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

6   American Football

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24 **Highlights**

25 • Used an idiographic staggered multiple-baseline across participants design

26 • Rational self-talk used as part of the intervention

27 • REBT increased self-determined motivation of the athletes

28 • REBT increased self-efficacy motivation of the athletes

29

30   Abstract

31   It has been suggested in recent research that rational beliefs as conceptualized within rational-

32   emotive behavior therapy (REBT) can be operationalized as strategic self-talk, but this has yet to

33   be meaningfully investigated. The current study examines the effects of five one-to-one REBT

34   sessions with three amateur American Football athletes to foster rational self-talk. The purpose

35   of the intervention was to reduce the irrational beliefs, but also in line with recent applied REBT

36   research, to increase the self-determined motivation and self-efficacy of the athletes. Using an

37   idiographic single-case, staggered multiple-baseline across participants design, visual analyses

38   revealed meaningful increases in self-determined motivation and self-efficacy, adjunct to

39   decreases in total irrational beliefs across all participants. Social validation data supported these

40   outcomes. These findings add to the growing research indicating that REBT can influence

41   motivational approaches in athletes, such as self-determined motivation and self-efficacy.

42   Results are discussed in relation to processes underlying the mechanisms of change, while also

43   reporting the limitations of the study. The robustness of the research design increases the extent

44   to which target variable changes can be attributed to REBT, but critical reflections are

45   undertaken to assess the veracity of the findings.

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

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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, Lorido-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/ debilitative) instead of valence (positive/negative). This is important

114 for REBT because the valance 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, Lorido-

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.

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)[e]	72.22 (9.97)[c]	78.89 (20.13)	53.24
	2	73.04	76.15 (4.26)[d]	78.81 (3.49)[e]	79.88 (1.36)[c]	82.00 (4.05)	12.27
	3	59.08	64.00 (8.33)[d]	63.97 (-0.05)[e]	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.* [a]Screening to Session 3, [b]Session 3 to Post-Intervention, [c]Post-Intervention to Follow-up,

762 [d]Pre-Intervention to Intervention, [e]Intervention to Post-Intervention, [f]Follow-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.