A systematic mapping review on the use of Rational Emotive Behavior Therapy (REBT) with athletes

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The expansion of evidence-based practices in the sports context, shows a promising growth in the use of REBT interventions with athletes. This evolution places us at the moment of gathering the research to identify where evidence is rich or wanting. We carried out a systematic mapping review to (a) classify the type of literature, (b) categorize current evidence, (c) identify trends and knowledge gaps in research, and (d) develop a critical appraisal of existing literature. Using the PICO tool, a search strategy was undertaken on the following databases: PsycINFO, Pubmed, Scopus, SPORTDiscus, Web of Science, and The Cochrane Library. As a result, 39 studies up to July 2020 were included for an in-depth analysis. The results indicated that the main corpus of evidence is found within journal articles and book chapters from European researchers, with adult male elite football (soccer) players as the target sample. We discuss the level of confidence readers can have in the research by offering a critical evaluation, and conclude by encouraging professionals to critically reflect on existing advances and knowledge gaps, so that they consider the evidence for their future work, as well as still unexplored populations, sport contexts and methods.

Keywords: beliefs; rational; REBT intervention; mental health

Rational Emotive Behavior Therapy (REBT), developed by Albert Ellis in the 1950s (Ellis, 1957), is widely regarded as the first of the cognitive behavioral therapies (CBTs; David et al., 2005). Despite being developed in a clinical context, in recent years the reported application of REBT in sport settings has grown (e.g., Mesagno et al., 2020; Wood et al., 2019), in part because of its benefits in promoting, restoring, and maintaining athlete mental health, wellbeing, and performance (Turner, 2016a). This burgeoning corpus of research includes different types of work, such as interventions (e.g., Davis & Turner, 2019; Turner, Kirkham et al., 2018), psychometric validations (e.g., Turner & Allen, 2018) or applied tools (Turner, 2016b). The effects of REBT have been studied widely in clinical and non-clinical populations (e.g., Eseadi et al., 2017; Kim et al., 2018), in youths and adults (e.g., Matin et al., 2012; Saelid et al., 2017), in educational (e.g., Igbokwe et al., 2019), military (e.g., Hyland et al., 2014) and business contexts (e.g., Turner & Barker, 2015), but currently sport reflects an exciting new path for the future of research in REBT (Turner, 2019). Many years after the first studies showed that REBT could enhance the practice of sport (Bernard, 1985) and exercise (Ellis, 1994). The use of REBT with athletes is supported across a variety of sports at various levels for increasing performance and wellbeing (e.g., Wood et al., 2019), but no study to date has compiled and reviewed the existing publications reporting these interventions. Literature has yet to outline the trends emerging from extant works, and identify areas that have not been explored, which is an important task in order to accurately inform and set the agenda for future research concerning the application of REBT with athletes.

Ellis' pioneering work and Beck's subsequent empirical research are considered foundation to Cognitive Behavioral Therapies (CBTs; Matweychuk et al., 2019). CBTs attribute varying levels of importance to different levels of cognition. For example, in

REBT the main focus is on irrational and rational beliefs, in contrast to methods such as cognitive therapy (CT; Beck, 1964), in which the main focus is on the role of automatic thinking and schema (Beck, 1995), but both therapies are centered on the notion of cognitive restructuring (Matweychuk et al., 2019). Comparing REBT with more recent therapies such as Hayes' Acceptance and Commitment Therapy (ACT: Flaxman et al., 2011; Hayes et al., 1999) it has been noted that, while REBT is based on a theoretical cognitive model (CBT), ACT advocates emphasizing learning models without depending on cognitive restructuring and any rational process. In this case, reactions to thoughts, emotions and images are the primary mechanism of change (Matweychuk et al., 2019). Furthermore, a particularity of REBT is its subscription to a Binary Theory of Emotional Distress (BTED; Turner, Jones et al., 2018). In REBT, there are two separate continuums of beliefs, emotions, and behaviors; one continuum is self-helping, and one continuum is self-defeating (Matweychuk et al., 2019). In brief, irrational beliefs co-occur with dysfunctional and maladaptive emotional and behavioural consequences (unhealthy negative emotions; UNEs), while rational beliefs co-occur with functional and adaptative emotional and behavioural consequences (healthy negative emotions; HNEs).

In the present study, we adopt the definition that irrational and rational beliefs are ways of evaluating particular representations of reality in terms of each individual's personal meanings (David et al., 2010), that can be about oneself, others, or the world in general (Froggatt, 2005). Ellis (1957) defined irrational beliefs as rigid, extreme, inefficient and inconsistent with reality, and he classified them into one primary belief (demandingness) and three secondary beliefs (awfulizing, self/other depreciation, and frustration intolerance). In contrast, rational beliefs are flexible, non-extreme, efficient, and consistent with reality, and are classified into one primary belief (i.e.,

preferences) and three secondary beliefs (i.e., anti-awfulizing, self/other acceptance, and frustration tolerance).

At its core, REBT proposes a GABCDE framework (David et al., 2010) in which irrational and rational beliefs (B) manifest in response to situations or events (A) that block or impede personal goals (G), and trigger emotions and behaviors (C). Since irrational beliefs beget UNEs, and rational beliefs beget HNEs, the focal point of an REBT intervention is to help people challenge (or dispute; D) their irrational beliefs, and to adopt new effective rational beliefs (E), with the goal of reducing UNEs (e.g., anxiety, depression) and associated maladaptive behaviours (e.g., avoidance, flight), and increasing HNEs (e.g., worry, sadness) and associated adaptive behaviours (e.g., approximation, assertiveness).

REBT takes a humanistic perspective, which offers possibilities of coping with the demands of the performance environment through changing irrational beliefs to rational beliefs. Furthermore, REBT offers a preventative approach to dysfunctional emotions and behaviours in which athletes are encouraged to take reasonability for their mental health, thus helping athletes to achieve wellbeing and performance objectives in the longer term (Turner, 2014a; Wood, Barker, Turner & Sheffield, 2018). Therefore, REBT goes beyond simply providing a solution to irrational beliefs and poor mental health; these interventions also pave the way for the development of rational beliefs in the early stages of the athletic career, which help prevent mental health problems stemming from irrational beliefs as the athlete progresses in their athletic career (Turner, 2016a). Similarly, REBT may be a useful tool for those athletes who make a dysfunctional evaluation of their sporting career, denying for instance its eventual termination, and helping them changing their beliefs for more rational and healthy ones that will lead them plan their sports retirement in advance (Lavallee et al., 2010).

According to Torregrossa et al. (2015), athletes should share their opinions and experiences before and after the retirement from sport in order to be able to provide more meaningful and valuable stories from this process, and not only taking a snapshot of a past situation and reporting it retrospectively.

In sports contexts, the development and strengthening of psychological aspects generally focuses on cognitive-behavioral approaches, a prominent example of which is the canon of psychological skills (Andersen, 2009). The techniques that comprise the canon (e.g., imagery, relaxation, concentration, goal setting, self-talk, pre-performance routines) are considered to be effective in improving and maintaining sports performance (Andersen, 2009). Within the context of the REBT framework, the canon provides techniques that chiefly impact upon the perceived adversity (A) faced by the athletes, or the emotional, behavioral, and cognitive consequences (C), of the adversity, rather than attempting to address core beliefs and schema (B) at the route of emotional reactivity, which is the main focus of REBT. In REBT, the main thrust of the work is to help the athlete to alter their deeply held beliefs (B) about adversity, facilitating adaptive consequences by encouraging cognitive change (Dryden & Neenan, 2015). Consequently, although the canon of psychological skills offers effective and indispensable techniques, some athletes require REBT-based work to achieve deeper philosophic change especially in relation to ingrained and entrenched beliefs that are rigid, extreme, and illogical. This deeper work provides a route to helping athletes experience healthy emotions and behaviours that can aid performance and mental health (Turner, 2016a). For this reason, compared to some cognitive behavioral techniques (e.g., canon; Anderson, 2009), the focus on deeply held beliefs provides an “elegant solution” that helps clients to reduce their proclivity to disturb themselves in the face of

aversity (Ellis, 1997, p. 334), helping them to approach and react to adversity with functional and adaptive emotions and behaviours (Dryden & Neenan, 2015).

A recent meta-analysis (David et al., 2018), which included 82 empirical studies dating back to the inception of REBT, supported the effectiveness and efficacy of REBT across a variety of contexts (e.g., psychotherapy, education) and populations (e.g., clinical and non-clinical populations, youths and adults). According to David et al. (2018) irrational beliefs are unfavourable due to their emotional, cognitive and behavioural consequences, which impoverish mental health. However, David et al.'s (2018) results did not include any data from studies undertaken in sport settings.

Because of the growing empirical research evidencing the effects of REBT in athletic settings, there is a need to synthesize and examine this literature (a) to identify patterns in research findings (Booth et al., 2016), (b) to generate an understanding of current knowledge, and (c) to assess the quality of the underpinning evidence (Tod, 2019). Furthermore, a possible risk of the expansion of an unrevised state of evidence is that future practitioners use an unsound base of knowledge to guide practice. Therefore, it is important to analyze the quality and rigor of the existing literature to facilitate a reliable transmission of scientific knowledge, and to guide research and practice towards possible future improvements. For all this, it is worth offering a visual overview that details what evidence is available, its nature and distribution, and the research designs used to develop it. To this end, the consideration of how research is being conducted can be beneficial to identify ways to improve this effort, and to inform future researchers by helping them to make evidence-based decisions that can improve the empirical examination of REBT in sport. Precisely, the concept of evidence-based practice in psychology, refers to the integration of the best available research to practical experience of the professionals adapted to the context, characteristics, culture

and preferences of the user (APA Presidential Task Force on Evidence-Based Practice, 2006). In short, the objective of this study was to carry out a systematic mapping review in order to offer a new way of viewing the body of the existing literature on REBT intervention with athletes, through (a) classifying the type of literature, (b) categorizing the current evidence, (c) identifying trends in its use and knowledge gaps in research literature, and (d) developing a critical appraisal of the methodological rigor, suitability, and relevance, of existing literature.

Methods

This systematic mapping review is informed by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA; Moher et al., 2010), and the Cochrane Handbook for Systematic Reviews of Interventions (Higgins & Green, 2011) to ensure the systematic process of the mapping. Moreover, we followed the recommendations of Booth et al. (2016), Gough et al. (2017), and Gough and Richardson (2018) to conduct this type of review.

Search strategy

The search strategy followed the four steps suggested by Moher et al. (2010): identification, screening, eligibility, and inclusion (Figure 1). Two inclusion criteria were borne in mind for studies: (a) they entailed a REBT intervention, and (b) the participants were athletes. As a critical evaluation, publications that did not clearly indicate their purpose were excluded. To organize the keywords, the PICO tool (i.e., Participants, Interventions, Comparisons, Outcomes) recommended by Higgins and Green (2011) was used in English to identify the abstracts of studies carried out in any language (see Supplementary File). The databases consulted were PsycINFO, Pubmed, Scopus, SPORTDiscus, Web of Science, and The Cochrane Library. In order to capture

all relevant previous research, no limitations were specified for the starting date in the search. In this way, we intended to reduce selection and language biases (Booth et al., 2016). The search extended until 26th July 2020.

Identifying relevant studies

The search round identified 108 articles (see Figure 1). Following the recommendations of Booth et al. (2016) for conducting a systematic mapping review, we carried out an exhaustive manual search on reference lists, bibliographies, citation searches, and we also contacted experts to decrease publication bias, for (a) making up for the potential insufficient indexing of these databases, and (b) identifying book chapters and grey literature (e.g., conference abstracts, doctoral dissertations, information from key websites in the field of interest). This second search yielded 25 relevant documents that were included in the review.

Once duplicates were excluded, 87 studies were evaluated in two stages. First, titles and abstracts were examined, and 41 studies that did not meet the inclusion criteria were excluded. In the second stage, the full texts of the remaining studies were analysed and evaluated for their eligibility. As a result, 46 studies remained in the database. In order not to duplicate the information from the same study when it was published at different stages and in different formats (i.e., book chapter or grey literature already published as journal articles), the authors made the decision to prioritize the inclusion in this systematic mapping review of peer-reviewed journal articles over other types of publication formats. For this reason, seven studies were excluded (e.g., Si & Zhang, 2017; Turner, 2014b). In total, 39 studies passed the critical evaluation and were finally considered for this systematic mapping review.

[Figure 1 near here]

Coding and appraisal of the included studies

The complete American Psychological Association reference was specified for each included study (American Psychological Association, 2020), and it was given a bibliographic code in order to facilitate identification (see Table 2 in the Supplementary File). In addition, the location where the study was carried out and the type of document (e.g., journal article, congress material) were detailed. The included studies were organized chronologically and, within each year, in alphabetical order. For content analysis, a spreadsheet was developed (see Figure A in the Supplementary File) with categories and subcategories predefined by the authors (Saldaña, 2015). A training session was held with two post-doctoral researchers and three PhD students, on the key concepts of the systematic mapping review (e.g., REBT, beliefs, wellbeing, athletes) and on the explicit instructions to fill in the spreadsheet throughout the coding process. The first coding stage was carried out by the first author with the help of said post-doctoral researchers and three PhD students, who acted as critical friends, in order to provide quality and rigor by offering a dialogue and reflective recognition of multiple truths, perspectives and results in this process of research (Smith & McGannon, 2018). The second coding was conducted by the first, third and fourth authors. The 39 studies were analysed in depth in both codifications to identify the following information: (a) target variables, (b) the method used (i.e., design, characteristics of participants, characteristics of interventions), and (c) the main conclusions about REBT interventions. If the coders could not identify the information in the cells, they checked the option “Information not available”. If the information was different from the pre-established subcategories, they marked the option “Other(s)”. If they were unsure whether the subcategory correctly reflected the study information, they marked it in red. In addition, each coder could add comments in the "Remarks about coding" cell. At the

end of the coding, the coders met to compare and discuss the discrepancies using the spreadsheets for each critical friend. Finally, the first author conducted a final review of the entire coding process using the subcategories resulting from the evolution of the process that best reflected the information from each study included in the systematic mapping review (see Table 3, Table 4 and Table 5 in the Supplementary File).

Critical appraisal of existing literature

Once the nature of the existing evidence was revealed, the authors developed a critical appraisal to assess its quality and pertinency. Critical appraisal is "the process of carefully and systematically examining research to judge its trustworthiness, and its value and relevance in a particular context" (Burls, 2009, p. 1). The development of a critical appraisal allows the determination of the solidity of the evidence-based practice (Amonette et al., 2016) and the level of trust that practitioners can have in a body of work to guide decision-making (Tod, 2019). Following the guide of Liabo et al. (2017), we have based the critical appraisal on: (a) the methodological rigor, (b) the suitability, and (c) the relevance of the studies included in this systematic mapping review (see Figure B in the Supplementary File).

Firstly, to analyze methodological rigor we focused on the robustness of the method and internal validity. We evaluated each study according to the description of the participants and whether they were recruited in an acceptable way. In addition, we focused on precision in exposure to minimize bias, on the precision of the procedure description, on whether the data was collected in a way that addressed the research problem, and on whether the data analysis was sufficiently rigorous. Second, to determine suitability we evaluated the match between the study method and the research question. Finally, we considered the relevance of each included study. We analyzed the declaration of findings, the intervention effects, the generalization of the results to the

population and the context to determine relevance, in addition to verifying that the results of the study were discussed with the consideration of other available evidence.

Results

The main findings are presented on Figures 2, 3, and 4. To complement this information, the reader can refer to the Supplementary File for a detailed analysis on each study. Below we provide a synthesis of the publication trend, the location of the evidence, and the integrated analysis of the studies' characteristics.

Publication trend

Figure 2 shows the trend of publication format per 5-year periods. The figure illustrates a gradual increase in the number of publications that implement REBT in the context of sports. Since 1985, the year in which the first publication is found (i.e., Bernard, 1985), until April 2020, only the 1996-2000 period does not show any publication of REBT interventions with athletes. In the 1985-1990, 1991-1995, 2001-2005, and 2006-2010 periods, only one publication is reported per period. However, in 2011-2015 an increase in the number of publications can be seen, reaching four. The most recent period, from 2016 to 2020, has the most studies with a total of 29. As outlined in Figure 2, book chapters and journal articles are the most common publication formats for REBT interventions. It should be noted that doctoral theses focused on REBT interventions with athletes do not appear until the 2006-2010 period. However, we must assume that different phases of the same study can be published in different formats at different times during the study process. That is why we cannot affirm that there are few congress materials, since the different journal articles or book chapters added in this mapping review, may have been presented previously in the form of congress materials.

In order to not duplicate information from the same study, this review prioritized the inclusion of peer-reviewed journal articles, before any other type of publication format.

[Figure 2 near here]

Location of evidence

Figure 3 shows an overview of where the evidence on REBT interventions with athletes is located. The 39 included studies have developed in 13 countries across four different continents. Although REBT interventions with athletes are beginning to be carried out worldwide, the figure illustrates the centralization of studies in the United Kingdom (61.55% of the studies; 14 journal articles, 9 book chapters, 1 doctoral dissertation).

[Figure 3 near here]

In terms of language, of the 39 studies, 37 were written in English, one study was in Japanese (Yamauchi & Murakoshi, 2001) and one in Korean (Ha & Chang, 2017). The 22 research articles are spread across 13 journals, all with an impact factor index in the Journal Citation Reports, with the exception of the *Japanese Journal of Sport Psychology* and the *Journal of Digital Convergence*. The journals with the most publications concerning REBT interventions with athletes are *The Sport Psychologist* (*n* = 6) and *Journal of Applied Sport Psychology* (*n* = 4). The 13 studies published as book chapters can be found in 5 different books, with *Rational Emotive Behavior Therapy in Sport and Exercise* (Turner & Bennett, 2017) presenting the majority of the chapters (*n* = 8). The three doctoral theses were defended at the National College of Ireland (Ireland), the Victoria University of Technology (Australia), and the Staffordshire University (United Kingdom), and the symposium contribution was developed at the European Federation of Sport Psychology congress (see Table 2 in Supplementary File).

Integrated synthesis of the study characteristics

The content analysis carried out in this systematic mapping review has made possible the identification of relevant information from the main categories that should be considered while developing a REBT intervention with athletes: (a) target variables, (b) design, (c) measures, (d) participants, and (e) interventions. Figure 4 shows an integrative synthesis of these five dominant categories with the intention of offering an overview of the variations used in this type of intervention, helping researchers and practitioners to acknowledge the trends through this systematic mapping review and use the information in order to combine different techniques or orientations. Since different phases of the same study can be published in different formats, in order not to duplicate information from the same study (e.g., target variable, number of participants, sport practiced, number of sessions), from this moment on the Wood's doctoral dissertation (2017) is analyzed through the journal articles and book chapters resulting from it (Wood et al., 2017a; Wood et al., 2017b; Wood, Barker, Turner, & Sheffield, 2018; Wood, Barker, Turner, & Thomson, 2018; Wood et al., 2019).

Focusing on the target variables, Figure 4 shows that 22 of the included studies had the purpose of studying the effect on irrational beliefs, as was expected given these are the core components of REBT. The next most common objectives were to study the effects of the intervention on performance, anxiety, rational beliefs and self-determined motivation.

The methodological contributions of these studies are one of the most analyzed parts in this systematic mapping review, since it can inform new resources and a systematic way to carry out this type of research. The most common design was the single-case design. Figure 4 reveals that with a total of 21 studies, a clear preference for this type of design is shown when implementing REBT interventions with athletes. Complementary to the single-case designs, three of these studies establish a multiple

baseline for participant design, and when the number of participants was higher than one, four studies set a multiple baseline staggered between the different participants in the study. However, only three studies compared the results obtained in an experimental (REBT) group with those found in a control group. Another factor to consider is the instruments used in each intervention to measure the variables being studied. We note that to measure beliefs, the Shortened General Attitudes and Belief Scale (SGABS; Lindner et al., 1999) was the most widely used, which is not a sport-specific measure of irrational beliefs. However, the Irrational Performance Beliefs Inventory (iPBI; Turner, Slater et al., 2018), which is sport-specific measure of irrational beliefs, has already been used in seven studies, a remarkable number considering its first appearance was in 2018. Furthermore, regardless of the variables being studied, 21 of the studies conducted a social validation interview/questionnaire.

With regard to participants, Figure 4 shows five subcategories to consider: (a) the number of participants, (b) the age of the participants, (c) their sex, (d) the sport practiced, and (e) the level of competition. Despite observing a trend in developing this kind of study with a single participant, it should be noted that, of the 15 studies with a single participant, 10 are published in books. In contrast, in terms of the ages of the participants, the clear trend is to develop interventions with adults. Of the included studies, 16 developed the interventions with males, eight with men and females, and only five were developed with a sample exclusively composed of females. The integrated synthesis reveals that REBT has been implemented in a wide variety of sports, both individual (e.g., triathlon, fencing, mixed martial arts, archery) and team sports (e.g., American football, basketball, cricket, rugby), with football (soccer) receiving the most attention. Only four studies showed the application of REBT with athletes with functional diversity, although all have been developed from 2017 onwards.

In terms of athletic level, studies have included a variety of competitive categories, with amateur and elite being the most represented levels, and former elite athletes the least studied population.

Focusing on the development of the interventions, Figure 4 shows how the researchers developed REBT interventions with differing numbers and type of sessions, using different procedures. Overall, we found that these sessions tended to focus on teaching the ABC model (i.e., event, belief, consequence) and on helping athletes to cognitively restructure primary and secondary irrational beliefs by recognizing and disputing them (i.e., on logical, pragmatic, and empirical grounds). We found 30 studies in which the REBT interventions comprised between two and 11 sessions, and two studies with 12 or more sessions. Only two studies carried out a single REBT workshop. Of these interventions, 26 were developed one-to-one (i.e., individual sessions), and 13 through group sessions. A clear trend in this type of intervention is to provide homework between sessions, as well as to carry out follow-up data collection once the intervention sessions have ended. Regardless of the specific content of the session, the tendency is to use a session duration of more than 30 minutes in length.

Figure 4 distinguishes between the 10 studies that, regardless the intervention sessions period, develop a short period for data collection (i.e., 12 weeks or less). In contrast, 14 studies have a data collection period of more than 12 weeks. However, although there is no clear trend for how many weeks the intervention should last, the vast majority of studies develop face-to-face interventions with online and/or audio/phone support. Only the study by Cunningham and Turner (2016) shows a completely online intervention using Skype (video-calling) sessions.

In relation to the measures used to determine the effectiveness of the interventions, Figure 4 shows that there is a variety in how to analyze effectiveness

(e.g., ANOVA, critical friend, observation, performance results). However, the most widely used measure is visual analysis and Cohen's *d* (Cohen, 1988). Social validation is frequently used to complement the data and to understand the effectiveness of the intervention in a deeper way (i.e., with a total of 21 studies). Therefore, as a result of this systematic mapping review, we can observe that there is a clear tendency in REBT interventions to use questionnaires and social validation interviews during and/or after the intervention, in order to determine the perceptions and feelings of the participants about the effects of the intervention.

[Figure 4 near here]

Methodological rigor, suitability and relevance of existing research

Once the nature of the existing evidence was revealed, the authors developed a critical appraisal to assess its quality and pertinency, based on: (a) the methodological rigor, (b) the suitability, and (c) the relevance, of the studies.

The critical appraisal demonstrates the difference between peer-reviewed journal articles, with other types of publication format (i.e., book chapters, grey literature). In general, journal articles usually meet the previously established criteria, showing validity of evidence. The peer-reviewed studies show a less robust methodological rigor than the other format publications, which focus on the description of participants, the procedure, and the description of how data was collected and analyzed, but not on the explanation of minimization of possible biases. A more detailed description of the analysis process often appears in journal articles to support study findings. Regarding suitability, the evidence comes mainly from single-case designs, with 58.33% published in peer-reviewed journals and 41.66% in book chapters. The journal articles included in the review, tend to be more consistent in describing a specific research question, and in explicitly justifying its relationship with the developed design. The other publication

formats, especially book chapters, tend to focus more than journal articles on contextualizing the case and the background of each participant, in order to show the rationale and importance of the REBT intervention. Although the book chapters are explicit regarding design and procedures, the peer-reviewed articles present a level of demand that ends up being a screening point for quality in this type of publication format. Regarding relevance, the findings are explicit in any type of publication format and are discussed in relation to the original objective. However, in the journal articles the discussion of the credibility of the findings and the adequate comparison with existing evidence predominates, in addition to the proposal of future research with similar participants.

Discussion

The purpose of this study was to conduct a systematic mapping review to provide an overview of current evidence concerning the application of REBT with athletes, by categorizing the existing literature and identifying trends and gaps in the knowledge in this field. In this way, we provide practical considerations to reflect upon and aid the design of future REBT applications in sport. In total, 39 studies fulfilled the inclusion criteria. The analysis of the evidence shows an increase in the development of this type of study. Until 2005, only three studies are reported, published as a book chapter (n = 1) and journal articles (n = 2). It is not until the 2006-2010 period that the first doctoral thesis appears in this field of research. In the 2011-2015 period, only journal articles are reported. It is only in the period from 2016 to the present, that we observe an increase in the report application of REBT with athletes, with 15 journal articles, 11 book chapters, two doctoral theses, and a congress symposium. Demonstrably, this topic of study is gaining interest. Although the studies have been carried out in different continents, the

United Kingdom is the country that has reported the most REBT interventions with athletes.

This systematic mapping review examines the development trends of REBT interventions with athletes, providing information on the five key categories that have been considered for the development of the interventions throughout the different periods of time: (a) target variables, (b) design, (c) measures, (d) participants, and (e) interventions. Overall, the aim of reporting these detailed categories is to improve the clarity, completeness, and transparency of research reports. Based on the integrative analysis performed in this systematic mapping review, we extract various trends to help researchers and practitioners guide future interventions. Furthermore, the same trends allow us to point out gaps in this type of studies in order to conduct valuable further research.

Target variables

In recent years the different types of target variables studied has increased. Up to 2016, only interventions with the goal of determining their effects on beliefs, anxiety and sport performance were reported. After 2017, even though the tendency is to maintain the focus on irrational beliefs, a higher variety in the target variables studied is reported (e.g., emotional wellbeing, physiological variables, self-determined motivation). Although the number of studies that adopt a humanistic approach, to restore, promote, and maintain athletes' mental health beyond other variables (e.g., performance, resilience) is increasing, it is important to continue considering risk and protective factors for the athlete's mental health. As recent research on REBT interventions in the sports context indicates, REBT is presented as a potentially effective approach to promoting athlete psychological wellbeing (e.g., David & Turner, 2019; Vîslă et al., 2016; Wood et al., 2019). The demanding environment that characterizes competitive

sport (Reardon & Factor, 2010), and the growing concern for the psychological wellbeing of athletes (e.g., MacIntyre et al., 2016; Turner, Carrington, et al., 2018), means that effective interventions that can promote athlete psychological wellbeing is a major concern in the applied research literature (Turner, 2019). As argued by Stambulova et al. (2020) in their study, the concept of sports career excellence is defined by the athlete's ability to maintain a healthy, successful and long-lasting career. Because athletes lead intense lives and experience overlapping transitions between different contexts for several months or years (e.g., sports, academics, work, family), the demands, resources and coping strategies must be distributed accordingly. Indeed, research has indicated that irrational beliefs are related to increased burnout (Turner & Moore, 2016), choking under pressure (Mesagno et al., 2020), psychological distress (Turner, Aspin et al., 2019; Vîslă, et al., 2016), and anger (Turner, Carrington et al., 2019). But to date, studies have focused on studying the effects of REBT interventions with athletes in situations on-the-field (e.g., anger, performance, resilience), and less focus has been towards mental health effects (see Davis & Turner, 2019, for an exception). In order to promote the holistic development and mental health of athletes, it would be interesting to explore situations beyond on-the-field, and select off-the-field target variables (e.g., sports career decision-making, prevention in light of future transitions). We encourage researchers and practitioners to organize their future work to include mental health markers of intervention effectiveness, and to specifically study more holistic markers that more completely reflect the athlete experience.

Design and measures

In the present review, study design represents the most variability between studies, although the tendency is to use both quantitative and qualitative data. The results of this systematic mapping review allow us to observe the great variety of quantitative

measures that are being used when assessing the effects of REBT, unlike the few qualitative data collection resources used (e.g., observation, interviews, specific sport exercises). There are different design characteristics that tend to predominate in this type of intervention. This is the case of the single-case designs, the multiple baseline (staggered when the number of participants allows), and the measurement of the target variable before and after the intervention, regardless of the design used (i.e., pretest-posttest). In line with Normand (2016), single-case designs allow studying fewer participants, taking repeated measures, and generalizing effects inductively and systematically among the participants of different studies. By emphasizing this type of design, psychology produces more efficient results, learning more by studying fewer participants. Furthermore, the multiple baseline design among participants reflects good practice within single-case research (Kazdin, 2011). Three recent studies included in this systematic mapping review (i.e., Chrysidis et al., 2020; David & Turner, 2019; Turner, Ewen et al., 2018) adopt an idiographic single-case design to facilitate a deep and multimodal form of data collection. In line with Normand (2016), this type of design helps to understand the result of the intervention for each participant in a personalized way, and learn more by studying fewer participants.

In addition to the single-case design, social validation is one of the most prominent assessment tools in REBT interventions with athletes. These findings are consistent with Page and Thelwell's (2013) recommendation that single-case designs should include a social validation at the end of the procedure to complement the statistical data that determines the efficacy of the interventions. As argued by Deen et al. (2017), in an effort to avoid bias, the practitioner who develops the intervention should not perform the social validation, as it could have a biasing effect on the responses of the participants. Athletes might be more honest if they offer their opinion to a third

party. This instrument can be used to collect information during and/or after the intervention by different agents related to athletes, such as parents (see Sille et al., 2020), and coaches (see Si & Lee, 2008), in order to complement and enrich the information, and to help practitioners understand the results. For example, this type of tool would provide information beyond the objective variables studied, as in the case of Deen et al. (2017) and Turner, Ewen et al. (2018). In these cases, interventions are favorably rated given that, in addition to leading to positive results in the target variables, they also tend to highlight positive effects in variables that are not part of the main objectives of the study (e.g., rational language resulting from the REBT intervention fostered interpersonal relations within the team).

Given that the research on the use of REBT with athletes is a growing field, future studies should promote the use of rigorous and innovative qualitative research methods to overcome this lack of evidence, in order to expand the qualitative research within this field (Normand, 2016; Smith & McGannon, 2018). However, in line with what was declared by Barker et al. (2013), the authors do not propose that single-case designs or qualitative measures should replace controlled group designs. These types of design and measurement are valuable when embarking on new research areas, or when the intervention has a unique population. Single-case research in sport psychology could detect positive effects for individuals who would otherwise have their success masked in a non-significant group design. Nevertheless, there are many questions that are best answered using group designs with stringent controls in place such as a comparison group, or an attention placebo control group.

Participants

The results of this review highlight that REBT interventions have been applied in a wide variety of sports, and competitive levels, although some of them are

underrepresented (e.g., artistic swimming, basketball, former elite athletes). However, the results of this systematic mapping review show that there is a trend in conducting REBT interventions with adult male elite football (soccer) players. In relation to age, the younger the athletes are (i.e., 13 years or younger), the more sessions should be held and the longer each one should last in order to ensure that the athlete fully understands the GABCDE framework. The younger athletes are, the education phase tends to lengthen, requiring more than three 45-minute sessions, as opposed to the three 20-minute sessions necessary from the age of 14 onward (Turner & Barker, 2014). For this reason, according to Turner and Barker (2014), REBT interventions may not be the most effective approach for younger athletes (i.e., 13 years or younger) in relation to time-effectiveness, since a prolonged education phase attenuates the general effectiveness of sports psychology practitioners, especially when they have been hired to work for a limited period of time (e.g., 10 weeks). Furthermore, in line with the results found by Wood et al. (2017b), and Turner, Ewen et al. (2018), it is important to take into consideration the progress of each participant and to conduct the intervention in ecologically valid environments. In relation to gender, there are only five studies with a totally female sample, while 16 have a fully male sample, and eight with samples of both genders. Therefore, we observe a trend in conducting studies with male athletes. In the future, there may be more attention devoted to populations that are underrepresented in the literature, such as female athletes, former elite athletes, LGTBI population, migrants during the process of a cultural transition, refugee athletes, or at-risk youth, among others. From this review, we encourage future researchers and practitioners to critically reflect on unexplored populations and sport contexts, and to adopt these innovations in their work.

Interventions

In relation to the organization of the REBT intervention, there are different aspects that should be contemplated: (a) content of the sessions, (b) session length, (c) data collection length, (d) participants organization, (e) procedures, and (f) effectiveness measures.

REBT interventions should be focused on promoting a long-term change in beliefs (i.e., by identifying and disputing irrational beliefs, and replacing them with rational beliefs), regardless of the target variable chosen (e.g., anxiety, performance, self-determined motivation). It is important to foster a profound shift in athletes' beliefs with the purpose of promoting adaptive and constructive consequences when dealing with situations in their daily lives (Wood et al., 2017a). These sessions should be divided into five phases: (a) the educational phase ABCDE framework, (b) the recognition and disputation phase (i.e., logic, pragmatic, evidence-based) of primary and secondary irrational beliefs, (c) the phase of developing effective rational beliefs, (d) the phase of disputing rational belief to make sure they are rational, and (e) the reinforcing and using REBT independently phase (see Turner, Aspin et al., 2020). The studies included in this review do not always explicitly refer to the G of the GABCDE framework. We must consider that goals play an important role in the sport context, creating different types of A's, B's, and C's. Then, understanding the athletes' goals when investigating irrational beliefs is important (Turner & Davis, 2018). Therefore, practitioners should consider these goals throughout the ABCDE process, as Ellis (1994) specified with the GABCDE framework, and argued by Chadha et al. (2019) and Turner et al. (2020) in their works.

Seven studies complemented REBT interventions with additional techniques. These particular cases merit closer examination. In the studies by Sille et al. (2020), and Wood and Woodcock's (2017), the effects of the REBT intervention cannot be separated

from the effects of the other strategies implemented (e.g., distraction control plan intervention). However, the study developed by Wood and Woodcock's (2017) specify in more detail the technique of work used to modify beliefs, a fact that allows us to consider that only REBT could have reduced irrational beliefs in the way it is reported. In the remaining studies (i.e., Chrysidis et al., 2020; Deen et al., 2017; Turner & Davis, 2018; Vertopoulos & Turner, 2017; Wood et al., 2019), in addition to the REBT intervention, Self-Talk, Personal Disclosure Mutual-Sharing (PDMS), Rational Emotive Personal Disclosure Mutual-Sharing (REPDMS), or Athlete Rational Resilience Credo (ARRC) were added, following REBT principles, as forms of rational reinforcement. Indeed, little is written about specific tools used by practitioners to support REBT with athletes, however Turner (2016b) developed an athlete-specific applied tool, the ARRC, that was tested for the first time by Deen et al. (2017). A Credo can be defined as ‘a set of beliefs, which expresses a particular opinion and influences the way you live’ (Dryden, 2007, p. 219). The ARRC promotes rational beliefs in athletes, which are important for resiliently responding to adverse events (Turner, 2016b). Another possible tool is holding PDMS sessions, which increases the likelihood that group interventions are effective by fostering an understanding of the values and needs of the different team members, beyond understanding oneself (Dunn & Holt, 2004). The REPDMS version includes the application of the REBT framework principles (i.e., ABCDE) within PDMS by having athletes share their experiences in using the ABCDE framework within a group setting, using a real issue, including precisely what their irrational and rational beliefs were, and how the disputation phase was operationalized.

Furthermore, the setting and subsequent reviewing of homework tasks between sessions is important to reinforce the understanding of the GABCDE framework and the athletes’ ability to use REBT autonomously (Turner, 2016a). These homework tasks

should be specific for the sport and the participants' level, and they should be geared towards working on comprehension of the ABC model; reflecting on thoughts, emotions and behaviors throughout the entire intervention; and fostering disputation on irrational beliefs in favor of other more rational ones. For example, the Smarter Thinking App 2 (Turner & Wood, 2018) has been developed to help athletes practice the REBT framework digitally in their own time and keep a record of their progress. To finish the intervention, it is important to conduct at least one follow-up session to track the progress of the participants and to ensure the athlete can apply REBT independently (Turner, Aspin et al., 2020).

In order to ensure the sustainability of intervention effects, the tendency is to carry out more than one REBT session (e.g., between 3 and 11) with a duration of between 30 and 45 minutes per session. Regardless of the moment of the data collection beyond the REBT sessions, the overall duration of the intervention will depend on the number of sessions that will be carried out and on whether there will be a combination of one-to-one and group sessions. In general, brief interventions refers to 11 sessions or less, and the use of REBT has been shown to be an example of a good work philosophy for short interventions (Dryden, 2019). However, as discussed in the study by Turner and Barker (2014), the use of REBT in group contexts with a single educational objective (i.e., without stressing the phases of recognition and dispute of irrational beliefs, and the replacement for more effective rational beliefs) has a short-term effect on irrational beliefs, and shortly after the intervention phase ends, data returns to pre-REBT levels. Researchers can choose to hold educational workshops with groups, but REBT tends to be more effective using one-to-one modes of working (Turner & Barker, 2014).

The interventions effectiveness

In relation to the effectiveness of the interventions, research uses irrational belief measures (e.g., iPBI, SGABS), which help to ensure that REBT can modify the central mechanism at the heart of REBT; irrational beliefs. The evidence included shows that procedural reliability, multiple baseline across participants (staggered), and pretest and posttest intervention data collection are often used. Focusing on the design of the intervention, the most used in the existing evidence in REBT interventions is the single-case design. In line with Barker et al. (2013), in sport psychology researchers are encouraged to develop single-case studies to expand knowledge about the effectiveness of interventions and evidence-based practice. Single-case designs have the strength of being able to carry out experimental investigations with one or a few cases and the ability to rigorously assess individual nuances and the effects of interventions between the reference and post-intervention phases (Kazdin, 2011). Furthermore, according to Normand (2016) although between-subjects experiments certainly have their place, the field of psychology would benefit if more researchers study fewer participants, took repeated measures of the subjects of their study, and established generality inductively and systematically through individual subjects. According to Kazdin, these designs should not be considered a replacement for more traditional controlled group designs (e.g., randomized controlled trials), but are a complementary or alternative approach when developing new intervention protocols or working with small or unique populations (Kazdin, 2011). In these types of designs, what determines the quality of the study in is that the intervention is applied as planned and consistently among the participants, therefore, the quality is governed by the reliability of the procedure (Barker et al., 2013. Nevertheless, despite the advantages of this type of design in relation to internal validity, the results of single-case designs are limited in terms of external

validity, since it is difficult to determine confidence in the generalization of the results (Normand, 2016).

In addition, qualitative data is generally included to complement information on the effectiveness of the intervention. For example, in the social validation data reported by Wood, Barker, Turner, and Thomson (2018), the participants had to consider three key areas: (a) the social significance of the results, (b) the social appropriateness of the procedures, and (c) the social importance of the effects. The other most widely used measure, visual analysis of the data, included four steps to determine the effectiveness of the intervention; (a) immediacy of the effect, (b) replicated effects among participants, (c) overlapping data points between baseline and follow-up, (d) magnitude of percentage change from baseline to follow-up phases (Hrycaiko & Martin, 1996). In line with the discussion in Davis and Turner (2019), future research should more meaningfully assess participants' opinions when receiving REBT to form valuable information on the effect, efficacy, and veracity of the intervention. Therefore, we consider social validation an important supplement of effectiveness data about the target variables, as it helps to explore a broader level of emotional and behavioural changes, and to probe and understand why these changes happened or did not happen.

The critical appraisal shows that the contributions of the existing literature are qualitatively different depending on the format in which they are published. This fact that could condition practitioners when making decisions about which literature to draw upon to inform their practice. However, we observe that although peer review is a screening point to mark the quality of the studies, what bestows quality is the study design and the procedure reliability, rather than the publication format. In consequence and considering the amount of REBT interventions published as book chapters, it would

be beneficial for the quality of the evidence to be ensured via peer-review before publication.

Therefore, we encourage researchers to follow the steps of the existing evidence, taking care in the study design and ensuring the use of robust and stringent resources to provide confidence in the use of REBT, such as irrational beliefs questionnaires, procedure reliability, and multiple baselines. Furthermore, we encourage the use of social validation to complement the data on the REBT intervention beyond the target variable. Having this type of information collected, opens the ways to a deeper analysis (e.g., meta-synthesis) to examine whether the trends observed in the results of this systematic mapping review are, in fact, the most effective strategies for the application of REBT with athletes. Furthermore, future studies may be aimed at finding ways to develop more traditional experiments in the sport context, such as randomized controlled trials, to provide stronger generalizable evidence.

The development of REBT interventions in the sport field

The studies included in this systematic mapping review capture the realistic, pragmatic and non-dogmatic philosophy of REBT, attempt to make the GABCDE framework understandable for participating athletes, and endorse the notion that negative emotions can be functional. Indeed, REBT is primarily concerned with encouraging adaptive negative emotional consequences (HNEs), rather than solely fostering positive emotional consequences (Turner, 2016a). As discussed in the study by Turner and Davis (2018), REBT interventions can improve athletes' autonomy regarding the control of their emotions and behaviors by facilitating emotional responsibility through the management of their beliefs. Furthermore, in relation to the results found by Ramis et al. (2017), we suggest that REBT may be beneficial for training coaches with the purpose of encouraging them to promote an autonomy-supportive climate, which can

foster the athlete mental health, acting as a protective factor against competitive anxiety. Indeed, within the REBT literature there are examples of coaches applying the language of irrational beliefs to foster adaptive approaches to performance (Evans et al., 2018), and some research has reported a positive relationship between irrational beliefs and maladaptive cognitive appraisal of stress (threat) in coaches (Dixon et al., 2016). In short, future research and applied work should focus on working with and through coaches.

It is important for practitioners who carry out REBT interventions to convey to the athletes and coaches that REBT is not exclusively used in clinical populations (Turner & Barker, 2014), although it is essential for them to understand that irrational beliefs are a risk factor for mental health (e.g., Turner, Carrington et al., 2019; Vîslă et al., 2016) whilst rational beliefs act as a protective factor (Turner, 2016a). However, the use of the word 'irrational' can lead to negative connotations in the context of sports, since irrationality in common lexicon can be considered to be a sign of low intelligence or a lack of maturity. Importantly, the irrationality presented within REBT is not a proxy for intellect, rather, irrationality is defined specifically as rigid, extreme, inefficient and inconsistent with reality. Due to negative connotations associated with the term 'irrational', and the clinical connotations associated with the term 'therapy', Turner (2014a) suggested that in the context of sport, the term Smarter Thinking can be used instead of REBT. Furthermore, since REBT in the context of sport is not considered to be 'therapy', a more accurate term might be Rational Emotive Behavioural Coaching (REBC; Turner, 2019). Similarly, the study by Jordana et al. (2019) refers to irrational beliefs as 'dysfunctional' and to rational beliefs as 'functional', in an attempt to support the fact that beliefs can help or hinder attainment of a given goal. Within the specific context of sports, the consequences stemming from

irrational beliefs can hinder athletes from achieving their objectives and attaining sound sports performance in both the short and long term, and they can affect athletes' psychological wellbeing (Turner, 2016a). For example, the research developed by Mesagno et al. (2020) showed a strong negative correlation between irrational beliefs and the performance for Australian football players who 'choked' under pressure; performance tended to increase with increasing irrational beliefs under low pressure and decrease with increasing irrational beliefs under high pressure.

To ensure procedural reliability, practitioners who carry out REBT interventions must have a theoretical and practical understanding of REBT, and ideally be trained in REBT, or at least be under supervision of trained and experienced REBT practitioners. Furthermore, the practitioners should adopt an educational approach initially, and then gradually transition to a more collaborative approach (Dryden, 2019; Wood et al., 2017a), since the communication style and the working-alliance of the practitioner with the athlete are a key to the effectiveness of this type of intervention (Bernard & Dryden, 2019; Wood et al., 2020). If the athlete possesses indicators that imply that a brief intervention is suitable (i.e., comprehension of the ABC model, willingness to perform the homework tasks between sessions), benefits will come in both the short- and long-term, and the experience will be efficient and effective for both the athletes and practitioners (e.g., Dryden, 2016).

In addition to disputing irrational beliefs, it is important for practitioners to take a preventive approach in order to strengthen the rational beliefs and mental health of athletes, with the goal of fostering protective factors in the development of their athletic careers. As discussed in the study by Torregrossa et al. (2004), reflecting on the transition to retirement from sports with a prospective approach (i.e., when the athlete is still active) helps them to understand better how they should deal with this transition,

promoting a decrease in uncertainty surrounding the future and preventing possible negative consequences. In contrast, if this reflection takes place during or after retirement, the majority of athletes may have already developed irrational beliefs about the transition process, as observed in the study conducted by Jordana et al. (2019), included in this systematic mapping review. Therefore, rather than REBT being seen as a remedial approach to irrationality and human misery, it can be more accurately considered to be a positive approach to helping people to apply rationality to life. Indeed, it is recognised that REBT and the rationality it presents can help people live pleasurable and fulfilled lives, and can be aligned with positive psychology (Bernard et al., 2010; Oltean et al., 2019).

Even though the application of REBT in sport is a growing field, as an emerging approach, much research is still to be done. Given that the purpose of the current systematic mapping review was to identify trends with the application of REBT with athletes in order to classify where is evidence plentiful and where is evidence lacking, future researchers may seek to develop a meta-analysis, based on the knowledge generated in this systematic mapping review, to explore the effectiveness of these REBT interventions. This new study could combine the results from the individual studies and analyze whether there are different results for different variables (e.g., types of sport, level of competition, gender). This is important since, added to the results of this research, identifying the effects of the interventions depending on the type of variable target, design and measures, population or intervention strategy, could contribute to more individualized interventions for each case, and help to maximize the efforts of the researchers and practitioners.

Limitations

One limitation of the current study is related to the codification process of the included studies. Although the present work has followed a systematic process, the generation of categories and subcategories could have been developed in a different way in another research group. Another limitation is related to traceability, since the fact that different phases of the same study can be published in different formats has meant that, in order not to duplicate information from the same study, when a study has been published as a journal article, in addition to another format, we have prioritized the inclusion of peer-reviewed journal article, to any other type of publication format (e.g., book chapters, grey literature). This may have resulted in losing of relevant information from some phases of some studies. Finally, an additional limitation was that the descriptive characterization and interpretation of the synthesis offered by the systematic mapping review could be hindered by information not provided in the included studies.

Conclusions

This systematic mapping review aimed to shed light on the application of REBT with athletes, critically synthesizing this growing research area for the first time. The study contributes to the burgeoning research in this field by offering a new way of viewing the work by the classification and the categorization of existing evidence to show the study trends to date, as well as highlighting gaps in evidence that remain to be explored. We discuss the level of confidence readers can have in the research by offering a critical evaluation of the studies that develop REBT interventions with athletes (i.e., rigor, suitability, relevance), as well as those that still remain to be explored. The evidence tends to be found in Europe and with an increase in peer-reviewed journal articles in the last 10 years. The most typical intervention studies usually adopt single-case designs, where quantitative resources abound, and where social validation is often a data complement to help examine the effectiveness of the intervention. These studies have

often been aimed at adult male elite football (soccer) players with the purpose of improving their anxiety management or performance, and functionalizing their irrational beliefs. Future research may seek to diversify the population, design and/or measures (e.g., randomized controlled trials), to add the most innovative advances in this field to its interventions, or even to analyze the studies already included in this review from another approach to test the claims made in this review (e.g., meta-analysis). Finally, from this systematic mapping review we urge readers to focus their work on promoting athletes' overall mental health and helping them maintain a healthy, successful and long-lasting career, besides promoting the rational beliefs. We hope this review document inspire readers to reflect on the areas that remain yet to be explored and guides the design and procedures of future REBT interventions with athletes. In this way, we encourage researchers and practitioners to include the contributions of this review to their work and, together, we can enhance the quality of evidence within the REBT field at large.

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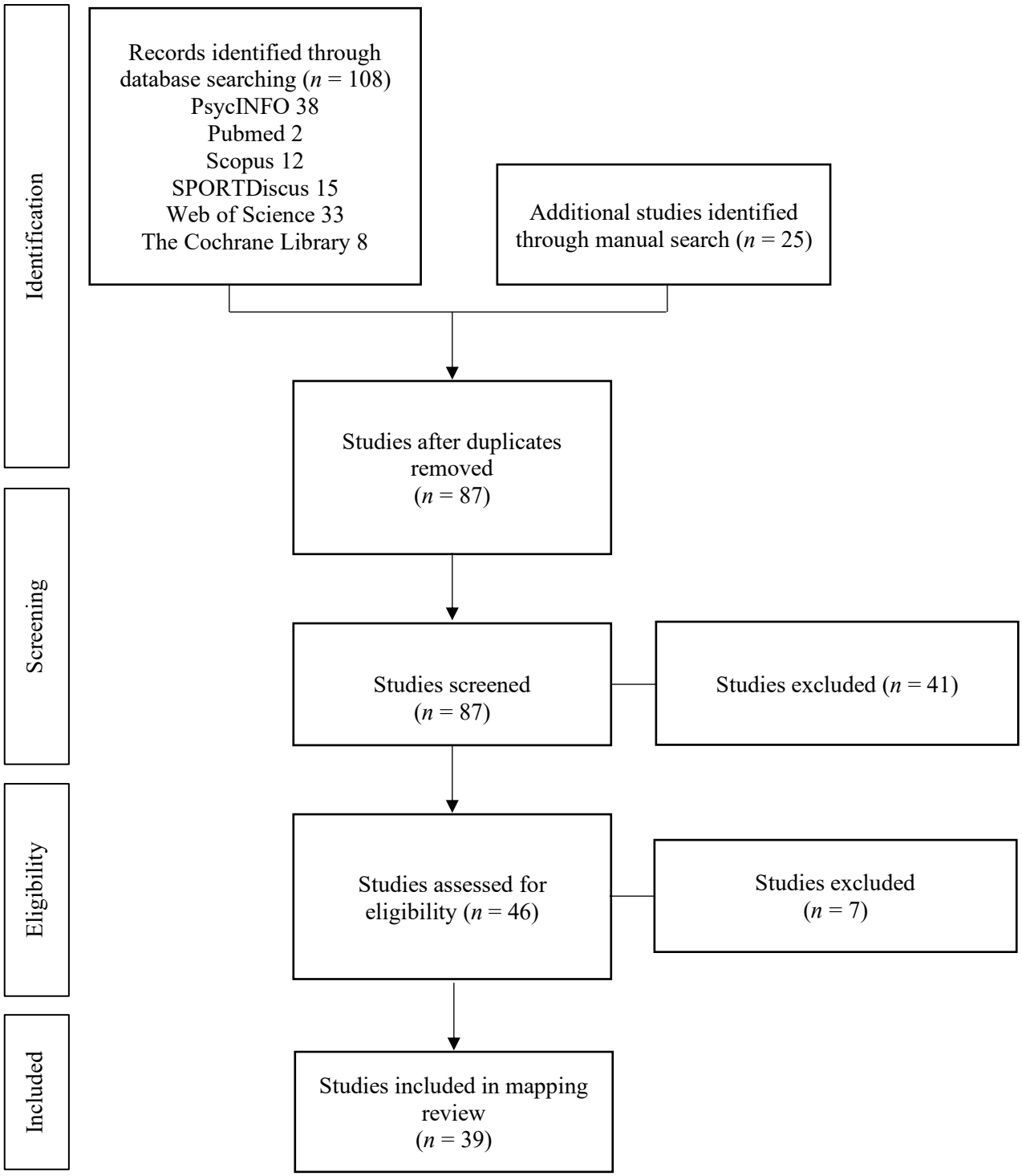

Figure 1. Stages and results of the search strategy using the PRISMA flowchart

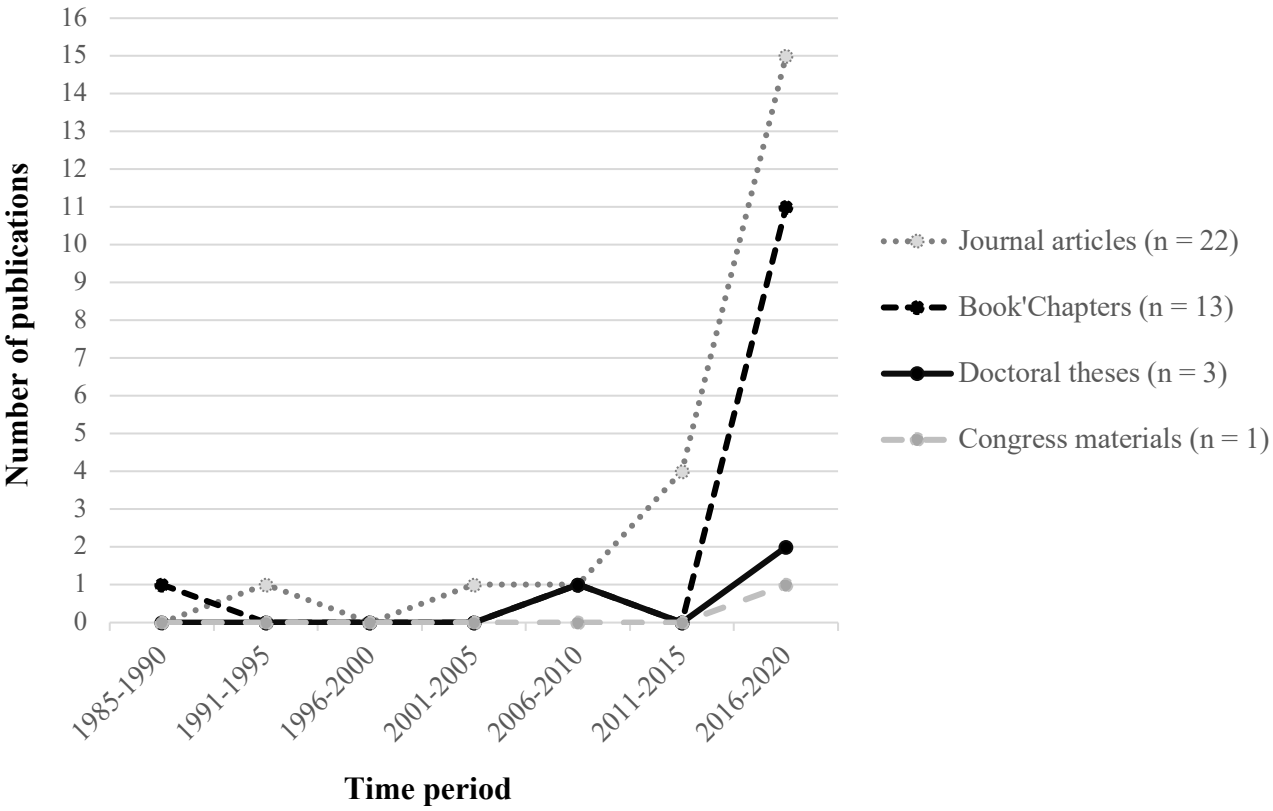

Figure 2. Number of publications organized by format, per 5-year period

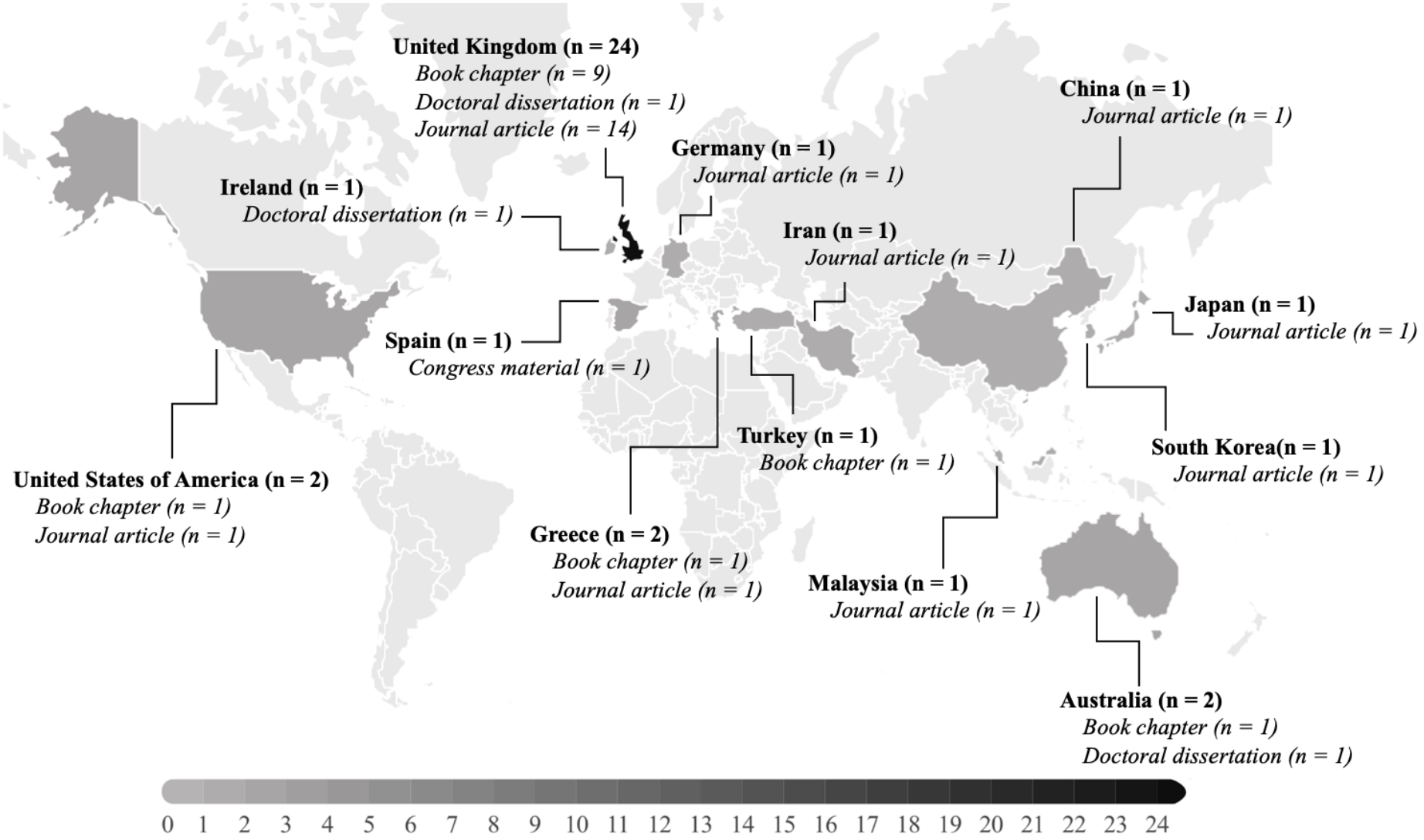

Figure 3. Geographic location of studies included

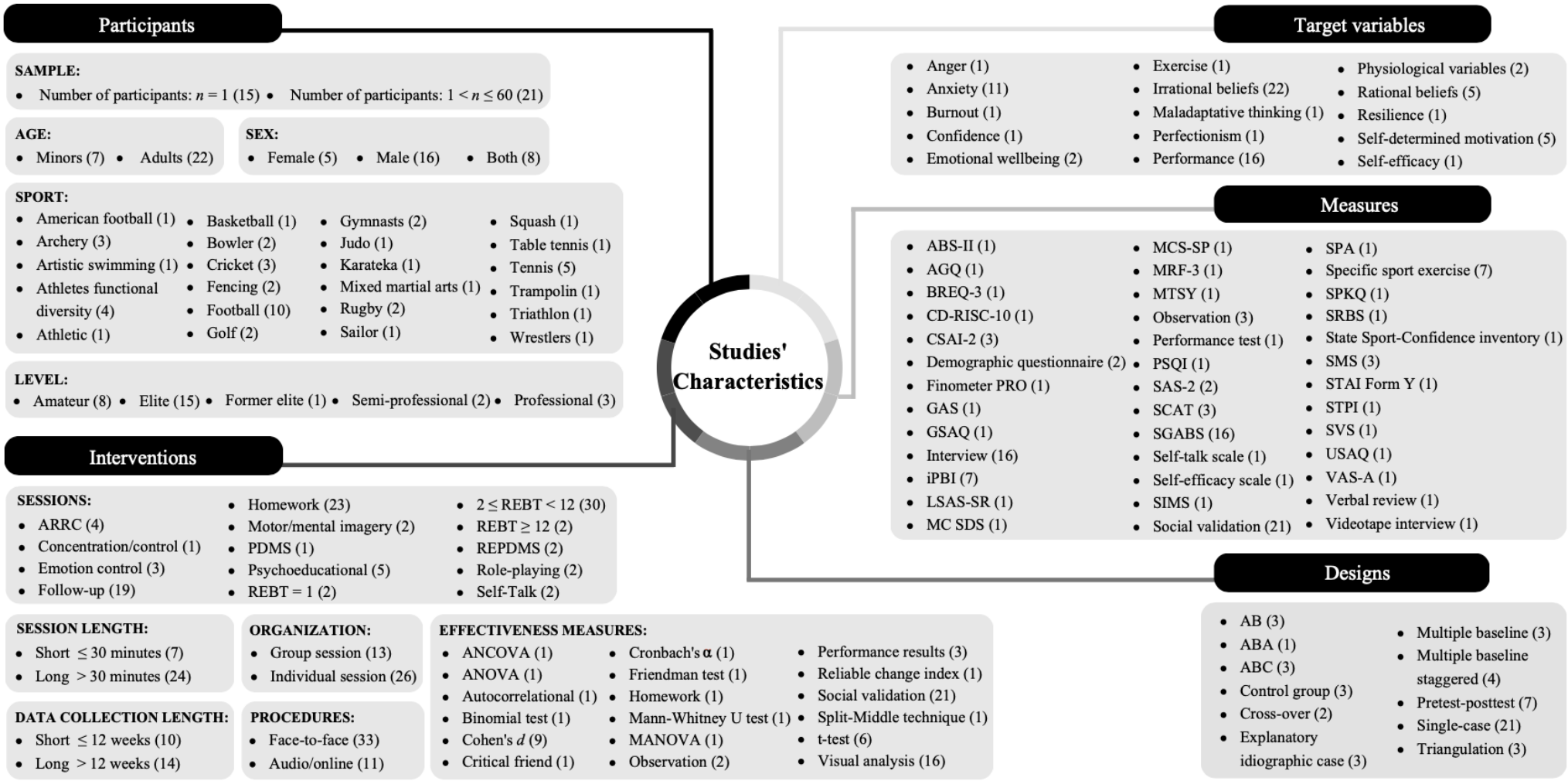

Figure 4. Integrative synthesis of the studies characteristics

Note: See the complete titles of the measures in Supplementary File (Table 3, Table 4 and Table 5 notes)

Index Supplementary File

Table 1. Keywords organized using the PICO tool

Population	**Athletes:** 'sport*' OR 'athlete*' OR 'competition*' OR 'performance' OR 'sport psycholog*' **AND**
Intervention	**Rational Emotive Behavior Therapy:** 'Rational Emotive Behavior Therapy' OR 'REBT' **AND**
	Method: 'qualitative' OR 'quantitative' OR 'mixed' OR 'case*' OR 'intervention*' **OR**
Comparison	**Others:** 'RET' OR 'ARRC' OR 'PDMS' OR 'REPDMS' OR 'Smart Think*' **AND**
Outcome	**Beliefs and emotions:** 'belief*' OR 'rational' OR 'irrational' OR 'emotion*' OR 'demand*' OR 'awful*' OR 'frustration' OR 'depreciation' OR 'anxiety' OR 'wellbeing' OR 'sadness' OR 'happiness' OR 'anger' OR 'contempt' OR 'surprise' OR 'disgust' OR 'fear'

Table 2. Descriptive information about included studies in the mapping review

	Reference	Bibliographical code	Type	Country
1.	Chrysidis, S., Turner, M. J., & Wood, A. G. (2020). The effects of REBT on irrational beliefs, self-determined motivation, and self-efficacy in American Football. *Journal of Sports Sciences*, 1-10	Chrysidis et al. (2020)	Journal article	Germany
2.	Sille, R. A., Turner, M. J., & Eubank, M. R. (2020). "Don't be stupid, Stupid!": Cognitive-behavioral techniques to reduce irrational beliefs and enhance focus in a youth tennis player. *Case Studies in Sport and Exercise Psychology, 4*(1), 40-51	Sille et al. (2020)	Journal article	United Kingdom

Table 2. Descriptive information about included studies in the mapping review

3.	Wood, A., Mack, R., & Turner, M. (2020). Developing Self-Determined Motivation and Performance with an Elite Athlete: Integrating Motivational Interviewing with Rational Emotive Behavior Therapy Introduction. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*	Wood et al. (2020)	Journal article	United Kingdom
4.	Davis, H., & Turner, M. J. (2019). The use of rational emotive behavior therapy (REBT) to increase the self-determined motivation and psychological well-being of triathletes. *Sport, Exercise, and Performance Psychology*.	Davis and Turner (2019)	Journal article	United Kingdom
5.	Jordana, A., Ramis, Y., Vega, J., Regüela, S., & Torregrossa, M. (2019, July). Helping former elite athlete changing irrational beliefs about healthy physical activity. In K. De Brandt (Chair), *A holistic perspective on coaching athletes through transitional challenges* [Symposium]. European Federation of Sport Psychology, Münster, Germany.	Jordana et al. (2019)	Symposium contribution	Spain
6.	Turner, M. J., & Davis, H. S. (2019). Exploring the effects of rational emotive behavior therapy on the irrational beliefs and self-determined motivation of triathletes. *Journal of Applied Sport Psychology*, *31*(3), 253-272.	Turner and Davis (2019)	Journal article	United Kingdom
7.	Wood, A. G., Turner, M. J., & Barker, J. B. (2019). Bolstering psychological health using rational emotive behaviour therapy. In G. Breslin & G. Leavey (Eds.), *Mental health and well-being interventions in sport: Research, theory and practice*, (pp. 45-62).	Wood et al. (2019)	Book chapter	United Kingdom
8.	Rafat, M. S., Sanatkaran, A., & Mohammadkhani, S. (2018). The effect of Rational Emotive Behavior Therapy (REBT) on negative perfectionism and burnout in athletes. *International Journal of Ecosystems and Ecology Science (IJEES)*, *8*(2), 309-318.	Rafat et al. (2018)	Journal article	Iran

Table 2. Descriptive information about included studies in the mapping review

9.	Turner, M. J., Ewen, D., & Barker, J. B. (2018). An idiographic single-case study examining the use of rational emotive behavior therapy (REBT) with three amateur golfers to alleviate social anxiety. *Journal of Applied Sport Psychology*, 1-19.	Turner, Ewen et al. (2018)	Journal article	United Kingdom
10.	Turner, M. J., Kirkham, L., & Wood, A. G. (2018). Teeing up for success: The effects of rational and irrational self-talk on the putting performance of amateur golfers. *Psychology of Sport and Exercise*, *38*, 148-153.	Turner, Kirkham et al. (2018)	Journal article	United Kingdom
11.	Wood, A. G., Barker, J. B., Turner, M. J., & Sheffield, D. (2018). Examining the effects of rational emotive behavior therapy on performance outcomes in elite Paralympic athletes. *Scandinavian journal of medicine & science in sports*, *28*(1), 329-339.	Wood, Barker, Turner, and Sheffield (2018)	Journal article	United Kingdom
12.	Wood, A. G., Barker, J. B., Turner, M., & Thomson, P. (2018). Exploring the effects of a single rational emotive behavior therapy workshop in elite blind soccer players. *The Sport Psychologist*, *32*(4), 321-332.	Wood, Barker, Turner, and Thomson (2018)	Journal article	United Kingdom
13.	Artiran, M. (2017). Rebounding from injury and increasing performance using rational emotive behavior therapy (REBT). In M. J. Turner & R. Bennet (Eds.), *Rational emotive behavior therapy in sport and exercise* (pp. 150-168). Routledge.	Artiran (2017)	Book chapter	Turkey
14.	Barker, J. (2017). “It will be the end of the world if we don’t win this game”: Exploring the use of Rational Emotive Behavior Therapy (REBT) interventions in Paralympic soccer. In M. J. Turner & R. Bennet (Eds.), *Rational emotive behavior therapy in sport and exercise* (pp. 53-67). Routledge.	Barker (2017)	Book chapter	United Kingdom
15.	Breitmeyer, A., & David, O. (2017). Managing injury and loss: The use of rational emotive behavior therapy (REBT) with a collegiate football player. In M. J. Turner & R. Bennet (Eds.), *Rational Emotive Behavior Therapy in Sport and Exercise* (pp. 68-82). Routledge.	Breitmeyer and David (2017)	Book chapter	United States of America

Table 2. Descriptive information about included studies in the mapping review

16. Churchman, C. (2017). Using Rational Emotive Behavior Therapy (REBT) to combat performance-debilitating unhealthy anxiety in an international level karateka. In M. J. Turner & R. Bennet (Eds.), *Rational Emotive Behavior Therapy in Sport and Exercise* (pp. 231-248). Routledge.	Churchman (2017)	Book chapter	United Kingdom
17. Deen, S., Turner, M. J., & Wong, R. S. (2017). The effects of REBT, and the use of credos, on irrational beliefs and resilience qualities in athletes. *The Sport Psychologist*, *31*(3), 249-263.	Deen et al. (2017)	Journal article	Malaysia
18. Ha, J., & Chang, D. (2017). Effects of REBT Program Application for the Changes in Maladaptive Thoughts among Female Junior Tennis Players. *Journal of Digital Convergence*, *15*(12), 591-604	Ha and Chang (2017)	Journal article	South Korea
19. Huggins, M. (2017). A short-term rational emotive behavior therapy (REBT) intervention for competition anxiety with a trampoline gymnast. In M. J. Turner & R. Bennet (Eds.), *Rational Emotive Behavior Therapy in Sport and Exercise* (pp. 20-37). Routledge.	Huggins (2017)	Book chapter	United Kingdom
20. Murphy, D. (2017). *A quasi-experimental investigation into the efficacy of rational emotive behaviour therapy (REBT) in the enhancement of soccer performance* [Doctoral dissertation, National College of Ireland]. National College of Ireland Archive. http://trap.ncirl.ie/2771/1/davidmurphy.pdf	Murphy (2017)	Doctoral dissertation	Ireland
21. Morris, R., Tod, D., & Eubank, M. (2017). "It's the end of the world as we know it (and I feel fine)": The use of Rational Emotive Behavior Therapy (REBT) to increase function and reduce irrational beliefs of an injured athlete. In M. J. Turner & R. Bennet (Eds.), *Rational emotive behavior therapy in sport and exercise* (pp. 220-230). Routledge.	Morris et al. (2017)	Book chapter	United Kingdom
22. Phelps-Naqvi, A., & Katz, J. (2017). Delivering Rational Emotive Behavior Therapy (REBT) education in youth rugby union. In M. J. Turner & R. Bennet (Eds.), *Rational Emotive Behavior Therapy in Sport and Exercise* (pp. 187-205). Routledge.	Phelps-Naqvi and Katz (2017)	Book chapter	United Kingdom

Table 2. Descriptive information about included studies in the mapping review

23. Vertopoulos, E. (2017). The use of Rational Emotive Behavior Therapy (REBT) with an anxious sub-elite fencer. In M. J. Turner & R. Bennet (Eds.), *Rational Emotive Behavior Therapy in Sport and Exercise* (pp. 121-133). Routledge.	Vertopoulos (2017)	Book chapter	Greece
24. Vertopoulos, E., & Turner, M. J. (2017). Examining the effectiveness of a rational emotive personal-disclosure mutual-sharing (REPDMS) intervention on the irrational beliefs and rational beliefs of Greek adolescent athletes. *The Sport Psychologist*, *31*(3), 264-274.	Vertopoulos and Turner (2017)	Journal article	Greece
25. Wood, A. G. (2017). *Demanding Success: Examining the Effects of Rational Emotive Behaviour Therapy on Performance-Related Outcomes* [Doctoral dissertation, Staffordshire University]. Staffordshire Online Repository. http://eprints.staffs.ac.uk/id/eprint/4267	Wood (2017)	Doctoral dissertation	United Kingdom
26. Wood, A. G., Barker, J. B., & Turner, M. J. (2017). Developing performance using rational emotive behavior therapy (REBT): A case study with an elite archer. *The Sport Psychologist*, *31*(1), 78-87.	Wood et al. (2017a)	Journal article	United Kingdom
27. Wood, A. G., Barker, J. B., & Turner, M. J. (2017). Rational emotive behaviour therapy to help young athletes build resilience and deal with adversity. In C. J., Knight, C. Harwood & D. Gould (Eds.). *Sport Psychology for Young Athletes*, (pp. 265-276). Routledge.	Wood et al. (2017b)	Book chapter	United Kingdom
28. Wood, A., & Woodcock, C. (2017). "Is it really that bad?": A case study applying Rational Emotive Behavior Therapy (REBT) with an elite youth tennis player. In M. J. Turner & R. Bennet (Eds.), *Rational Emotive Behavior Therapy in Sport and Exercise* (pp. 206-219). Routledge.	Wood and Woodcock (2017)	Book chapter	United Kingdom
29. Cunningham, R., & Turner, M. J. (2016). Using Rational Emotive Behavior Therapy (REBT) with Mixed Martial Arts (MMA) athletes to reduce irrational beliefs and increase unconditional self-acceptance. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, *34*(4), 289-309.	Cunningham and Turner (2016)	Journal article	United Kingdom

Table 2. Descriptive information about included studies in the mapping review

30. Turner, M. J., & Barker, J. B. (2014). Using rational emotive behavior therapy with athletes. *The Sport Psychologist*, *28*(1), 75-90.	Turner and Barker (2014)	Journal article	United Kingdom
31. Turner, M. J., Slater, M. J., & Barker, J. B. (2014). The season-long effects of Rational Emotive Behavior Therapy on the irrational beliefs of professional academy soccer athletes. *International Journal of Sport Psychology*, *45*(5), 429–451. https://doi.org/10.7352/IJSP.2014.45.429	Turner et al. (2014a)	Journal article	United Kingdom
32. Turner, M. J., Slater, M. J., & Barker, J. B. (2014). Not the end of the world: The effects of rational-emotive behavior therapy (REBT) on irrational beliefs in elite soccer academy athletes. *Journal of Applied Sport Psychology*, *26*(2), 144–156. https://doi.org/10.1080/10413200.2013.812159	Turner et al. (2014b)	Journal article	United Kingdom
33. Turner, M. J., & Barker, J. B. (2013). Examining the efficacy of Rational Emotive Behavior Therapy (REBT) on irrational beliefs and anxiety in elite youth cricketers. *Journal of Applied Sport Psychology*, *25*(1), 131–147. https://doi.org/10.1080/10413200.2011.574311	Turner and Barker (2013)	Journal article	United Kingdom
34. Marlow, C. (2009). Creating positive performance beliefs: The case of a tenpin bowler. In B. Hemmings & T. Holder (Eds.). *Applied sport psychology: A case based approach* (pp. 65- 87). John Wiley & Sons Ltd.	Marlow (2009)	Book chapter	United Kingdom
35. Larner, C. (2008). *On making warriors out of worriers: The management of trait anxiety in competitve sports* [Doctoral dissertation, Victoria University of Technology]. Victoria University of Technology Archive. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.666.6536&rep=rep1&type=pdf	Larner (2008)	Doctoral dissertation	Australia
36. Si, G., & Lee, H. C. (2008). Is it so hard to change? The case of a Hong Kong Olympic silver medallist. *International Journal of Sport and Exercise Psychology*, *6*(3), 319–330.	Si and Lee (2008)	Journal article	China

Table 2. Descriptive information about included studies in the mapping review

37. Yamauchi, R., & Murakoshi, S. (2001). The effect of rational emotive behavior therapy on female soft-tennis players experiencing cognitive anxiety. *Japanese Journal of Sport Psychology*, *28*, 67–75.	Yamauchi and Murakoshi (2001)	Journal article	Japan
38. Elko, P. K., & Ostrow, A. C. (1991). Effects of a rational-emotive education program on heightened anxiety levels of female collegiate gymnasts. *The Sport Psychologist*, *5*(3), 235–255. https://doi.org/http://dx.doi.org/10.1123/tsp.5.3.235	Elko and Ostrow (1991)	Journal article	United States of America
39. Bernard, M. E. (1985). A rational-emotive mental training program for professional athletes. In A. Ellis & M. E. Bernard (Eds.), *Clinical applications of rational-emotive therapy* (pp. 277-309). Springer.	Bernard (1985)	Book chapter	Australia

Figure A. Spreadsheet used to code and evaluate included studies

			Participants					Intervention						
Bibliographical code	**Target variables**	**Design**	*Size*	*Age & Sex*	*Sport*	*Level*	**Measures**	*Sessions*	*Session length*	*Intervention length*	*Participants organization*	*Proceadures*	**Effectiveness measures**	**Remarks about coding**
3. Davis and Turner (2019)	Irrational beliefs	Explanatory idiographic case-study	Small group 2 ≤ n < 10	Adults M ≥ 18	Triathlon	Amateur	iPBI	2 ≤ REBT < 6	Long SL > 30 minutes	Long IL > 12 weeks	Individual session	Face-to-face	Social validation	Check wellbeing, include measures (e.g., SMS-II, SVS)
	Self-determined motivation	Single-case		Both			Social validation interview/questionnaire	Homework				Audio/online/ telephone	Visual analysis	
	Wellbeing	Baseline					Other(s)	Follow-up						
4. Rafat et al. (2018)	Other(s)	Control group	Large group n ≥ 10	Information not available	Other(s)	Information not available	Other(s)	Information not available	Information not available	Information not available	Information not available	Information not available	Information not available	Much information not available
		Pretest-posttest		Information not available										
5. Turner and Davis (2018)			ge group ≥ 10	Adults M ≥ 18	Triathlon	Amateur	iPBI	2 ≤ REBT < 6	Long SL > 30 minutes	Long IL > 12 weeks	Group session	Face-to-face	Visual analysis of (1) comparison of mean values, (b) immediacy of effect, and (c) magnitude of change	Measures: SMS
				Both		Professional	Social validation interview/questionnaire	Follow-up				Audio/online/ telephone		
							Other(s)	PDMS					Cohen's *d*	
								REPDMS						
								Homework						
	Anxiety	Explanatory idiographic case-study	Small group 2 ≤ n < 10	Adults M ≥ 18	Golf	Amateur	iPBI	REBT ≥ 6	Long SL > 30 minutes	Long IL > 12 weeks	Individual session	Face-to-face	Visual analysis	

Anxiety
Irrational beliefs
Performance
Physiological variables
Rational beliefs
Resilience
Self-determined motivation
Wellbeing
Information not available
Other(s)

Journal articles | Book Chapters | Grey literature | Data | +

Table 3. Relevant information from journal articles resulting from the coding process

Reference	**Target variables**	**Method**								**Effectiveness measures**
		Design	Participants			Measures	Intervention			
			Sample	*Age*	*Sex & Sport & level*		*Sessions & content*	*Approximate length*	*Procedures*	
1. Chrysidis et al. (2020)	Irrational beliefs, self-determined motivation, self-efficacy	Idiographic single-case, staggered multiple-baseline across participants	*n* = 3	21, 22 and 23	Male American football	- SMS-28 - iPBI-2 - *Ad-hoc* self-efficacy scale - Social validation semi-structured interview	- 5 REBT - Self-talk - Homework tasks - 2-weeks Follow-up	- 30 min/ session - 22-weeks	- Face-to-face - Individual sessions	- Social validation - Visual analysis
2. Sille et al. (2020)	Performance	Single-case	*n* = 1	12	Male tennis player	- Semi-structured interviews - Specific sport exercise	- 4 REBT - 1 ARRC - Control plan - Homework tasks - 4-weeks follow-up	- 20 min/ session - 7-weeks	- Face-to-face - Individual sessions - Sessions with father	- Social validation

Table 3. Relevant information from journal articles resulting from the coding process

3. Wood et al. (2020)	Irrational beliefs, self-determined motivation, performance	Single-case	*n* = 1	22	Male elite archer	- Interview - iPBI - SIMS	- 8 REBT - Homework tasks - 24-weeks follow-up	- 50-75 min - > 24-weeks	- Face-to-face - Individual sessions	- Critical friend
4. Davis and Turner (2019)	Irrational beliefs, self-determined motivation, and psychological wellbeing (i.e., vitality, sleep quality)	Explanatory idiographic single-case design with baseline data	*n* = 4	M = 41,75 (SD = 8,77)	Male and female amateur triathletes	- iPBI - SMS-II - SVS - PSQI - Social validation semi-structured online interview	- 5 REBT - Homework tasks - 4-weeks follow-up	- M = 43,07 min (SD = 5,30 min) /session - 20 weeks	- Face-to-face - Individual sessions - Voice recording App	- Social validation - Visual analysis
5. Rafat et al. (2018)	Negative perfectionism and burnout	Experimental and control group with pretest-posttest	*n* = 30	Informa-tion not available	Youth wrestlers	- Burnout and negative perfectionism Questionnaires	Information not available	Information not available	Information not available	Information not available

Table 3. Relevant information from journal articles resulting from the coding process

6. Turner and Davis (2018)	Self-determined motivation	ABC single-case between-groups (group REBT+ PDMS and group REBT+REPDMS)	*n* = 24	M = 40,83 (SD = 11,13)	Male and female triathletes (e.g., amateurs, professio-nals)	- iPBI - SMS - Social validation questionnaire	- 5 REBT - 4-weeks follow-up PDMS/ REPDMS sessions - 4-week follow-up - Homework tasks	- 45 min /session - 22 weeks	- Face-to-face - Group session - Video and PowerPoint	- Visual analysis of (1) comparison of mean values, (b) immediacy of effect, and (c) magnitude of change - Cohen's *d*
7. Turner, Ewen et al. (2018)	Social anxiety	Explanatory idiographic case-study	*n* = 3	M = 57,66 (SD = 6,11)	Male amateur golfers	- iPBI - GSAQ - LSAS-SR - SPA - Interview - Social validation questionnaire	- 6 REBT - Homework tasks - 4-weeks follow-up	- 60 min /session - 16 weeks	- Face-to-face and telephone call - Individual sessions	- Visual analysis - Social validation

Table 3. Relevant information from journal articles resulting from the coding process

8. Turner, Kirkham et al. (2018)	Performance	Within-subjects cross-over	*n* = 57	M = 30,63 (SD = 11,85)	Male and female amateur golfers	- Demographic questionnaire - Pressured golf-putting task - Likert-scale of self-talk performance facilitation	- 1 golf exercise - 2 exercise + rational/irrational self-talk + exercise	- 10 minutes of rational/ irrational self-talk between golf exercises - 3 weeks	- Face-to-face - Individual sessions	- Cohen's *d* - ANCOVA - t-tests (one-samples, paired-samples)
9. Wood, Barker, Turner, and Sheffield (2018)	Irrational beliefs, anxiety, performance and physiological variables (i.e., heart rate, systolic and diastolic blood pressure)	Single-case, staggered multiple-baseline across-participants	*n* = 8	M = 40,12 (SD = 12,99)	Male and female Paralym-pic athletes	- SGABS - STPI - AGQ - Social validation semi-structured interview	- 5 REBT - Homework tasks - 36-weeks follow-up	- 30 min /session - 13 weeks	- Face-to-face - Individual sessions	- Visual analysis - Cohen's *d* - Homework tasks

Table 3. Relevant information from journal articles resulting from the coding process

10. Wood, Barker, Turner, and Thomson (2018)	Psychological variables (e.g., irrational beliefs, pre-competitive anxiety), physiological variables (i.e., systolic and diastolic blood pressure) and performance	Pretest-posttest cross-over	*n* = 10	M = 28,36 (SD = 5,54)	Male elite blind soccer players	- SGABS - STAI Form Y - Penalty kick - Finometer PRO - Social validation semi-structured interview	- Experimental group (n = 5): 1 REBT + 1 psychoeduca-tional workshop - Placebo group (n = 5): 1 psychoeduca-tional workshop + 1 REBT	- 60 min /session - 16 weeks	- Face-to-face - Audio file - Individual sessions	- Social validation - Cohen's *d*
11. Deen et al. (2017)	Irrational beliefs and resilience	Single-case, staggered multiple-baseline across-participants	*n* = 5	M = 19,7 (SD = 3,14)	Male and female lite squash athletes	- iPBI - CD-RISC 10 - Social validation semi-structured interview	- 5 REBT - ARRC - Homework tasks - 4-weeks follow-up	- 60 min /session - 9 weeks	- Face-to-face - Individual session	- Visual analysis - Social validation - Cohen's *d* -Auto-correlational analysis - ANOVA - t-test

Table 3. Relevant information from journal articles resulting from the coding process

12. Ha and Chang (2017)	Maladaptive thinking, performance, holistic development	Experimental pre- and post-	*n* = 8	M = 15,65 (SD = 0,37)	Female tennis players	- Interview - MTSY - SPKQ - Korean version performance strategy test sheet	- 12 REBT - Homework tasks - Follow-up	Information not available	- Face-to-face - Group session	t-test
13. Vertopoulos and Turner (2017)	Rational and irrational beliefs	Single-case AB and ABC between-groups	*n* = 20	M = 16,35 (SD = 1,00)	Male athletes of football, tennis players sailor and fencing	SGABS	- 4 REBT - 1 REPDMS - Homework tasks - 3-weeks follow-up	- 40 min /session - 12 weeks	- Face-to-face - Group session	- Cohen's *d* - Friedman test - Mann-Whitney U test
14. Wood et al. (2017a)	Competitive anxiety, emotional well-being and performance	Single-case	*n* = 1	44	Elite archer	- SGABS - Social validation semi-structured interview	- 7 REBT - 12 and 24-weeks follow-up	- 60 min /session - 12 weeks	- Face-to-face - Individual sessions	- Visual analysis - Social validation

Table 3. Relevant information from journal articles resulting from the coding process

15. Cunningham and Turner (2016)	Self-depreciation (irrational belief) and unconditional self-acceptance (rational belief)	Single-case, multiple-baseline across participants	*n* = 3	M = 23,67 (SD = 2,52)	Male semi-professional mixed martial arts athletes	- USAQ - SGABS - Social validation semi-structured interview	- 4 REBT - Homework tasks - 2 and 24-weeks follow-up	Information not available	- Skype - Individual sessions	- Social validation - Cohen's *d* - Reliable Change Index
16. Turner and Barker (2014)	Irrational beliefs	Single-case, multiple-baseline across participants	*n* = 3	Informa-tion not available	Football and cricket athletes	- SGABS - Social validation questionnaire	- Option 1: 11 REBT - Option 2: 7 REBT - Both groups: homework tasks and 4 or 8-weeks follow-up	- Opción 1: 20-30 min /session - Opción 2: 45 min/session	- Face-to-face - Individual session	- Social validation
17. Turner et al. (2014a)	Irrational beliefs	Quasi-experimental single-case A-	*n* = 17	M = 16,71 (SD = 0,61)	Male elite football athletes	- SGABS - Social validation semi-structured interview	-Experimental group (n = 9): 3 REBT	- Experi-mental group: 40 min /session	- Face-to-face - Group sessions	- Social validation - Visual analysis

Table 3. Relevant information from journal articles resulting from the coding process

		B design, and control group					- Control group (n = 8): 3 emotion control program - 4 and 8-weeks follow-up	- Control group: 40 min /session - 10 weeks		
18. Turner et al. (2014b)	Irrational beliefs	Pretest and posttest	*n* = 15	M = 15,13 (SD = 0,74)	Male elite football athletes	- SGABS - Social validation semi-structured interview	- 1 REBT - 6-weeks follow-up	60 min	- Face-to-face - Group session	- MANOVA - Social validation
19. Turner and Barker (2013)	Irrational beliefs and cognitive anxiety	Single-case staggered multiple-baseline across-participants	*n* = 4	M = 15,5 (SD = 1,00)	Male elite cricketers	- SGABS - SAS-2 - Social validation semi-structured interview	- 3 REBT - Homework tasks	- 20 min /session - 3 weeks	- Face-to-face - Group sessions	- Visual analysis - Cohen's *d* - t-test

Table 3. Relevant information from journal articles resulting from the coding process

20. Si and Lee (2008)	Low frustration tolerance (irrational belief) during competitions and performance	Triangulation method	*n* = 1	Information not available	Table tennis Olympic athlete	- GAS - Observation - Verbal review of progress - Videotape interview	Average of 1,5 sessions per week	- 60 min /session - 44 weeks	- Face-to-face - 75% individual sessions, 25% group sessions	- Visual analysis
21. Yamauchi and Murakoshi (2001)	Cognitive anxiety	Information not available	*n* = 11	Informa-tion not available	Tennis	- SCAT	5 REBT	Information not available	- Conferen-ces - Group sessions	Information not available
22. Elko and Ostrow (1991)	Anxiety in a competitive environment	Single-subject (ABA) multiple-treatment	*n* = 6	M = 19,25	Female gymnasts from a division I team	- CSAI-2 - SCAT - Interview	- 6 RET - Homework tasks	- 60 min /session - 3 weeks	- Face-to-face - Individual sessions	- Split-middle technique - Binomial test

Note: Table 3 abbreviations

General: ARRC = Athlete Rational Resilience Credos; SD = Standard deviation; M = Mean; PDMS = Personal Disclosure Mutual-Sharing; REBT = Rational Emotive Behavior Therapy; REPDMS = Rational Emotive Personal Disclosure Mutual-Sharing

Measures: AGQ = The Achievement Goal Questionnaire; CD-RISC 10 = Connor-Davidson Resilience Scale; CSAI-2 = Competitive State Anxiety Inventory 2; GAS = Goal Attainment Scale; GSAQ = Golf-specific anxiety questionnaire; iPBI = irrational Performance Beliefs Inventory; LSAS-SR = Liebowitz social anxiety scale; MRF-3 = Mental Readiness Form Version 3; MTSY = Misadaptative Thinking Scale for Youth; SIMS = The Situational Motivational Scale; SAS-2 = Sport Anxiety Scale-2; SCAT = Sport Competition Anxiety Test; SGABS = Shortened General Attitudes and Beliefs Scale; SMS = The Sport Motivation Scale; SPA = Subjective performance anxiety; SPKQ = Sports Psychological Skills Questionnaire; STAI (Form Y) = State-Trait Anxiety Inventory Form Y; STPI = State Trait Personality Inventory; USAQ = Unconditional Self-Acceptance Questionnaire.

Table 4. Relevant information from book chapters resulting from the coding process

Reference	**Target variables**	**Method**								**Effectiveness measures**
		Design	Participants			Measures	Intervention			
			Size	*Age*	*Sex & Sport & level*		*Sessions & content*	*Approximate length*	*Procedures*	
1. Wood et al. (2019b)	Performance and irrational beliefs	Single-case	*n* = 1	42	Female Paralympic athlete	- SGABS - Social validation semi-structured interview	- 5 REBT - Homework tasks - ARRC	- 45 min/ session - 18 weeks	- Face-to-face - Individual sessions	- Social validation
2. Artiran (2017)	Anxiety, confidence, irrational beliefs	Single-case	*n* = 1	19	Female professional basketball athlete	- ABS-II - CSAI-2 - State Sport-Confidence Inventory	- 10 REBT - Homework tasks	- 16 weeks	- Face-to-face - Individual sessions	- Visual analysis

Table 4. Relevant information from book chapters resulting from the coding process

3. Barker (2017)	Rational and irrational beliefs	Triangula-tion with pretest and posttest data collection	*n* = 16	From 18 to 29	Male amateur Paralympic football	- SGABS - Social validation	- 6 REBT - Homework tasks - 1 Workshop	- 45-60 min /session - 90 min /workshop	- Face-to-face - Individual and group sessions - Skype	- Visual analysis - Social validation
4. Breitmeyer and Davis (2017)	Anger, unconditional self-acceptance (i.e., rational belief)	Single-case	*n* = 1	18	Male football athlete	Behavioral observation	- 10 REBT - Homework tasks	- 10 weeks	Face-to-face and telephone call - Individual sessions	- Social validation - Behavioral observations
5. Churchman (2017)	Anxiety, irrational beliefs, performance	Single-case	*n* = 1	Informa-tion not available	Elite karateka	- REBT competency scale	- 10 REBT	- 45 min /session	- Face-to-face - Individual sessions	- Social validation - Performance results

Table 4. Relevant information from book chapters resulting from the coding process

6. Huggins (2017)	Performance	Single-case	*n* = 1	26	Female elite trampoline gymnast	- SAS-2 - Semi structed interview - MCS-SP - Three competition routines	- 1 assessment session - 6 REBT - 8-weeks follow-up	- 90 min assessment session - 50 min /REBT session 8 weeks	- Face-to-face - Individual sessions - E-mail	- Performance results - Visual analysis
7. Morris et al. (2017)	Rational beliefs	Single-case	*n* = 1	Early 20s	Male professional rugby player	Information not available	Information not available	Information not available	- Face-to-face - Individual sessions	Social validation
8. Phelps-Naqvi and Katz (2017)	Irrational beliefs	Triangula-tion with pretest and posttest data collection	Infor-mation not availa-ble	Youth pla-yers	Rugby players	- Interviews - Observation - SGABS - Social validation questionnaire	- 7 REBT - Homework tasks - Role-playing	- 45 min /session	- Face-to-face - Group sessions	- Social validation - Behavioral observation - Visual analysis

Table 4. Relevant information from book chapters resulting from the coding process

9. Vertopoulos (2017)	Performance	Single-case	*n* = 1	Informa-tion not available	Male fencing athlete	- Semi-structured interview - SGABS	- 1 > REBT sessions - Homework tasks	- 32 weeks	- Face-to-face - Individual sessions	- Social validation - Performance results - Visual analysis
10. Wood et al. (2017b)	Performance, irrational beliefs	Single-case	*n* = 1	15	Cricketer	- SGABS	- 6 REBT - Homework task - Role-playing - Follow-up session	- 45 min /session	- Face-to-face - Individual sessions	- Social validation
11. Wood and Woodcock (2017)	Irrational beliefs, performance	Single-case	*n* = 1	17	Nationally ranked tennis athlete	iPBI	- 9 REBT - Credo - Homework tasks	- 60 min /session - 24 weeks	- Face-to-face - Individual sessions	- Social validation

Table 4. Relevant information from book chapters resulting from the coding process

12. Marlow (2009)	Performance	Single-case	*n* = 1	Junior	Elite tenpin bowler	- Semi-structured interview - Performance profile process - Social validation	- 6 REBT - Feedback between sessions - Follow-up	Information not available - 90 min / Semi-structured interview	- Face-to-face - Individual sessions - Group sessions - Email contact	- Social validation
13. Bernard (1985)	Performance	Informa-tion not available	Infor-mation not availa-ble	Informa-tion not avai-lable	Professio-nal football players	Information not available	- 1 > educational REBT workshops - Concentration training - goal setting	Information not available	- Group sessions	Information not available

Note: Table 4 abbreviations

Measures: ABS-II = Attitudes and Beliefs Scale-II; ED-Q = Exercise dependence questionnaire; MCS-SP = Multilevel Classification System for Sport Psychology; see the complete titles of the measures in Table 3 notes.

Table 5. Relevant information about studies of different origin resulting from the coding process

Reference	**Type**	**Target variables**	**Method**								**Effectiveness measures**
			Design	Participants			Measures	Intervention			
				Size	*Age*	*Sex & Sport & level*		*Sessions & content*	*Approximate length*	*Procedures*	
1. Jordana et al. (2019)	Sympo-sium	Exercise, motivation, irrational beliefs	Multiple baseline single-case	*n = 8*	M = 41 (SD = 4.66)	Male and female former elite athletes (i.e., athletics, artistic swimming, gymnastics, judo)	- Semi-structured interview - SGABS - BREQ-3 - Satisfaction questionnaire	- 3 REBT - Homework tasks - 5-weeks Follow-up	- 45 min /session - 14 weeks	- Face-to-face - Skype - Individual sessions	- Social validation - Visual analysis

Table 5. Relevant information about studies of different origin resulting from the coding process

2. Murphy (2017)	Doctoral dissertation	Anxiety, irrational beliefs, performance	Quantitative quasi-experimental design	*n* = 16	M = 20.94 (SD = 3.09)	Male and female amateur football players	- SRBS - VAS-A - Penalty kick	- 1 REBT - 1 motor imagery	- 8 min /REBT session - 8 min/motor imagery session	- Face-to-face - Group sessions	- t-test
3. Larner (2008)	Doctoral dissertation	Anxiety	Experimental design with control group	*n* = 60	M = 18 (SD = 1.59)	Male and female freestyle skiing, athletics, and ten-pin bowling	- CTAI-2 - Demographical questionnaire - Game scores - MC SDS - MRF-3 - SGABS	- Experimental group 1: 6 REBT - Experimental group 2: 6 relaxation and mental imagery - Control group: 6 befriending therapy	- 90 min /session - 10 weeks	Face-to-face - Group sessions	- Cronbach's α - Cohen's *d* - t-test

Note: Table 5 abbreviations

BREQ-3 = Cuestionario de Regulación de la Conducta en el Ejercicio; CTAI-2-D = Competitive Trait Anxiety Inventory - Mark 2; MC SDS = Marlowe-Crowne Social Desirability Scale; SRBS = Sports related beliefs scale; VAS-A = Analoge Scale-Anxiety; see the complete titles of the measures in Table 3 and Table 4 notes.

Figure B. Tool used for critical appraisal of included studies

								ANSWER OPTIONS
	STEP 1 CRITICAL APPRAISAL: METHODOLOGICAL RIGOR							Yes
Bibliographical code	xxxx							No
	Were the cases recruited in an acceptable way?							Can't Tell
	Are the cases defined precisely?	Were the cases representative of a defined population (geographically and/or temporally)?	Was there an established reliable system for selecting the cases?	Is the time frame of the study relevant to intervention?	Was there a sufficient number of cases selected?	Could other factors affect the results (e.g., sex, age, social class)?	There are any discussions around recruitment (e.g. why some people choose not to take part)?	
	Was the exposure accurately measured to minimise bias?							
	Was the intervention clearly defined and accurately measured?	Did the authors use measurements correctly?	Do the measures truly reflect what they are supposed to measure (have they been validated)?	Were the measurement methods similar in the cases and/or controls?	There are control measures depending on the design (e.g., multiple base-line, control group)?			
Methodological rigor	**Procedure reliability**							
	Detailed population?	Detailed intervention?	Detailed procedure development?	The given comparator?	The outcomes considered	Transparent and replicable?		
	Was the data collected in a way that addressed the research issue?							
	The setting for the data collection was justified?	Is it clear how data were collected (e.g. questionnaires, focus group, semi-structured interview)?	The researchers have justified the methods chosen?	The form of data is clear (e.g. tape recordings, video material, notes etc.)?	The researchers have discussed saturation of data?	Informed consent obtained?		
	Was the data analysis sufficiently rigorous?							
	Is there a detailed description of the analysis process?	The researchers explains how the data presented were selected from the original sample to demonstrate the analysis process?	Is sufficient data presented to support the findings?	The researchers critically examined their own role, potential bias and influence during analysis and selection of data for presentation?				

Yes
No
Can't tell

Rigor | Suitability | Relevance | Data | +

Figure B. Tool used for critical appraisal of included studies

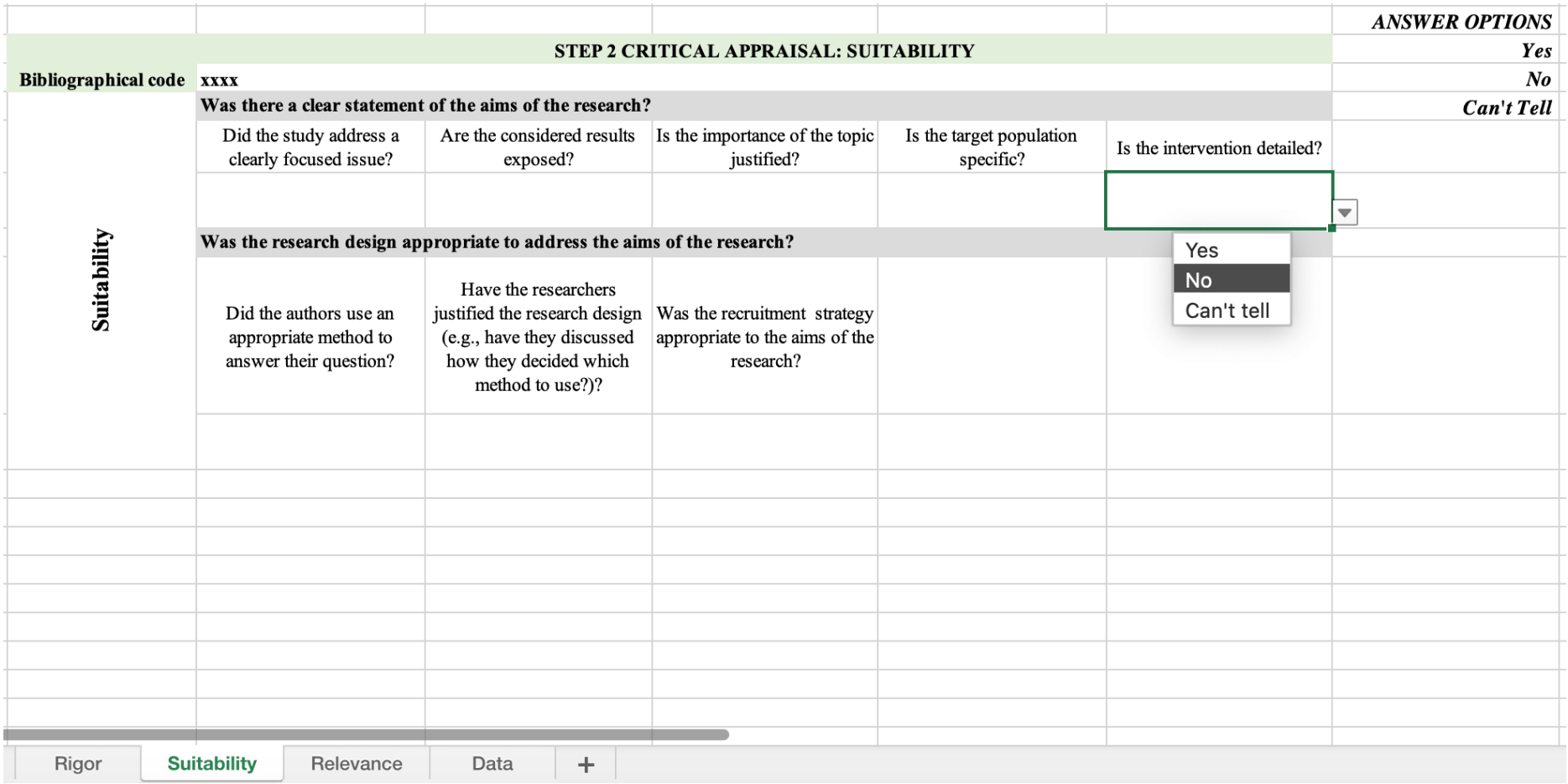

Figure B. Tool used for critical appraisal of included studies