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**Exploring the Effects of a Single Rational Emotive Behavior Therapy (REBT)
Workshop in Elite Blind Soccer Players**

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Abstract

Research examining the effects of Rational Emotive Behavior Therapy (REBT) on athletic performance is emerging. There exists however, a paucity of research exploring psychological interventions within specialized sport populations. Our present study investigated the effects of a single REBT workshop, including intellectual and practical insight into the ABC(DE) framework on psychological, physiological, and performance markers within an elite blind soccer team. Using a within-participant pretest-posttest crossover design in an ecologically valid setting, data indicated small and immediate reductions in irrational beliefs, perceived helpfulness of pre-performance anxiety, and physiological markers (i.e., Systolic Blood Pressure) prior to a penalty-kick simulation. However, no substantial changes were shown in penalty-kick performance. In sum, although the findings elucidate some benefits of a single REBT workshop, the educational insight into the ABC(DE) framework was deemed insufficient for meaningful changes in outcome measures. Practical implications and recommendations for future researchers are discussed.

Key words: irrational beliefs, penalty kick, applied sport psychology, disability sport,

74 *must be successful, otherwise it would be terrible, and means that I am a complete failure”*
75 will become disproportionately anxious (unhealthy negative emotion) to what the situation
76 warrants and thus behave in a way that hinders goal achievement (i.e., avoidant strategies).

77 Using the ABC (DE) framework (Ellis & Dryden, 1997) practitioners educate clients
78 that beliefs (B) about an activating event (A; i.e., failure, rejection, or poor treatment) rather
79 than the activating event itself (A) to determine the functionality of emotional and behavioral
80 consequences (C). As such, practitioners dispute (D) irrational beliefs and replace them with
81 effective and new rational alternatives (E), in turn, encouraging healthy negative emotions
82 and adaptive behaviors (C) when approaching or responding to an activating event (A; see
83 Turner & Barker, 2014 for an overview). Therefore, when faced with adversity, athletes who
84 harbor irrational beliefs place disproportionately greater demand(s) on themselves than the
85 situation warrants. Instead the REBT process promotes a functional and rational view of an
86 activating event, allowing athletes to better manage and overcome the many challenges they
87 inevitably encounter in the pursuit of performance excellence, without compromising
88 psychological wellbeing (Turner, 2016; Wood, Barker, Turner, & Sheffield, 2018).

89 Previous researchers have reported the promising effects of REBT in reducing
90 irrational beliefs and facilitating psychological outcomes indicative of superior athletic
91 performance using both one-to-one and workshop modalities (e.g., Turner & Barker, 2014).
92 First, using a one-to-one counseling approach, research demonstrates immediate and long-
93 term reductions in irrational beliefs, cognitive anxiety, as well as increases in self-efficacy,
94 perceptions of control, and objective measures of performance (e.g., Turner & Barker, 2013;
95 Turner & Barker, 2014; Wood, Barker, & Turner, 2017b; Wood et al., 2018). Second, in the
96 highly pressurized industry of elite sport there is an increased recognition that practicing sport
97 psychologists are required to deliver both efficient and effective interventions, whereby, brief
98 contact interventions shorter in duration offer a valuable and timely solution (Giges &

99 Petipas, 2000). Accordingly, the application of a single workshop in high performance sport
100 offers a pragmatic and cost-effective method for practitioners to disseminate psychological
101 principles in brief contact intervention strategy (Turner & Barker, 2014). Within elite soccer
102 academy settings researchers report immediate reductions in irrational beliefs after receiving a
103 single REBT workshop (Turner, Slater, & Barker, 2013), indicating that the brief application
104 of REBT is effective in providing educational insights into the ABC(DE) framework.
105 Nonetheless, little is known about the quantitative or long-term effects of a single REBT
106 workshop, that is an educational insight into a rational view of performance on psychological
107 (i.e., intensity and perceived helpfulness of pre-performance anxiety), physiological, and
108 performance markers. Further, previous methods are burdened with methodological
109 shortcomings including no comparison conditions, over reliance on self-report measures, and
110 failure to include measures of task performance (Turner, 2016).

111 Moving beyond self-report measures, researchers have begun to draw associations
112 between irrational and rational beliefs and physiological markers. For example, irrational
113 beliefs are shown to positively associate with C-reactive protein, interleukin-6 tumor necrosis
114 factor, and white blood cell count and present a risk factor for cardiovascular diseases
115 (Papageorgiou et al., 2006). During a real-life stressful scenario, researchers have also shown
116 the adoption of irrational beliefs to be matched with greater increases in Systolic Blood
117 Pressure (SBP) indicative of autonomic rigidity; whereas the adoption of rational beliefs were
118 matched with decreases in SBP which is indicative of autonomic flexibility (e.g., Harris,
119 David, & Dryden, 2006). Most notably, research with elite Paralympic athletes also recorded
120 acute and maintained reductions in baseline SBP prior to a competition simulation after
121 receiving five, one-to-one REBT sessions (Wood et al., 2018). To this end, in alignment with
122 REBT theory, measurement of blood pressure (i.e., systolic and diastolic) provides an
123 objective insight into an athlete's physiological state (adaptive or maladaptive) when

124 encountering an activating event. Considering the promise, there exists a dearth of REBT
125 research exploring the use of physiological markers.

126 In-line with REBT theory, a penalty-kick simulation for an elite blind soccer player
127 presents a significant activating event. In elite blind soccer, penalty kicks are awarded to the
128 opposing team after accruing five team fouls; whereby penalty kick importance is escalated
129 during the knock-out stages of major international tournaments if the game ends in a tie;
130 where teams partake in a three-man penalty-kick shootout. Researchers propose a successful
131 penalty kick is in part, a function of a player's psychology (i.e., coping with stress; Jordet,
132 Hartman, Vischer, & Lemmink, 2007) and REBT may be particularly effective for players
133 who have a predisposition for threat appraisals (e.g., a history of failure during penalty kicks;
134 Wood, Jordet, & Wilson, 2015). For example, REBT will dispute and replace a player's core
135 irrational belief of awfulizing (e.g., "it would be the end of the world if I missed") with the
136 rational alternative of anti-awfulizing (e.g., "it would be bad, but it certainly wouldn't be
137 terrible if I missed"). Subsequently, athletes are better able to take perspective and accurately
138 gauge the severity of the consequences often amplified and exaggerated during a penalty-kick
139 situation. Overcoming previous REBT research limitations, in the present study we used a
140 penalty kick simulation as a performance task relevant to REBT theory.

141 Despite widespread intervention research there exists a paucity (e.g., Arnold,
142 Wagstaff, Steadman, & Pratt, 2017) of literature examining the effects of sport psychology
143 interventions within specialized populations, such as elite athletes with a physical disability
144 (Barker, Mellalieu, McCarthy, Jones, & Moran, 2013). This is surprising considering the
145 prevalence of disability sport, whereby events such as the Paralympics are now the second
146 largest multisport event in the world (Legg & Steadward, 2011). Researchers suggest athletes
147 with a physical disability experience both physical and psychological challenges specific to
148 their condition and distinct to able-bodied athletes (e.g., lack of autonomy, potential injury,

149 medical care and negative social reactions; Jaarsma, Geertzen, De jon, Dijkstra, & Dekker,
150 2014). In addition, the nature of a disability (i.e., congenital or acquired) presents differing
151 psychological issues such as: compromised self-identity, diminished self-worth, body image
152 issues, and depression (Skordilis, Skafida, Chrysagis, & Nikitaras, 2006). Nonetheless,
153 significantly less attention has been afforded to understand the application and idiosyncrasies
154 of sport psychology intervention(s) with elite athletes with a disability.

155 In sum, the present study explores the effectiveness of a single REBT workshop on
156 important psychological, physiological, and performance indicators during a penalty kick
157 shootout with elite blind soccer players. In our present study we add intellectual and practical
158 insight into the extant literature by applying REBT to a novel population in a unique setting,
159 whilst attempting to delineate intervention effects beyond self-report markers. Accordingly,
160 we tried to maintain adequate scientific rigor, overcome the methodological shortcomings of
161 previous studies (e.g., Turner et al., 2014), and to conduct an applied investigation within an
162 ecologically valid setting. To this end, a within-participant pretest-posttest crossover design
163 was used to compare the effectiveness of a single REBT workshop with an attention placebo
164 with players from an elite blind soccer team. Based upon REBT theory and previous research
165 two exploratory hypotheses were established: The REBT intervention would bring about
166 immediate decreases in irrational beliefs and pre-performance anxiety intensity. Given the
167 dearth of previous research the present study explored the effects of a single REBT workshop
168 on perceived helpfulness of pre-performance anxiety, physiological markers (i.e., systolic and
169 diastolic blood pressure) prior to a penalty-kick simulation, and subjective penalty-kick
170 scores. In our study we offer practitioner implications for the use of a REBT workshop
171 within sport, along with how to apply a sport psychology intervention with elite blind soccer
172 players.

173

Method

174 Participants

175 Based upon unique access to a specialized population sample all ten members of an
176 elite male blind soccer team were purposively recruited and were aged between 19 and 41 (M
177 = 28.36, $SD = 5.54$). Participants included three fully sighted goalkeepers and seven outfield
178 players with a B1 blind classification, that is visual from no light perception up to and
179 including hand movements. In blind soccer, teams consist of four outfield players with a
180 blind classification and one goalkeeper who can be fully sighted or have a visual impairment.
181 Pre-screening procedures confirmed participants had had no previous psychological support
182 around REBT. Institutional ethical approval and participant consent was obtained prior to data
183 collection. Participant and organization identity would remain anonymous and confidential.

184 Context

185 The lead author, a training Sport and Exercise Psychologist (British Psychological
186 Society) and a Qualified REBT Practitioner (Primary Practicum) was asked to deliver an
187 intervention developing the player's ability to perform under pressure, specifically during a
188 penalty-kick. In blind soccer penalty kicks have a large bearing on the outcome of a game.
189 Penalty kicks are awarded to the opposition: 1) for every foul, after a team have accrued five
190 fouls, 2) if a goalkeeper interferes with play outside the goalkeeper's area, and 3) if the game
191 is tied at the end of open play. Considering the time-constraints and nature of this unique
192 sample, a workshop modality was deemed suitable and pragmatic modality of delivery.

193 Research Design

194 A within-participants pretest-posttest cross-over design was used to explore the effectiveness
195 of a single REBT workshop with an elite blind soccer team. Specifically, data were collected over
196 four - monthly training camps, and separated into pre-intervention, time-point one, time point two,
197 and post-intervention time points. Initially, all data were collected from participants at pre-
198 intervention. To safeguard threats to internal validity and to avoid order effects, participants were

199 assigned into one of two groups and counterbalanced accordingly. Using a separate set of numbers,
200 each participant was given a number and randomly allocated to ensure an equal spread of outfield
201 players ($N = 7$) and goal keepers ($N = 3$) between Group A and B. At time-point 1 Group A ($N = 5$)
202 received the REBT workshop, whereas Group B ($N = 5$) were placed into an attention placebo
203 workshop providing a highly valid control condition (Popp & Schneider, 2015). An attention
204 placebo group was created as a plausible psychoeducational workshop that in theory would have no
205 effects on the dependent variables, whilst also controlling for any expectancy effects. Following
206 this, at time-point three, Group A received the attention placebo workshop and Group B received the
207 REBT workshop. Ultimately, the study design created the conditions for causality and safeguarded
208 threats to internal validity. For example, we would only expect changes in Group A and not in
209 Group B between pre-intervention and time-point 1 as a result of the experimental intervention.

210 **Measures**

211 ***Irrational beliefs.*** The Shortened General Attitudes and Beliefs Scale (SGABS;
212 Lindner, Kirkby, Wertheim, & Birch, 1999) was used to measure participant's total irrational
213 beliefs. In this study all four items from the rational belief subscale were removed due to its
214 failure to provide a reliable and sensitive measure of rational beliefs. In turn the SGABS was
215 reduced from 26 to 22 items (e.g., Turner & Barker, 2013). Participants responded on a 5-
216 point Likert-scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Each item related
217 to one total irrational and six irrational belief content areas (i.e., self-downing, other-downing,
218 need for achievement, need for approval, need for comfort and demand for fairness).
219 Cronbach's alpha coefficient indicated internal reliability scores ranging from $\alpha=.73$ to $\alpha= .$
220 $.97$ for total irrational beliefs scores across all four time-points.

221 ***Pre-performance anxiety and perceived helpfulness.*** The State Trait Anxiety
222 Inventory (STAI Form Y; Spielberger, 1983) comprised of 20 items and was used as a

223 validated measure of pre-performance anxiety prior to a competitive penalty shoot-out
224 simulation. Participants reported their answers on a 4-point Likert-scale ranging from 1 (*not*
225 *at all*) to 4 (*very much so*). In addition, participants reported the extent they perceived these
226 feelings to be helpful/unhelpful towards the upcoming penalty-kick simulation on a 7-point
227 Likert-scale ranging from -3 (*Not at all helpful*) to 3 (*Extremely Helpful*). A Cronbach's alpha
228 coefficient indicated internal reliability scores ranging from $\alpha = .73$ to $\alpha = .91$.

229 ***Penalty kick performance scores.*** To ascertain the effects of a single REBT
230 workshop, the performance of the seven outfield players was assessed during a competitive
231 penalty-kick shootout across all four time-points. Subject to injury and availability all three
232 goalkeepers and seven outfield players participated in the penalty shootouts. Due to the low
233 scoring percentage associated with penalty-kicks in blind football the use of objective
234 measure of penalty-kick performance (e.g., goal/no goal) was deemed to not offer a sensitive
235 assessment of penalty-kick performance. Penalty kick performance markers were instead
236 conceptualized and generated in conjunction with the head coach to assess three distinct
237 processes associated with a successful penalty-kick performance in blind soccer. The three
238 markers included: ball strike (i.e., contact between the players foot and the ball on striking),
239 accuracy (i.e., ball direction after contact) and power (i.e., the rate at which the ball travelled
240 after the strike). Each penalty was reported out of 10 by the same head coach at each of the
241 four data collection time-points. To negate any learning effects participants were all
242 experienced and versed in penalty taking. Further, to ensure reliability participants were
243 instructed to use the same technique for each data collection session. The penalty shootout
244 simulation itself mimicked the format of a major championship, whereby each player was
245 lined-up and asked to take a penalty-kick alternately on three separate occasions from both the

246 6 metre and 8 metre penalty spots. Mean penalty-kick scores were calculated from a total of
247 six penalties for each marker (e.g., power).

248 *Physiological markers.* Similar to previous researchers (e.g., Wood et al., 2018)
249 measures of heart rate, systolic, and diastolic blood pressure were monitored over a five-
250 minute period prior to the upcoming competition scenario (i.e., penalty-kick simulation).
251 Physiological measures were collected using the Finometer PRO (Finapres Medical Systems,
252 Netherlands), which is a validated apparatus to measure cardiovascular indices (e.g., Kaltoft,
253 Hobolth, & Miller, 2010). Prior to each data collection time-point participants were notified
254 of an upcoming penalty-kick competition which would be conducted on the last day of each
255 training camp.

256 *Social Validation.* Upon completion of the post-intervention data collection phase
257 social validation data was collected using semi-structured interviews to explore the perceived
258 effectiveness of the REBT intervention (Page & Thelwell, 2013). Specifically, the interviews
259 focused on three key areas of social validity: social significance of the goal(s), social
260 appropriateness of the procedures, and social importance of the effects.

261 **Data Collection Procedures**

262 Participants were provided with a 30-minute introduction session to the research
263 project and familiarized with the research protocol. All self-report (i.e., irrational beliefs, pre-
264 competitive anxiety), physiological measures (i.e., SBP and DBP) and performance scores
265 (i.e., penalty-kick performance) were collected at each of the four training camps, and were
266 established as pre-intervention, intervention one, intervention two and post-intervention time-
267 points. During each camp all participants were allocated a time slot to complete a series of
268 self-report measures, following this baseline physiological measures of resting HR, SBP, and
269 DBP were collected. Participants were again asked to complete a series of self-report
270 measures in reference to the upcoming competitive penalty-kick simulation. The content of

271 the questionnaires were dictated to the participants by the first and fourth author. On the final
272 day of each camp and within 24 hours of the self-report and physiological measures, all
273 players took part in a competitive penalty-kick simulation mimicking the format used within
274 major competitions (see supporting information for procedural flow chart).

275 **Experimental Intervention**

276 To ensure the REBT workshop was delivered consistently and to maintain procedural
277 reliability (Barker et al., 2013) an intervention workshop manual was created collaboratively
278 with the second and third authors. The intervention comprised a single 60-minute educational
279 REBT workshop including three separate stages based upon the ABC (DE) framework
280 (Dryden & Branch, 2008; Ellis & Dryden, 1997). As advocated by previous researchers (e.g.,
281 Turner & Barker, 2014) a relaxed and discussion-based session was structured including
282 discussions, self-disclosure surrounding their own irrational beliefs, and practical adoption of
283 rational self-statements. Furthermore, participants understanding and agreement with the
284 ABC (DE) framework was gauged via verbal feedback and the periodic use of open questions
285 (see Figure 1).

286 Initially, players were educated on the ABC framework, discussing their thoughts,
287 feelings, and behaviors in response to situations where they were required to take a penalty-
288 kick, whilst emphasizing the central role of beliefs in determining the functionality of their
289 response. Following this, participants were educated on the four core irrational beliefs, and
290 taken systematically through the disputation process (D) using empirical, logical, and
291 pragmatic disputes (Dryden & Branch, 2008). For example, when disputing the irrational
292 demand “*I must be successful*” or awfulizing belief “*if I missed the penalty it would be the end*
293 *of the world*” the participants were questioned as to how true, logical, and helpful these
294 beliefs would be for their performance. Finally, rational alternatives (E) for the four irrational
295 beliefs were presented, for example: “*I really want to be successful, but that doesn’t mean I*

296 *have to be*” or anti- awfulizing belief “*if I missed the penalty it would be bad, but not the end*
297 *of the world*”. Finally, the functional and helpful influence of the new rational beliefs on
298 thoughts, feelings, and behaviors were discussed. The delivery of the REBT intervention was
299 tailored to the participant’s needs and separated into three sections. These included: 1)
300 introducing the ABC model, via the exploration of participants experience of activating
301 events (A), 2) discussing key distinctions in irrational and rational beliefs (B), and 3) the
302 process of disputation (D), in terms of empirical, logical, and pragmatics arguments. The lead
303 author acted as the educator and group facilitator asking participants to share their thoughts to
304 the rest of the group. Participants were unable to collate notes during the session, thus upon
305 completion of the workshop each player was provided with a 30-minute audio recording on
306 CD. The audio file captured the salient workshop themes (i.e., breakdown of the ABC model),
307 and afforded the participants opportunities to reflect on the session content.

308 **Attention Placebo Workshop**

309 The attention placebo workshop controlled for the possibility that improvement by the
310 experimental group was a result of a placebo effect (Boot, Simons, Stothart, & Stutts, 2013),
311 thereby increasing the confidence in the causal effects of the REBT workshop. The attention
312 placebo condition lasted for 60 minutes, and involved discussing examples of the best sport
313 teams in the world, and the subsequent impact on both performance and success in major
314 competitions. Each participant had five minutes to collate their thoughts, and then presented
315 their examples back to the group – each case was followed by small group-based discussion.

316 **Procedural Reliability**

317 To ensure procedural reliability the intervention was delivered using a workshop
318 manual to guide the REBT intervention and attention placebo conditions (Barker et al., 2013).
319 At the end of the workshops participants were asked if they found any elements challenging
320 or ambiguous, in turn any queries were addressed.

321 **Analytic Strategy**

322 A small sample size ($N \leq 5$) is associated with low statistical power, inflated false
323 discovery rate, and low reproducibility (Button et al., 2013) thus inferential statistics were not
324 deemed suitable for the present analyses. Therefore, intervention effects were assessed using
325 descriptive statistics, and guidelines as seen in single-case designs (Barker et al., 2013). To
326 explore the magnitude of the intervention effectiveness Effect Sizes (ES) were calculated and
327 interpreted using guidelines and classification of Cohen's d (Cohen, 1988). Specifically,
328 where $M_1 - M_2$ indicates the difference between mean group scores between two different
329 data-points. Whereas SD_1 refers to the mean standard deviation of groups scores at the first
330 time-point, and SD_2 the mean standard deviation of group scores at the second data point:
331 Cohen's $d = M_1 - M_2 / SD_{pooled}$ (where $SD_{pooled} = \sqrt{(SD_1^2 + SD_2^2) / 2}$). Mean change scores were
332 also calculated between pre-intervention, time-point 1, time-point 2, and post-intervention
333 time points across both Groups A and B. Descriptive statistics (M and SD), and change scores
334 (mean change and *Effect size*) between time-points for both groups A and B are reported in
335 Table 1.

336 **Results**

337 **Irrational Beliefs.**

338 There was a medium decrease in total irrational beliefs after receiving the REBT
339 intervention in both Groups A ($M = -.23$, $d = -.64$) and B ($M = -.49$, $d = -.59$). Furthermore,
340 reductions in irrational beliefs were maintained between pre- and post-intervention time-
341 points, reporting a large decrease in Group A ($M = -.40$, $d = -1.11$) and a medium decrease in
342 Group B ($M = -.20$, $d = -.36$). After first receiving the REBT intervention participants in
343 Group A reported a large decrease ($M = -.20$, $d = -1.05$), whereas participants Group B after
344 receiving the attention placebo session at time-point 1 reported an increase ($M = .50$, $d =$

345 1.09) in total irrational beliefs compared with pre-intervention scores (see Figure 2, Table 1).
346 Across both groups A and B, and between pre- and post-intervention time-points a total of
347 eight participants reported reductions whereas two participants reported increases in irrational
348 beliefs.

349 **Pre-Performance Anxiety.**

350 Participants in Group A reported a large decrease ($M = -.31, d = -1.55$) in pre-
351 performance anxiety prior to the penalty-kick simulation after receiving the REBT
352 intervention at time-point 1. However, such reductions were not maintained, instead reporting
353 a large increase ($M = .41, d = 4.56$) at time-point 2 after receiving the attention placebo
354 session. Participants in Group B reported a small increase ($M = .19, d = .30$) in pre-
355 performance anxiety prior to the penalty-kick simulation after receiving the REBT
356 intervention at time-point 2, further reporting no changes between pre-intervention and post-
357 intervention time points. A medium decrease ($M = -.18, d = -.62$) in pre-performance anxiety
358 was also reported at time-point 1 after receiving only the attention placebo session (see Figure
359 3, Table 1). Across both groups A and B, and between pre- and post-intervention time-points
360 five participants reported reductions, and five participants reported increases in pre-
361 performance anxiety.

362 Participants in Group A reported a small increase ($M = .12, d = .14$) in perceived
363 helpfulness of pre-performance anxiety prior to the penalty-kick simulation after receiving the
364 REBT intervention. Small increases in perceived helpfulness were also maintained in Group
365 A, between: time-point 1 and time-point 2 ($M = .22, d = .17$). Participants in Group B
366 reported a medium decrease ($M = -.40, d = -.33$) in perceived helpfulness after receiving the
367 attention placebo session, whereas indicating a medium increase ($M = .73, d = -.64$) after
368 receiving the REBT intervention between time-point 1 and time-point 2. Such increases were
369 not maintained between pre- and post- intervention time points (see Table 1). Across both

370 groups two participants reported increases, seven participants no changes, and one participant
371 decreases in the perceived helpfulness of pre-performance anxiety between re- and post-
372 intervention time-points.

373 **Physiological Markers.**

374 Mean levels of resting SBP collected prior to the penalty-kick simulation showed a
375 large decrease ($M = -22.74$, $d = -1.23$) in Group A and a small decrease in Group B ($M = -$
376 5.78 , $d = .48$) after receiving the REBT intervention. However, small reductions were
377 reported in SBP in Group B ($M = -6.07$, $d = -.49$) after the attention placebo session at time-
378 point 1. A small, decrease in Group A ($M = -4.36$, $d = -.24$) and a medium increase in Group
379 B ($M = 3.84$, $d = .30$) were reported between pre- and post-intervention time points (see
380 Figure 4, Table 1).

381 **Penalty Kick Performance**

382 Data from Group A reported a large increase in accuracy ($M = .47$, $d = .80$) and
383 medium increase in power ($M = .39$, $d = .55$), as well a large decrease in ball strike ($M = -.55$,
384 $d = -2.49$) after receiving the REBT intervention (pre-intervention and time-point 1). In Group
385 B, data showed a small decrease in ball strike ($M = -.24$, $d = -.12$) and power ($M = -.28$, $d = -$
386 $.11$), as well as a large decrease in accuracy ($M = -1.36$, $d = -1.70$) after receiving the
387 intervention. Across both groups, four participants reported increases, and three participants
388 reported decreases in ball strike, between pre- and post-intervention time-points. For accuracy
389 and power, five participants showed increases, whilst two participants showed decreases
390 between re- and post-intervention time-points (see Figure 5, Table 1).

391 **Social Validation**

392 Social validation data indicated the intervention was received positively, and the
393 provision of the ABC (DE) framework offered participants an insight into the formation of
394 emotions and behaviors, having benefits on emotional control. For example, one player noted

395 “I am quite cynical about psychological based workshops, so for me to find it useful shows
396 there must be something good in the approach”. All players noted psychological benefits
397 stemming from the group-based delivery of the REBT intervention. The session afforded
398 players an insight into their teammates mind-set and created a shared appreciation into each
399 other’s perspectives. The REBT intervention helped players normalize the ubiquitous nature
400 of negative emotions, whilst reaffirming a helpful and unhelpful distinction when
401 approaching an activating event. One player noted “the session helped reaffirm my
402 preparation for pressurized situations”. As indicated by the statistical data, although noting
403 psychological benefits participants reported difficulties in directly quantifying the effects of
404 the REBT intervention on performance. As such, the use of a single workshop was reported to
405 be insufficient for a comprehensive understanding into the ABC (DE) framework. Finally,
406 three players noted the value of coach inclusion within the REBT workshop, despite the
407 proximity, time, and influence coaches have with the players.

408 **Discussion**

409 Our study is the first study to explore the effectiveness of a single REBT workshop on
410 psychological (intensity and perceived helpfulness of anxiety), physiological (HR, SBP, &
411 DBP), and performance indicators during a penalty-kicks in elite blind soccer players. In-line
412 with previous researchers (e.g., Turner et al., 2013) and the study hypothesis, the application
413 of a single REBT workshop was associated with immediate and maintained (i.e., pre- and
414 post-intervention) reductions in irrational beliefs. The findings also indicate the first
415 successful application of REBT as an intervention to reduce self-reported irrational beliefs
416 within a specialized sample of elite blind soccer players. Nevertheless, whilst an educational
417 insight into REBT reduced participant’s endorsements of irrational beliefs, the intervention
418 dose was insufficient in bringing about meaningful changes in players deeply held beliefs.

419 The results indicated the REBT intervention elicited immediate reductions in pre-
420 performance anxiety prior to a penalty-shootout simulation for Group A, whereas no
421 reductions were reported in Group B. In part, findings contrast with previous results (e.g.,
422 Turner & Barker, 2013) evidencing reductions in cognitive-anxiety after receiving an REBT
423 intervention. This can be explained by the binary theory of emotion, where when one
424 encounters an activating event (i.e., penalty-kick) rational beliefs lead to healthy negative
425 emotions (i.e., concern) that are lower in intensity. Where instead the endorsement of
426 irrational beliefs generates unhealthy negative emotions (i.e., anxiety) higher in intensity,
427 hindering goal achievement (Dryden & Branch, 2008). Indeed, researchers have reported
428 greater increases in anxiety in those who adopt irrational beliefs compared to rational
429 alternatives (e.g., Harris, Davies, & Dryden, 2006). In the present study, short-term
430 reductions in anxiety may be explained by the intervention dose, whereby although the
431 educational insight into the ABC(DE) framework may have offered an immediate rational re-
432 appraisal of upcoming situations, this was insufficient in bringing about long-term changes in
433 the intensity of cognitive anxiety. In addition, these findings were echoed by data showing
434 immediate increases in the perceived helpfulness of pre-performance anxiety for both groups,
435 nonetheless at the pre-intervention time points such increases were maintained only within
436 group A. On this basis we postulate, instead of reducing the intensity of the player's anxiety,
437 the REBT workshop may have encouraged an immediate and small shift in participants'
438 perceptions of pre-performance anxiety towards a penalty-shootout performance. These
439 findings are consistent with a binary model of emotion, whereby both unhelpful and helpful
440 negative emotions can be experienced under low, medium, and high intensities (Hyland &
441 Boduszek, 2012). Therefore, little changes would be expected in participants' emotion
442 intensity (e.g., pre-performance anxiety) prior to a competitive penalty-shootout.

443 Previous researchers examining the role of psychology and penalty-kick outcomes
444 have suggested REBT to be valuable for players who have a predisposition for threat
445 appraisals (e.g., Wood et al., 2015). However, our findings indicate the REBT intervention
446 had no effect on performance during a penalty shootout simulation. This could be explained
447 by first, a single REBT workshop was insufficient in bringing around substantial and/or
448 meaningful reductions in irrational beliefs, and thus no changes were ascertained in penalty-
449 kick performance. Second, by measuring performance over four testing sessions participants
450 may have been systematically desensitized to the penalty-shootout simulation, thus
451 minimizing the influence of irrational beliefs on task performance. Finally, due to the player's
452 visual impairment there was greater variability in the technical execution of the penalty-kicks,
453 in-turn making the causal effects of the REBT intervention on penalty-kick performance
454 difficult to determine. Nonetheless, researchers have evidenced the negative associations
455 between perceived importance and outcome of penalty shootouts in elite soccer players during
456 world-cup and major championships (e.g., Jordet et al., 2007). Thus, the endorsement of a
457 rational belief (i.e., anti-awfulizing), that is the proportionate evaluation of missing a penalty-
458 kick performance (e.g., "it would be bad, but certainly not terrible") may assuage perceived
459 outcome importance, and thus enhance penalty-kick performance. The examination into the
460 effects of REBT, that is the endorsement of a rational philosophy towards performance during
461 a penalty-kick offers a fruitful avenue for future investigation. For example, irrational beliefs
462 are purported to be deeply held and activated during a challenging situation (i.e., important
463 penalty-kick), thus researchers may wish to quantify differences in penalty-kicks between
464 those with high and low irrational beliefs within game settings. Further, it would be prudent to
465 explore the mechanisms by which athlete's beliefs (irrational/rational) effects the appraisal
466 process (e.g., demand vs. resource appraisals; Jones, Meijen, McCarthy, & Sheffield, 2009)

467 using both self-reported and psychophysiological measures (i.e., cardiovascular indices;
468 Turner, Jones, Sheffield, & Cross, 2012).

469 In-line with previous studies (e.g., Harris et al., 2006; Wood et al., 2018) our results
470 indicated reductions in irrational beliefs were also coupled with acute reductions in pre-
471 intervention measures of SBP measured prior to a penalty- shootout after receiving the REBT
472 intervention. These findings may be explained by the notion of ‘mental rigidity’ (Harris et
473 al., 2006, p 5), which suggests rigid and absolutistic thinking is associated with autonomic
474 rigidity (e.g., increased in SBP) prior to a real-life stressful situation. The notion that
475 irrational beliefs may determine a maladaptive physiological state (i.e., increase in SBP)
476 offers a novel contribution to the extant literature (e.g., Papageorgiou et al., 2006) and
477 presents an avenue for future researchers. Nonetheless, baseline measures of blood pressure
478 are not direct determinants of athletic performance and therefore future researchers may wish
479 to consider adopting cardiovascular indices of challenge and threat (e.g., Turner et al., 2013)
480 to better ascertain the predictive effects of irrational and rational beliefs on a player’s
481 performance appraisals (i.e., challenge or threat) and performance outcomes.

482 In-line with previous researchers, social validation data supported the changes in
483 participant’s irrational beliefs, as well as perceived performance benefits (e.g., Turner &
484 Barker, 2014). However, data also indicated that a player may understand or agree with a
485 rational approach yet a single-session alone is insufficient in promoting and maintaining a
486 rational philosophy towards success and/or failure. This has significant implications for
487 professional practice considering the prevalence of workshop delivery in team- based settings.
488 As such, practitioners should not expect long-term changes in an individual’s beliefs about
489 success from one session, and ultimately, brings into question the value of applying single
490 REBT workshops. Indeed, irrational and rational beliefs are deeply held and practitioners

491 should prioritize the intervention dose if they wish to facilitate fundamental and sustainable
492 shifts in players beliefs.

493 Using a series of one-to-one sessions REBT is particularly effective in bringing about
494 long-term reductions in irrational beliefs, as well as increases in perception of control, self-
495 efficacy, and performance in athletes (e.g., Wood et al., 2017b). However, when working
496 within a team, a workshop format offers a pragmatic modality popular with coaches and is
497 cost-efficient for organizations (Turner & Barker, 2014). Not limited to pragmatic reasons,
498 social validation data gleaned various benefits from using a group-based REBT modality.
499 These included: normalizing players concerns about competition and negative emotions,
500 providing a shared understanding amongst teammates, and allowing players to role-model and
501 learn best practices from one another. Such benefits may be explained by adjustments to a
502 ‘typical’ REBT workshop (e.g., Turner & Barker, 2014) accommodating the participant’s
503 visual impairments. To illustrate, the protocol mirrored that of Personal Disclosure Mutual
504 Sharing (PDMS; Holt & Dunn, 2006), whereby each player was in-turn asked to consider and
505 disclose examples of an ABC framework. The use of REBT and PDMS may offer an
506 effective means of promoting a rational philosophy in athletes, whilst also enhancing the
507 closeness, understanding, and communication between teammates. In addition, participants
508 emphasized the value of coach involvement within the REBT workshop, highlighting that
509 REBT is not restricted to athlete-facing support. Practitioners may wish to draw upon
510 research that advocates sport psychologists as the catalyst for cultural change within elite
511 teams (Cruickshank, Collins, & Minten, 2013). Thus, future researchers could explore the
512 effects of a rational culture as an elegant and pragmatic way to foster rational beliefs about
513 sport, performance, and long-term athlete wellbeing (Barker, 2018).

514 **Limitations and Future Directions**

515 While we strived to offer an ecologically valid field-based intervention and some immediate
516 reductions were observed, there are inherent limitations when examining the cause and effect
517 of brief-contact interventions. In the present study the feasibility was constrained by a trade-
518 off between maintaining adequate scientific and/or methodological rigor whilst conducting
519 field-based research with an elite blind soccer team within in ecologically valid settings. For
520 example, the performance criteria for the penalty-kicks was not pilot-tested prior to the first
521 testing session which may have compromised the reliability of the performance measure.
522 Nevertheless, methodological changes were introduced to maintain adequate internal validity
523 (i.e., maturation, testing effects; Campbell & Stanley, 2015); these include: use of both
524 subjective and objective measures, a cross-over pre- and post-test design, and procedural
525 reliability (i.e., single researcher, intervention manual. The inclusion of an attention placebo
526 group was created as a plausible psychoeducational workshop that theoretically had no
527 bearing on the participants approach or performance during the penalty kick task. However,
528 no intervention expectation checks were administered and we were unable to rule out any
529 placebo effects in our study (Boot, Simons, Stothart, & Stutts, 2013). Although, effect size
530 calculations are ubiquitous there remains some conjecture in terms of its use (Hedges,
531 Pustejovsky, & Shadish, 2012). Our study included a small sample size and the use of single
532 data-points, which are susceptible to inflated effect sizes (Ivarsson, Andersen, Johnson, &
533 Lindwall, 2013), as such caution should be taken when interpreting effect size calculations.
534 To ensure adequate internal validity, future researchers examining interventions effects in
535 applied settings and with specialized populations are recommended to adhere closely to
536 criteria put forth by Campbell and Stanley (2015) and/or follow principles typical of a single-
537 case research design (i.e., collection of stable baseline data, staggered intervention; Barker,
538 Jones, McCarthy, & Moran, 2011) to better ascertain intervention effectiveness. Finally,
539 future researchers may wish to consider qualitative examinations into athletes/client's

540 perceptions of the REBT process and interventions per se. Such research will enable insight
541 into the nuances of REBT practitioner-client therapeutic processes thus influencing
542 intervention design and implementation.

543 **Practical Implications**

544 The findings of our study have implications for the application of REBT within sport, and for
545 practitioners offering sport psychology provision to elite blind athletes. First, although the
546 application of single REBT workshop may offer brief intellectual insight into a rational view
547 of success and achievement, it is insufficient to expect any fundamental or long-term changes
548 in deeply held beliefs. Second, practitioners are recommended to consider B1 players in terms
549 of athletes with a B1 classification, rather than as a disabled athlete. Though a subtle change
550 in terminology this notion is coherent with the philosophy of REBT, that any facet of a human
551 provides no objective basis for determining an individual's self-worth (Chamberlain &
552 Haaga, 2010). Third, participants were able to comprehend the precise content of the REBT
553 workshop, nonetheless due care was and should be given when conceptualizing the delivery
554 of sport psychology support. For example, participants noted becoming mentally fatigued
555 relatively quickly compared to fully-sighted individual's due to the greater demand on their
556 cognitive processes to both ascertain their surroundings and communicate effectively with
557 others. Finally, for practitioners and researchers working with athletes with visual
558 impairments, the modality of workshops/psycho-education should be player led and favor
559 digital methods (e.g., audio, electronic messaging) over that of typical approaches (e.g.,
560 braille) to enhance effectiveness.

561 **Conclusion**

562 In summary, our current study explored the effectiveness of a single-REBT workshop
563 on important psychological, physiological, and performance indicators during a penalty-kick

564 in elite blind soccer players. Further, our study is one of a very few that has explored and
565 validated the suitability of a sport psychology intervention within a specialized sample of elite
566 disability soccer players. Collectively, data indicate that the REBT intervention brought about
567 immediate and small reductions in irrational beliefs, altered perceptions of pre-performance
568 anxiety, and baseline physiological measures (SBP), although had no effect on subjective
569 penalty-kick performance. Our data contribute to the growing body of research exploring the
570 effectiveness of group-based REBT interventions, and posit that a single group workshop
571 maybe insufficient to promote meaningful and lasting changes in an athlete's beliefs. Our
572 study therefore, has implications for practitioners looking to adopt principles of REBT as a
573 brief-contact intervention to promote psychological well-being and performance in sport.

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710

711 Figure captions

712 *Figure 1.* A schematic of the ABCDE framework used within the REBT workshop.

713

714 *Figure 2.* Mean irrational belief scores for Groups A and B at pre-intervention, intervention
715 one, intervention two, and post-intervention time points. Standard errors are represented in the
716 figure by the error bars attached to each data point.

717

718 *Figure 3.* Mean pre-performance anxiety for Groups A and B at pre-intervention,
719 intervention one, intervention two, and post-intervention time points. Standard errors are
720 represented in the figure by the error bars attached to each data point.

721

722 *Figure 4.* Mean systolic blood pressure levels for Groups A and B at pre-intervention,
723 intervention one, intervention two, and post-intervention time points. Standard errors are
724 represented in the figure by the error bars attached to each data point.

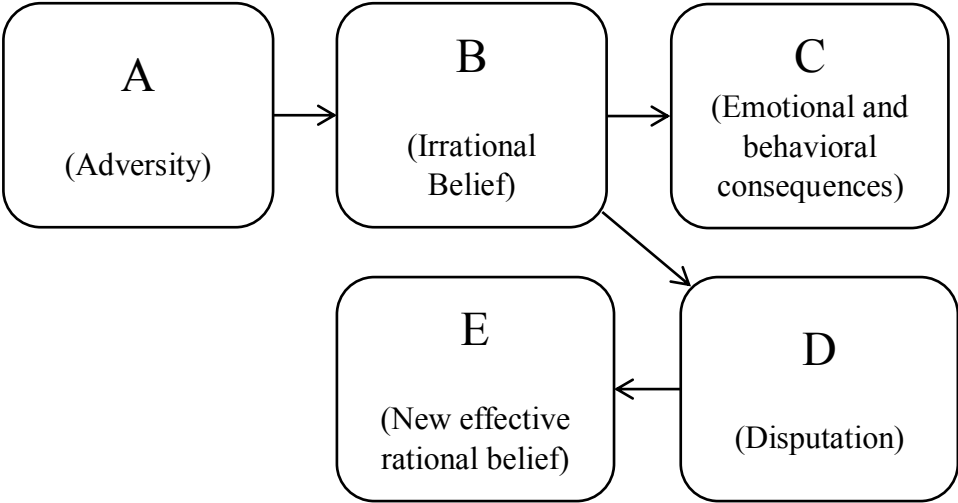
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726 *Figure 5.* Mean performance rating scores for ball strike, accuracy, and power for Groups A
727 and B at pre-intervention, intervention one, intervention two, and post-intervention time
728 points.

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730 Table 1. Means (SD) for dependent variables across time-points and mean percentage change
731 scores (effect size) between time-points.

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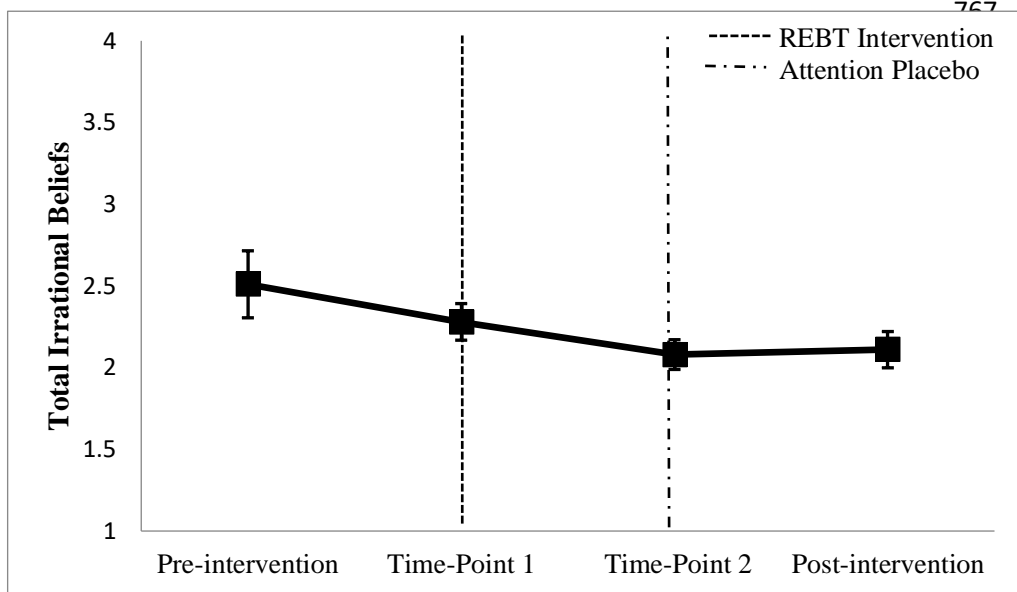


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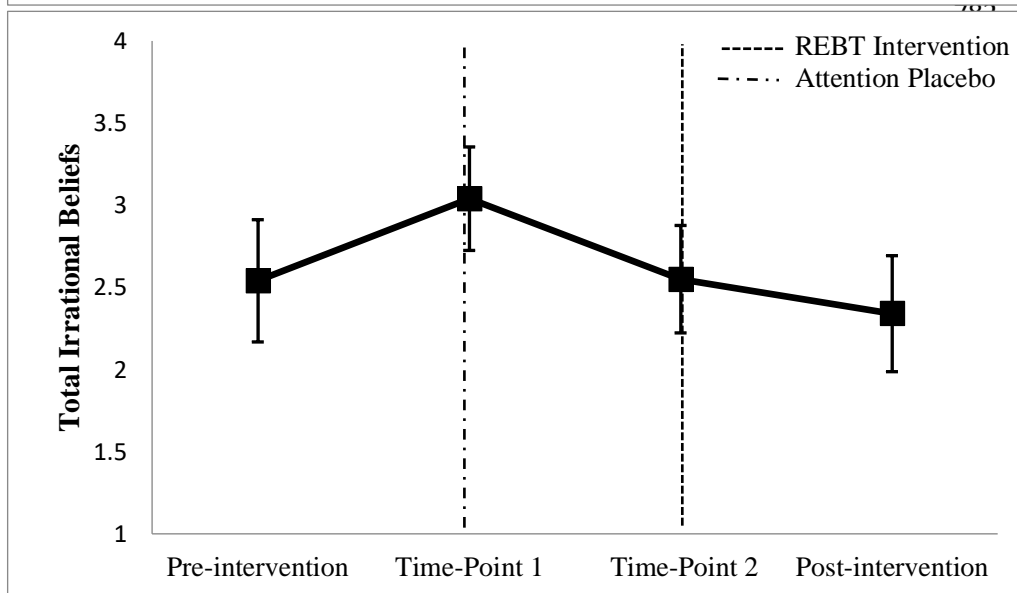
Figure 1. A schematic of the ABCDE framework used within the REBT workshop.

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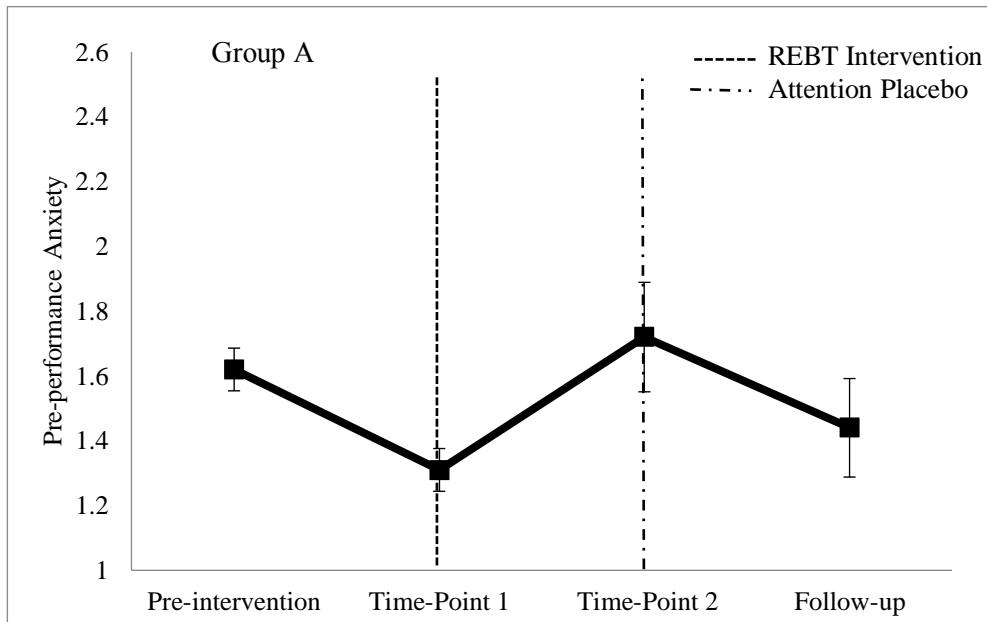
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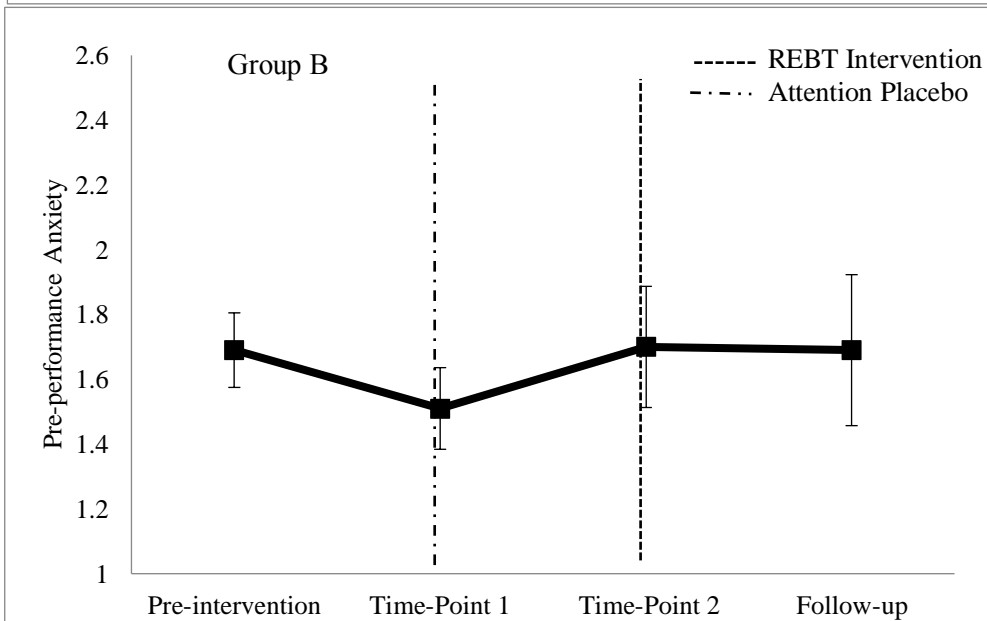
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Figure 2. Mean irrational belief scores for Groups A and B at pre-intervention, intervention one, intervention two, and post-intervention time points. Standard errors are represented in the figure by the error bars attached to each data point.

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Figure 3. Mean pre-performance anxiety for Groups A and B at pre-intervention, intervention one, intervention two, and post-intervention time points. Standard errors are represented in the figure by the error bars attached to each data point.

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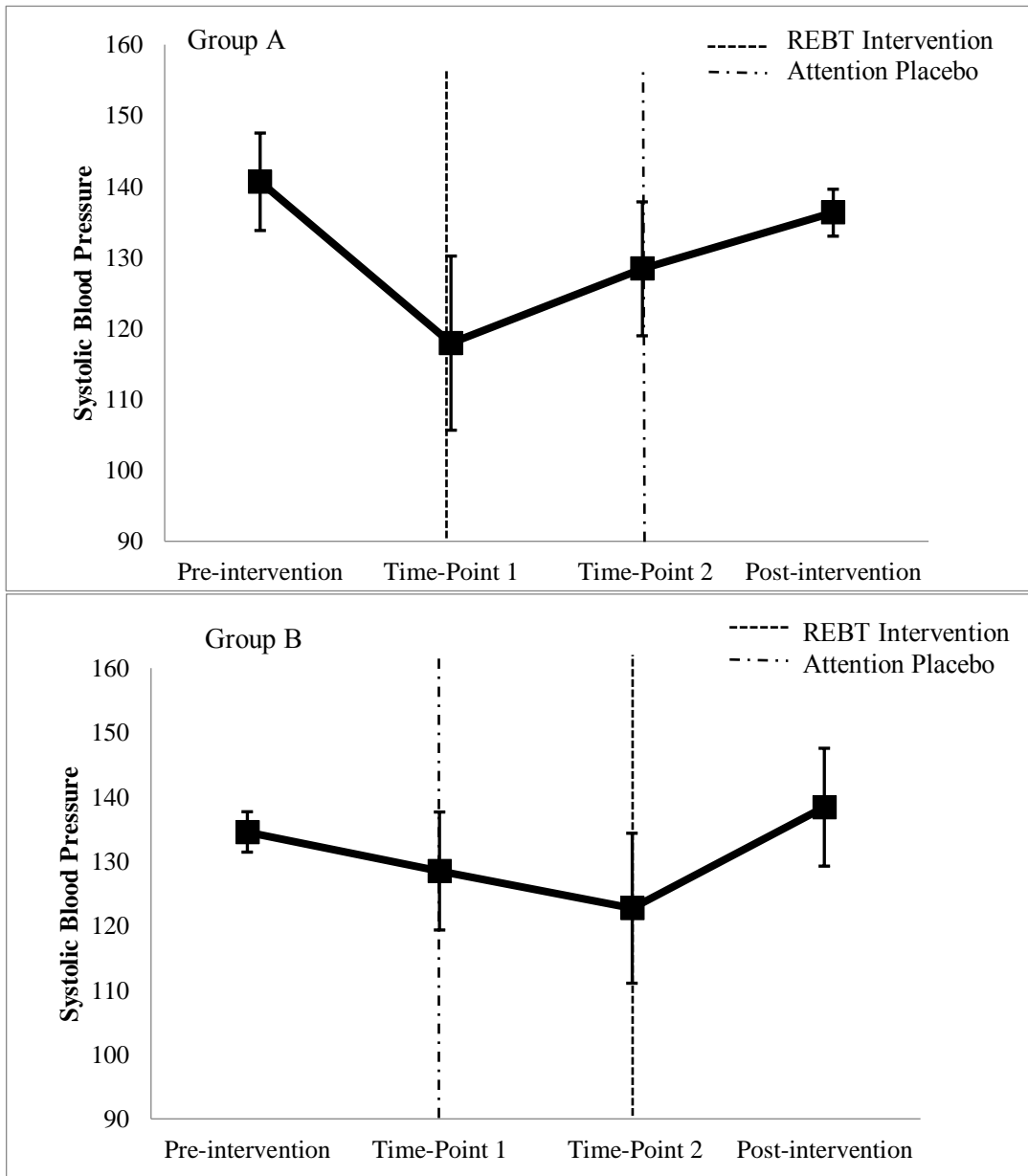
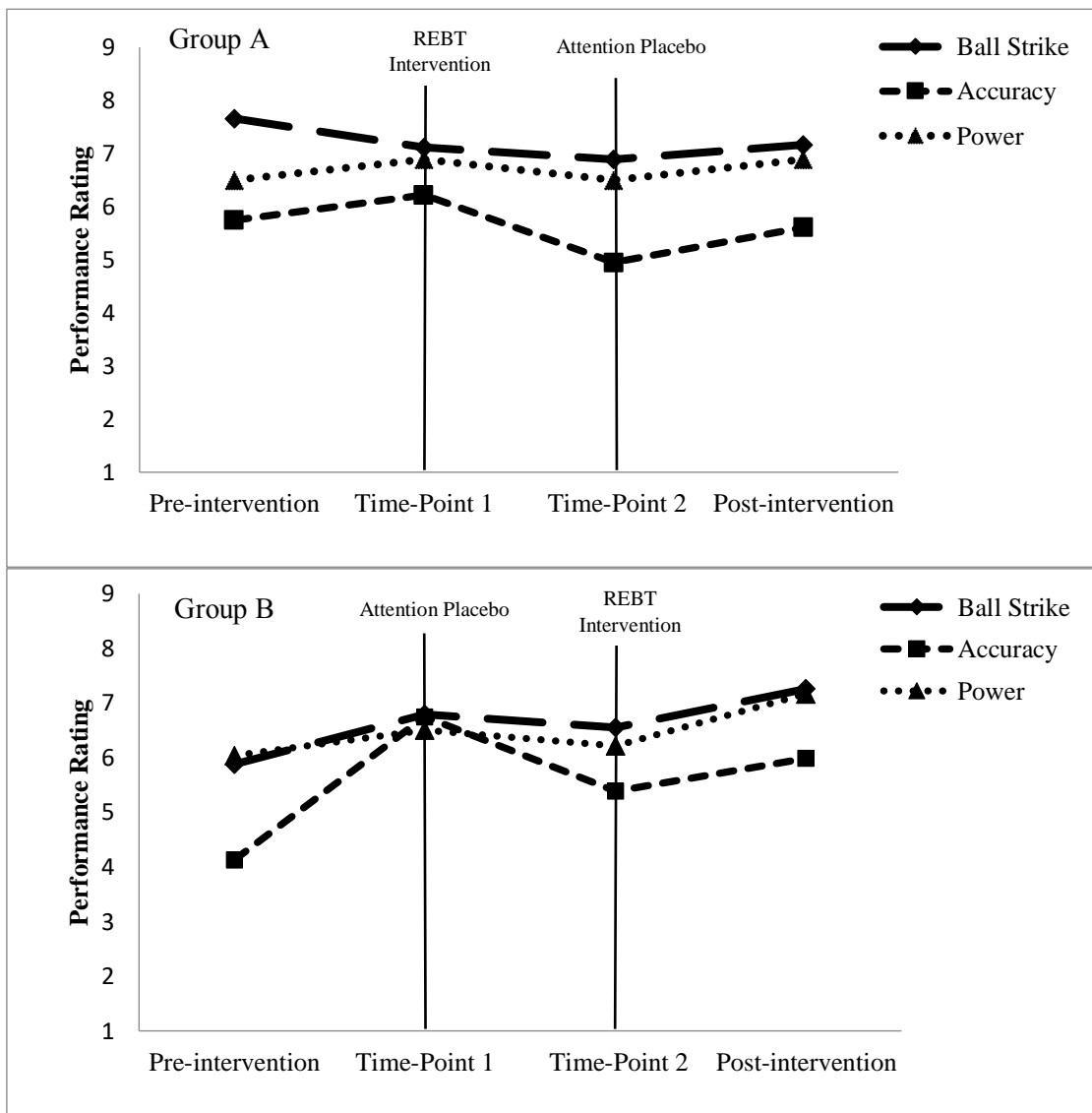


Figure 4. Mean systolic blood pressure levels for Groups A and B at pre-intervention, intervention one, intervention two, and post-intervention time points. Standard errors are represented in the figure by the error bars attached to each data point.



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Figure 5. Mean performance rating scores for ball strike, accuracy, and power for Groups A and B at pre-intervention, intervention one, intervention two, and post-intervention time points.

Table 1.

Means (SD) for dependent variables across time-points and mean percentage change scores (effect size) between time-points

Group A ^a	Mean (\pm SD)				Mean Change Scores (Cohen's <i>d</i>)			
	Pre-intervention (Pre)	Time Point 1 (TP1)	Time point 2 (TP2)	Post-intervention (Post)	Pre – TP1	TP1 – TP2	TP2 – Post	Pre-Post
Irrational Beliefs	2.51 (.36)	2.28 (.19)	2.08 (.29)	2.11 (.29)	-0.23 (.64)	-0.20 (1.05)	0.03 (.10)	-0.40 (1.11)
Penalty ball strike score	7.66 (.23)	7.11 (.59)	6.89 (.96)	7.17 (.34)	-0.55 (2.39)	-0.22 (.37)	0.23 (.29)	-0.54 (2.13)
Penalty accuracy score	5.75 (.59)	6.22 (.75)	4.95 (1.07)	5.61 (3.81)	0.47 (.80)	-1.27 (1.69)	0.66 (.62)	-0.14 (.24)
Penalty power score	6.50 (.71)	6.89 (.67)	6.50 (1.17)	6.89 (.54)	0.39 (.55)	-0.39 (.58)	0.39 (.33)	0.39 (.55)
Anxiety intensity	1.62 (.20)	1.31 (.09)	1.72 (.46)	1.44 (.46)	-0.31 (1.55)	0.41 (4.56)	-0.28 (.67)	-0.18 (.90)
Anxiety perceived helpfulness	1.00 (1.22)	1.17 (.98)	1.34 (.89)	1.2 (1.3)	0.12 (.14)	0.22 (.17)	-0.14 (.97)	0.20 (.16)
Heart Rate	65.30 (15.35)	63.46 (7.53)	63.66 (11.44)	63.26 (13.36)	-1.84 (.12)	0.20 (.03)	-0.40 (.03)	-2.04 (.13)
Diastolic Blood Pressure	88.21 (10.81)	72.49 (8.66)	78.10 (11.04)	83.44 (7.24)	-15.72 (1.45)	5.61 (.65)	5.34 (.48)	-4.77 (.44)
Systolic Blood Pressure	140.67 (18.47)	117.93 (15.07)	128.40 (14.60)	136.31 (6.39)	-22.74 (1.23)	10.47 (.69)	7.91 (.54)	-4.36 (.24)
Group B ^b	Pre-intervention (Pre)	Time Point 1 (TP1)	Time point 2 (TP2)	Post-intervention (Post)				
Irrational Beliefs	2.54 (.46)	3.04 (.83)	2.55 (.58)	2.34 (.84)	0.50 (1.09)	-0.49 (.59)	-0.21 (.02)	-0.20 (.36)
Penalty ball strike score	5.88 (2.05)	6.79 (1.99)	6.55 (1.07)	7.26 (.84)	0.91 (.44)	-0.24 (.12)	0.71 (.66)	1.38 (.67)
Penalty accuracy score	4.13 (.38)	6.75 (.80)*	5.39 (1.75)	5.99 (1.18)	2.62 (6.89)	-1.36 (1.70)	0.60 (.34)	1.86 (4.89)
Penalty power score	6.04 (1.82)	6.5 (2.65)	6.22 (1.00)	7.17 (.71)	0.46 (.25)	-0.28 (.11)	0.95 (.95)	1.13 (.62)
Anxiety intensity	1.69 (.29)	1.51 (.63)	1.70 (.65)	1.69 (.58)	-0.18 (.62)	0.19 (.30)	-0.01 (.02)	0.00 (.00)
Anxiety perceived helpfulness	1.00 (1.22)	.60 (1.14)	1.33 (.58)	.80 (1.48)	-0.40 (.33)	0.73 (.64)	-0.53 (.91)	-0.20 (.16)
Heart Rate	78.30 (5.21)	74.26 (2.78)	73.17 (6.61)	73.40 (12.04)	-4.04 (.78)	-1.09 (.39)	0.23 (.03)	-4.90 (.94)
Diastolic Blood Pressure	93.37 (6.34)	77.00 (7.53)	75.24 (13.71)	87.35 (9.08)	-16.37 (2.58)	-1.76 (.23)	12.11 (.88)	-6.02 (.95)
Systolic Blood Pressure	134.56 (12.66)	128.49 (11.95)	122.71 (20.17)	138.40 (13.35)	-6.07 (.49)	-5.78 (.48)	15.69 (.78)	3.84 (.30)

Note. ^a Group A completed the REBT workshop at time point 1 and attention placebo condition at time point 2.

^b Group B completed the attention placebo condition at time point 1 and REBT workshop at time point 2.