

A SYSTEMATIC REVIEW OF GOAL SETTING INTERVENTIONS TO IMPROVE SPORTS PERFORMANCE

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ABSTRACT. Introduction. Goal setting theory (Locke & Latham, 1990) was initially developed for the field of organizational psychology, and since then it was used as a motivational technique in a variety of areas, including sports performance. Considering the multiple factors influencing sports performance and the fact that goal setting has become an increasingly popular subject, we consider it appropriate to summarize the recent results regarding this topic. **Objective.** The purpose of this paper was to conduct a systematic review of the literature on goal setting interventions to enhance sports performance. **Methods.** A comprehensive literature search of Scopus, ScienceDirect, Directory of Open Access Journals, ERIC, Social Sciences Citation Index, Science Citation Index, and APA PsycArticles databases was conducted in October 2020 and included journal articles published since 2000. **Results.** A total of 1520 results were identified, of which 27 studies met eligibility criteria and were fully reviewed. **Conclusions.** This systematic review highlights that goal setting is an effective behavior modification procedure that can improve athletes' performance. Discussions focus on practical implications and future research directions.

Keywords: goal setting, sports, applied behavior analysis, sports performance

REZUMAT. O recenzie sistematică asupra intervențiilor care folosesc stabilirea obiectivelor pentru îmbunătățirea performanței sportive. Introducere. Teoria stabilirii obiectivelor (Locke & Latham, 1990) a fost dezvoltată inițial pentru domeniul psihologiei organizaționale, iar de atunci a fost folosită ca tehnică motivațională în mai multe domenii, printre care și cel al performanței sportive. Având în vedere factorii multipli care influențează performanța sportivă, precum și faptul că stabilirea obiectivelor a devenit un subiect din ce în ce mai popular, considerăm oportună sumarizarea celor mai recente rezultate științifice din acest domeniu. **Obiectiv.** Obiectivul acestei lucrări este de a realiza o recenzie sistematică a literaturii de specialitate asupra intervențiilor care folosesc stabilirea obiectivelor pentru creșterea performanței sportive. **Metode.** O căutare comprehensivă a literaturii de specialitate a fost realizată în bazele de date: Scopus, ScienceDirect,

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Directory of Open Access Journals, ERIC, Social Sciences Citation Index, Science Citation Index și APA PsycArticles în Octombrie 2020 și a inclus articole științifice publicate începând cu anul 2000. **Rezultate.** Un total de 1520 de rezultate au fost identificate, dintre care 27 de articole au întrunit criteriile de eligibilitate și au fost incluse în această recenzie. **Concluzii.** Această recenzie sistematică evidențiază faptul că stabilirea obiectivelor reprezintă o strategie eficientă de modificare comportamentală care poate îmbunătăți performanța sportivilor. Discuțiile se concentrează asupra implicațiilor practice și a direcțiilor viitoare de cercetare.

***Cuvinte cheie:** stabilirea obiectivelor, sport, analiza aplicată a comportamentului, performanța sportivă*

INTRODUCTION

Goal setting theory (Locke & Latham, 1990) is a motivational theory initially developed for organizational psychology, based on more than 400 studies that suggest that specific and challenging goals conduct to a higher level of task performance than easy or vague goals.

Applied behavior analysis also relies on goal setting as a behavior modification tool that implies establishing a goal for the desired change in the target behavior (Miltenberger, 2015). It is effective as a single procedure, but practitioners also use it in conjunction with other strategies such as monitoring, public posting, feedback, or reinforcement (Cooper et al., 2014). From a behavioral perspective, Luiselli & Reed (2011) consider goal setting as a rule that modifies behavior because it describes a contingency that arises from following that rule (Luiselli & Reed, 2011).

Nevertheless, in the sports performance field, findings were inconsistent at first, which was attributed by Locke (1991) mainly to methodological flaws, arguing that different problems occurred in manipulating “do your best” conditions, measuring personal goals, and making specific goals difficult. In a reaction to Locke, Weinberg & Weigand (1993) consider that it would be overly simplistic to attribute inconsistent findings only to methodological issues and propose as alternative explanation differences in motivation and type of task between sport and organizational settings. However, as the number of academic papers regarding goal setting in sports increased, a meta-analysis showed that results are similar to goal setting in organizational psychology, highlighting an effective strategy (Kyllo & Landers, 1995).

From the standpoint of Mellalieu & Hanton (2008), researchers and practitioners should consider contextual variations, intra-individual, and inter-individual differences when they use goal setting in sport. Therefore, goals can be viewed either as a direct motivational strategy that regulates behavior in terms of attention and effort or as the cognitive drivers for involvement in activities (Mellalieu & Hanton, 2008). According to achievement-goal theory (Nicholls, 1989), individuals are motivated by demonstrating competence, and they set goals that are consonant with their cognitive beliefs about what is needed to maximize achievement in that context (Harwood et al., 2000). Athletes usually adopt two types of achievement goals: mastery (or task involved) and ego (or result involved) (Tenenbaum & Eklund, 2007). Mastery involvement refers to situations in which athletes feel competent about improving their own performance, while ego involvement refers to situations in which athletes feel successful about outperforming others (Ames, 1992; Nicholls, 1989).

In sports and exercise settings, people set either subjective goals that are not measurable, either objective goals requiring meeting a specific standard on a given task within a time frame (Weinberg & Gould, 2011). Another classification describes three types of goals: outcome goals, performance goals, and process goals (Cox, 2011). Outcome goals refer to sports' competitive aspects and emphasize social comparison and winning (Eklund & Tenenbaum, 2013). On the other hand, performance goals imply self-comparison, focusing on own achieving standards, which are independent of other competitor's performance, and for that reason, these types of objectives are more flexible and within an athlete's control (Weinberg & Gould, 2011). Finally, process goals target specific behavior, focusing on the process of performing rather than on performance (Eklund & Tenenbaum, 2013). In sports performance, all three types of goals are essential in directing behavioral change (Weinberg & Gould, 2011).

When setting goals, coaches need to focus on four aspects: goal difficulty, goal specificity, goal proximity, and goal collectivity (Eklund & Tenenbaum, 2013). Based on these variables, recommendations include using moderate or difficult goals, both short- and long-term goals, using them in conjunction with performance feedback, and using specificity, public acknowledgment, and a combination of different goals (Luiselli & Reed, 2011; Weinberg & Gould, 2011).

Although other papers have emphasized the utility of using goal setting in sports performance, there is no recent systematic review on this topic. Considering the multiple factors influencing sports performance and the fact that goal setting has become increasingly popular, we believe it is appropriate to summarize the recent results regarding this topic. According to Munn et al. (2018), a literature review can provide clarity, identify gaps and trends regarding the topic studied, and provide pieces of information that future research may address. Therefore, this paper's purpose was to conduct a systematic review of the literature on goal setting interventions to enhance sports performance.

METHODS

Inclusion and exclusion criteria

Our inclusion criteria include the following: first, a goal setting intervention had to be implemented, either single or in conjunction with other strategies. Second, the target behavior had to be related to sports performance: technical, tactical, physical, or psychological. We excluded studies that targeted the participant's physical activity level or studies that have not implemented an intervention. Also, we excluded from this review studies that were not written in English.

Search strategy

We conducted a comprehensive literature search using specific keywords sport* and "goal setting" together. Double quotes were used to restrict the search to the exact phrase of goal setting, and an asterisk was used to find also derivatives such as sports, sporting, sportive, sportsmen, sportswoman, and others.

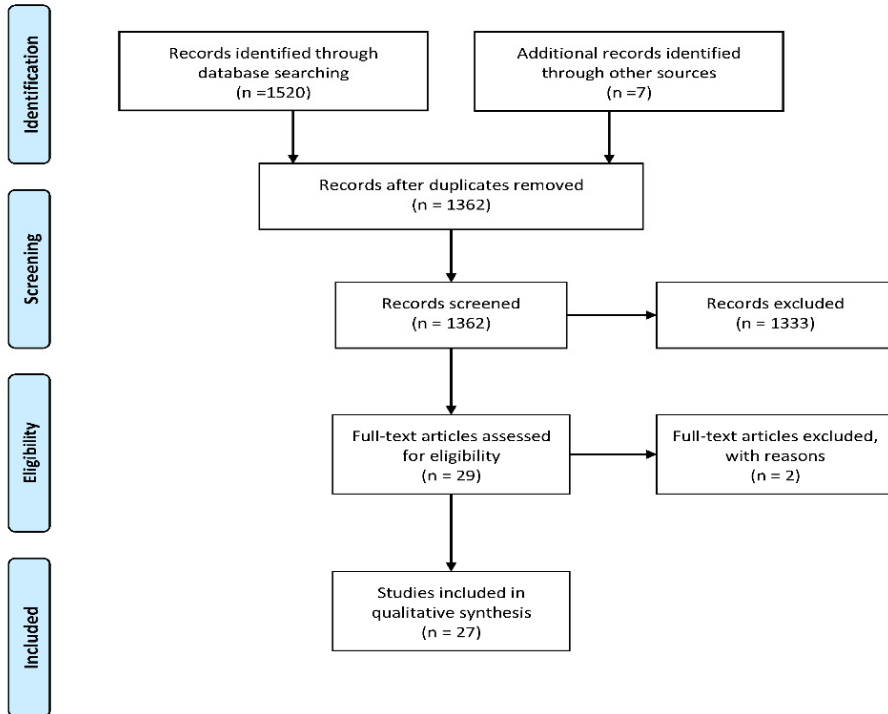
The literature search was performed in October 2020 and included journal articles published since 2000 in the following databases: Scopus, ScienceDirect, Directory of Open Access Journals, ERIC, Social Sciences Citation Index, Science Citation Index, and APA PsycArticles.

RESULTS

We found a total of 1520 journal articles as a result of the systematic search, and after removing duplicates, there were 1354 papers included for abstract review. Two independent reviewers assessed abstracts using Rayyan software (Ouzzani et al., 2016), and in situations in which they did not get enough information from the abstract, they evaluated the full article. Disagreements on whether to include an article were resolved by consensus of authors. After reviewing abstracts, a number of 22 studies were included, and we identified seven more papers by cross-checking the reference list of published articles. A total of 29 journal articles were thoroughly reviewed with full-text, out of which two were removed because they did not assess an intervention's effect. Therefore, 27 journal articles were included in this review. Figure 1 illustrates the process of selecting studies for this review.



PRISMA 2009 Flow Diagram



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For more information, visit www.prisma-statement.org.

Figure 1. Goal Setting Interventions - Study Selection for Review.

Participant characteristics

In the reviewed articles, 770 individuals participated in interventions based on goal setting, out of which 400 were females and 370 males. Participants were both adults and children, whose ages ranged from 7 to 36. They practiced sports as amateurs or professional athletes at different levels: recreational, high school, collegiate, or sports clubs. Also, participants played both individual and team sports.

Sports included

The most studied team sport in selected articles was volleyball (6) (e.g., Palao, 2016), followed by basketball (4) (e.g., Ortega et al., 2013), soccer (3) (e.g., Brobst & Ward, 2002), and football (2) (e.g., Ward & Carnes, 2002). Other team sports examined were rugby (1) (Mellalieu et al., 2006) and cricket (1) (Thelwell & Maynard, 2003).

As far as individual sports are concerned, tennis (2) (e.g., Boyce et al., 2001), triathlon (2) (e.g., Thelwell & Greenlees, 2001), track and field (2) (e.g., Thelwell & Greenlees, 2003), table tennis (1) (Liu et al., 2012), boxing (1) (O'Brien et al., 2009), and swimming (1) (Simoes et al., 2012) were the sports analyzed in this review. Additionally, one study assessed the intervention in two different individual sports: swimming & track and field (Wikman et al., 2014).

Study design characteristics

In this review, articles included used both individual-level design popularly known as single-subject design and group level experimental design. Of the studies that used a single-subject design, the most common approach was multiple baseline across participants (5) (e.g., Thelwell & Greenlees, 2003), followed by multiple baseline across behaviors (2) (e.g., Ward & Carnes, 2002). Other studies utilized multiple baseline design with a reversal (1) (Holt et al., 2012a), alternating treatments design (1) (Holt et al., 2012b), ABACABC multi-treatment withdrawal (1) (Smith & Ward, 2006), and AB design (1) (Mellalieu et al., 2006). Regarding group design, authors also used different approaches, and both quasi-experimental (e.g., Palao, 2016) or experimental designs (e.g., Corrêa et al., 2006).

Type of goal setting intervention

The authors studied goal setting as a single procedure in 15 studies from a total of 27 identified. Out of those, some evaluated the effect of a goal setting program (e.g., Ortega et al., 2013; Zetou et al., 2008), and others also looked at variables associated with efficacy of goal setting programs such as goal difficulty (e.g., Dutra et al., 2017; Liu et al., 2012) or goal specificity (e.g., Corrêa et al., 2006). In these interventions, authors used assigned-set goals (e.g., Corrêa et al., 2006), self-set goals (e.g., Vidic & Burton, 2010; Zetou et al., 2008), or they investigated both self-set and assigned-set goals (e.g., Boyce et al., 2001). Concerning self-set goals, Mellalieu et al. (2006) and O'Brien et al. (2009) used a procedure based on a model proposed by Burton et al. (2001), which consisted of goal determination, goal setting, and goal reviewing.

Moreover, selected articles tested separately short- and long-term goals (e.g., Corrêa et al., 2006) or a combination of both (e.g., Boyce et al., 2001; Durdubas et al., 2019), and also looked at individual goals (e.g., Ortega et al., 2013), group goals (e.g., Senécal et al., 2008), or a combination of individual and group goals (e.g., Vidic & Burton, 2010).

Finally, in order to make the intervention more effective, McCarthy et al. (2010) accompanied the goal setting intervention with an educational booklet that explained and offered examples of different outcome goals, performance goals, and process goals and taught athletes to set SMART goals.

In contrast to single procedure interventions, several studies looked at the effect of goal setting in conjunction with other strategies such as peer-assessed feedback and group contingency (Holt et al., 2012a), individual contingency and group contingency (Holt et al., 2012b), public posting (Ward & Carnes, 2002), public posting and verbal feedback (Brobst & Ward, 2002; Smith & Ward, 2006), planning (Bieleke et al., 2019), positive self-talk and imagery (Heydari et al., 2018), relaxation, mental imagery, and self-talk (Thelwell & Greenlees, 2001, 2003), activation regulation strategies, self-talk, mental imagery, and concentration (Thelwell & Maynard, 2003) and patterns of social comparison (Bueno et al., 2008).

Target behavior

We grouped selected articles according to target behaviors into four different sports performance factors: technical, tactical, physical, and psychological.

Technical performance

A large number of studies looked at technical improvements in sports performance. For instance, in volleyball, authors investigated motor learning performance in a task of dig/forearm pass (Corrêa et al., 2006), errors, velocity, and precision (Bieleke et al., 2019), serving, serve-receiving, and attacking (Zetou et al., 2008) or serve reception (Dutra et al., 2017). In the case of soccer, we identified studies that examined changes in players' technique, such as: passing and first touch (Holt et al., 2012a), the highest number of consecutive touches of the ball or "juggles" in the correct sequence (Holt et al., 2012b), movement with the ball, movement during restarts and movement after the player passed the ball (Brobst & Ward, 2002). Regarding football, the authors were interested in technical target behaviors including tackles (Ward & Carnes, 2002), percentage of correct blocks & percentage of correct releases from the line of scrimmage (Smith & Ward, 2006).

Additionally, for other sports were utilized the following target behaviors: the number of ball carries, the number of tackles, successful kicks, and the number of turnovers in rugby (Mellalieu et al., 2006), punches landed

in boxing (O'Brien et al., 2009), tennis serve speed and placement (Boyce et al., 2001), serving success in table tennis (Liu et al., 2012), accuracy score for a basketball free-throw task (Neumann & Hohnke, 2018) and subjective and objective performance in cricket (Thelwell & Maynard, 2003).

Tactical performance

Four studies implemented a goal setting intervention targeting the tactical behavior of athletes. The variables targeted were advanced offensive tactical play in tennis (Vidic & Burton, 2010), perception and use of the game statistics in volleyball (Palao, 2016), and percentage of correct routes run (Smith & Ward, 2006), and reads and drops in football (Ward & Carnes, 2002).

Physical performance

Concerning physical performance, the following dependent variables were aimed: swimming chronometric performance (Simoes et al., 2012), the overall time achieved in triathlon (Thelwell & Greenlees, 2001, 2003), total meters covered in track and field endurance athletes (Bueno et al., 2008), fitness performance in tennis (Vidic & Burton, 2010) and total touches during each 4-min practice as a measure of the intensity of effort in soccer (Holt et al., 2012b).

Psychological outcomes

Several papers used psychological outcomes in track and field, including threat perceptions, strategies to cope with threats while running, self-efficacy, personal goals (Bueno et al., 2008), fear of failure (Wikman et al., 2014), and positive and negative affect experienced (McCarthy et al., 2010). Moreover, for basketball, cohesion (Senécal et al., 2008), perceptions of cohesion and perceptions of a task-involving and ego-involving motivational climate (Durdubas et al., 2019), perceived efficacy and level of achievement of the individual goals (Ortega et al., 2013) were studied as psychological outcomes of goal setting interventions.

Finally, in relation to other sports, psychological outcomes targeted were swimmers fear of failure (Wikman et al., 2014), motivation and confidence of tennis players (Vidic & Burton, 2010), use of mental skills in triathlon (Thelwell & Greenlees, 2001, 2003), self-regulation of table-tennis players (Liu et al., 2012), cognitive anxiety, somatic anxiety and self-confidence of boxers (O'Brien et al., 2009), awareness in soccer (Holt et al., 2012a), and self-confidence (Heydari et al., 2018) and commitment to the goal in volleyball (Dutra et al., 2017).

Table 1 shows a summary of reviewed articles embracing relevant aspects discussed, such as the type of sport, procedures implemented, and target behavior.

Table 1. Summary of Studies Reviewed Sorted by Type of Sport

| Type of sport | Sport | Procedures | Target behavior | In-text citation |
|----------------------|------------------------------|--|--|---|
| Individual sport | Boxing | Goal setting | Punches landed, cognitive anxiety, somatic anxiety, self-confidence | (O'Brien et al., 2009) |
| Individual sport | Swimming | Goal setting | Swimmers' chronometric performance | (Simoes et al., 2012) |
| Individual sport | Swimming & track and field | Goal setting | Fear of failure | (Wikman et al., 2014) |
| Individual sport | Table tennis | Goal setting | Self-regulation & serving success | (Liu et al., 2012) |
| Individual sport | Tennis | Goal setting | Motivation, confidence, and performance | (Vidic & Burton, 2010) |
| Individual sport | Tennis | Goal setting | Performance (at tennis serve speed and placement) and retention | (Boyce et al., 2001) |
| Individual sport | Track and field (Endurance) | Goal setting | Performance (total meters covered), threat perceptions self-efficacy, personal goals | (Bueno et al., 2008) |
| Individual sport | Track and field (Multievent) | Goal setting | Positive & negative affect experienced | (McCarthy et al., 2010) |
| Individual sport | Triathlon | Goal setting, relaxation, imagery, and self-talk | Overall triathlon time, use of mental skills | (Richard C. Thelwell & Greenlees, 2003) |
| Individual sport | Triathlon | Relaxation, mental imagery, self-talk & goal setting | Total time to complete a Gymnasium Triathlon, usage of mental skills | (Thelwell & Greenlees, 2001) |
| Team sport | Basketball | Goal setting | Cohesion | (Senécal et al., 2008) |
| Team sport | Basketball | Goal setting | Perceptions of cohesion, perceptions of a task- and ego-involving motivational climate | (Durdubas et al., 2019) |
| Team sport | Basketball | Goal setting | Accuracy score for a basketball free-throw task | (Neumann & Hohnke, 2018) |
| Team sport | Basketball | Goal setting | Perceived efficacy and level of achievement of the individual goals | (Ortega et al., 2013) |
| Team sport | Cricket | Goal setting, activation, regulation, self-talk, mental imagery, concentration | Subjective and objective cricketing performance scores | (Thelwell & Maynard, 2003) |

| Type of sport | Sport | Procedures | Target behavior | In-text citation |
|----------------------|--------------|--|--|--------------------------|
| Team sport | Football | Goal setting, public posting, verbal feedback | Percentage of correct blocks the percentage of correct routes run, percentage of correct releases from the line of scrimmage | (Smith & Ward, 2006) |
| Team sport | Football | Public posting, goal setting | Reads, drops, and tackles | (Ward & Carnes, 2002) |
| Team sport | Rugby | Goal setting | Number of ball carries, number of tackles (either made or missed), successful kick, number of turnovers won | (Mellalieu et al., 2006) |
| Team sport | Soccer | Goal setting alone, an individual contingency, and a group contingency | The highest number of consecutive touches of the ball in the correct sequence and total touches | (Holt et al., 2012b) |
| Team sport | Soccer | Public posting, goal setting & oral feedback | Movement with the ball, movement during restarts, movement after the player passed the ball | (Brobst & Ward, 2002) |
| Team sport | Soccer | Peer-assessed feedback, goal setting and a group contingency | Awareness, passing, and first touch | (Holt et al., 2012a) |
| Team sport | Volleyball | Goal setting, positive self-talk, and imagery | Self-confidence | (Heydari et al., 2018) |
| Team sport | Volleyball | Goal setting | Motor learning performance in a task of dig/forearm pass | (Corrêa et al., 2006) |
| Team sport | Volleyball | Goal setting & planning | Errors, velocity, precision, and the coach's ratings of performance improvements | (Bieleke et al., 2019) |
| Team sport | Volleyball | Goal setting | Serving, serve-receiving, and attacking | (Zetou et al., 2008) |
| Team sport | Volleyball | Goal setting | The score on each serve reception and the commitment to the goal | (Dutra et al., 2017) |
| Team sport | Volleyball | Educational program about game statistics and goal setting | Perception and use of the game statistics | (Palao, 2016) |

DISCUSSION

This paper aimed to review recent journal articles published and also to summarize the applicability of goal setting interventions in sports performance.

Compared to participants in control or baseline conditions, participants in goal setting group improved performance, showing consistent behavior change. However, the results were slightly contradictory with respect to group cohesion. In a study, female high school basketball players improved cohesion after participating in a season-long intervention (Senécal et al., 2008). In contrast, Durdubas et al. (2019) found that the season-long goal setting intervention failed to increase the perception of cohesion in a group of male high school basketball players except for group integration-task dimension. According to the authors, these inconsistent findings could be explained by different methodologies and the usage of motivational climate as a variable in the second study (Durdubas et al., 2019).

Another concern might be represented by the generalization of intervention effects to game or competition settings. In a study investigating the effect of public posting, goal setting, and oral feedback on female soccer players' skills, positive results emerged during practice, but it produced limited generalization during games (Brobst & Ward, 2002).

A significant number of studies focused on technical and psychological outcomes. While the attention on technical performance seems logical due to the high educability nature of motor behavior, concentration on psychological outcomes could be considered surprising. Moreover, in the case of package interventions, variables used in conjunction with goal setting were also psychological. However, considering the need for interdisciplinarity in the sports performance field and the fact that goal setting is a term derived from psychology literature, it might explain the focus on psychological interventions and outcomes.

On the other hand, a small number of articles showed interest in athletes' physical and tactical improvements. Physical performance was examined in six papers with an emphasis on the volume or intensity of effort. In our opinion, practitioners could improve both variables of effort with the use of goal setting interventions. Therefore, there is a need for more data from articles to draw useful conclusions and design guidelines. In the last years, the appearance of GPS devices means that coaches could get more information about athletes' physical effort and set goals to improve it (Malone et al., 2017).

In the case of tactical behavior, four studies were included in this review. This small number might be explained because tactical behavior is more present in sports training with experienced athletes than with amateurs and children. However, in a recent review of behavioral interventions to improve

sports performance, Schenk & Miltenberger (2019) claimed that they found no studies aiming to enhance professional athletes' performance. Furthermore, authors argue that most sports clubs hire specialists for these kinds of interventions, and they are also cautious about revealing valuable pieces of information about performance enhancement to rival teams (Schenk & Miltenberger, 2019). Considering the small number of studies that assessed tactical behavior and the relative lack of studies that used high-level athletes in goal setting interventions, future research should address this issue.

According to Eklund & Tenenbaum (2013), coaches need to focus on four aspects when setting goals: goal difficulty, goal specificity, goal proximity, and goal collectivity. Studies included in this review focused on demonstrating the utility of variables aftermentioned. Most articles used moderate or difficult goals in their intervention. Additionally, some studies examined goal difficulty as the primary variable of interest. For example, Dutra et al. (2017) looked into the effects of difficulty on the volleyball serve reception, and results showed that the difficulty of group goals improved motor performance. Similarly, Liu et al. (2012) studied goal setting difficulty in serving success in table tennis. Once again, results highlighted that challenging goals improve sports performance and also that self-regulation is a mediator between goal difficulty and serving success (Liu et al., 2012).

Another key variable in goal setting is specificity. The literature covered in this review used specific goals set by instructors or taught participants to set their own specific goals. Furthermore, authors in one study were interested in the effect of goal specificity on sports performance. In this study, even if participants improved performance, the authors did not find differences among the four different experimental groups: generic goals, specific long-term goals, specific short-term goals, and control (Corrêa et al., 2006). In short, Corrêa et al. (2006) explained these results to methodological aspects like task difficulty, the quantity of practice (only four practice sessions), and self-set goals. In our opinion, taken all together, results suggest that goal setting might be less efficient with high-level athletes because they naturally use self-set goals and because they already have trained skills. In the case of goal proximity and goal collectivity, most articles reviewed used short-term goals or a combination of short- and long-term goals and both individual and group goals, in line with guidelines (Eklund & Tenenbaum, 2013).

Finally, only three articles of those included described a mediation model. As stated earlier, self-regulation seems to mediate the relationship between goal difficulty and serving success in table tennis (Liu et al., 2012). In another study, Bueno et al. (2008) found that motivational and emotional variables mediated goal setting efficacy in endurance sports. In future research,

authors should consider mediation and moderation analyses in order to explore complex relationships between goal setting and sports performance. The concern of complex research designs, in particular, is an issue in the field of sports performance.

CONCLUSION

This systematic review highlights that goal setting is an effective behavior modification procedure that can improve athletes' performance. We ought to provide a contribution to the literature by adding new insights into the methods used to maximize goal setting interventions with athletes.

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