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,

The Effects of Rational Emotive Behavior Therapy (REBT) on Penalty Shootout Performance in Elite Blind Soccer Players.

Introduction

The application of clinical models within elite sport symbolizes a shift in effective interventions that aim to enhance psychological well-being and performance. Examination into the effects of Rational Emotive Behavior Therapy (REBT; Ellis, 1957) on psychological health and athletic performance is receiving increasing interest within the extant literature (see Turner, 2016). Originally a psychotherapeutic model, benefits of REBT on psychological health is widely supported in clinical and non-clinical settings, with both youths and adults (David, Szentagotai, Eva, & Macavei, 2005). REBT essentially offers a model of human functioning (David, Freeman, & DiGiuseppe, 2010), and is receiving increased attention within elite sport (see Turner, 2014).

REBT is based on the tenet that "people are not disturbed by things, but by the view they take of them" (Epictetus, 55-135 A.D.). Distinct to a typical view of cognitive behavioral methods, REBT is focused on altering individual's evaluative cognitions, that is their beliefs about an activating event (i.e., experience/prospect of failure, rejection, or poor treatment) to propagate a functional response that helps goal achievement (David, Schnur, & Belloiu, 2002). Thus, the process of REBT encourages a fundamental shift in an athletes' philosophy towards achievement and success. Central to REBT are both irrational and rational beliefs (David et al., 2005). When encountering an activating event (e.g., important competition) those who endorse irrational beliefs will respond with unhealthy negative emotions (e.g., extreme anxiety) and maladaptive behaviors (e.g., avoidance) that hinder goal achievement. Alternatively, those who hold rational beliefs will experience healthy negative emotions (e.g., concern) and adaptive behaviors (e.g., approach and manage) that facilitate goal attainment (Dryden & Branch, 2008). For example, an athlete who endorses the irrational belief that "*I*

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

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

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

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

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

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

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

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

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

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

Method

Participants

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

Context

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

Research Design

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

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

Measures

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

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

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

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

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

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

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

Data Collection Procedures

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

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

Experimental Intervention

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

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

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

Attention Placebo Workshop

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

Procedural Reliability

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

Analytic Strategy

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

Results

Irrational Beliefs.

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

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

Pre-Performance Anxiety.

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

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

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

Physiological Markers.

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

Penalty Kick Performance

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

Social Validation

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

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

Discussion

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

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

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

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

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

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

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

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

Limitations and Future Directions

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

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

Practical Implications

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

Conclusion

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

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

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Figure captions

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

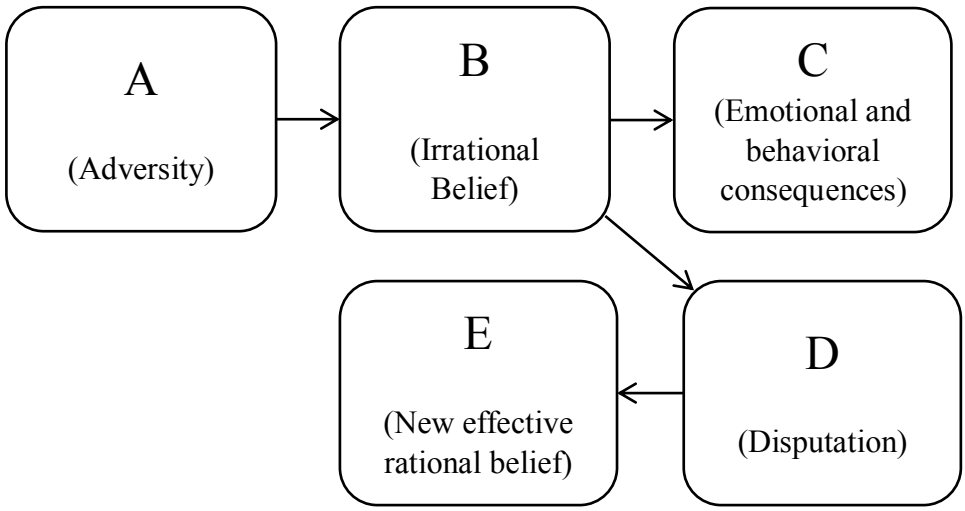
Figure 2. Mean irrational belief scores for Groups A and B at pre-intervention, intervention one, intervention two, and post-intervention time points. Standard errors are represented in the figure by the error bars attached to each data point.

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.

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.

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.



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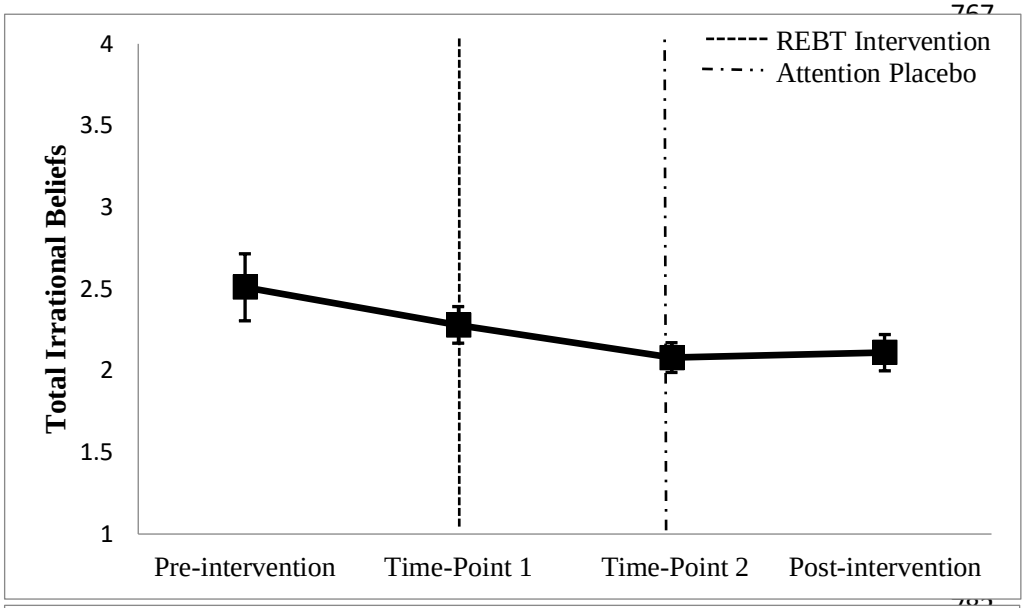

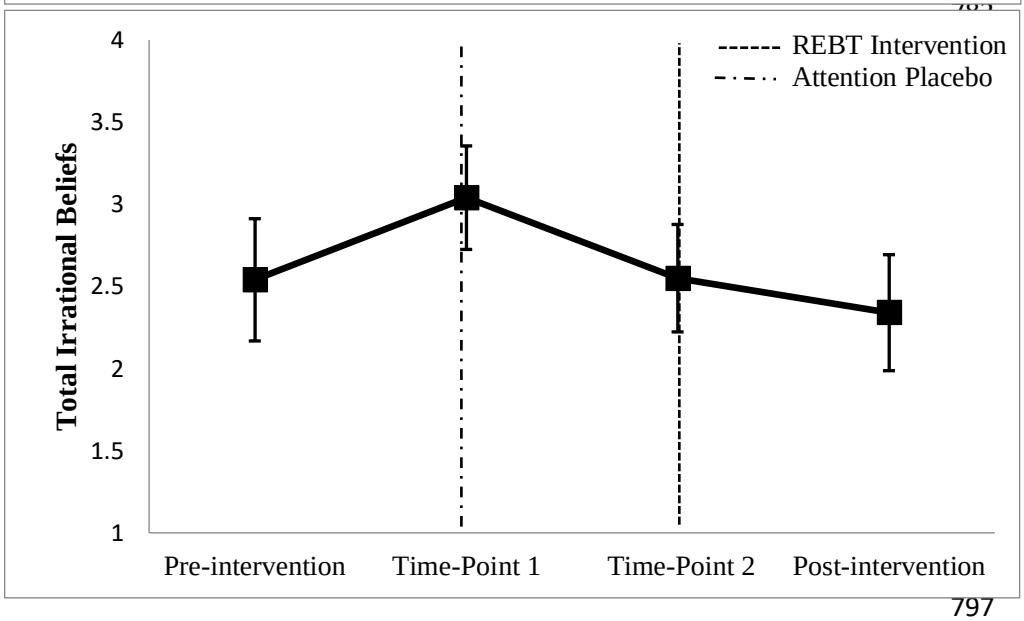

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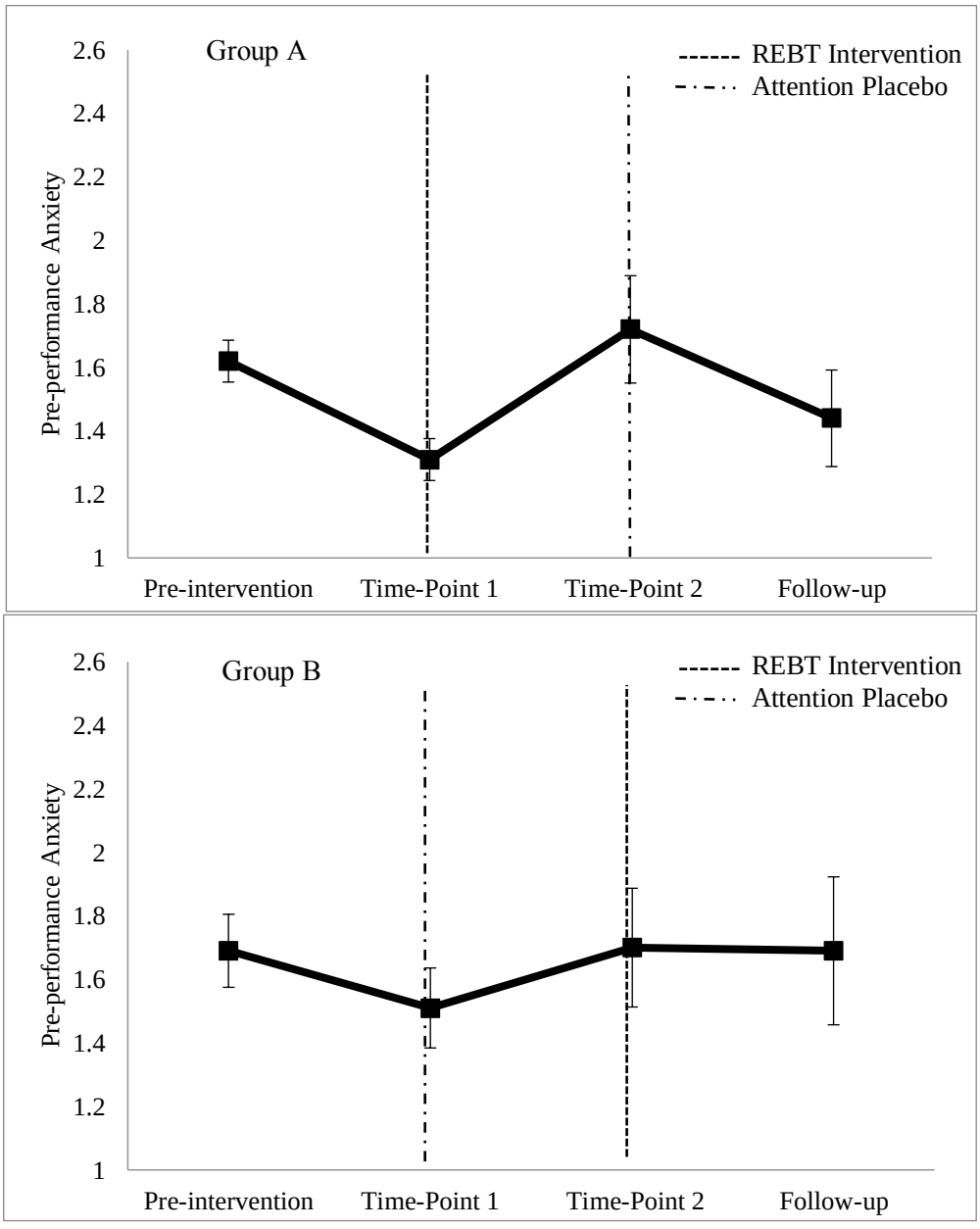

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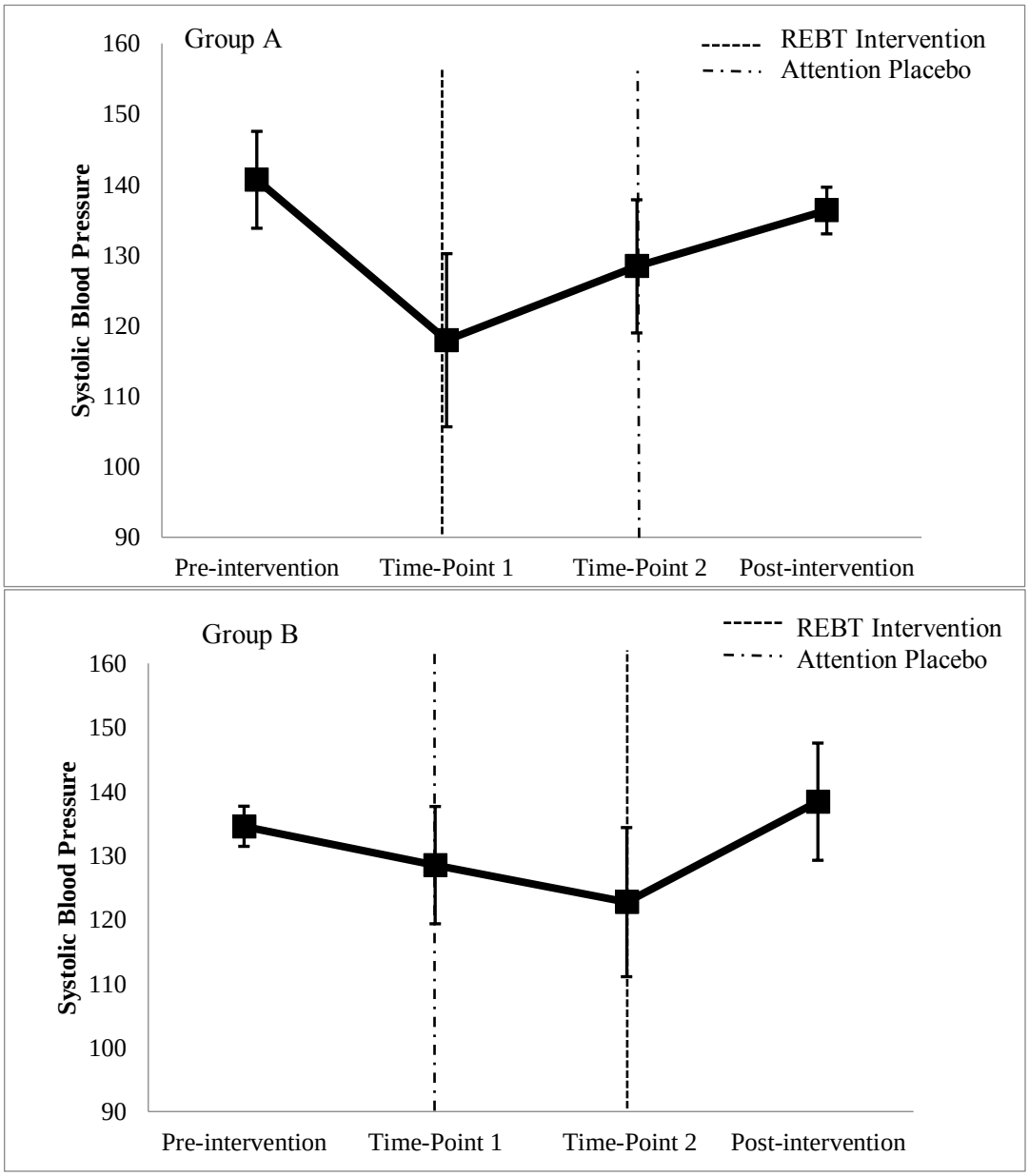

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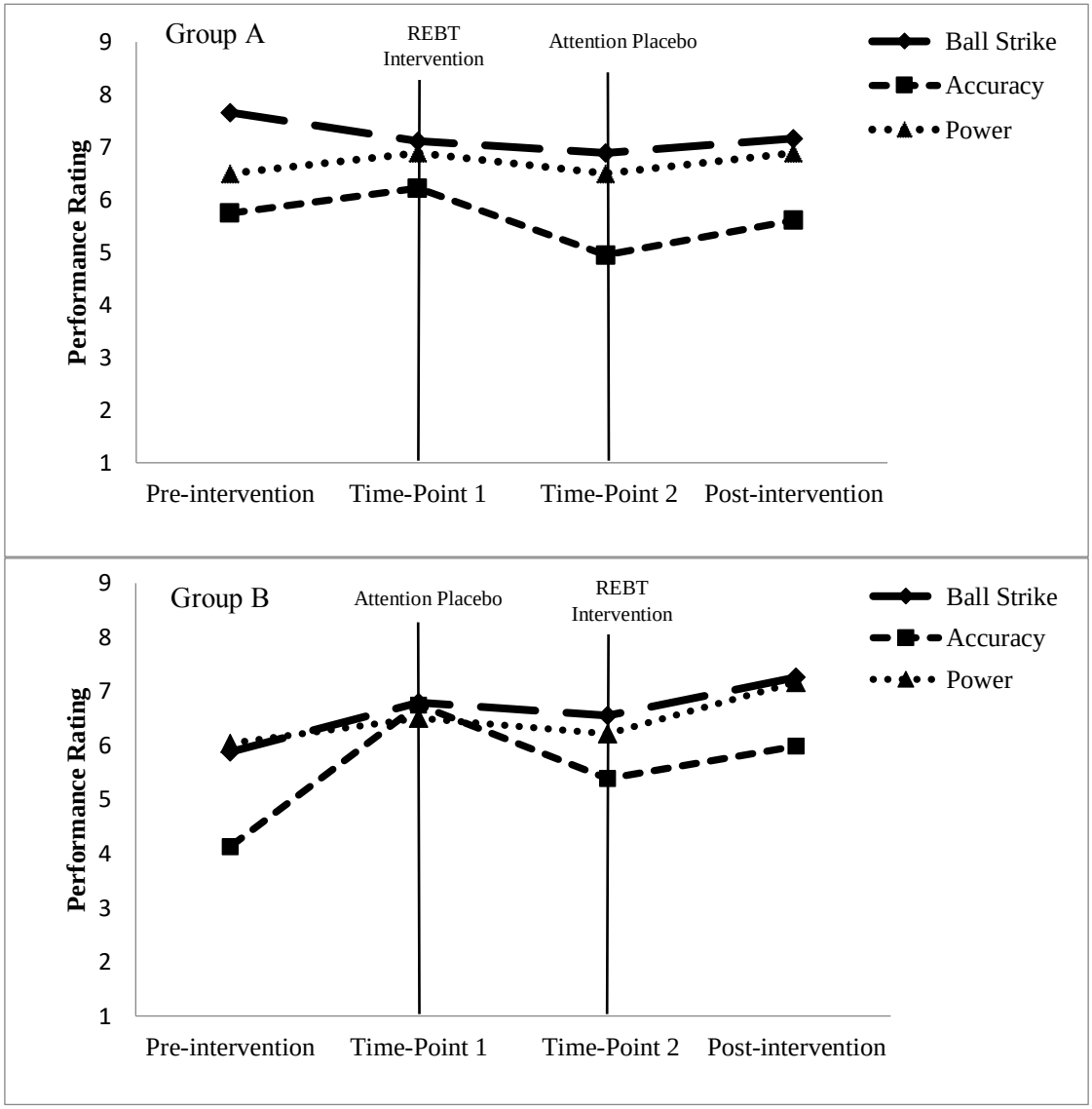

Figure 5. Mean performance rating scores for ball strike, accuracy, and power for Groups A and B at pre-intervention, intervention one, intervention two, and post-intervention time points.

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

	Mean (±SD)				**Mean Change Scores (Cohen's *d*)**			
Group A [a]	*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.