

Using Rational Emotive Behavior Therapy (REBT) with Mixed Martial Arts (MMA) Athletes to Reduce Irrational Beliefs and Increase Unconditional Self-Acceptance

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Abstract The reported application of rational emotive behavior therapy (REBT) with athletes is growing but remains scarce within sport psychology literature. This study used a single-case multiple-baseline across participants design to investigate the effects of REBT on irrational self-depreciation beliefs and unconditional self-acceptance (USA) with three male mixed martial arts (MMA) athletes. Visual and statistical analyses indicate a reduction in total irrationality and self-depreciation and an increase in USA, which was maintained at 6 months post-REBT for two of the three athletes. Social validation data revealed positive changes in emotion management and performance in all athletes. The mechanisms by which REBT promoted changes in self-depreciation and USA are discussed as are recommendations regarding the future implementation of REBT with athletes.

Keywords Case study · Applied sport psychology · Counseling · Intervention · Combat sports

Introduction

Developed by Albert Ellis, Rational-Emotive Behavior Therapy (REBT; Ellis 1962, 1984) is an active-directive evidence-based, cognitive behavioral model (David et al. 2010) which helps people deal effectively with distress, achieved by actively-directively disputing irrational beliefs, and then endorsing and maintaining rational beliefs, behaviors, and emotional reactions. According to REBT, there are four core types of irrational beliefs that cause dysfunctional emotions and maladaptive behaviors; demandingness (“I must be accepted”), awfulizing (“it is awful to fail”),

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low-frustration tolerance (LFT; “I can’t stand unfair treatment”) and self/other-depreciation (“because I have failed, I am a complete failure”; Dryden 2009). Also, the fundamental technique of REBT during practice is the disputation of irrational beliefs and endorsement of rational beliefs, thus promoting functional emotions and adaptive behaviors (Ellis and Dryden 1997). Irrational beliefs are associated with dysfunctional emotions such as feelings of anger and shame, and psychopathological conditions including depression, anxiety, and suicidal thoughts (for a review see Browne et al. 2010), as well as maladaptive behaviors such as social avoidance, self-harming, procrastination, anger suppression, aggression, and violence (for a review see Szentagotai and Jones 2010). In parallel, there are four core rational beliefs; preferences (“I want to be accepted, but don’t have to be”), anti-awfulizing (“it is bad to fail, but not awful”), high-frustration tolerance (LFT; “I can stand unfair treatment”) and self/other-acceptance (“I am not a complete failure, just because I have failed”; Dryden 2009).

REBT is applicable to athletes who present with irrational beliefs as the main cause of dysfunctional emotions and behaviors and it is possible to assess and target specific core irrational and rational beliefs when working with athletes. The extant literature (see Turner 2014, for review) has reported reductions in athlete irrational beliefs through REBT, but has not yet focused on the disputation of specific irrational beliefs or the promotion of specific rational beliefs. We conducted a needs analysis with three mixed martial arts (MMA) athletes who were the focus of this paper. Our analysis suggested that they would benefit from learning to recognize and dispute self-depreciating beliefs and from learning to adopt a philosophy of unconditional self-acceptance (USA; Ellis 1977).

MMA is a full-contact combat sport allowing striking and grappling techniques, both standing and on the ground, from various combat sports and martial arts. MMA is highly physically demanding, with high injury rates (228.7 injuries per 100 fights; Lystad et al. 2014), and fatalities sometimes occur. Indeed, research has found that accepting pain and psychological distress are perceived as part of the training process for MMA athletes (Massey et al. 2013). Due to the high-risk nature of the sport (such as permanent injury or death), individuals have also expressed a shared concern for burning out from training as well as fearing the impact of losing fights on their social identity (Vaccaro et al. 2011). Fear is a fundamental element in the thinking of MMA fighters; two studies (Harpold 2008; Vaccaro et al. 2011) suggest that fear of failure and a focus on creating fear in opponents are the two main concerns expressed by MMA athletes. Both fear avoidance and ego-oriented performance motivations have been linked to negative emotions (e.g., Bartels and Herman 2011) and destructive behaviors such as self-handicapping (e.g., Midgley et al. 1996). Exaggerated fear of events that are not physically dangerous arises from irrational appraisals. Caution for physically dangerous events arises from rational appraisals (Ellis 1985). Vaccaro et al. (2011) identified some of the ways MMA fighters attempt to manage fear, for example by accepting the outcome of any fight as a valuable learning experience, and also pretending that the fight is like a video game thus reducing fear of an opponent. Acceptance is consistent with REBT and is especially evident in the promotion of USA (the A stands for acceptance), but distraction, such as in the video game strategy, suggests that the athletes are

attempting to reappraise the importance of the event, which is not the main goal of REBT. However, no study has reported the application of psychological reframing or cognitive restructuring such as those used in REBT with MMA athletes, therefore the utility of REBT with MMA athletes is unknown. Because past research indicates that acceptance may be a valuable strategy for MMA athletes, and that the athletes in this current study presented with self-depreciation beliefs, we tested the use of REBT to reduce self-depreciation and increase USA among MMA athletes. Self-depreciation is one of the four core irrational beliefs in REBT and is considered one of the mechanisms that differentiate between the dysfunctional emotion of depression and a healthy level of sadness (David et al. 2005). Adverse events will trigger depression if a person is self-depreciating or self-blaming, while adverse events will probably trigger sadness if a person is not self-depreciating or self-blaming. Depression is, of course, unhealthy, while sadness is often healthy. Thus, self-depreciation has been strongly associated with emotional disturbance and negative affect during adverse events (e.g., Szentagotai and Jones 2010), and is considered a major predictor of depression (David et al. 2002). For athletes in particular, self-depreciation beliefs (e.g., I am useless/a failure/worthless) are particularly salient because they will likely face many adverse career experiences including injury, rejection, and retirement. Any of these events could, in combination with self-depreciating beliefs, trigger depression. In contrast, research indicates that self-acceptance can prevent depression among athletes facing adversity (Falek and Britton 1974; Mills 1993). That is, the management of self-depreciation beliefs in athletes might be important for healthy responses to adversity, and it is possible to target specific beliefs such as self-depreciation via the use of REBT. In particular, through REBT an individual who presents with irrational self-depreciation beliefs can be helped to dispute those beliefs and replace them with USA beliefs.

USA (Ellis 1977) reflects unconditional regard for oneself despite undesirable behaviors and adverse events (e.g., rejection, failure). USA includes the acceptance of oneself regardless of the approval, respect or love received from other people (Hill et al. 2008). USA reflects the tendency to rate one's behavior and not the self as a whole (e.g., "My performance was poor in this competition" rather than "I am a failure"). This is in contrast to self-depreciation where the individual devalues him or herself as a whole because of undesirable outcomes (e.g., failure) or behavior (MacInnes 2003). Also, in contrast to self-depreciation, USA is negatively related to depression and anxiety (Chamberlain and Haaga 2001). Therefore, rather than focus solely on the reduction of irrational beliefs as past research has done (e.g., Turner and Barker 2013), a greater focus on the promotion of rational beliefs such as USA is warranted.

Given the potential harmful effect of self-depreciation beliefs (e.g., Szentagotai and Jones 2010) and the potential benefits of USA (e.g., Chamberlain and Haaga 2001), the use of REBT to dispute self-depreciation and encourage USA (Dryden and Neenan 2004) may be an important strategy for enhancing and maintaining athlete well-being, and for helping athletes to fulfill their potential. The use of REBT in sport has been reported sparingly in research literature, but broadly shows that REBT is effective in reducing anxiety (Elko and Ostrow 1991; Turner and

Barker 2013) in reducing negative perceptions of anxiety symptoms (Larner 2008), and in helping to facilitate performance (Bernard 1985). Although research reflects a promising growth of REBT use in sport, no study has yet focused on specific core irrational beliefs (such as self-depreciation) and rational beliefs (such as USA), and no study has assessed the effects of REBT with combat sports athletes. Further, MMA has only more recently become a mainstream sport in 1980 (CV Productions), suggesting an apparent need for more research into the psychology of MMA athletes.

The current study offers a single-case analysis of the effects of REBT on self-depreciation and USA beliefs in three MMA athletes. The focus on self-depreciation and USA beliefs in this study was driven by a needs analysis conducted with the athletes. During the initial consultation with the coach it emerged that the MMA athletes were often putting themselves down, being too hard on themselves, and “beating themselves up” in training and in competition. This resonates with the literature on self-depreciation in REBT (e.g., see Dryden 2009) and prompted the investigation of USA by the authors. It was felt that confirming the presence of irrational beliefs and testing the effects of the REBT intervention on self-depreciation required an additional test of a specific and contrasting rational belief (Terjesen et al. 2009) such as USA. In line with REBT and sport literature, we expected USA to increase at the onset of REBT, accompanied by decreased self-depreciation.

Methods

Participants

Three semi-professional male MMA athletes ($M_{\text{age}} = 23.67$, $SD = 2.52$) were put forward for assessment by their coach, who expressed concerns about the athletes' psychological approach to performance. Specifically, the coach was concerned that participant 1 showed high levels of self-condemnation, participant 2 had a tendency to ‘talk himself out of a fight’ before the event had even taken place, and participant 3 was not progressing due to being overly self-critical. The coach also indicated that participant 2 had difficulty in recognizing his potential, while participant 3 was extremely self-limiting about transitioning from low profile to high profile fights. These coach observations are symptomatic of self-depreciation beliefs. Each athlete was then contacted by the first author, informed of the purpose of the intervention, and offered the opportunity to take part. The coach's comments and initial discussion with the athletes formed part of a needs analysis, which also included the completion of an online inventory packet measuring irrational beliefs and USA. Needs analysis indicated that the athletes displayed sufficient irrational beliefs ($M > 2.51$) and self-depreciation beliefs ($M > 1.66$) to warrant REBT intervention (see Turner and Barker 2014). This research was approved by the University ethics panel and by the coach. Each athlete gave informed, written consent for his participation.

Measures

Unconditional Self-Acceptance (USA)

The Unconditional Self-Acceptance Questionnaire (USAQ; Chamberlain and Haaga 2001) is based on defining self-worth by accepting oneself without the need for approval from others and regardless of personal accomplishments (Ellis 1985). The USAQ consists of 20 items that are measured on a 7-point Likert-scale. Participants are required to rate how often each statement is true about themselves, from 1 (*almost always untrue*) to 7 (*almost always true*). Eleven items are reverse-scored, with final scores based on the sum total of all 20 items. The USAQ demonstrated a moderate internal consistency ($\alpha = .72$) in the original validation study (Chamberlain and Haaga 2001). Rewording of three problematic items improved internal consistency ($\alpha = .86$). Research has found inverse relationships between self-acceptance and irrational beliefs (Davies 2008), anxiety (Chamberlain and Haaga 2001) and depressive mood states (Scott 2007). The scale achieved a moderate internal consistency ($\alpha = .77$) for the current sample.

Irrational Beliefs

The Shortened General Attitudes Beliefs Scale (SGABS) provides a brief measure of beliefs that has good test–retest reliability ($r = .91$; Lindner et al. 1999) and good construct, criterion, concurrent, convergent, and discriminant reliability (MacInnes 2003). The SGABS contains 26 statements comprising of 7 sub-scales and assesses both rationality (1 sub-scale) and irrationality (6 sub-scales). An average is calculated for each of the subscales, by dividing the total scores of each subscale by the number of items in the scale (Lindner et al. 1999). Respondents are required to rate their agreement on a 5-point Likert-scale from 1 (*strongly disagree*) to 5 (*strongly agree*). A specific focus for this study was the subscale self-depreciation. Total irrationality is computed based on the total sum of the irrationality sub-scales alone with higher scores indicating more irrational beliefs of a greater intensity. Cronbach's alphas for the current sample ranged between .63–.91 for total irrationality and .72–.93 for self-depreciation.

Social Validation

There is limited research about athlete and coach assessments of interventions, especially where change in athletic behavior is concerned (Barker et al. 2011). Based on previous research (Page and Thelwell 2013), we conducted semi-structured interviews with the athletes and their coach using a brief, open-ended questionnaire. Basic content analysis was used to identify themes in their responses using guidelines developed by Downe-Wamboldt (1992) and Mellalieu et al. (2009). To assess the stability of athlete and coach beliefs, a brief, client-led discussion was held 2 weeks after the initial brief interview.

Design

A single-case, multiple-baseline across participants design was adopted for data collection and analyses of intervention effects (Barker et al. 2013). Past REBT in sport research has also adopted this approach (e.g., Turner and Barker 2013), as it affords an in-depth investigation into a small number of athletes, as would often be the case in applied practice. It was anticipated that a combined quantitative and qualitative analysis would provide further insight into irrational beliefs management in athletes and the practice of REBT with athletes. Three participants are considered an adequate sample size for the implementation of a single-case design (Kazdin 1982). The multiple-baseline-across-participants design is characterized by an A (baseline phase) B (intervention phase) design where the timing of the intervention is staggered across participants. Specifically, participant 1 received the intervention at week 3, participant 2 received the intervention at week 5, and participant 3 received the intervention at week 4. This staggered approach enhances the conviction that observed effects are a function of the intervention rather than extraneous variables (Kazdin 1982). Additionally participants were asked not to discuss the study with each other during baseline to avoid cross-participant contamination. Three baseline data points are recommended as the minimum for single case multiple baseline/across-participants designs (Kazdin 2011).

Data Collection

Initially, participants completed the SGABS and USAQ as part of the needs analysis. Then, each participant completed the SGABS via an online system developed using the Qualtrics web-based development system, until self-reported irrational beliefs showed a level of consistency (indicating a stable baseline had been achieved; Barker et al. 2011; Kazdin 2011). Participants continued to complete the questionnaire each week throughout baseline and intervention phases. The practitioner contacted each participant on a weekly basis to encourage adherence. The SGABS and USAQ were also administered at a two-week post-intervention follow up to assess whether the intervention effects had been maintained, and at 6 months post-intervention to assess longer-term changes in the targeted variables. To be clear, the USAQ was completed once at each phase (baseline, post-intervention, and 6-month follow-up), while the SGABS was completed weekly throughout all phases, and then once again at the 6-month follow-up phase. Completion of the USAQ was limited to pre, post, and follow-up intervention phases to ensure clients were not overloaded with questions. Further to this, we administered the SGABS weekly because we were more confident in the use of the SGABS for repeated measurement, due to excellent test–retest validity (Cronbach's $\alpha = .91$) compared to the USAQ for which there is at present no published test–retest data (Hill et al. 2008). The SGABS has been used more frequently in applied sport psychology research (e.g. Bernard 1985; Elko and Ostrow 1991; Marlow 2009) while this is the first study known to date to apply USA as a specific test of a specific rational belief with athletes.

Intervention

The REBT intervention included four one-to-one REBT sessions delivered with video calls using the web-based package, Skype, as suggested by Cotterill and Symes (2014). Electronic forms of therapy have previously proven to be effective (e.g., Bewick et al. 2008) with Skype providing the additional benefit of maintaining face-to-face interaction with athletes, who like these athletes, were in distant locations (Bergman et al. 2003). Skype was used instead of face-to-face meetings due to athlete location and availability. The REBT intervention followed recently published guidelines from prominent literature (e.g., David et al. 2010; Dryden and Branch 2008), to ensure consistency in intervention delivery and adherence to the REBT process. To help standardize the REBT intervention across participants and to ensure the REBT ABCDE process was adhered to, each session adhered to a framework that guided the content. The lead practitioner used the ABCDE framework under the guidance of the second author who is also an accredited REBT practitioner in order to ensure the approach was standardized.

An initial discussion was conducted with the athlete to discuss performance concerns and to explore their irrational beliefs. Participants were asked to keep a diary of their thoughts in and/or relating to their training and competition, including thoughts they could recall from training and competition episodes. Their diaries further confirmed the athletes' self-depreciation beliefs, particularly around 'being good enough' for participant 1 and 2, and regarding attention to failure in participant 3. The subsequent sessions implemented the REBT ABCDE process. Athletes were encouraged to understand that their beliefs (B) cause emotional and behavioral consequences (C) not activating events (A) alone, and that they can dispute (D) their irrational beliefs to promote more functional emotional and behavioral effects (E). The intervention started with a training (or psychoeducational) phase during the first meeting in which the athlete learned about the ABCDE process. Once this concept was fully understood the athlete identified the A in the second session, discussed the related irrational beliefs (B) and how these were linked with unhealthy emotions/behaviors (C) normally in the third session. Beliefs relating to self-depreciation were disputed (D) and rational beliefs generated in collaboration with the practitioner in the concluding session. During the disputation phase the practitioner worked with the athletes to establish greater acceptance through less rigid self-appraisal. The athlete's social context was also explored to identify other potential triggers of self-depreciation and to enhance adaptability in the presence of adversity. Homework assignments were administered after each meeting. These consisted of practical tasks and self-help worksheets based on the proceeding session. Finally the last session focused on reinforcing independent use of the ABCDE process, and provided a review of the coping strategies the athlete had developed during REBT. For clarity, examples of this process for each individual are described in the following passages.

Participant 1: Being Good Enough for ‘Home’ Fights

Participant 1 was experiencing anxiety (C) concerning fighting a ‘home’ fight, and was depreciating himself about his perceived inability to win a ‘home’ fight (A). In the initial discussion, he stated that he always loses when fighting at ‘home’, which was holding him back from securing more prestigious matches, which would result in him being a failure (B). When REBT commenced, the athlete had a fight scheduled for 8 weeks hence, but was already contemplating pulling out since it was at home, demonstrating the kind of avoidance commonly associated with anxiety. This upcoming fight provided a focus for the athlete during the REBT sessions. He was especially anxious (C) about his children seeing him fail “...when there’s people you know, they want you to win. When you don’t know anyone you can just get on with it, focus on the match and be done with it.” He was preoccupied with the belief that failing in front of his family would seal his fate as a failure. He also felt that the anxiety he was experiencing was to blame for his coach not selecting him for more high profile fights. REBT focused on disputing his self-depreciation beliefs, also helping the athlete to realize that it was not the home match itself that was causing his anxiety, but the views he held about this situation. To explore Unhealthy Negative Emotions (UNEs) and Healthy Negative Emotions (HNEs), we also compared his emotions and behaviors in ‘home’ fights versus his emotions and behaviors in ‘away’ fights. He was able to see how his emotions were more helpful for performance in ‘away’ fights, because he did not endorse self-depreciation beliefs in relation to ‘away’ fights. The athlete was able to challenge his irrational beliefs by recognizing that losing in front of his family did not make him a failure (D). He was encouraged to understand that his self-depreciation beliefs were not pragmatic, in part because they caused UNEs that impeded his performance, and his commitment to training (D). After REBT his coach commented on the positive changes he saw in the athlete’s behaviors, commenting that he had witnessed an increase in this athlete’s confidence (E). As a result, the coach offered participant 1 a chance to compete in a televised title fight.

Participant 2: Wanting to Do Well by Avoiding Training/Decision Making

Participant 2 was distracted and anxious (C) about having to make the decision of whether to go to college or not (A). He believed that making the wrong decision would mean he was a failure (B). Also, he felt that the inability to address this decision was preventing him from making progress in MMA training (A), which as a result would make him a failure (B). He believed that he would not be a successful student or successful professional athlete, described himself as being ‘stuck’, and he reported that instead of planning for his studies or training he had taken on extra hours at work (C). The athlete admitted that the debilitating pressure he felt from his self-depreciation beliefs regarding these larger life decisions had led him to miss a lot of training time. During REBT, instead of being controlled by the pressure of the decision, he was encouraged to see that it was ultimately his decision and that the pressure was being caused by his beliefs, rather than external events. He was encouraged to understand that the incorrect decision would not mean he was a

failure, and that this belief was actually inhibiting him from making a decision (D). After disputation the athlete still felt apprehensive about his decision, was unhappy with his lack of training, but was able to accept that making the 'wrong' decision wouldn't mean he was a failure (E). As a result, he started to look at this period within the wider context of his longer term plans, reminding himself of why he had considered further study and why he became an MMA athlete (E). He worked on challenging his irrational beliefs that he was a failure for not committing to training, and that making a 'bad' decision about further study would have dire consequences. He also worked on replacing his irrational beliefs with rational beliefs, that his decisions do not reflect the whole self, and that his lack of commitment just shows that he is fallible and human, rather than a failure.

Participant 3: Focus on Failure Even When Training Hard

Participant 3 felt that he was a failure (B) because he was not fighting at an elite level (A). This athlete was training very hard and following a very strict dietary program, feeling the need to train at every session being offered in his gym, also undertaking a separate strength training program. He did not view this high level of discipline and commitment as a valuable attribute, but instead could only focus on the fact that he was not yet at elite level and that unless this was the case, he was a failure (B). This was leading to fatigue and depressive mood states, seemingly affecting the athlete's mental well-being (C). REBT with this athlete helped him to question his irrational self-depreciation beliefs, and encouraged him to re-examine what he perceived were the requirements of being an elite athlete. When asked to consider why he held these beliefs, he could not remember how the beliefs were formed, but endorsed the truth of those beliefs. He was challenged to provide evidence of a real MMA fighter who met his strict criteria (D), but he could not produce any. He was able to realize that no individual is without their flaws, and all MMA athletes, and human beings, take time out of performing and that does not make them failures. He then realized he was comparing himself to a fictitious role model and began to understand how this was becoming unhealthy. He began to endorse the rational belief that not meeting his perfectionistic standards did not make him a failure, and began to accept that his current level of performance was admirable, and showed demonstrated pride and enthusiasm about his current progress as an athlete (E).

Analytic Strategy

Visual Analysis

Visual analysis alone has been criticized for lacking in inter-rater reliability (Wampold and Furlong 1981) and therefore may be susceptible to the misrepresentation of data. But small effects in single-case research may have major theoretical implications (Barker et al. 2013) Therefore, to determine whether REBT had an effect on self-depreciation and USA, data were visually analysed

(Ottenbacher 1986), based on the recommendations of Parsonson and Baer (1978, in Barker et al. 2013). Briefly, intervention effects were compared to stable baseline levels, with immediacy of change and low number of overlapping data points considered preferable, and the consideration of the overall pattern of change. Data for SGABS subscales were plotted for each participant to assess changes across time points. For brevity and because of the intervention focus, graphs were plotted for total irrationality (Fig. 1) and self-depreciation (Fig. 2) only.

Statistical Analysis

Intervention effects were assessed as recommended for use in single-case designs (Barker et al. 2013). Effect Size (ES) was calculated using Cohen's d , where $M_1 - M_2$ provides the difference between the mean pre- and post-test scores. SD_1 refers to the mean standard deviation of pre-intervention scores and SD_2 is the mean standard deviation of post-intervention scores:

$$\text{Cohen's } d = \text{Cohen's } d = M_1 - M_2 / SD_{\text{pooled}}$$

$$(\text{where } SD_{\text{pooled}} = \sqrt{(SD_1^2 + SD_2^2) / 2})$$

Cohen (1992) suggested specific categories for effect size interpretation with .2 as small, .5 as medium and .8 as large, although this originates from group research. In an assessment of single-case AB designs Parker and Vannest (2009) determined that $<.87$ indicated a small effect while $.87-2.67$ suggested a medium effect and a large effect being anything >2.67 . Therefore the latter was selected for this analysis because single-cases (athletes) were assessed.

To determine whether the magnitude of change for each participant was also statistically reliable, the present analysis included calculating the Reliable Change Index (RCI; Jacobson and Truax 1991) for total irrationality, self-depreciation and USA. The RCI is the difference between the participants' pre- and post-test scores divided by the *Standard Error of the Difference* (SE_D ; Jacobson and Truax 1991). If the value of the RCI greater than 1.96, then the probability that the change in score is random is less than .05. RCI values are provided for each individual on total irrationality, self-depreciation, and USA in Table 1.

Total Irrationality

Overall there was a significant, $t(2) = 3.25$, $p = .05$, reduction in total irrationality across participants from pre- ($M = 3.65$, $SD = .61$) to post-intervention ($M = 3.28$, $SD = .61$). According to Lindner et al. (1999) scores above 2.37 indicate that total irrationality is above the population mean. Therefore the intervention appeared to reduce total irrationality below this level for Participant 2 only. Participant 1 was already below this threshold and although Participant 3's total irrationality score decreased, it remained high relative to the population mean.

Participant 1 showed a small decrease ($d = .17$) in total irrationality from pre- ($M = 3.19$, $SD = .06$) to post-intervention ($M = 3.08$, $SD = .06$), where response scores initially decreased from the baseline phase with the lowest score immediately

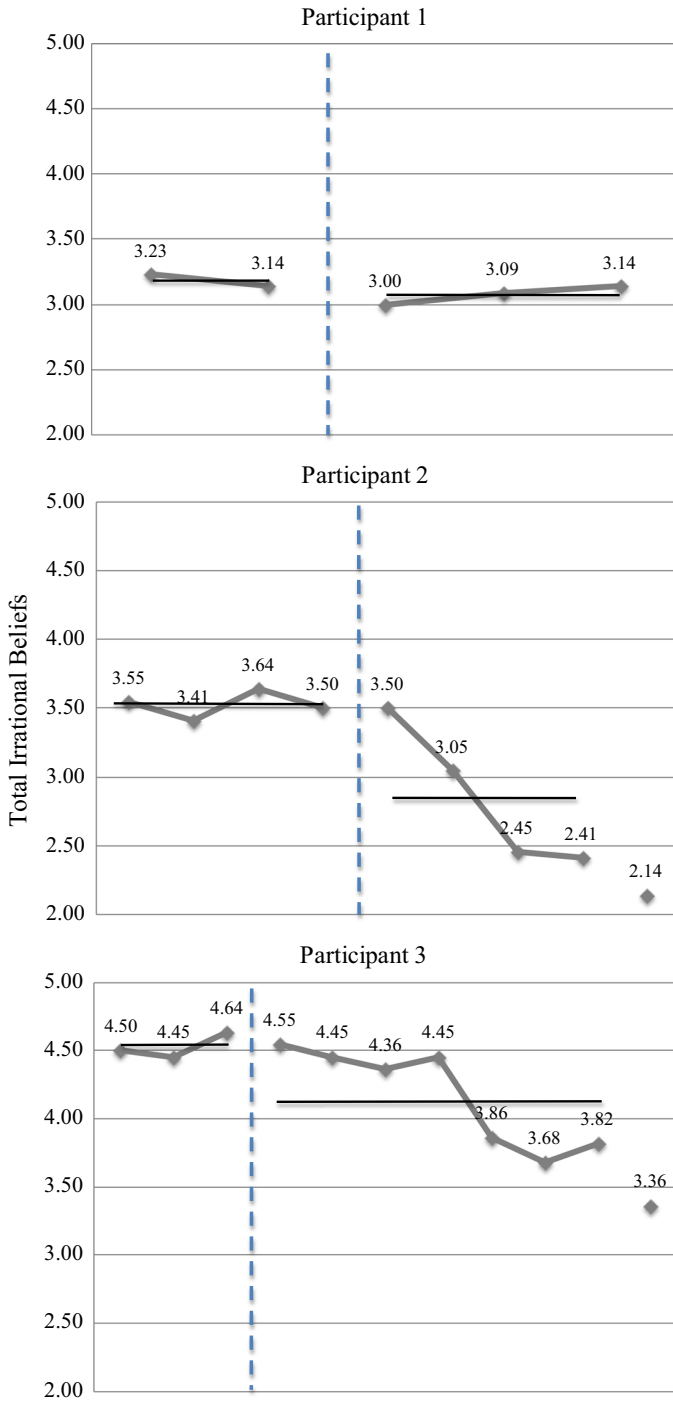


Fig. 1 Total irrational beliefs scores across intervention phases for all participants

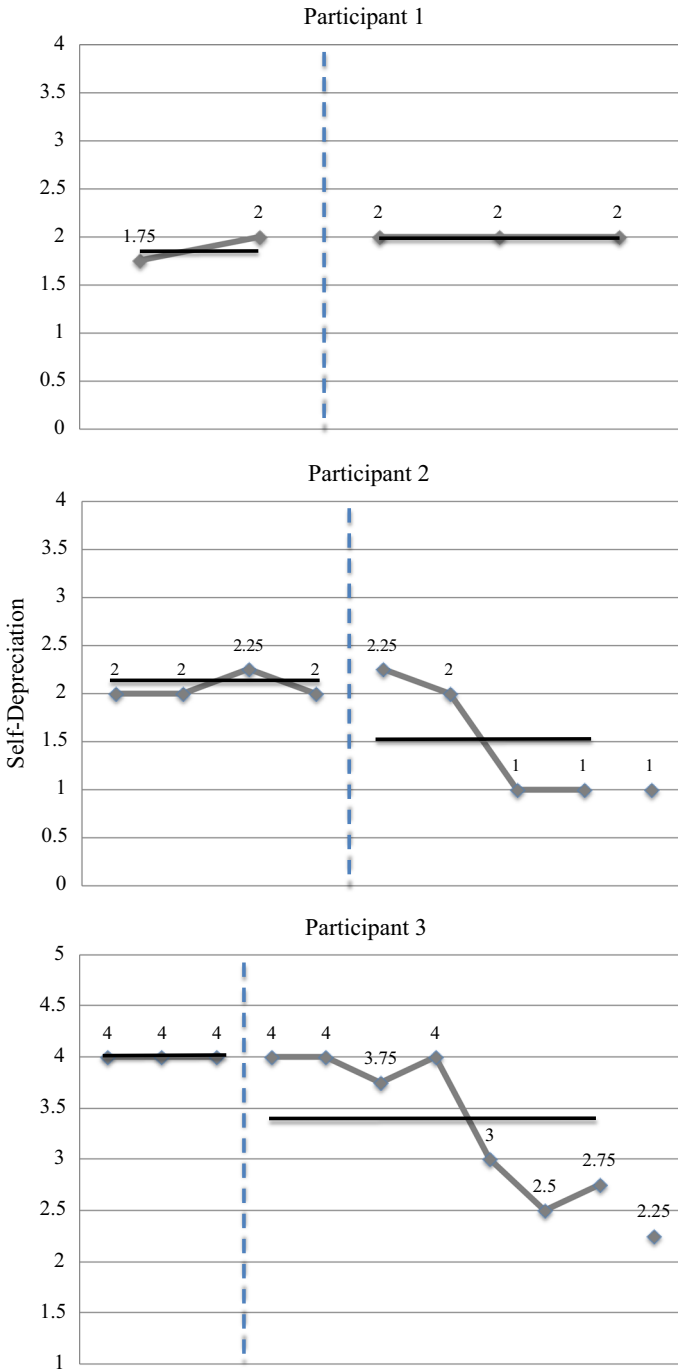


Fig. 2 Self-depreciation scores across intervention phases for all participants

Table 1 Irrational Beliefs, self-depreciation, and USA scores ($M \pm SD$) from pre- to post-REBT, and post- to follow-up for all participants, Reliable Change Indices (RCI), and Cohen's d

Irrational beliefs	Participant	Pre-REBT ($M \pm SD$)	Post-REBT ($M \pm SD$)	RCI (.95) CI	Effect size (d)	6 months follow-up
Total irrational beliefs	1	3.19 \pm .06	3.08 \pm .07	-.19	.17	-
	2	3.53 \pm .10	2.86 \pm .52	-1.17	1.79	2.14
	3	4.53 \pm .10	4.18 \pm .36	-.61	1.32	3.36
Self-depreciation	1	1.88 \pm .18	2.00 \pm .00	.14	-.94	-
	2	2.07 \pm .13	1.56 \pm .66	-.58	1.07	2.14
	3	4.00 \pm .00	3.43 \pm .66	-.65	1.22	3.36
USA	1	86	96	.61	-	-
	2	57	71	.85	-	77
	3	84	118	2.06	-	122

following intervention delivery. Participant 1 did not complete the 6-month follow-up data point. Participant 2 demonstrated a medium decrease ($d = 1.79$) in irrational beliefs from before the intervention ($M = 2.06$, $SD = .13$) to the final session ($M = 1.56$, $SD = .66$) and a decrease from post- to follow-up phases. A stable baseline was achieved and there was an immediate reduction in scores following the introduction of the intervention. Participant 3 showed a medium decrease ($d = 1.32$) in irrational beliefs from pre- ($M = 4$, $SD = 0$) to post-REBT ($M = 3.43$, $SD = .66$) and a decrease from post- to follow-up phases, where the biggest decrease did not occur until the second week of the intervention. RCIs indicated non-significant changes in total irrationality from pre- to post-REBT for all participants.

Self-Depreciation

Overall there was a small and non-significant, $t(2) = 2.24$, $p = .11$, reduction in self-depreciation beliefs across participants from pre- ($M = 2.61$, $SD = .96$) to post-intervention ($M = 2.25$, $SD = .82$). According to Lindner et al. (1999) scores above 1.47 indicate that self-depreciation is above the population mean. All participants remained above this threshold despite a decrease in both participants 2 and 3.

Participant 1 demonstrated a small increase ($d = -.94$) in self-depreciation beliefs from pre- ($M = 1.88$, $SD = .18$) to post-intervention ($M = 2$, $SD = 0$). Although data overlapped by 60 % between intervention phases, and a stable baseline was not achieved. Participant 1 did not complete the 6-month follow-up data point. Participant 2 showed a medium decrease ($d = 1.07$) from pre- ($M = 2.06$, $SD = .13$) to post-REBT ($M = 1.56$, $SD = .66$), and a moderate decrease from post- to follow-up phases. There was a stable baseline, although the change did not

occur immediately following the intervention. Participant 3 displayed a medium decrease ($d = 1.22$) in self-depreciation from pre- ($M = 4$, $SD = 0$) to post-REBT ($M = 3.43$, $SD = .66$), and a 34 % decrease from post- to follow-up phases. Again baseline stability was achieved but effects did not occur immediately after the intervention was introduced. RCIs indicated non-significant changes in self-depreciation from pre- to post-REBT for all participants.

Unconditional Self-Acceptance

Overall the intervention had a positive but non-significant effect, $t(2) = -2.60$, $p = .12$, on USA scores in all participants from pre- ($M = 75.67$, $SD = 16.20$) to post-REBT ($M = 95$, $SD = 23.52$). Normative data suggests that USA scores below 82.78 represent low USA (Chamberlain and Haaga 2001). Only participant 3's post-REBT remained below the population mean.

Participant 1 (pre = 86, post = 96), participant 2 (pre = 57, post = 71), and participant 3 (pre = 84, post = 118) all demonstrated an increase in USA scores from pre- to post-REBT. Participant 2 showed the largest increase. At the 6-month follow-up phase participant 2 (77) and participant 3 (122) experienced an increase in USA from post-intervention. Participant 1 did not respond to the 6-month follow-up. RCIs indicated that only participant 3's increase in USA was significant ($RCI = 2.06$).

Social Validation

A brief qualitative interview was carried out with each participant and the coach. Broadly, the interview comprised questions concerning how the effectiveness of the sessions, perceived changes post-intervention, and perceived ability to use REBT independently. Using basic content analysis (Mellalieu et al. 2009) the recorded interviews were coded for both manifest and latent content. This was identified by assessing data for the presence of recurrent themes: control, reflection, decrease in unhealthy thoughts/emotions, and perception of enhanced athletic performance

Control

The semi-structured interviews indicated that all participants felt more in control of their respective weaknesses. Participant 1 changed from being too anxious to fight to remarking that, "it's no different than in the gym... just another guy, just another fight". He also reported enhanced self-belief and motivation, "I'm finding the diet really hard, I'm so low on energy trying to make weight... I know though, if I stick to it I'll make the weigh in". Participant 3 used the REBT process to gain control over his training progress. He no longer associated the activating event (A) with an unhealthy response (C). Instead he was able to identify that he had previously been engaging in self-depreciation, evident in the perception that he was not good enough when unable to stick to the 'perfect' diet for achieving elite performance (B). Through REBT the participant was able to recognize that his self-worth is not dependent on whether he can execute his nutrition plan or not. This functioned as

his new rational beliefs (E), demonstrating a healthier approach to his diet plan. He stated, “Break it down, make a plan... see if I can change things, and if I can’t, let it go...” The coach confirmed the presence of increased sense of control amongst athletes. “He’s [participant 3] just doing what he needs to do...focused on the task”

Reflection

All participants recognized their old behaviors in other fighters within the gym, and commented on witnessing others go through similar anxieties such as “energy wasting” worries in the pre-fight process. Participants 1 and 3 particularly commented on their ability to question themselves when they experienced dissatisfaction with performance. They used this self-assessment to improve performance and accept losses as part of the process of becoming an elite athlete. Participant 1 described his new experience on fight day, “As far as I’m concerned, it’s an opportunity... I watched the guys sitting there, seeing them look worried and thought that’s how I used to be... Now I take myself to a quiet spot, focus my thoughts”

Decrease in Unhealthy Thoughts/Emotions

Participant 1 reported feeling that he was able to accept change and he had less debilitating emotional responses. Participant 2 reported being able to remain motivated when he was training. This athlete also indicated the impact the REBT had on all aspects of his life, including reduced anxiety in making career decisions he had been putting off for some time. The coach believed the athletes were less worked up about getting things right and instead were able to focus on improving.

Perception of Enhanced Athletic Performance

Participant 1 spoke of “good days and bad days” in training but in his last win demonstrated the ability to make his opponent “fight my [his] fight”. He explained this as using his strengths to capitalize on his opponent’s weaknesses. Participant 3 was able to recognize where he was in his long-term plan to becoming an elite athlete. He was able to recognize his current skills instead of continual striving to be as good as those at the “top of their game” which previously lead to procrastination and disappointment in the self. The coach also recognized that these athletes sought less confirmation of good performance from him, and although participant 3 still wanted to gain his respect, checking to see whether he had done something right or wrong had become less frequent.

Discussion

The purpose of this study was to examine the effects of REBT, on self-depreciation and USA in MMA athletes. This is the first study to focus on self-depreciation and USA in an athlete population, and the first to apply REBT with MMA athletes.

Based on visual and statistical analyses the results indicate that for two participants the intervention was able to reduce self-depreciation and increase USA as hypothesized. Participant 1's irrational beliefs scores showed only marginal change at the end of the intervention, and he did not complete the follow-up inventories. However, participant 1 expressed greater acceptance of failure in the social validation data. While it is theoretically plausible that self-depreciation and USA are negatively related, this may not be the case for all people. In participants 2 and 3, self-depreciation decreased from baseline and remained reduced at the 6-month follow-up phase. This finding supports the vast literature advocating the use of REBT to reduce irrational beliefs (e.g., see David et al. 2005 for a full synopsis), and specifically within the domain of sport psychology (e.g., Lerner 2008; Turner and Barker 2013). Social validation confirmed the reduction of self-depreciation and increase in USA, alongside various positive effects of the intervention such as enhanced emotional control and performance. However it is important to note that although effect sizes calculated using Cohen's *d* (Cohen 1992) indicated small to medium changes from pre- to post-REBT, RCIs did not meet the criteria set by Jacobson and Truax (1991) to indicate significant intervention effects.

This is the first study to focus on the self-depreciation beliefs of athletes and the impact of REBT on reducing self-depreciation beliefs. Rather than reacting to failure with "I am a failure" beliefs, athletes instead react with "I may have failed but that does not mean I am a failure" beliefs. Adopting low self-depreciation beliefs can help athletes to react to adversity with functional emotions and behaviors such as sadness and acute withdrawal, rather than dysfunctional emotions and behaviors such as depression and chronic withdrawal (e.g., David et al. 2002; Szentagotai and Jones 2010). This may be of particular salience to MMA athletes where a culture of fear not only exists, but is often promoted (Harpold 2008; Vaccaro et al. 2011). The findings of this study may help to develop effective strategies for managing fear in MMA athletes, although more research is required.

Notably, USA increased in all three participants, even in participant 1 who showed a small and unstable increase in self-depreciation. The increases in USA in participants 2 and 3 could be related to the decreases in self-depreciation, but for participant 1 it may be that his self-depreciation beliefs were unrelated to his USA beliefs. In REBT it is possible to harbor both irrational and rational beliefs (e.g., Ellis and Dryden 1997). Therefore, just because participant 1 did not hold high self-depreciation beliefs at baseline, it does not mean that he held high USA beliefs. For participant 3, RCIs for USA did indicate reliable change and therefore suggest that the inclusion of this measure with MMA athletes could be a useful indicator of whether an intervention decreased irrational, and increased rational beliefs. It may be that the discrepancy in RCIs between the SGABS scores and USAQ scores indicates the use of the SGABS with this population needs to be refined in future research.

In contrast to self-depreciation, USA reflects unconditional regard for oneself despite undesirable behavior and adverse events. Previous research outside of the sport psychology literature has found that self-depreciation involves intensive self-evaluation, which opposes USA. This can lead to negative emotions such as depression (Scott 2007) and thought consequences such as self-blame and self-

criticism (Hill et al. 2008) and may increase the propensity for narcissism, self-centeredness and downward social comparison (Neff 2003). Therefore, it is perhaps unsurprising that with reductions in self-depreciation beliefs found in this study, increases in USA were also evident.

It should also be noted that while reducing self-depreciation to augment USA was the specific focus of the REBT intervention with the athletes, changes in total irrationality were also detected. Participant 2 and 3 both showed a meaningful decrease in total irrationality, which is a composite of various types of irrational beliefs described in REBT theory. The finding that other irrational beliefs can be reduced by focusing on very specific irrational beliefs (such as self-depreciation) is consistent with past research in sport (e.g., Turner and Barker 2014) and may suggest that irrational beliefs are interconnected. For example, the reduction in self-depreciation beliefs may also reduce need for achievement, because the demand for success may be negated by the increased acceptance of failure. In addition, a reduction in self-depreciation beliefs may also lead to reduced need for achievement beliefs if at an individual level, demandingness is less prevalent in some athletes. This interconnectedness is referred to as the “spillover effect” at the beliefs level in that point, and is mentioned extensively in the REBT literature (e.g. David et al. 2010). Again, for participant 1 the reduction in total irrationality was very small despite increases in USA. This may further support the notion that irrational beliefs are not necessarily related to rational beliefs and therefore may be relatively orthogonal (i.e., they do not correlate highly; Ellis et al. 2010).

The use of a single-case design in this paper allowed for idiosyncratic observations of each participant before, during, and after the REBT intervention and via social validation. For example, although Participant 1 did not demonstrate quantitative reductions in irrational beliefs, he expressed being able to now accept his weaknesses, recognize his strength, and focus on becoming a professional fighter. Indeed, an awareness of personal failures is considered part of the process of moving from unhealthy to healthy self-appraisal (Driscoll 1989; Dryden and Neenan 2004). Participant 2 reported a high estimation of his performance, along with reduced anxiety (in sport and in life), which has previously been associated with engaging in self-blame and selective attention to failures (Dunn et al. 2006). Participant 3 gained a new understanding that his peers and significant others would not be disappointed in him should he lose a fight. This irrational fear was originally holding him back from entering a competition, and it appeared he no longer believed that being a successful athlete required winning every fight. By challenging the cognitive evaluation of an event and not the event per se, or the emotional outcome, participant 3 was able to accept his failings as part of the process of becoming an elite MMA fighter.

Appropriate evaluation of practice is considered a key issue in applied sport psychology literature (Grove et al. 1999; Streat and Roberts 1992). Therefore, as well as reporting the effects of the REBT intervention on belief variables, drawing on the lead author’s reflections, it was possible to provide evaluation of the REBT intervention. Overall, it appeared that the REBT intervention had a positive effect on the athletes, some of which were reflected in questionnaire data, and some of which were reflected in social validation data.

Using Skype as a means to deliver REBT was the most practical option given the geographical distance between practitioner and participants (Cotterill and Symes 2014). Therefore it was possible to conduct sessions at a convenient time for the participants, and more personal face-to-face communication was possible (compared to telephone communication). Skype sessions could be conducted cost-effectively, without travel, and changed at short notice, adding flexibility to the intervention. However, the delivery of efficient sessions depended in part on a stable Internet connection. The use of Skype was a unique feature of this study that allowed the practitioner to work with each participant in a counseling style as close to a traditional face-to-face delivery as was feasible. Because REBT is in essence a humanistic approach, the fostering of empathy, warmth, and respect are important aspects of delivering effective REBT (Ellis and Dryden 1997). Positive changes in participant's beliefs may have been facilitated by core conditions postulated by Rogers (1959), but specific changes in irrational beliefs would not be anticipated without the application of REBT. In applied sport psychology, intervention effectiveness is believed to rely on providing individualized treatment in a systematic way (Barker et al. 2013). Although some of the effects found in this study may be attributable in part to the development of a strong working relationship, specific changes can be attributed to the REBT intervention.

The development of a strong working relationship did facilitate greater depth of understanding of the athlete's experience and a sense of context that often reflected the trends in the visual analysis. Indeed, maintaining professional, high quality practitioner-participant interactions was especially important given that sessions were delivered using Skype (Cropley et al. 2007).

The present study is limited in several ways. Although the multiple-baseline across-participants design adopted here is considered to be robust (e.g., Barker et al. 2013), there were aspects of its application in this study that could be improved for future research. For example, single-case guidelines suggest that 8 weeks of baseline data be collected (e.g., Turner et al. 2014). These athletes' schedules could not accommodate such a lengthy baseline phase with the planned REBT intervention. In addition, although the measures used are valid and reliable questionnaires that have been used in sporting contexts (e.g., Hill et al. 2008; Turner et al. 2014), they are not sport specific. Future research may benefit from confirming the validity of these for use with athlete populations, or developing an irrational beliefs measure for use with athlete populations (e.g., Turner et al. 2016). Further, only four REBT sessions were conducted with the athletes in this study, although is typical in sport (e.g., Turner and Barker 2013), more sessions would allow greater breadth and depth of REBT with each athlete, particularly participant 1 who did not respond as hypothesized to the intervention as hoped. REBT and other therapeutic approaches used in sport must reconcile practicality and thoroughness in applied settings.

In conclusion, an REBT intervention focused on reducing self-depreciation in MMA athletes was found to be effective in reducing self-depreciation, increasing USA, and reducing irrational beliefs in general for two of the three participants. In addition, changes in participants 2 and 3 were maintained for 6-months following the REBT intervention. For one participant, only USA changed in the hypothesized direction. The results of this study also suggest that REBT was able to bring about

positive changes in emotional management and performance, recorded using social validation methods. This is the first study to focus on the self-depreciation and USA beliefs of athletes, and the first study to apply REBT with MMA athletes. Working with MMA athletes broadens the base of sports to which interventions have been applied and enlarges the athlete populations and sports that have been treated. Changes in self-depreciation and USA were not uniform across participants, indicating a greater need for understanding the individual differences in how REBT might be applied with different athletes. Future research might develop sport specific measures of irrational beliefs (e.g., Turner et al. 2016) and conform more rigorously to single-case guidelines for extended data collection period. REBT use is relatively novel within sport psychology. Hopefully, this paper will encourage more frequent use of REBT in sport psychology literature.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

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