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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 six 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

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

53 Developed by Albert Ellis, Rational-Emotive Behavior Therapy (REBT; Ellis, 1962; 1994) is
54 an active-directive evidence-based, cognitive behavioral model (David, Lynn, & Ellis, 2010)
55 which helps people deal effectively with distress, achieved by actively-directively disputing
56 irrational beliefs, and then endorsing and maintaining rational beliefs, behaviors, and
57 emotional reactions. According to REBT, there are four core types of irrational beliefs that
58 cause dysfunctional emotions and maladaptive behaviors; demandingness (“I must be
59 accepted”), awfulizing (“it is awful to fail”), low-frustration tolerance (LFT; “I can’t stand
60 unfair treatment”) and self/other-depreciation (“because I have failed, I am a complete
61 failure”; Dryden, 2009). Also, the fundamental technique of REBT during practice is the
62 disputation of irrational beliefs and endorsement of rational beliefs, thus promoting functional
63 emotions and adaptive behaviors (Ellis & Dryden, 1997). Irrational beliefs are associated with
64 dysfunctional emotions such as feelings of anger and shame, and psychopathological
65 conditions including depression, anxiety, and suicidal thoughts (for a review see Browne,
66 Dowd, & Freeman, 2010), as well as maladaptive behaviors such as social avoidance, self-
67 harming, procrastination, anger suppression, aggression, and violence (for a review see
68 Szentagotai & Jones, 2010). In parallel, there are four core rational beliefs; preferences (“I
69 want to be accepted, but don’t have to be”), anti-awfulizing (“it is bad to fail, but not awful”),
70 high-frustration tolerance (LFT; “I can stand unfair treatment”) and self/other-acceptance (“I
71 am not a complete failure, just because I have failed”; Dryden, 2009).

72 REBT is applicable to athletes who present with irrational beliefs as the main cause of
73 dysfunctional emotions and behaviors and it is possible to assess and target specific core
74 irrational and rational beliefs when working with athletes. The extant literature (see Turner,
75 2014, for review) has reported reductions in athlete irrational beliefs through REBT, but has

76 not yet focused on the disputation of specific irrational beliefs or the promotion of specific
77 rational beliefs. We conducted a needs analysis with three mixed martial arts (MMA) athletes
78 who were the focus of this paper. Our analysis suggested that they would benefit from
79 learning to recognize and dispute self-depreciating beliefs and from learning to adopt a
80 philosophy of unconditional self-acceptance (USA; Ellis, 1977).

81 MMA is a full-contact combat sport allowing striking and grappling techniques, both
82 standing and on the ground, from various combat sports and martial arts. MMA is highly
83 physically demanding, with injury rates are high (228.7 injuries per 100 fights; Lystad,
84 Gregory, & Wilson, 2014), and fatalities sometimes occur. Indeed, research has found that
85 accepting pain and psychological distress are perceived as part of the training process for
86 MMA athletes (Massey, Meyer, & Naylor, 2013). Due to the high-risk nature of the sport
87 (such as permanent injury or death), individuals have also expressed a shared concern for
88 burning out from training as well as fearing the impact of losing fights on their social identity
89 (Vaccaro, Shrock & McCabe, 2011). Fear is a fundamental element in the thinking of MMA
90 fighters; two studies (Harpold, 2008; Vaccaro et al., 2011) suggest that fear of failure and a
91 focus on creating fear in opponents are the two main concerns expressed by MMA athletes.
92 Both fear avoidance and ego-oriented performance motivations have been linked to negative
93 emotions (e.g., Bartels & Herman, 2011) and destructive behaviors such as self-handicapping
94 (e.g., Midgley, Arunkumar, & Urdan, 1996). Exaggerated fear of events that are not
95 physically dangerous arises from irrational appraisals. Caution for physically dangerous
96 events arises from rational appraisals (Ellis, 1995). Vaccaro et al. (2011) identified some of
97 the ways MMA fighters attempt to manage fear, for example by accepting the outcome of any
98 fight as a valuable learning experience, and also pretending that the fight is like a video game
99 thus reducing fear of an opponent. Acceptance is consistent with REBT and is especially
100 evident in the promotion of USA (the A stands for acceptance), but distraction, such as in the

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

126 USA (Ellis, 1977) reflects unconditional regard for oneself despite undesirable
127 behaviors and adverse events (e.g., rejection, failure). USA includes the acceptance of oneself
128 regardless of the approval, respect or love received from other people (Hill, Hall, Appleton, &
129 Kozub, 2008). USA reflects the tendency to rate one's behavior and not the self as a whole
130 (e.g., "My performance was poor in this competition" rather than "I am a failure"). This is in
131 contrast to self-depreciation where the individual devalues him or herself as a whole because
132 of undesirable outcomes (e.g., failure) or behavior (MacInnes, 2003). Also, in contrast to self-
133 depreciation, USA is negatively related to depression and anxiety (Chamberlain & Haaga,
134 2001). Therefore, rather than focus solely on the reduction of irrational beliefs as past
135 research has done (e.g., Turner & Barker, 2013), a greater focus on the promotion of rational
136 beliefs such as USA is warranted.

137 Given the potential harmful effect of self-depreciation beliefs (e.g., Szentagotai &
138 Jones, 2010) and the potential benefits of USA (e.g., Chamberlain & Haaga, 2001), the use of
139 REBT to dispute self-depreciation and encourage USA (Dryden & Neenan, 2004) may be an
140 important strategy for enhancing and maintaining athlete well-being, and for helping athletes
141 to fulfill their potential. The use of REBT in sport has been reported sparingly in research
142 literature, but broadly shows that REBT is effective in reducing anxiety (Elko & Ostrow,
143 1991; Turner & Barker, 2013) in reducing negative perceptions of anxiety symptoms (Larner,
144 2008), and in helping to facilitate performance (Bernard, 1985). Although research reflects a
145 promising growth of REBT use in sport, no study has yet focused on specific core irrational
146 beliefs (such as self-depreciation) and rational beliefs (such as USA), and no study has
147 assessed the effects of REBT with combat sports athletes. Further, MMA has only more
148 recently become a mainstream sport in 1980 (CV Productions), suggesting an apparent need
149 for more research into the psychology of MMA athletes.

175 and USA. Needs analysis indicated that the athletes displayed sufficient irrational beliefs (M
176 > 2.51) and self-depreciation beliefs ($M > 1.66$) to warrant REBT intervention (see Turner &
177 Barker, 2014). This research was approved by the University ethics panel and by the coach.
178 Each athlete gave informed, written consent for his participation.

179 **Measures**

180 **Unconditional Self-Acceptance (USA).** The Unconditional Self-Acceptance
181 Questionnaire (USAQ; Chamberlain & Haaga, 2001) is based on defining self-worth by
182 accepting oneself without the need for approval from others and regardless of personal
183 accomplishments (Ellis, 1995). The USAQ consists of 20 items that are measured on a 7-
184 point Likert-scale. Participants are required to rate how often each statement is true about
185 themselves, from 1 (*almost always untrue*) to 7 (*almost always true*). Eleven items are
186 reverse-scored, with final scores based on the sum total of all 20 items. The USAQ
187 demonstrated a moderate internal consistency ($\alpha = .72$) in the original validation study
188 (Chamberlain & Haaga, 2001). Rewording of three problematic items improved internal
189 consistency ($\alpha = .86$). Research has found inverse relationships between self-acceptance and
190 irrational beliefs (Davies, 2006), anxiety (Chamberlain & Haaga, 2001; Stankovic &
191 Vukosavljevic-Gvizden, 2001) and depressive mood states (Scott, 2007; Stankovic &
192 Vukosavljevic-Gvizden, 2001). The scale achieved a moderate internal consistency ($\alpha = .77$)
193 for the current sample.

194 **Irrational Beliefs.** The Shortened General Attitudes Beliefs Scale (SGABS) provides
195 a brief measure of beliefs that has good test-retest reliability ($r = .91$; Lindner et al., 1999) and
196 good construct, criterion, concurrent, convergent, and discriminant reliability (MacInnes,
197 2003). The SGABS contains 26 statements comprising of 7 sub-scales and assesses both
198 rationality (1 sub-scale) and irrationality (6 sub-scales). An average is calculated for each of
199 the subscales, by dividing the total scores of each subscale by the number of items in the scale

200 (Linder, Kirkby, Wertheim, & Birch, 1999). Respondents are required to rate their agreement
201 on a 5-point Likert-scale from 1 (*strongly disagree*) to 5 (*strongly agree*). A specific focus for
202 this study was the subscale self-depreciation. Total irrationality is computed based on the total
203 sum of the irrationality sub-scales alone with higher scores indicating more irrational beliefs
204 of a greater intensity. Cronbach's alphas for the current sample ranged between .63 - .91 for
205 total irrationality and .72 - .93 for self-depreciation.

206 **Social Validation**

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

215 **Design**

216 A single-case, multiple-baseline across participants design was adopted for data
217 collection and analyses of intervention effects (Barker, Mellalieu, McCarthy, Jones, & Moran,
218 2013). Past REBT in sport research has also adopted this approach (e.g., Turner & Barker,
219 2013), as it affords an in-depth investigation into a small number of athletes, as would often
220 be the case in applied practice. It was anticipated that a combined quantitative and qualitative
221 analysis would provide further insight into irrational beliefs management in athletes and the
222 practice of REBT with athletes. Three participants are considered an adequate sample size for
223 the implementation of a single-case design (Kazdin, 1982). The multiple-baseline-across-
224 participants design is characterized by an A (baseline phase) B (intervention phase) design

225 where the timing of the intervention is staggered across participants. Specifically, participant
226 1 received the intervention at week 3, participant 2 received the intervention at week 5, and
227 participant 3 received the intervention at week 4. This staggered approach enhances the
228 conviction that observed effects are a function of the intervention rather than extraneous
229 variables (Kazdin, 1982). Additionally participants were asked not to discuss the study with
230 each other during baseline to avoid cross-participant contamination. Three baseline data
231 points are recommended as the minimum for single case multiple baseline/across-participants
232 designs (Kazdin, 2011).

233 **Data Collection**

234 Initially, participants completed the SGABS and USAQ as part of the needs analysis.
235 Then, each participant completed the SGABS via an online system developed using the
236 Qualtrics web-based development system, until self-reported irrational beliefs showed a level
237 of consistency (indicating a stable baseline had been achieved; Barker, et al., 2011; Kazdin,
238 2011). Participants continued to complete the questionnaire each week throughout baseline
239 and intervention phases. The practitioner contacted each participant on a weekly basis to
240 encourage adherence. The SGABS and USAQ were also administered at a two-week post-
241 intervention follow up to assess whether the intervention effects had been maintained, and at
242 six months post-intervention to assess longer-term changes in the targeted variables. To be
243 clear, the USAQ was completed once at each phase (baseline, post-intervention, and six-
244 month follow-up), while the SGABS was completed weekly throughout all phases, and then
245 once again at the six-month follow-up phase. Completion of the USAQ was limited to pre,
246 post, and follow-up intervention phases to ensure clients were not overloaded with questions
247 (Popper, 1959). Further to this, we administered the SGABS weekly because we were more
248 confident in the use of the SGABS for repeated measurement, due to excellent test-retest
249 validity (Cronbach's $\alpha = .91$) compared to the USAQ for which there is at present no

250 published test-retest data (Hill et al., 2008). The SGABS has been used more frequently
251 applied sport psychology research (e.g. Bernard, 1985; Elko & Ostrow, 1991; Marlow, 2009)
252 while this is the first study known to date to apply USA as a specific test of a specific rational
253 belief with athletes.

254 **Intervention**

255 The REBT intervention included four one-to-one REBT sessions delivered with video
256 calls using the web-based package, Skype, as suggested by Cotterill and Symes (2014).
257 Electronic forms of therapy have previously proven to be effective (e.g., Bewick, Trusler,
258 Mulhern, Barkham, & Hill, 2008) with Skype providing the additional benefit of maintaining
259 face-to-face interaction with athletes, who like these athletes, were in distant locations
260 (Bergman, Magnusson & El Khouri, 2003). Skype was used instead of face-to-face meetings
261 due to athlete location and availability. The REBT intervention followed recently published
262 guidelines from prominent literature (e.g., David, Lynn & Ellis, 2010; Dryden & Branch,
263 2008), to ensure consistency in intervention delivery and adherence to the REBT process. To
264 help standardize the REBT intervention across participants and to ensure the REBT ABCDE
265 process was adhered to, each session adhered to a framework that guided the content. The
266 lead practitioner used the ABCDE framework under the guidance of the second author who is
267 an accredited REBT practitioner in order to ensure the approach was standardized.

268 An initial discussion was conducted with the athlete to discuss performance concerns
269 and to explore their irrational beliefs. Participants were asked to keep a diary of their thoughts
270 in and/or relating to their training and competition, including thoughts they could recall from
271 training and competition episodes. Their diaries further confirmed the athletes' self-
272 depreciation beliefs, particularly around 'being good enough' for participant 1 and 2, and
273 regarding attention to failure in participant 3. The subsequent sessions implemented the
274 REBT ABCDE process. Athletes were encouraged to understand that their beliefs (B) cause

275 emotional and behavioral consequences (C) not activating events (A) alone, and that they can
276 dispute (D) their irrational beliefs to promote more functional emotional and behavioral
277 effects (E). The intervention started with a training (or psychoeducational) phase during the
278 first meeting in which the athlete learned about the ABCDE process. Once this concept was
279 fully understood the athlete identified the A in the second session, discussed the related
280 irrational beliefs (B) and how these were linked with unhealthy emotions/behaviors (C)
281 normally in the third session. Beliefs relating to self-depreciation were disputed (D) and
282 rational beliefs generated in collaboration with the practitioner in the concluding session.
283 During the disputation phase the practitioner worked with the athletes to establish greater
284 acceptance through less rigid self-appraisal. The athlete's social context was also explored to
285 identify other potential triggers of self-depreciation and to enhance adaptability in the
286 presence of adversity. Homework assignments were administered after each meeting. These
287 consisted of practical tasks and self-help worksheets based on the proceeding session. Finally
288 the last session focused on reinforcing independent use of the ABCDE process, and provided
289 a review of the coping strategies the athlete had developed during REBT. For clarity,
290 examples of this process for each individual are described in the following passages.

291 **Participant 1 – Being good enough for ‘home’ fights**

292 Participant 1 was experiencing anxiety (C) concerning fighting a ‘home’ fight, and
293 was depreciating himself about his perceived inability to win a ‘home’ fight (A). In the initial
294 discussion, he stated that he always loses when fighting at ‘home’, which was holding him
295 back from securing more prestigious matches, which would result in him being a failure (B).
296 When REBT commenced, the athlete had a fight scheduled for eight weeks hence, but was
297 already contemplating pulling out since it was at home, demonstrating the kind of avoidance
298 commonly associated with anxiety. This upcoming fight provided a focus for the athlete
299 during the REBT sessions. He was especially anxious (C) about his children seeing him fail

300 “...when there’s people you know, they want you to win. When you don’t know anyone you
301 can just get on with it, focus on the match and be done with it.” He was preoccupied with the
302 belief that failing in front of his family would seal his fate as a failure. He also felt that the
303 anxiety he was experiencing was to blame for his coach not selecting him for more high
304 profile fights. REBT focused on disputing his self-depreciation beliefs, also helping the
305 athlete to realize that it was not the home match itself that was causing his anxiety, but the
306 views he held about this situation. To explore Unhealthy Negative Emotions (UNEs) and
307 Healthy Negative Emotions (HNEs), we also compared his emotions and behaviors in ‘home’
308 fights versus his emotions and behaviors in ‘away’ fights. He was able to see how his
309 emotions were more helpful for performance in ‘away’ fights, because he did not endorse
310 self-depreciation beliefs in relation to ‘away’ fights. The athlete was able to challenge his
311 irrational beliefs by recognizing that losing in front of his family did not make him a failure
312 (D). He was encouraged to understand that his self-depreciation beliefs were not pragmatic, in
313 part because they caused UNEs that impeded his performance, and his commitment to
314 training (D). After REBT his coach commented on the positive changes he saw in the
315 athlete’s behaviors, commenting that he had witnessed an increase in this athlete’s confidence
316 (E). As a result, the coach offered participant 1 a chance to compete in a televised title fight.

317 **Participant 2 – Wanting to do well by avoiding training/decision making**

318 Participant 2 was distracted and anxious (C) about having to make the decision of
319 whether to go to college or not (A). He believed that making the wrong decision would mean
320 he was a failure (B). Also, he felt that the inability to address this decision was preventing
321 him from making progress in MMA training (A), which as a result would make him a failure
322 (B). He believed that he would not be a successful student or successful professional athlete,
323 described himself as being ‘stuck’, and he reported that instead of planning for his studies or
324 training he had taken on extra hours at work (C). The athlete admitted that the debilitating

325 pressure he felt from his self-depreciation beliefs regarding these larger life decisions had led
326 him to miss a lot of training time. During REBT, instead of being controlled by the pressure
327 of the decision, he was encouraged to see that it was ultimately his decision and that the
328 pressure was being caused by his beliefs, rather than external events. He was encouraged to
329 understand that the incorrect decision would not mean he was a failure, and that this belief
330 was actually inhibiting him from making a decision (D). After disputation the athlete still felt
331 apprehensive about his decision, was unhappy with his lack of training, but was able to accept
332 that making the ‘wrong’ decision wouldn’t mean he was a failure (E). As a result, he started
333 to look at this period within the wider context of his longer term plans, reminding himself of
334 why he had considered further study and why he became an MMA athlete (E). He worked on
335 challenging his irrational beliefs that he was a failure for not committing to training, and that
336 making a ‘bad’ decision about further study would have dire consequences. He also worked
337 on replacing his irrational beliefs with rational beliefs, that his decisions do not reflect the
338 whole self, and that his lack of commitment just shows that he is fallible and human, rather
339 than a failure.

340 **Participant 3 – Focus on failure even when Training Hard**

341 Participant 3 felt that he was a failure (B) because he was not fighting at an elite level
342 (A). This athlete was training very hard and following a very strict dietary program, feeling
343 the need to train at every session being offered in his gym, also undertaking a separate
344 strength training program. He did not view this high level of discipline and commitment as a
345 valuable attribute, but instead could only focus on the fact that he was not yet at elite level
346 and that unless this was the case, he was a failure (B). This was leading to fatigue and
347 depressive mood states, seemingly affective the athlete’s mental well-being (C). REBT with
348 this athlete helped him to question his irrational self-depreciation beliefs, and encouraged him
349 to re-examine what he perceived were the requirements of being an elite athlete. When asked

350 to consider why he held these beliefs, he could not remember how the beliefs were formed,
351 but endorsed the truth of those beliefs. He was challenged to provide evidence of a real MMA
352 fighter who met his strict criteria (D), but he could not produce any. He was able to realize
353 that no individual is without their flaws, and all MMA athletes, and human beings, take time
354 out of performing and that does not make them failures. He then realized he was comparing
355 himself to a fictitious role model and began to understand how this was becoming unhealthy.
356 He began to endorse the rational belief that not meeting his perfectionistic standards did not
357 make him a failure, and began to accept was that his current level of performance was
358 admirable, and showed demonstrated pride and enthusiasm about his current progress as an
359 athlete (E).

360 **Analytic Strategy**

361 **Visual Analysis**

362 Visual analysis alone has been criticized for lacking in inter-rater reliability (Wampold
363 & Furlong, 1981) and therefore may be susceptible to the misrepresentation of data. But small
364 effects in single-case research may have major theoretical implications (Barker et al., 2013)
365 Therefore, to determine whether REBT had an effect on self-depreciation and USA, data were
366 visually analysed (Ottenbacher, 1986), based on the recommendations of Parsonson and Baer
367 (1978, in Barker et al., 2013). Briefly, intervention effects were compared to stable baseline
368 levels, with immediacy of change and low number of overlapping data points considered
369 preferable, and the consideration of the overall pattern of change. Data for SGABS subscales
370 were plotted for each participant to assess changes across time points. For brevity and because
371 of the intervention focus, graphs were plotted for total irrationality (Figure 1) and self-
372 depreciation (Figure 2) only.

373 **Statistical Analysis**

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

$$379 \text{Cohen's } d = \text{Cohen's } d = M_1 - M_2 / SD_{\text{pooled}}$$

$$380 \text{(where } SD_{\text{pooled}} = \sqrt{(SD_1^2 + SD_2^2) / 2})$$

381
382 Cohen (1992) suggested specific categories for effect size interpretation with .2 as
383 small, .5 as medium and .8 as large, although this originates from group research. In an
384 assessment of single-case AB designs Parker and Vannest (2009) determined that $<.87$
385 indicated a small effect while $.87-2.67$ suggested a medium effect and a large effect being
386 anything >2.67 . Therefore the latter was selected for this analysis because single-cases
387 (athletes) were assessed.

388 To determine whether the magnitude of change for each participant was also
389 statistically reliable, the present analysis included calculating the Reliable Change Index
390 (RCI; Jacobson & Truax, 1991) for total irrationality, self-depreciation and USA. The RCI is
391 the difference between the participants' pre- and post-test scores divided by the *Standard*
392 *Error of the Difference* (SE_D ; Jacobson & Truax, 1991). If the value of the RCI greater than
393 1.96, then the probability that the change in score is random is less than .05. RCI values are
394 provided for each individual on total irrationality, self-depreciation, and USA in Table 1.

395 **Total irrationality**

396 Overall there was a significant, $t(2) = 3.25, p = .05$, reduction in total irrationality
397 across participants from pre- ($M = 3.65, SD = .61$) to post-intervention ($M = 3.28, SD = .61$).
398 According to Linder et al., (1999) scores above 2.37 indicate that total irrationality is above
399 the population mean. Therefore the intervention appeared to reduce total irrationality below

400 this level for Participant 2 only. Participant 1 was already below this threshold and although
401 Participant 3's total irrationality score decreased, it remained high relative to the population
402 mean.

403 Participant 1 showed a small decrease ($d = .17$) in total irrationality from pre- ($M =$
404 $3.19, SD = .06$) to post-intervention ($M = 3.08, SD = .06$), where response scores initially
405 decreased from the baseline phase with the lowest score immediately following intervention
406 delivery. Participant 1 did not complete the 6-month follow-up data point. Participant 2
407 demonstrated a medium decrease ($d = 1.79$) in irrational beliefs from before the intervention
408 ($M = 2.06, SD = .13$) to the final session ($M = 1.56, SD = .66$) and a decrease from post- to
409 follow-up phases. A stable baseline was achieved and there was an immediate reduction in
410 scores following the introduction of the intervention. Participant 3 showed a medium decrease
411 ($d = 1.32$) of in irrational beliefs from pre- ($M = 4, SD = 0$) to post-REBT ($M = 3.43, SD =$
412 $.66$) and a decrease from post- to follow-up phases, where the biggest decrease did not occur
413 until the second week of the intervention. RCIs indicated non-significant changes in total
414 irrationality from pre- to post-REBT for all participants.

415 **Self-Depreciation**

416 Overall there was a small and non-significant, $t(2) = 2.24, p = .11$, reduction in self-
417 depreciation beliefs across participants from pre- ($M = 2.61, SD = .96$) to post-intervention (M
418 $= 2.25, SD = .82$). According to Linder et al., (1999) scores above 1.47 indicate that self-
419 depreciation is above the population mean. All participants remained above this threshold
420 despite a decrease in both participants 2 and 3.

421 Participant 1 demonstrated a small increase ($d = -.94$) in self-depreciation beliefs from
422 pre- ($M = 1.88, SD = .18$) to post-intervention ($M = 2, SD = 0$). Although data overlapped by
423 60% between intervention phases, and a stable baseline was not achieved. Participant 1 did
424 not complete the 6-month follow-up data point. Participant 2 showed a medium decrease ($d =$

425 1.07) from pre- ($M = 2.06, SD = .13$) to post-REBT ($M = 1.56, SD = .66$), and a moderate
426 decrease from post- to follow-up phases. There was a stable baseline, although the change did
427 not occur immediately following the intervention. Participant 3 displayed a medium decrease
428 ($d = 1.22$) in self-depreciation from pre- ($M = 4, SD = 0$) to post-REBT ($M = 3.43, SD = .66$),
429 and a 34% decrease from post- to follow-up phases. Again baseline stability was achieved but
430 effects did not occur immediately after the intervention was introduced. RCIs indicated non-
431 significant changes in self-depreciation from pre- to post-REBT for all participants.

432 **Unconditional Self-Acceptance**

433 Overall the intervention had a positive but non-significant effect, $t(2) = -2.60, p = .12$,
434 on USA scores in all participants from pre- ($M = 75.67, SD = 16.20$) to post-REBT ($M = 95$,
435 $SD = 23.52$). Normative data suggests that USA scores below 82.78 represent low USA
436 (Chamberlain & Haaga, 2001). Only participant 3's post-REBT remained below the
437 population mean.

438 Participant 1 (pre = 86, post = 96), participant 2 (pre = 57, post = 71), and participant
439 3 (pre = 84, post = 118) all demonstrated an increase in USA scores from pre- to post-REBT.
440 Participant 2 showed the largest increase. At the six-month follow-up phase participant 2 (77)
441 and participant 3 (122) experienced an increase in USA from post-intervention Participant 1
442 did not respond to the six-month follow-up. RCIs indicated that only participant 3's increase
443 in USA was significant ($RCI = 2.06$).

444 **Social Validation**

445 A brief qualitative interview was carried out with each participant and the coach.
446 Broadly, the interview comprised questions concerning how the effectiveness of the sessions,
447 perceived changes post-intervention, and perceived ability to use REBT independently. Using
448 basic content analysis (Mellalieu et al., 2009) the recorded interviews were coded for both
449 manifest and latent content. This was identified by assessing data for the presence of recurrent

450 themes: control, reflection, decrease in unhealthy thoughts/emotions, and perception of
451 enhanced athletic performance

452 **Control.** The semi-structured interviews indicated that all participants felt more in
453 control of their respective weaknesses. Participant 1 changed from being too anxious to fight
454 to remarking that, “it’s no different than in the gym... just another guy, just another fight”.
455 He also reported enhanced self-belief and motivation, “I’m finding the diet really hard, I’m so
456 low on energy trying to make weight... I know though, if I stick to it I’ll make the weigh in”.
457 Participant 3 used the REBT process to gain control over his training progress. He no longer
458 associated the activating event (A) with an unhealthy response (C). Instead he was able to
459 identify that he had previously been engaging in self-depreciation, evident in the perception
460 that he was not good enough when unable to stick to the ‘perfect’ diet for achieving elite
461 performance (B). Through REBT the participant was able to recognize that his self-worth is
462 not dependent on whether he can execute his nutrition plan or not. This functioned as his new
463 rational beliefs (E), demonstrating a healthier approach to his diet plan. He stated, “Break it
464 down, make a plan... see if I can change things, and if I can’t, let it go...” The coach
465 confirmed the presence of increased sense of control amongst athletes. “He’s [participant 3]
466 just doing what he needs to do...focused on the task”

467 **Reflection.** All participants recognized their old behaviors in other fighters within the
468 gym, and commented on witnessing others go through similar anxieties such as “energy
469 wasting” worries in the pre-fight process. Participants 1 and 3 particularly commented on
470 their ability to question themselves when they experienced dissatisfaction with performance.
471 They used this self-assessment to improve performance and accept losses as part of the
472 process of becoming an elite athlete. Participant 1 described his new experience on fight day,
473 “As far as I’m concerned, it’s an opportunity... I watched the guys sitting there, seeing them

474 look worried and thought that's how I used to be... Now I take myself to a quiet spot, focus
475 my thoughts”

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

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

492 **Discussion**

493 The purpose of this study was to examine the effects of REBT, on self-depreciation
494 and USA in MMA athletes. This is the first study to focus on self-depreciation and USA in an
495 athlete population, and the first to apply REBT with MMA athletes. Based on visual and
496 statistical analyses the results indicate that for two participants the intervention was able to
497 reduce self-depreciation and increase USA as hypothesized. Participant 1's irrational beliefs
498 scores showed only marginal change at the end of the intervention, and he did not complete

499 the follow-up inventories. However, participant 1 expressed greater acceptance of failure in
500 the social validation data. While it is theoretically plausible that self-depreciation and USA
501 are negatively related, this may not be the case for all people. In participants 2 and 3, self-
502 depreciation decreased from baseline and remained reduced at the six-month follow-up phase.
503 This finding supports the vast literature advocating the use of REBT to reduce irrational
504 beliefs (e.g., see David, Szentagotai, Eva & Macavei, 2005 for a full synopsis), and
505 specifically within the domain of sport psychology (e.g., Lerner, 2008; Turner & Barker
506 2013). Social validation confirmed the reduction of self-depreciation and increase in USA,
507 alongside various positive effects of the intervention such as enhanced emotional control and
508 performance. However it is important to note that although effect sizes calculated using
509 Cohen's *d* (Cohen, 1992) indicated small to medium changes from pre- to post-REBT, RCIs
510 did not meet the criteria set by Jacobson and Truax (1991) to indicate significant intervention
511 effects.

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

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

534 In contrast to self-depreciation, USA reflects unconditional regard for oneself despite
535 undesirable behavior and adverse events. Previous research outside of the sport psychology
536 literature has found that self-depreciation involves intensive self-evaluation, which opposes
537 USA. This can lead to negative emotions such as depression (Scott, 2007) and thought
538 consequences such as self-blame and self-criticism (Hill, Hall & Appleton, 2008) and may
539 increase the propensity for narcissism, self-centeredness and downward social comparison
540 (Neff, 2003). Therefore, it is perhaps unsurprising that with reductions in self-depreciation
541 beliefs found in this study, increases in USA were also evident.

542 It should also be noted that while reducing self-depreciation to augment USA was the
543 specific focus of the REBT intervention with the athletes, changes in total irrationality were
544 also detected. Participant 2 and 3 both showed a meaningful decrease in total irrationality,
545 which is a composite of various types of irrational beliefs described in REBT theory. The
546 finding that other irrational beliefs can be reduced by focusing on very specific irrational
547 beliefs (such as self-depreciation) is consistent with past research in sport (e.g., Turner &

548 Barker, 2014) and may suggest that irrational beliefs are interconnected. For example, the
549 reduction in self-depreciation beliefs may also reduce need for achievement, because the
550 demand for success may be negated by the increased acceptance of failure. In addition, a
551 reduction in self-depreciation beliefs may also lead to reduced Need for Achievement beliefs
552 if at an individual level, demandingness is less prevalent in some athletes. This
553 interconnectedness is referred to as the “spillover effect” at the beliefs level in that point, and
554 is mentioned extensively in the REBT literature (e.g. David, Lynn, & Ellis, 2010). Again, for
555 participant 1 the reduction in total irrationality was very small despite increases in USA. This
556 may further support the notion that irrational beliefs are not necessarily related to rational
557 beliefs and therefore may be relatively orthogonal (i.e., they do not correlate highly; Ellis,
558 David, & Lynn, 2010).

559 The use of a single-case design in this paper allowed for idiosyncratic observations of
560 each participant before, during, and after the REBT intervention and via social validation. For
561 example, although Participant 1 did not demonstrate quantitative reductions in irrational
562 beliefs, he expressed being able to now accept his weaknesses, recognize his strength, and
563 focus on becoming a professional fighter. Indeed, an awareness of personal failures is
564 considered part of the process of moving from unhealthy to healthy self-appraisal (Driscoll
565 1989; Dryden & Neenan, 2004). Participant 2 reported a high estimation of his performance,
566 along with reduced anxiety (in sport and in life), which has previously been associated with
567 engaging in self-blame and selective attention to failures (Dunn et. al, 2006). Participant 3
568 gained a new understanding that his peers and significant others would not be disappointed in
569 him should he lose a fight. This irrational fear was originally holding him back from entering
570 a competition, and it appeared he no longer believed that being a successful athlete required
571 winning every fight. By challenging the cognitive evaluation of an event and not the event per

572 se, or the emotional outcome, participant 3 was able to accept his failings as part of the
573 process of becoming an elite MMA fighter.

574 Appropriate evaluation of practice is considered a key issue in applied sport
575 psychology literature (Grove, Norton, Van Raalte, & Brewer, 1999; Streat & Roberts, 1992).
576 Therefore, as well as reporting the effects of the REBT intervention on belief variables,
577 drawing on the lead author's reflections, it was possible to provide evaluation of the REBT
578 intervention. Overall, it appeared that the REBT intervention had a positive effect on the
579 athletes, some of which were reflected in questionnaire data, and some of which were
580 reflected in social validation data.

581 Using Skype as a means to deliver REBT was the most practical option given the
582 geographical distance between practitioner and participants (Cotterill & Symes, 2014).
583 Therefore it was possible to conduct sessions at a convenient time for the participants, and
584 more personal face-to-face communication was possible (compared to telephone
585 communication). Skype sessions could be conducted cost-effectively, without travel, and
586 changed at short notice, adding flexibility to the intervention. However, the delivery of
587 efficient sessions depended in part on a stable Internet connection. The use of Skype was a
588 unique feature of this study that allowed the practitioner to work with each participant in a
589 counseling style as close to a traditional face-to-face delivery as was feasible. Because REBT
590 is in essence a humanistic approach, the fostering of empathy, warmth, and respect are
591 important aspects of delivering effective REBT (Ellis & Dryden, 1997). Positive changes in
592 participant's beliefs may have been facilitated by core conditions postulated by Rogers
593 (1957), but specific changes in irrational beliefs would not be anticipated without the
594 application of REBT. In applied sport psychology, intervention effectiveness is believed to
595 rely on providing individualized treatment in a systematic way (Barker et al., 2013). Although

596 some of the effects found in this study may be attributable in part to the development of a
597 strong working relationship, specific changes can be attributed to the REBT intervention.

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

603 The present study is limited in several ways. Although the multiple-baseline across-
604 participants design adopted here is considered to be robust (e.g., Barker et al., 2013), there
605 were aspects of its application in this study that could be improved for future research. For
606 example, single-case guidelines suggest that eight weeks of baseline data be collected (e.g.,
607 Turner, Slater, & Barker, 2014). These athletes' schedules could not accommodate such a
608 lengthy baseline phase with the planned REBT intervention. In addition, although the
609 measures used are valid and reliable questionnaires that have been used in sporting contexts
610 (e.g., Hill et al., 2009; Turner et al., 2014), they are not sport specific. Future research may
611 benefit from confirming the validity of these for use with athlete populations, or developing
612 an irrational beliefs measure for use with athlete populations. Further, only four REBT
613 sessions were conducted with the athletes in this study, although is typical in sport (e.g.,
614 Turner & Barker, 2013), more sessions would allow greater breadth and depth of REBT with
615 each athlete, particularly participant 1 who did not respond as hypothesized to the intervention
616 as hoped. REBT and other therapeutic approaches used in sport must reconcile practicality
617 and thoroughness in applied settings.

618 In conclusion, an REBT intervention focused on reducing self-depreciation in MMA
619 athletes was found to be effective in reducing self-depreciation, increasing USA, and reducing
620 irrational beliefs in general for two of the three participants. In addition, changes in

621 participants 2 and 3 were maintained for six-months following the REBT intervention. For
622 one participant, only USA changed in the hypothesized direction. The results of this study
623 also suggest that REBT was able to bring about positive changes in emotional management
624 and performance, recorded using social validation methods. This is the first study to focus on
625 the self-depreciation and USA beliefs of athletes, and the first study to apply REBT with
626 MMA athletes. Working with MMA athletes broadens the base of sports to which
627 interventions have been applied and enlarges the athlete populations and sports that have been
628 treated. Changes in self-depreciation and USA were not uniform across participants,
629 indicating a greater need for understanding the individual differences in how REBT might be
630 applied with different athletes. Future research might develop sport specific measures of
631 irrational beliefs and conform more rigorously to single-case guidelines for extended data
632 collection period. REBT use is relatively novel within sport psychology. Hopefully, this paper
633 will encourage more frequent use of REBT in sport psychology literature.

634 **Compliance with Ethical Standards:** The authors declare that they have no conflict of
635 interest.

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865 Table 1

866 *Irrational Beliefs, self-depreciation, and USA scores ($M \pm SD$) from pre- to post-REBT, and*867 *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 (0.95) CI	Effect size (d)	6 Month follow-up
Total	1	3.19 \pm .06	3.08 \pm .07	-.19	.17	-
irrational beliefs	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

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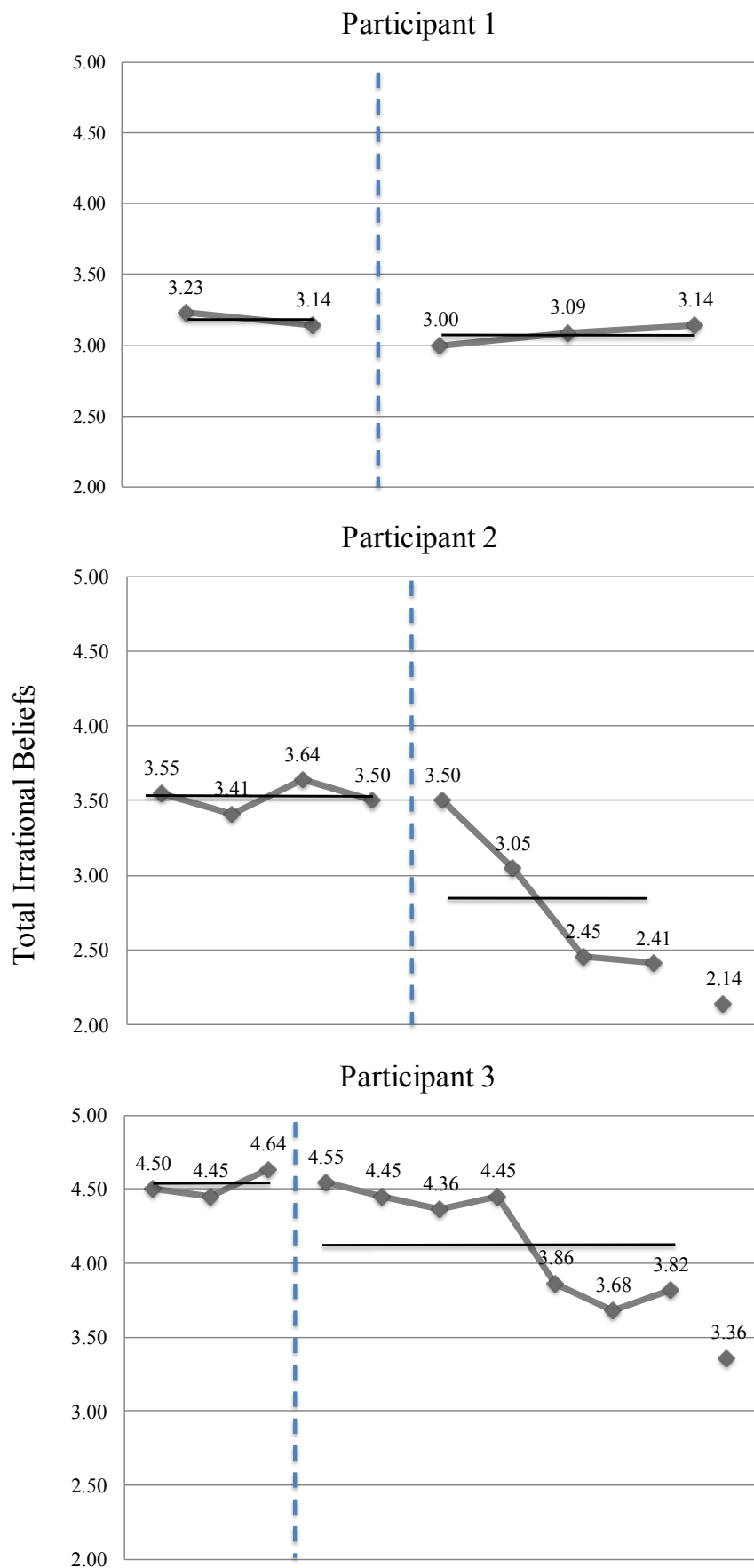
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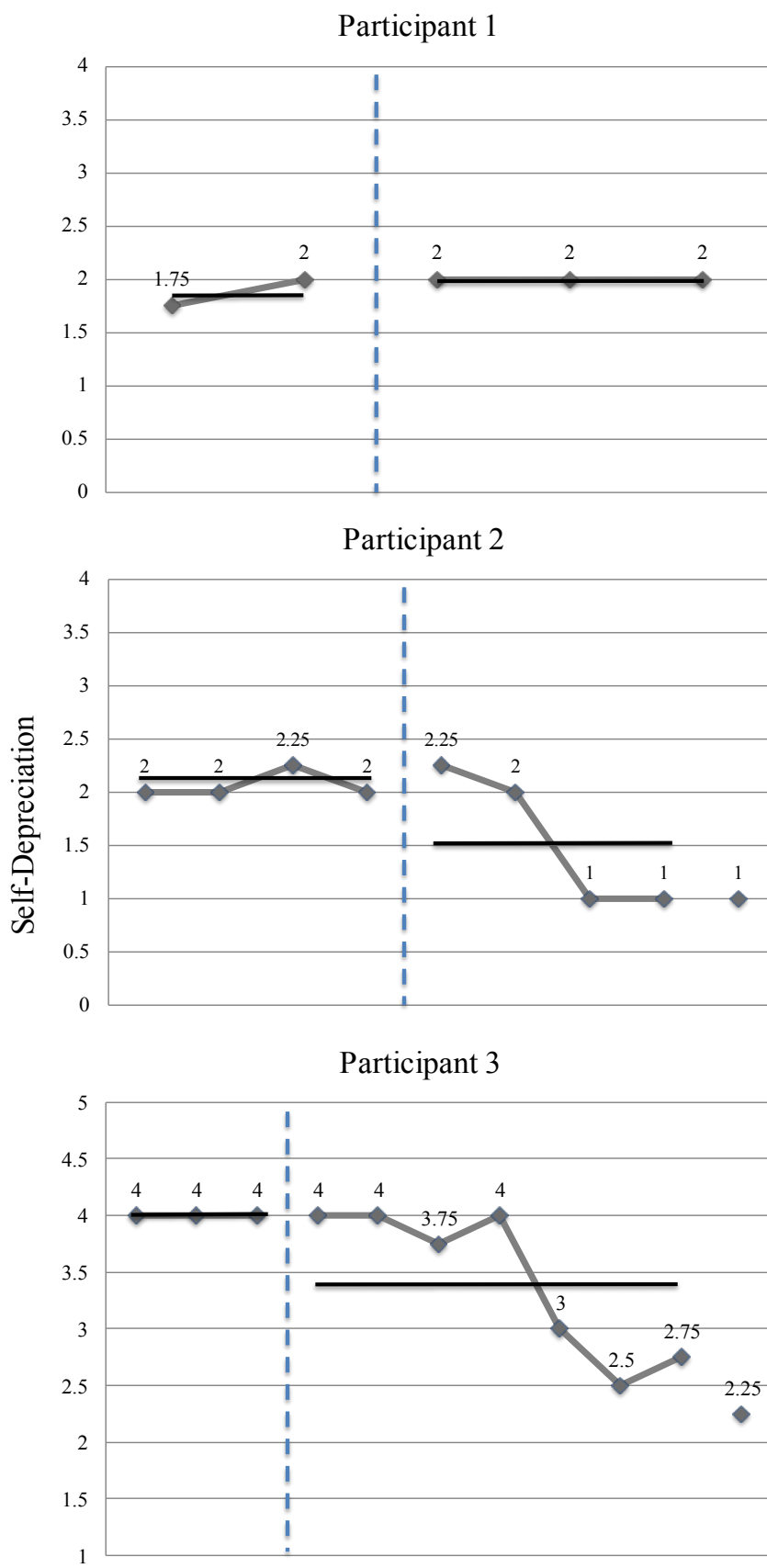
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879 *Figure 1.* Total irrational beliefs scores across intervention phases for all participants.



881 *Figure 2.* Self-depreciation scores across intervention phases for all participants.



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