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The Effects of REBT on Irrational Beliefs, Self-Determined Motivation, and Self-Efficacy in
American Football

Chrysidis, S¹., Turner, M. J*²., Wood, A. G.²

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¹School of Life Sciences and Education, Staffordshire University.

²Department of Psychology, Manchester Metropolitan University

*corresponding author, Martin Turner: m.turner@mmu.ac.uk

Spyridon Chrysidis: spiros.chrysidis@gmail.com

Andrew Wood: Andrew.Wood@mmu.ac.uk

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Highlights

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- Used an idiographic staggered multiple-baseline across participants design

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- Rational self-talk used as part of the intervention

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- REBT increased self-determined motivation of the athletes

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- REBT increased self-efficacy motivation of the athletes

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Abstract

It has been suggested in recent research that rational beliefs as conceptualized within rational-emotive behavior therapy (REBT) can be operationalized as strategic self-talk, but this has yet to be meaningfully investigated. The current study examines the effects of five one-to-one REBT sessions with three amateur American Football athletes to foster rational self-talk. The purpose of the intervention was to reduce the irrational beliefs, but also in line with recent applied REBT research, to increase the self-determined motivation and self-efficacy of the athletes. Using an idiographic single-case, staggered multiple-baseline across participants design, visual analyses revealed meaningful increases in self-determined motivation and self-efficacy, adjunct to decreases in total irrational beliefs across all participants. Social validation data supported these outcomes. These findings add to the growing research indicating that REBT can influence motivational approaches in athletes, such as self-determined motivation and self-efficacy. Results are discussed in relation to processes underlying the mechanisms of change, while also reporting the limitations of the study. The robustness of the research design increases the extent to which target variable changes can be attributed to REBT, but critical reflections are undertaken to assess the veracity of the findings.

Keywords: football; single-case; introjected regulation; CBT; self-statements

52 The Effects of REBT on Irrational Beliefs, Self-Determined Motivation, and Self-Efficacy in
53 American Football

54 Rational Emotive Behavior Therapy (REBT; Ellis, 1990) is a cognitive-behavioural approach to
55 psychotherapy (CBT), that is receiving growing interest for its application in sport and exercise
56 settings (Turner & Bennett, 2018). Broadly, in REBT it is one's beliefs regarding events, such as
57 rejection, poor treatment, or failure, that determine subsequent emotional and behavioral
58 responses (Ellis & Dryden, 1997). In REBT, there are two main types of core belief; irrational
59 beliefs and rational beliefs. Irrational beliefs are rigid, extreme, and illogical, whilst rational
60 beliefs are flexible, non-extreme, and logical (DiGiuseppe, Doyle, Dryden, & Backx, 2013).

61 Extensive research indicates that irrational beliefs are associated with maladaptive
62 affective and behavioural responses (Visla, Fluckiger, Holtforth, & David, 2016), a finding that
63 is echoed in the sport literature (e.g., Turner, Carrington, & Miller, 2019). As such, one of the
64 core goals of REBT is to help individuals reduce their irrational beliefs and increase their
65 rational beliefs. REBT has been applied across a variety of sports, revealing reductions in social
66 anxiety (Turner, Ewen, & Barker, 2018), competitive anxiety (Turner & Barker, 2013), Systolic
67 Blood Pressure (SBP; Wood, Barker, Turner, & Sheffield, 2017), increases in resilience (Deen,
68 Turner, & Wong, 2017), self-efficacy and perceived control (Wood, Barker, & Turner, 2017),
69 vitality and sleep (Davis & Turner, 2019), and performance (Wood et al., 2016; 2017).

70 Research applying REBT with athletes is growing, and practitioner guidance is readily
71 available (see Turner & Bennett, 2018). In REBT a GABCDE framework (Ellis & Dryden,
72 1997) guides the work done with athletes. This framework asserts that in pursuit of our goals
73 (G), the adversity we face (A) does not cause emotional and behavioural responses alone (C),
74 rather, it is our beliefs (B) about A that helps determine C. After being identified, irrational

75 beliefs are rigorously disputed (D) and rational alternative beliefs are developed and reinforced
76 (E; Dryden, 2009). One way that REBT can be operationalized in sport settings is through
77 helping athletes to develop rational self-talk, in place of irrational self-talk. In early research
78 examining the effects of rational and irrational self-talk on performance outcomes, mostly non-
79 athletic participants undertook laboratory-based motor tasks. Studies found that anxiety
80 intensified, and performance declined when irrational self-talk statements were employed in a
81 sequence of trail making tasks (Kombos, Fournet, & Estes, 1989), and a puzzle task (Rosin &
82 Nelson, 1983). Other studies revealed that irrational self-talk impeded behavioral efficiency and
83 performance in a mirror-tracing task (Bonadies & Bass, 1984; Schill, Monroe, Evans, &
84 Ramanaiah, 1978). A recent study in sport (Turner, Kirkham, & Wood, 2018) showed that when
85 athletes used rational self-talk (i.e., self-statements that reflect non-extreme, flexible, and logical
86 beliefs) they performed better in pressured golf putting compared to when they used irrational
87 self-talk (i.e., self-statements that reflect extreme, rigid, and illogical beliefs). In a laboratory
88 setting, researchers (Wood, Turner, Barker, & Higgins, 2017) examined the effects of rational
89 and irrational self-talk on golf putting performance, finding little between-subjects effects on
90 performance. In an applied study (Deen et al., 2017), athletes were encouraged to adopt rational
91 self-talk using the athlete rational resilience credo (ARRC; Turner, 2016b), finding decreases in
92 irrational beliefs and increased self-reported resilient qualities. Clearly, more research is required
93 to more fully examine the applicability of rational self-talk in athletes.

94 Studies have consistently shown that self-talk can positively affect motivational aspects
95 and self-efficacy in athletes (e.g., Chang et al., 2014; Galanis, Hatzigeorgiadis, Zourbanos, &
96 Theodorakis, 2016; Hatzigeorgiadis, Zourbanos, Goltsios, & Theodorakis, 2008; Kolovelonis,
97 Goudas, & Dermitzaki, 2011; Tod, Hardy, & Oliver, 2011; Vargas-Tonsing, Myers, & Feltz,

98 2004). By using self-talk, athletes learn to control their cognitions, to direct their focus on
99 relevant stimuli, whilst putting more effort into subsequent tasks (Zinsser, Bunker, & Williams,
100 2010). Self-talk can be considered as an internal regulation mechanism, capable of affecting
101 cognitive, emotional, and behavioural states (Van Raalte et al., 2016). Thus, based on this
102 premise, and on former research on rational and irrational self-talk (e.g., Turner et al., 2018a;
103 Wood et. al, 2017), integrating personal belief statements into athletes' self-talk might have
104 implications for the regulation of motivationally relevant cognitions, particularly if the content of
105 the irrational beliefs pertains to self-regulation and motivation.

106 Recent literature on the use of rational and irrational beliefs as self-talk (Turner, Wood,
107 Barker, & Chadha, 2020) shows that the way self-talk can change as a result of REBT is similar
108 to the procedures described in the in reflexive self-talk intervention posited by Latinjak,
109 Hernando-Gimeno, Lorigo-Méndez, and Hardy (2019). The GABCDE framework reflects a
110 process of reflexively and meta-cognitively analyzing past self-talk (irrational Bs) and exploring
111 alternate self-talk (rational Bs) to cope with future adversities (As). In addition, when this self-
112 talk is goal-directed, Latinjak et al (2014) suggest that self-talk can be classified in terms of
113 functionality (facilitative/ debilitating) instead of valence (positive/negative). This is important
114 for REBT because the valence of irrational beliefs is not clear, or relevant. For example, the
115 rational beliefs “it is bad to fail, but not awful” is not clearly a positively valenced self-talk
116 statement, but it is functional if the goal is the expression of healthy emotions and adaptive
117 behaviours. Since beliefs are reflective of our deeply held goals and preferences, in REBT more
118 focus is placed on function, than valence. In the current study, we draw on both reflexive and
119 strategic self-talk with participating athletes. Reflexive self-talk intervention procedures are
120 reflected in the REBT work that takes place between the practitioner and the athletes, but the

121 athlete is then encouraged to develop predetermined self-talk plans for performance situations for
122 motivational instructional purposes (Latinjak et al., 2019).

123 To gain a better understanding of how rational and irrational beliefs might influence
124 motivational aspects, multidimensional motivation theories should be considered. Specifically,
125 self-determination theory (SDT; Deci & Ryan, 1985) posits that different types of motivation
126 drive individuals to fulfil their objectives. Organismic integration theory (OIT; Ryan & Deci,
127 2000), which is a sub-theory of SDT, categorizes motivation into six categories, located on the
128 same continuum and ranging from intrinsic motivation (participating in an activity for its own
129 sake) to amotivation (lack of motivation), with integrated, identified, introjected and external
130 regulations residing in between (from more to less self-determined motivation). Extant literature
131 (Turner, 2016) indicates that irrational beliefs are conceptually similar to external motivation,
132 and especially introjected regulation, with behavior being controlled by self-imposed sanctions,
133 such as to avoid shame or guilt (Ryan & Deci, 2002). Hence, if irrational beliefs represent a less
134 self-determined, more controlled, types of motivation (introjected regulation), REBT should
135 have the potential to improve self-determined motivation, as it focuses on disputing and
136 restructuring irrational beliefs. Indeed, Turner and Davis (2018) found that self-determined
137 motivation was increased in triathletes after an REBT education intervention and have
138 subsequently repeated this finding using one-to-one REBT in a multi-participant idiographic
139 case-study design (Davis & Turner, 2019). The potential dual benefits of REBT for reducing
140 irrational beliefs and increasing self-determined motivation is important because behavioral
141 actions that are controlled by external motives and can lead to dysfunctional behavior, such as
142 wanting to, or actually, avoiding or escaping the current situation (Dryden & Branch, 2008; Ryan
143 & Deci, 2002).

144 Moreover, REBT has the potential to enhance self-efficacy, not only in the academic or
145 occupational context as has been previously demonstrated (Kim, Kim, & Kim, 2015; Warren,
146 2010), but in the sporting context as well. In one study, after seven one-to-one REBT sessions, a
147 professional archer showed a long-term increase in self-efficacy scores, which has been
148 attributed to the athlete's ability to better control their emotions (Wood et al., 2017). Self-
149 efficacy refers to the belief people have in their abilities to execute a given behavior successfully
150 (Bandura, 1977), and as such, is affected by situational aspects (Bandura, 1986). Bandura
151 suggests that self-efficacy is affected by people's emotional states and therefore, if an athlete can
152 exert control over their emotional state, this would lead to greater perceived control in coping
153 under stressful conditions. In REBT the aim is to help athletes to exert greater control over their
154 beliefs and emotions, and if athletes can manage their beliefs, self-efficacy can be augmented.

155 Understanding whether and to what extent REBT, through the mechanism of belief
156 change, influences athletes' motivation regulation and self-efficacy is paramount, due to the
157 implications for athletic performance and mental health (Turner, 2016). Therefore, the main aim
158 of the present study is to idiographically examine the effects of one-to-one REBT on the
159 irrational beliefs, self-determined motivation, and self-efficacy of American football athletes.
160 The current study will extend the knowledge base concerning the application of REBT in three
161 main ways. First, for the first time in research we examine the application of strategic self-talk in
162 adjunct to REBT, which could provide a useful method for REBT application with athletes.
163 Second, within the idiographic design we have adopted, we include a one-year maintenance data
164 collection point, that allows us to examine longer-term effects of REBT beyond what has been
165 achieved in past research. Finally, apply REBT with a novel population of athletes, namely
166 American football athletes of German nationality, a sample previously unexamined. To our

167 knowledge, this is the first time REBT has been applied to German athletes, regardless of their
168 sport, which extends the research of REBT and offers a new approach in other cultures. In line
169 with the corpus of extant literature, it was hypothesized that following the REBT intervention,
170 the athletes would report short- and long-term reductions in irrational beliefs, and increases in
171 self-determined motivation and self-efficacy.

172 **Methods**

173 **Participants**

174 Participants were three male German American football players aged 23 (p1), 21 (p2),
175 and 22 (p3) years ($M_{age} = 22.0$, $SD_{age} = 1.0$). They had less than four years of experience playing
176 the sport, competing at a regional level, and thus were categorized as amateur athletes (Swann,
177 Moran, & Piggott, 2015). Before commencing the study, the procedure was explained to the
178 coaching staff, who agreed to the project. Informed consent was obtained from participants and
179 university ethical approval was granted prior to the data-collection process.

180 In line with similar past research (Davis & Turner, 2019), the entire American football
181 squad ($n = 25$) were screened to determine which participants would take part in the REBT
182 intervention. The screening included the German version of the Sport Motivation Scale-28
183 (SMS-28; Burtscher, Furtner, Sachse, & Burtscher, 2011), and the German translated version of
184 the irrational Performance Beliefs Inventory-2 (iPBI-2; Turner & Allen, 2018). Scores for each
185 questionnaire were calculated for each athlete and based on their SMS-28 derived self-
186 determination index (SDI), and the composite irrational beliefs scores from the iPBI-2, the final
187 participants were selected. Specifically, individuals who scored higher than the Mean for the
188 squad in irrational beliefs (15.30), and lower than the Mean of the squad in SDI (3.86), were
189 selected for the REBT intervention, because they represented those most in need of the

190 intervention. The selected participants SDI scores were below the squad mean, and the irrational
191 beliefs scores were above the squad mean (see Table 1). In addition, the selected participants
192 scored above the irrational beliefs norm scores for amateur athletes ($M = 15.62$; Turner & Allen,
193 2018). Participants were not screened for self-efficacy, because self-efficacy is rather dependent
194 on situational factors and has the tendency to fluctuate (Bandura, 1986), whereas motivation and
195 irrational beliefs are thought of as more deeply held convictions regarding the self and hence, are
196 more stable and reliable over time.

197 **Measures**

198 **Motivation.** The SMS-28 (Burtscher et al., 2011; Pelletier et al., 1995) consists of seven
199 subscales and 28-items in total, measuring intrinsic motivation regarding knowledge,
200 accomplishment, and stimulation, identified, introjected, and external regulations, as well as
201 amotivation, using a 7-point Likert-scale from 1 (*does not correspond at all*) to 7 (*corresponds*
202 *exactly*). The SMS-28 (Pelletier et al., 1995) is widely used to measure motivation in sport (Hu
203 & Bentler, 1999), demonstrating adequate confirmatory factor analysis (alpha reliability between
204 .63 and .80), internal consistency (mean alpha score of .82), moderate to high indices of temporal
205 stability (mean re-test correlation of .69), and internal consistency (was above .70 on all
206 subscales except the 'identified' subscale). In sum, test-retest correlations and construct validity
207 have been shown to be acceptable. Burtscher et al. (2011) found that the German version
208 demonstrates high internal consistency, with Cronbach's alphas ranging from .70 to .85 across
209 the seven subscales. Furthermore, the high correlations between the scores of the subscales for
210 the German and English version evidence an acceptable validity of the German SMS-28. For the
211 current study, in line with past similar research (Turner & Davis, 2018), an index of self-
212 determined motivation (SDI; Vallerand, 2001) was used for all analyses by multiplying each

213 subscale by an assigned weight in accordance with its' location on the OIT (e.g., Gillet,
214 Vallerand, Amourab, & Baldesb, 2010). A higher score represents more self-determined (or
215 autonomous) motivation and a lower score represents less self-determined (more controlled)
216 motivation.

217 **Irrational beliefs.** The iPBI-2 (Turner & Allen, 2018) consists of 20-items which
218 measure four core irrational beliefs, namely demandingness (5-items; e.g., "I have to be viewed
219 favourably by people that matter to me"), awfulizing (5-items; e.g., "It would be awful if my
220 position in my team was not secure"), low-frustration tolerance (5-items; e.g., "I can't stand
221 failing in things that are important to me"), and depreciation (5-items; e.g., "I am a loser if I do
222 not succeed in things that matter to me"), with responses being recorded on a 5-point Likert-
223 scale, from 1 (*strongly disagree*) to 5 (*strongly agree*). The iPBI is a context-specific measure of
224 irrational performance beliefs, with demonstrable construct (alpha reliability between .90 and
225 .96), concurrent (medium to large correlations reported) and predictive (small to medium
226 correlations reported) validity (Turner & Allen, 2018). The iPBI has a good factor structure
227 (RMSEA = .07; CFI = .93; NNFI = .92, SRMR = .06), according to confirmatory factor analysis
228 (Turner, Allen...et al., 2018). The iPBI-2 has also been used with athletes in previous studies
229 using a similar design (idiographic) to the current study (e.g., Turner, Ewen, & Barker, 2018b).

230 The iPBI-2 was translated into German language in order for participants to accurately
231 complete it. Translation followed guidelines offered by Wild et al. (2005). The first step
232 consisted of the forward translation of the iPBI-2, and for this purpose, the questionnaire was
233 translated independently by two individuals into the target language. For both translators German
234 was their native language. Afterwards, the reconciliation step was carried out, as the two forward
235 translations were merged into one. Subsequently, the reconciled translation was translated back

236 into the source language by four independent translators, so as to guarantee the quality of the
237 forward translation. For two of the four translators, English was their native language, while the
238 remaining two were speaking English on a sufficient level (at least C1; Council of Europe,
239 2011). After the back translations were collected, they were reviewed and compared with each
240 other, and with the original iPBI-2, and any misinterpretations were elucidated. Wild et al.
241 (2005) suggested that this step is pivotal in the process of cross-cultural adaptation of
242 questionnaires, in that, any discrepancy leads not only to a reevaluation of the back translated
243 version, but also to a reassessment and potential revision of the reconciled translation. In the end,
244 and as soon as the revision was completed, the questionnaire could be distributed.

245 **Self-efficacy.** A self-efficacy scale was developed by the authors in line with Bandura's
246 (2006) guidelines to specifically fit the selected activity domain, as "there is no all-purpose
247 measure of perceived self-efficacy" (p. 307). Hence, items were tailored to particular situations
248 confronted in American football. Athletes were asked to what extent that felt confident to
249 "prevent the opponent from going through the offense line," "score a field goal," and "perform a
250 wide punt." The final version consisted of 17-items, rated on a scale from 0 (*cannot do at all*) to
251 100 (*highly certain can do*). The scale was developed in German and had to be translated into
252 English, in order to be submitted for ethical review, whereby the same guidelines as before (Wild
253 et al., 2005) were adopted.

254 **Social Validation**

255 Social validation was used to clarify how participants perceived the intervention and
256 whether they thought it helped them deal with adversities. Past research has employed social
257 validation (e.g., Barker & Jones, 2008) in order to determine the effectiveness of interventions as
258 seen by participants (Page & Thelwell, 2013). Participants were asked open-ended questions in a

259 one-on-one meeting on whether they used REBT and self-talk in months to follow, if it helped
260 them in adverse situations and if so, what exactly it was that felt different after the intervention.
261 Furthermore, during the follow up, they were also asked if they used their self-compiled self-talk
262 throughout the year and whether it helped them in adverse situations or not.

263 **Experimental Design**

264 The study used an idiographic single-case, staggered multiple-baseline across participants
265 design (Barker, McCarthy, Jones, & Moran, 2011; Kazdin, 2011). This design distinguishes the
266 initiation of the intervention by means of comparing it with baseline data, which is acquired
267 before the intervention commences (Hrycaiko & Martin, 1996). Furthermore, greater flexibility
268 is granted in obtaining data, with results being reported separately for each participant (Thelwell
269 & Greenlees, 2001). Participants began the intervention sequentially in a staggered manner, so
270 that changes in target variables could be better ascribed to the intervention rather than to external
271 factors (Kazdin, 1982; Turner & Barker, 2013). The first participant commenced the intervention
272 in the first week, the participant 2 in the second week, and participant 3 in the third week. Barker
273 et al. (2011) suggest that only participants undergoing the intervention should demonstrate
274 change. The order of participation was assigned randomly. Participants completed the self-
275 efficacy scale twice per week for as long as the intervention took place. Additionally, the SMS28
276 and the iPBI-2 were completed in the 3rd session, one week after the 5th session, at a follow up
277 phase, and at a one-year maintenance phase. Participant 3 did not respond to the request to
278 complete the one-year maintenance phase data collection,

279 **Intervention**

280 Each athlete received five one-to-one REBT session of 30 minutes duration per session.
281 Dose responses have been reported in previous REBT literature (Turner, Slater, & Barker, 2015),

282 and therefore session-number is an important consideration. Past research has utilized three (e.g.,
283 Turner & Barker, 2013), four (e.g., Cunningham & Turner, 2016), five (Davis & Turner, 2019),
284 and six (Turner et al., 2018b) sessions, and Turner and Barker 2014 suggest seven sessions of
285 30-45-minute length each. All of these lengths are in line with the extant REBT guidelines for
286 brief intervention work (Ellis, Gordan, Neenan, & Palmer, 1997), but five sessions were selected
287 in the current study based on a recent paper that adopted a similar idiographic single-case design
288 targeting similar outcome variables (Davis & Turner, 2019). In line with guidelines (Turner &
289 Barker, 2014) the first session was very flexible, with participants talking freely about what was
290 currently limiting their fulfilment of athletic potential. In the second session, athletes'
291 performance issues were framed within the REBT GABCDE framework, helping the athletes to
292 understand how the adversity (A) they face in pursuit of their goals (G) does not directly cause
293 their emotions and behaviors (C), rather, their beliefs (B) mediate this relationship. The third
294 session helped the athletes to dispute (D) their irrational beliefs. Following disputation, the
295 athletes developed alternative rational beliefs (E), and developed rational self-talk statements
296 with guidance from the practitioner.

297 The procedures for analysing irrational self-talk and developing rational self-talk in this
298 phase were similar to those of reflexive self-talk interventions. But in the fourth and fifth
299 session, participants refined and practiced using their self-talk statements in a way that is more
300 akin to strategic self-talk. Each participant devised and used a specific behavioral cue, such as
301 grabbing their football helmet or tapping the chest, that would remind them to identify and stop
302 the irrational self-talk they had at that moment and start using their self-developed rational self-
303 talk. Following the fifth session, participants were encouraged to apply self-talk independently
304 up until the follow-up phase, and as a homework task, asked to keep a diary of any adverse

305 events they encountered. In the diary they were asked to state the situation, their thoughts about
306 the situation, and the self-talk they used, in line with previous self-talk interventions (e.g.
307 Latinjak, Font-Lladó, Zourbanos, & Hatzigeorgiadis, 2016; Latinjak, Hernando-Gimeno, Lorigo-
308 Méndez, & Hardy, 2019). The purpose of the diary task was to prompt participants to make
309 habitual the use of rational self-talk when facing and/or faced with adversity. Diaries were
310 reviewed with participants to clarify any difficulties they might have encountered. However,
311 diaries were not included in analysis, as we wanted participants to be as honest as possible in
312 their notes and not withhold information from the practitioner. It was intended to be a cognitive
313 assignment for them, in which they engaged with their beliefs and the corresponding self-talk, in
314 terms of the GABCDE framework (Ellis & Dryden, 1997). As such, consent was not collected
315 from participants and the content of the diaries remained confidential. The practitioner
316 administering the intervention was a postgraduate student with no prior experience in REBT.
317 However, two HCPC registered sport and exercise psychologist, with substantial REBT-training,
318 were supervising the intervention.

319 **Analytic Strategy**

320 Graphed and tabulated data were visually examined for each participant across each
321 dependent variable to assess the effectiveness of REBT. Visual analysis is a common approach
322 in idiographic single-case research designs (e.g., Turner et al., 2018b), and is preferred to
323 statistical analysis, with the practical significance of the data being highlighted over statistical
324 significance (Hrycaiko & Martin, 1996). Furthermore, this kind of study produces limited data-
325 points, which do not warrant the use of statistical tests, due to the underlying assumptions not
326 being met (Ottenbacher, 1986). Hence, this study made use of Hrycaiko and Martin's (1996)
327 criteria for assessment for self-efficacy. These state that, (a) the effect is present in every

328 participant, (b) change appeared shortly after the intervention was initiated, (c) the baseline and
329 intervention phase show scarcely any overlapping data points, and (d) a relatively big change
330 occurred from baseline. Finally, results were organized according to participant, not variable, so
331 as to conform with the idiographic study design, and to represent the outcome of the visual
332 analysis for each participant in a distinct and clear manner (Thelwell & Greenlees, 2001).

333 **Results**

334 For the results, we include a narrative of data changes across the intervention for each participant
335 separately, in line with the idiographic design we have adopted. It is possible to understand how
336 each athlete responded to the intervention, but overall, the intervention appeared to cause
337 meaningful changes in the target variables, with self-determined motivation and self-efficacy
338 increasing, and irrational beliefs decreasing over the course of the intervention. For self-efficacy,
339 in line with Hrycaiko and Martin's (1996) assessment criteria, the intervention had a positive
340 effect in all participants, with change being present immediately after the onset of the
341 intervention in two participants (participants 1 and 3). Positive change is observed in all
342 participants, with few overlapping data points (26.67% for participant 1, 23.08% for participant
343 2, and 27.27% for participant 3) from baseline to post-intervention phases (during, post-, and
344 follow-up). Finally, the intervention resulted in substantial change from baseline in all
345 participants, as is evident in the effect sizes recorded for each participant henceforth.

346 **Participant 1**

347 Visual examination of data (see Table 1 and Figure 1) showed a large ($d = 3.29$) increase
348 in self-efficacy (+53.24%) from screening ($M = 51.48$) to the one-year maintenance phase ($M =$
349 78.89). In addition, self-determined motivation increased (+96.21%) and irrational beliefs
350 decreased (-16.46%) in that same period. For the specific irrational beliefs, LFT increased

351 (+8.70%), and demandingness (-42.11%), awfulizing (-29.41%), and depreciation (-10.00%) all
352 decreased from screening to one-year maintenance phase.

353 Self-efficacy continuously increased throughout the course of the intervention, with self-
354 determined motivation increasing up until follow up (+162.25%) and showing a decline in the
355 maintenance phase (-106.09%). The iPBI-2 subscale scores decreased from screening to session
356 3 (demandingness -36.84%, LFT -8.7%, awfulizing -29.41%), except for depreciation which
357 remained stable. Demandingness continued to decrease from session 3 to post-intervention (-
358 8.33%), with LFT and depreciation remaining stable and awfulizing slightly increasing
359 (+8.33%). From post-intervention to follow-up depreciation decreased (-10.0%), with LFT
360 (+14.29%), demandingness (+45.45%), and awfulizing (+23.08) showing increases in the same
361 time period. At the one-year maintenance phase, demandingness (-31.25%) and awfulizing (-
362 25.00%) both decreased, with depreciation remaining stable and LFT slightly increasing
363 (+4.17%).

364 **Participant 2**

365 Visual examination of data (see Table 1 and Figure 1) revealed a large ($d = 2.61$) increase
366 in self-efficacy (+12.27%) from screening ($M = 73.04$) to the one-year maintenance phase ($M =$
367 82.00; see Figure 1). Furthermore, self-determined motivation increased (147.81%) and irrational
368 beliefs decreased (-9.33%) throughout the same time period. For specific irrational beliefs, LFT
369 (-9.09%), awfulizing (-15.79%) and depreciation (-13.33%) all decreased, with demandingness
370 remaining stable from screening to maintenance phase.

371 Self-efficacy continued to increase throughout the intervention phase, while self-
372 determined motivation increased up until post-intervention (+126.09%) but decreased from post-
373 intervention to follow up (-25.00%). One year later, self-determined motivation increased again

374 (+144.33%). LFT (-4.55%) and awfulizing (-15.79%) decreased from screening to session 3,
375 with depreciation remaining stable and demandingness slightly increasing (+5.26%). From
376 session 3 to post-intervention all variables remained stable, apart from LFT, which continued to
377 decrease (-4.76%). Finally, both demandingness (-15.00%) and depreciation (-13.33%) showed
378 decreases from post-intervention to follow up, with LFT remaining stable and awfulizing slightly
379 increasing (+6.25%). At the maintenance phase, only awfulizing decreased (-5.88%), with LFT
380 and depreciation staying unchanged and demandingness increasing (+11.76%).

381 **Participant 3**

382 For participant 3, we were unable to collect one-year maintenance data. Visual
383 examination of data (see Table 1 and Figure 1) showed a large ($d = 0.84$) increase in self-efficacy
384 (+8.28%) from screening ($M = 59.08$) to follow up ($M = 61.76$; see Figure 1). Self-determined
385 motivation increased (+140.78%) from screening to follow up, while irrational beliefs decreased
386 (-10.96%) in the same time period. For specific irrational beliefs, demandingness (-13.64%),
387 LFT (-10.00%), and depreciation (-30.77%) showed decreases, while awfulizing slightly
388 increased (+5.56%).

389 Self-efficacy moderately increased from pre-intervention to intervention (+8.33%) but
390 showed a minor decrease from intervention to post-intervention (-.05%). Self-determined
391 motivation increased continuously from screening to post-intervention (+103.67%) to follow up
392 (+1012.12%). Regarding beliefs, all variables but one evidenced small to moderate decreases
393 from screening to session 3 (LFT -5%, demandingness -4.55%, depreciation -15.38%), and from
394 session 3 to post-intervention (LFT -10.53%, demandingness -9.52%, depreciation -9.09%,
395 awfulizing -5.56%), with awfulizing being the only variable that remained stable from screening
396 to session 3. From post-intervention to follow up only depreciation decreased (-10.00%), while

397 demandingness remained stable, and LFT (+5.88%) and awfulizing (+11.76%) showed increases
398 in that time period.

399 **Social Validation Data**

400 A clear consensus among all participants was that it helped them deal with negative
401 thoughts in difficult situations. For example, “in such events, it is good to know that you have a
402 tool which helps you deal with such thoughts and emotions” (Participant 2), and “I am more
403 relaxed now, because I know I can change my attitude if a difficult situation comes up”
404 (Participant 1). These statements show that participants were better able to self-regulate their
405 thoughts regarding adversity, subsequently feeling more physically relaxed and confident in
406 situations that were previously seen as threatening. Participant 3 said on that matter “I feel better,
407 more confident of myself, when I’m in such a position”. Even after one year, participant 2 stated
408 that “I feel more confident in everything I do”. In general, they claimed that the intervention
409 encouraged them to think differently about adversities and were better able to cope in such
410 events.

411 Finally, all three participants agreed that after the intervention they felt more self-
412 determined to persist in their attempt to change their thoughts and perform to their best in
413 difficult situations. Participant 3 said, that “now that I have internalized it [REBT], I always try
414 to change my thoughts, so as to perform to the best of my abilities”, while participant 2 stated
415 “now I know how to keep myself motivated, to keep going during a game, as I keep managing
416 my own thoughts”. Overall, they reported that they were contented with the intervention, as it
417 provided them with the means to deal with and adjust their outlook on adversities. In line with
418 SDT (Ryan & Deci, 2002), with more autonomy support, their perceived competence to employ
419 rational self-talk and their persistence to change unpleasant situations increased (Deci & Ryan,

420 1987). On the contrary, participant 1 said that “there weren’t many occasions in which I could
421 use this technique, making it harder to really internalize it”, while participant 2 stated that
422 “although I understood the general idea [of REBT], one or two more sessions would be ideal to
423 really learn how to use it”. Moreover, both participants 1 and 2 admitted, that their use of rational
424 self-talk statements during this year became more infrequent with time, as they were either
425 “injured and it was not in my mind” (Participant 2), or on the one hand due to “becoming more
426 confident in general” and on the other hand because “it was hard to think about self-talk in
427 difficult situations” (Participant 1). It seems, even though results indicate that participants
428 comprehended REBT and self-talk, more sessions might have further improved the effectiveness
429 of the intervention.

430 **Discussion**

431 The current study used an idiographic single-case staggered multiple-baseline across
432 participants design (Barker et al., 2011; Kazdin, 2011) to examine the effects of REBT and
433 rational self-talk on self-efficacy and self-determined motivation in three amateur American
434 Football athletes. To build methodologically on past research, the present study applied REBT in
435 combination with strategic self-talk. Findings broadly support previous research showing that
436 REBT enhances self-efficacy (Wood et al., 2017) and self-determined motivation (e.g., Davis &
437 Turner, 2019), and aligns with proposals that a link may exist between irrational beliefs and self-
438 determined motivation. Overall, from screening to the final data point (one-year maintenance
439 phase for participants 1 and 2, and follow-up for participant 3), REBT had a positive effect on
440 target variables for all participants. Specifically, visual analysis of data (Hrycaiko & Martin,
441 1996) showed self-efficacy and self-determined motivation improved while irrational beliefs

442 declined following the intervention. Social validation corroborated the outcomes of visual
443 analysis.

444 The current study supports previous findings (Wood et al., 2017), indicating that REBT
445 can improve self-efficacy, as athletes learn to regulate their emotions. The present study also
446 supports the studies by Turner and Davis (2018; Davis & Turner, 2019) which demonstrated that
447 REBT can encourage greater self-determined motivation. The change in self-efficacy is likely
448 due to the focus on REBT on emotional control, since according to Bandura (1977), self-efficacy
449 is meaningfully associated with the emotional state of an individual. The change in self-
450 determined motivation is likely explained by the conceptual similarities between irrational
451 beliefs and external motivation regulation, particularly introjected regulation (Turner, 2016).
452 Also, it has been posited that REBT may enhance the autonomy felt by athletes regarding their
453 emotion and behaviour management (Davis & Turner, 2019). Indeed, participant 2 stated that
454 “now I know how to keep myself motivated, to keep going during a game, as I keep managing
455 my own thoughts”, which speaks to the enhancement in perceptions of autonomy following
456 REBT. The integration of self-talk with REBT appeared to help athletes operationalize rational
457 beliefs, and social validation attests somewhat to the utility of rational self-talk. As participants
458 learned to incorporate the GABCDE framework (Ellis & Dryden, 1997) into their training
459 routine and promote their rational beliefs through self-talk statements, they were more capable of
460 controlling their emotions and promoting their rational beliefs, ultimately enhancing their self-
461 efficacy and self-determined motivation.

462 Although overall the data indicated that target variables changed in the hypothesized
463 directions, results were not uniformly in line with expectations across the study phases. There are
464 points at which irrational beliefs increase from post-intervention to follow up (for two

465 participants). There are also fluctuations in self-determined motivation across time. Of course,
466 irrational beliefs are not the only contributing factor for motivation and a variety of occurrences
467 could have caused data to fluctuate. However, importantly the athletes reported sustained
468 decreases in irrational beliefs, and sustained increases in self-efficacy and self-determined
469 motivation at the one-year maintenance phase. This is made possible because in REBT the
470 practitioner endeavors to teach the athlete how to use the GABCDE framework independently
471 from the practitioner (Turner, 2019) to the point where the practitioner is redundant (Turner &
472 Barker, 2014). Thus, at the end of the intervention the athlete should be able to apply REBT in
473 an ongoing fashion, which may extend the intervention effects longitudinally. Although athletes
474 appear to endorse lower irrational beliefs at the final timepoint, fluctuation in data across time
475 post-intervention is a feature of the extant research (e.g., Davis & Turner, 2019). Similar to
476 Davis and Turner, the current study also recruited amateur athletes, and perhaps, sudden shifts in
477 target variables could be due to factors outside of the sporting context, to which amateurs must
478 devote meaningful time and energy (such as study or work) compared to elite athletes (Scanlan,
479 Carpenter, Simons, Schmidt, & Keeler, 1993). Whilst REBT sessions were ongoing, irrational
480 beliefs predominantly decreased, with short-term effects still apparent at post-intervention. But
481 from there on, scores either slightly increased or remained stable, with little positive changes
482 occurring in that time period. Of course, post-intervention stability is a laudable and valuable
483 goal for REBT, but further reductions in irrational beliefs is a more progressive goal.

484 Fluctuation in data can also be explained by inconsistent engagement in
485 homework assignments. Homework assignments in REBT are considered to be very important
486 (Dryden & Branch, 2008), but in the current study participants reported that they did not invest
487 as much time and effort as they could have in practicing their rational self-talk, and neglected to

488 record their self-talk on occasions. This behavior could be explained by the long-lasting period in
489 which they had to work on their rational self-talk independently. With no guidance between the
490 last session and follow up shortly after and one year later, they might have started to lose interest
491 in the intervention. Post-intervention support is clearly something that practitioners using REBT
492 with athletes should consider, because past research has also reported inconsistent homework
493 adherence (Turner & Barker, 2013). Past research has intimated a dose response (Turner, Slater,
494 & Barker, 2015), and therefore if more sessions are not viable, resources that encourage REBT
495 engagement should be explored (e.g., The Smarter Thinking App; Wood & Turner, 2018).

496 This study is not without limitations. First, the lack of experience by the practitioner
497 applying REBT and self-talk with athletes has to be mentioned, as this inexperience might have
498 influenced the outcome of the study. According to research, the level of expertise of an instructor
499 or coach plays an important role in achieving greater results in sport (Baker, Horton, Robertson-
500 Wilson, & Wall, 2003). In contrast, a meta-analysis of REBT efficacy (Engels, Garnefski, &
501 Diekstra, 1993) did not find that therapeutic experience was important for successful outcomes.
502 With the use of REBT in sport growing, a debate needs to be had about the level of training
503 required for a neophyte practitioner to apply REBT in athletes. In the current study, the
504 practitioner was supervised by two HCPC registered sport and exercise psychologists who are
505 REBT-trained to primary and advanced practicum levels. Therefore, it is recommended the
506 practitioners formally train in REBT, and obtain suitable professional supervision.

507 Second, due to the long duration over which the study took place (over one year), the
508 chances of extraneous factors, that were out of our control, affecting target variables was
509 increased. Considering personal life events, especially those that might have occurred during the
510 post-intervention phase and were actually never reported, the interaction of intrapersonal (e.g.,

511 motivation) and interpersonal (e.g., social support) factors pivotal for athletic behavior are in
512 constant flux (Iso-Ahola, 1995). Therefore, experimental designs should be adopted in future
513 research to conduct studies with tighter controls on extraneous variables with a higher sample
514 size, perhaps building on the laboratory work (e.g., Bonadies & Bass, 1984; Wood et al., 2017)
515 and field work (Turner et al., 2018a) of previous researchers.

516 Third, as we chose the athletes that needed the intervention the most, in line with our
517 screening method, this could have resulted in the overestimation of the effect found in this study.
518 Furthermore, we exclusively used self-report measures in our study, which might have
519 exaggerated or affected the results, as participants might tend to give socially desirable answers.
520 Fourth, even though participants were taught how to use REBT and self-talk, time-constraints
521 and minimal adherence to the agreed instructions and homework, might have diminished the
522 effectiveness of the intervention. Some reinforcement measures, such as e-mail reminders, could
523 have been installed, so as to prompt participants. Also, future research could collect and use
524 valuable data from any potential homework assignment, such as the diaries in our case, making it
525 clear from the onset of the intervention, that all reported data will be included in the analysis.
526 Also, considering that participants themselves were amateur athletes, dealing with sports
527 generally, and with sport psychological training specifically, might not be their main priority in
528 life and should be considered a limitation to this study. Finally, in the current paper we adopt the
529 terms ‘strategic self-talk’ and ‘reflexive self-talk’ to align our work with contemporary
530 conceptualisations of self-talk (e.g., Latinjak et al., 2019). However, terminology in the self-talk
531 literature is debated (see Van Raalte, Vincent, Dickens, & Brewer, 2019), and readers should
532 consult critical literature to determine the strengths and limitations of the different descriptive
533 terms regarding self-talk.

534 **Conclusion**

535 The present findings support and further extend research, with the adoption of rational
536 self-talk statements and the use of an idiographic multiple-baseline across-participants design.
537 REBT resulted in increased self-determined motivation and self-efficacy, and reduced irrational
538 beliefs. Consequently, practitioners may wish to encourage clients to employ REBT and rational
539 self-talk statements in order to bolster self-efficacy and autonomous motivation. But changes in
540 variables have to be interpreted with care, as REBT should be applied idiosyncratically, leading
541 to non-uniform effects. When utilizing REBT with athletes, especially amateurs, each athlete
542 should be treated as an individual, taking into account wider contextual factors.

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759 Table 1

760 All variables across time-points for all participants (percentage changes in parentheses).

	P	Screening	Session 3	Post-REBT	Follow-up	Maintenance	% change screening- last data point
Self- efficacy	1	51.48	52.22 (1.44) ^d	65.67 (25.76) ^c	72.22 (9.97) ^c	78.89 (20.13)	53.24
	2	73.04	76.15 (4.26) ^d	78.81 (3.49) ^c	79.88 (1.36) ^c	82.00 (4.05)	12.27
	3	59.08	64.00 (8.33) ^d	63.97 (-0.05) ^c	61.76 (-3.45) ^c	-	4.54
SDI	1	-17.67	-11.00 (37.75) ^a	1.67 (115.18) ^b	11.00 (558.68) ^c	-0.67 (-106.09)	96.21
	2	-15.33	0.33 (102.15) ^a	4.0 (1112.12) ^b	3.00 (-25.00) ^c	7.33 (144.33)	147.81
	3	-9.00	-2.00 (77.78) ^a	0.33 (116.5) ^b	3.67 (1012.12) ^c	-	140.78
iPBI-2	1	19.75	16.25 (-17.72) ^a	16.25 (0.00) ^b	18.5 (13.85) ^c	16.5 (-10.81)	-16.46
	2	18.75	18.00 (-4.00) ^a	17.75 (-1.39) ^b	16.75 (-5.63) ^c	17.00 (1.49)	-9.33
	3	18.25	17.25 (-5.48) ^a	15.75 (-8.7) ^b	16.25 (3.17) ^c	-	-10.96
DEM	1	19.00	12.00 (-36.84) ^a	11.00 (-8.33) ^b	16.00 (45.45) ^c	11.00 (-31.25)	-42.11
	2	19.00	20.00 (5.26) ^a	20.00 (0.00) ^b	17.00 (-15.00) ^c	19.00 (11.76)	0.00
	3	22.00	21.00 (-4.55) ^a	19.00 (-9.52) ^b	19.00 (0.00) ^c	-	-13.64
LFT	1	23.00	21.00 (-8.7) ^a	21.00 (0.00) ^b	24.00 (14.29) ^c	25.00 (4.17)	8.70
	2	22.00	21.00 (-4.55) ^a	20.00 (-4.76) ^b	20.00 (0.00) ^c	20.00 (0.00)	-9.09
	3	20.00	19.00 (-5.00) ^a	17.00 (-10.53) ^b	18.00 (5.88) ^c	-	-10.00
AWF	1	17.00	12.00 (-29.41) ^a	13.00 (8.33) ^b	16.00 (23.08) ^c	12.00 (-25.00)	-29.41
	2	19.00	16.00 (-15.79) ^a	16.00 (0.00) ^b	17.00 (6.25) ^c	16.00 (-5.88)	-15.79
	3	18.00	18.00 (0.00) ^a	17.00 (-5.56) ^b	19.00 (11.76) ^c	-	5.56
DEP	1	20.00	20.00 (0.00) ^a	20.00 (0.00) ^b	18.00 (-10.00) ^c	18.00 (0.00)	-10.00
	2	15.00	15.00 (0.00) ^a	15.00 (0.00) ^b	13.00 (-13.33) ^c	13.00 (0.00)	-13.33
	3	13.00	11.00 (-15.38) ^a	10.00 (-9.09) ^b	9.00 (-10.00) ^c	-	-30.77

761 *Notes.* ^aScreening to Session 3, ^bSession 3 to Post-Intervention, ^cPost-Intervention to Follow-up,762 ^dPre-Intervention to Intervention, ^eIntervention to Post-Intervention, ^fFollow-up to Maintenance;

763 P = participant number; DEM = demandingness, AWF = awfulizing, DEP = depreciation.

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766 *Figure 1.* Graphed self-efficacy data for all participants across baseline, during-REBT, post-
 767 REBT, follow-up (Fo-Up), and maintenance (maint) phases.

