it". Such perceptions demonstrate the usefulness of the REBT workshops in identifying why individuals participate in their sport. Eight participants suggested that the course had changed their emotions, "the ABC made me more positive and have a more realistic approach towards competing." Participants generally felt more relaxed about competing; "it helped me be calmer and enjoy my racing more by having fewer negative thoughts when racing". Importantly, eight athletes felt that the workshops had affected their sporting performances with one participant from the REBT+REPDMS group stating that running times had improved since the workshops began, others felt that although numeric indicators for performance improvements were not there, their attitude and enjoyment of their sport, had improved.

The final workshop comprised REPDMS elements for one group and PDMS elements for the other group. A member from the REBT+REPDMS indicated that this session was "the most useful to hear about others' experiences and realizing that all triathletes, no matter how experienced and successful have the same issues" and that this final session for a member of the REBT+PDMS group "was the most important to me, as it allowed a platform to share experiences and offer support". Generally

participants from both groups really enjoyed this session, but most said there was not enough time in the session to say all that they wanted. All participants reported they would remember and use the ABC framework in their sport.

Discussion

The main aim of the present study was to examine the effects of an REBT intervention, with a REPDMS or PDMS follow-up session, on the irrational beliefs and self-determined motivation of triathletes. This is the first published study to apply REBT with triathletes, but more importantly, to address recent proposals that REBT can influence the self-determined motivation of athletes (Turner, 2016a; Wood et al., 2016). As such, it was hypothesized that REBT education would decrease the irrational beliefs and subsequently increase the self-determined motivation of triathletes. To build on recent research applying REPDMS with athletes, (Vertopolous & Turner, 2017) the current study also examined the effects of REPDMS on the outcome variables, by comparing an REBT+REPDMS group (receiving REBT education and REPDMS) with an REBT+PDMS group (receiving REBT education and PDMS with no rational emotive elements). It was hypothesized that further reductions in irrational beliefs would follow REPDMS but not PDMS session.

Results from the visual analysis of data indicate that REBT education was effective in reducing irrational beliefs in the short-term (during and shortly after REBT education phase), however at the onset of REPDMS and PDMS, irrational beliefs increased towards baseline in both groups. Data suggest that the REPDMS session had no meaningful effect on irrational beliefs and indeed, irrational beliefs increased after both the REPDMS and PDMS sessions, with the exception of PIBs, which decreased. Indeed, statistical analyses showed that participants in both groups reported decreases in irrational beliefs from baseline to timepoints 2 and 3, but then

irrational beliefs data increased towards baseline in timepoints 4 and 5. To be clear, statistical analyses demonstrated that whilst participants in both groups reported reductions in CIB across the timepoints, there was some fluctuation in the data whereby increases towards baseline in the latter stages of the intervention are present. Overall, participants from both groups reported decreases in irrational beliefs from baseline to the final timepoint (timepoint 5), but this change appears to have been triggered by the REBT education sessions, rather than the REPDMS or PDMS sessions. However, larger decreases (> .8; Cohen 1988) in irrational beliefs were observed for the REBT+PDMS group, suggesting that REPDMS had little impact on irrational beliefs and in fact seemed to increase irrational beliefs to a greater extent than the PDMS session. In sum of the irrational beliefs data, in line with past research with athletes (Turner et al., 2015) REBT education was shown to be effective in reducing irrational beliefs, but contrary to recent research (Vertopolous & Turner, 2017) REPDMS was ineffective at reducing irrational beliefs further.

The finding that irrational beliefs were only temporarily reduced in both groups implies that either the education sessions were ineffective in producing longer-term change, or that the REPDMS or PDMS session actually increased irrational beliefs towards baseline levels. First, regarding the notion that the education sessions were ineffective, although past research has indicated that REBT can produce longer-term changes in irrational beliefs (e.g., Turner et al., 2015), supportive studies predominantly employ one-to-one methods of REBT delivery (e.g., Wood, Barker & Turner, 2016). Indeed, past research that has employed group education sessions reveals that irrational beliefs can change in the shorter rather than the longer-term (e.g., Turner et al., 2014). Therefore, future research should explore using more education sessions, or work towards a mixture of group education and one-to-one

sessions to maximize changes in irrational beliefs. Second, concerning the idea that REPDMS and PDMS increased irrational beliefs, while contrary to past research (Vertopolous & Turner, 2017), is a plausible explanation. To explain, PDMS can have potential detrimental effects for individuals with low self-esteem about public speaking (Cameron, Homes, & Vorauer, 2009), indeed some participants did express their nervousness and apprehension prior to their disclosure speeches, with one participant actively choosing not to take part. To be clear, it may be that by articulating irrational beliefs during stressful situations, such as the REPDMS/PDMS sessions, further distress may have been generated by a realization that irrational thinking was still present when recounting recent events (Bond & Dryden, 1997). Another possible explanation for an increase in irrational beliefs is the timing of REPDMS/PDMS session; an important factor to consider (Holt & Dunn 2006). PDMS is likely to heighten emotional intensity if delivered at important stages of the season when the salience of personal goals and associated emotional vulnerability is enhanced (cf. Lazarus, 1991). This may explain the increase in irrational beliefs scores after the REPDMS/PDMS as sessions took place in the middle of the triathlon race season. Future research could explore the timing of REPDMS/PDMS sessions and the influence this can have on irrational beliefs and emotions during competition season.

This study also demonstrated changes in self-determined motivation throughout and following the REBT education sessions. Statistical analyses showed that participants in both groups reported increases in SDI as the intervention went on, with the highest SDI scores appearing in the latter parts of the intervention. That is, statistical data analysis revealed that the greatest increases in SDI occurred in the latter stages of the intervention, and it is clear from the visual analyses that for both

groups, the largest increases in self-determined motivation (as indicated using the SDI) occurred following the completion of the five REBT education sessions, and the REPDMS or PDMS session. The pattern of increases in SDI across the five timepoints was comparable between the two groups and statistical analyses revealed no significant between-groups effects. However, one difference in SDI changes between the two groups occurred at timepoint 5. At timepoint 5 the REBT+REPDMS reported a slight decrease in SDI whilst the REBT+PDMS group reported a stabilization in SDI scores. Increments in self-determined motivation are generally in line with the decreases in irrational beliefs found in the current study. For example, medium-large reductions in CIB from baseline through to timepoint 3 (completion of REBT education) are complimented by small-medium increases in SDI in that same period. However, whilst SDI continues to increase from timepoint 3 to 4, CIB increases towards baseline levels in both groups. This suggests that the REPDMS and PDMS sessions served to further increase SDI whilst having very little, or a detrimental, effect on irrational beliefs. However, in the final timepoint at a one-month follow-up, small changes (or more accurately maintenance effects) are shown for both CIB and SDI. Overall, the data suggests that REBT education triggered some changes in self-determined motivation in the hypothesized direction, and that REPDMS and PDMS led to further increased in self-determined motivation.

Increases in self-determined motivation alongside complimentary reductions in irrational beliefs following REBT education sessions, suggest a potential relationship between the two constructs. Specifically, since less-self determined motivation reflects a sense of pressure and perceived obligation to engage in an activity (controlled motivation; Reeve, 2012), it makes sense that as irrational beliefs reduce there might be a consequent reduction in controlled motivation, captured in

this study by increased in self-determined motivation. One extrinsic motivation type is particularly salient with regards to irrational beliefs, namely introjected regulation, where action is controlled by self-imposed sanctions such as to avoid shame and guilt or to attain ego-enhancement such as pride. Introjected regulation represents regulation by contingent self-esteem (Deci & Ryan, 1995; 2000) in which an individual engages in a particular activity not because they want to, but because they 'should' (Standage, Duda, & Ntoumanis, 2005). This is of particular interest due to its potential relationship with irrational beliefs (Turner, 2016a; Van Wijhe et al., 2013) and can be further characterized by an individual internalizing external regulations and having a perception that 'I should' or 'I have to' engage in an activity. Indeed, the perception that one should or ought to engage in an activity is considered a hallmark of introjected regulation (e.g., Gillison, Osborn, Skevington, & Standage, 2009). The language of "should" and "have to" is common in REBT literature (Ellis & Dryden, 1997), and echoes PIB. Therefore, in the current study, as PIBs were challenged and reduced, a parallel change in self-determined motivation occurred. That is, participants were encouraged to challenge and abandon beliefs that reflect 'shoulds' and 'ought tos', which may have simultaneously reduced PIBs as well as controlled motivation types.

The finding in the current study that whilst irrational beliefs begin to return to baseline after the REPDMS and PDMS sessions, self-determined motivation continues to increase, may suggest the process of REPDMS/PDMS itself was beneficial to more autonomous motivation types. Indeed, the social connection promoted through PDMS (e.g., Evans, Slater, Turner, & Barker, 2013) may enhance perceptions of relatedness, an important basic psychological need posited with in the basic needs theory of SDT (Deci & Ryan, 2000). As well as the OIT, SDT also

incorporates three basic psychological needs, which are considered nutriments essential for psychological growth (Ryan & Deci, 2008). *Autonomy* concerns feeling volitional and congruent with respect to what one does (Ryan & Deci, 2004), *competence* concerns feeling effective in ones actions (Deci, 1975), and *relatedness* refers to having a sense of belonging within ones community (Deci & Ryan, 1991). In the current study, participants may have felt an increased sense of relatedness through experiencing perceptions of support and acceptance amongst peers because they felt socially connected within that setting (Cox, Duncheon, & McDavid, 2009). Increased basic psychological needs satisfaction are proposed to encourage greater self-determined motivation (Ryan, Williams, Patrick, & Deci, 2009) therefore it may be that the increased relatedness fostered through PDMS may have served to further increase the self-determined motivation of participants. However, without measures of basic psychological needs satisfaction in the present study, this assertion while plausible, is conjecture that should be investigated in future research.

The two approaches of REBT and PDMS have rarely been used in conjunction with each other with past research reporting the application of REBT (Turner et al., 2015) and PDMS (Evans et al., 2013) separately, with the exception of one study (Vertopoulos & Turner, 2017). Based on the data from the current study, between-groups differences in intervention effects across the timepoints did not emerge, but in contrast to the current paper, Vertopolous and Turner found a reduction in irrational beliefs after an REBT+REPDMS intervention. With a dearth of literature in this area, there is an opportunity to reflect on REPDMS. The REPDMS process allows participants to focus their talks on the specific REBT framework; that is participants were able to talk about events that triggered irrational beliefs, generated from ‘A’. Participants were encouraged to begin their talks at ‘A’ and then focus on what beliefs

('B') caused their emotions at 'C'. All participants commented on the importance of the final session, with one participant stating that it was perhaps "the most important" session of all. Increased camaraderie and hearing what others had to say made a difference to participants. The process of delivering a speech can enhance participants' feelings of relatedness (Windsor, Barker, & McCarthy 2011; Barker, Evans, Coffee, Slater, & McCarthy, 2014) and evidence suggests that having feelings of relatedness during sport sessions can enhance motivation (Gagné et al., 2003). Social validation data supports this, with one participant reporting they felt "more understood", and another "realizing that all triathletes, no matter how experienced and successful they are, have the same issues-that helped me". Therefore, maintained reductions in extrinsic motivation and further reductions in amotivation may be a result of social factors rather than maintenance or further changes in irrational beliefs.

The finding that REBT can reduce irrational beliefs and increase self-determined motivation presents some potentially important practical implications for practitioners. For example, whilst extant literature demonstrates that individuals in autonomy-supportive environments report greater enjoyment, positive affect, satisfaction and psychological adjustment relative to controlling contexts (e.g., Cooper, Okamura, & McNeil, 1995; Black & Deci, 2000), the current study shows how changes to individual beliefs and cognitions, rather than environmental factors, can bring about motivational changes. Indeed, significant literature proposes that autonomy-supportive coaching styles (by a person in authority; Occhino, Clifford, Mallett, Rynne, & Carlisle, 2014) encourage adaptive forms of motivation and positive athlete outcomes (e.g., increased persistence, improved performance; Mageau & Vallerand, 2003). The current study demonstrates how personal, rather than environmental, factors can be influenced to encourage more autonomous motivation.

This is important because individuals may not have the opportunity or ability to alter the environments in which they train and perform, but can have volition over how they choose to think and believe. REBT offers a potential self-regulation strategy for self-determined motivation that is driven by the individual athlete. As such, as well as helping athletes to hold more self-determined motives through disputing controlled regulation types (e.g., "I must train"), REBT may also enhance the autonomy felt by athletes regarding their emotion and behavior management. To explain, a key outcome of REBT is to enable the individual to exercise volition over their thoughts, emotions, and behaviors (Turner, 2016a), rather than feeling that their psychological wellbeing is dictated by external factors. In addition, REBT is a humanistic approach that encourages athletes to challenge their own thoughts and beliefs, which may contribute to an enhanced perception of needs satisfaction, particularly autonomy needs. Therefore, practitioners should emphasize the volitional aspects of REBT and encourage athletes to take responsibility over their thoughts, emotions, and behaviours, including those pertaining to their motives.

There are several limitations of the current study that if addressed would strengthen the findings. First, this study does not represent a full and detailed analysis of how irrational beliefs may or may not relate to self-determined motivation, and a cross-sectional approach using correlational and longitudinal methods would help to more fully understand the causal relationships between irrational beliefs and self-determined motivation. Although parallel changes in irrational beliefs and self-determined motivation was evident, a deeper exploration of how irrational beliefs interact with the specific types of autonomous and controlling motivation would offer a clearer understanding of how REBT and OIT may complement each other. Researchers (Turner, 2016a; Van Wijhe et al., 2013) have inferred that irrational

beliefs could be related to introjected regulation, however there is no data to support this assertion to date. Related to the need for a more comprehensive study of irrational beliefs and OIT, future research should include a more complete measure of self-determined motivation than included in the present study. Specifically, we used the SMS to measure self-determined motivation, which excludes integrated regulation, whereas newer measures such as the SMS-II (Pelletier et al., 2013) include this important motivation regulation type.

Although a single-case study design was adopted and is considered robust (e.g., Barker et al., 2011), there were aspects of its application that could be improved for future research. Firstly, single-case guidelines suggest that eight weeks of baseline data be collected (e.g., Turner et al., 2014). Participants' schedules could not accommodate such a lengthy baseline phase alongside the planned REBT intervention. Secondly, there was no control group and participants were selected using purposive sampling. To strengthen the study, participants could be selected based on motivation rather than irrational beliefs. Also, whilst novel in sport and exercise literature, the multiple-component design (ABC) employed in the current study did not protect against potential carryover effects from REBT education (B) to REPDMS or PDMS (C). Future research may consider alternating the order of REBT education and REPDMS delivery so that order and carryover effects can be accounted for. However, the authors encourage researchers to adopt more sophisticated single-case designs, such as multiple-baseline across-participants designs (e.g., Turner & Barker, 2013) where intervention effects can be assessed more robustly. Finally, due to the small sample size, the statistical data analysis should be interpreted with caution.

To conclude, the present study is the first published study to explore the effects of REBT on irrational beliefs and self-determined motivation in triathletes,

thus contributing to the growing research concerning the use of REBT within sport settings. It also addresses recent proposals that REBT can influence different types of motivation in athletes (Turner, 2016a) and explores the use of the previously under-considered method of REPDMS. It is hoped that the present study encourages other practitioners to explore the effects of REBT education on the self-determined motivation of athletes.

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Table 1. Means (*SD*) and effect sizes (*d*) for irrational performance beliefs (CIB, PIB, AWF, LFT, DEP), and self-determined motivation across time-points for group A (REBT+REPDMS).

GROUP A	Means (*SD*)					Cohen's *d*				
	BAS	TP2	TP3	TP4	TP5	Bas-TP2	TP2-TP3	TP3-TP4	TP4-TP5	Bas-TP5
CIB	24.38 (*2.47*)	20.48 (*3.27*)	15.48 (*5.83*)	22.02 (*5.33*)	22.25 (*9.36*)	1.35	1.06	1.17	.03	.31
PIB	28.62 (2.87)	24.62 (3.91)	18.46 (*9.19*)	31.23 (*7.84*)	27.69 (*10.87*)	1.17	.87	1.50	.37	.12
AWF	28.38 (*3.69*)	23.38 (*5.04*)	17.62 (*6.98*)	24.38 (*7.31*)	25.31 (*11.46*)	1.17	.95	1.50	.10	.36
LFT	24.69 (*3.92*)	19.85 (*4.74*)	15.62 (*7.42*)	20.00 (*7.07*)	22.00 (*9.48*)	1.11	.68	.60	.24	.37
DEP	15.45 (*5.19*)	14.08 (*4.15*)	10.23 (*4.69*)	12.46 (*6.17*)	14.00 (*8.86*)	.29	.87	.41	.20	.20
SDI	-2.72 (*13.90*)	.03 (*13.83*)	5.64 (*10.64*)	19.82 (*17.94*)	16.15 (*19.54*)	.20	.45	.96	.20	1.11

Table 2. Means (*SD*) and effect sizes (*d*) for irrational performance beliefs (CIB, PIB, AWF, LFT, DEP), and self-determined motivation across time-points for group B (REBT+PDMS).

GROUP B	Means (*SD*)					Cohen's *d (Mean change*)				
	BAS	TP2	TP3	TP4	TP5	Bas-TP2	TP2-TP3	TP3-TP4	TP4-TP5	Bas-TP5
CIB	22.77 (*2.80*)	18.30 (*3.50*)	14.95 (*3.36*)	17.98 (*5.79*)	18.36 (*7.26*)	1.41	.98	.64	.06	.80
PIB	25.91 (*3.53*)	22.00 (*3.41*)	20.00 (*4.31*)	26.00 (*8.12*)	25.00 (*9.03*)	1.13	.51	.92	.12	.13
AWF	27.36 (*3.67*)	20.73 (*4.38*)	15.45 (*4.46*)	17.64 (*6.53*)	19.36 (*9.45*)	1.64	1.19	.39	.21	1.12
LFT	22.73 (*4.29*)	17.45 (*3.96*)	14.73 (*5.04*)	17.00 (*6.68*)	17.18 (*7.80*)	1.28	.60	.38	.02	.88
DEP	15.09 (*6.46*)	13.00 (*5.25*)	9.64 (*3.32*)	11.27 (*5.04*)	11.91 (*5.22*)	.36	*.76*	.38	.12	.54
SDI	5.58 (*13.19*)	8.86 (*14.32*)	10.68 (*12.21*)	22.51 (*13.60*)	22.95 (*17.17*)	.24	.14	.92	.03	1.13