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"Yes, we can!" review on team confidence in sports

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During the last decade, team confidence has received more and more attention in the sport psychology literature. Research has demonstrated that athletes who are more confident in their team's abilities exert more effort, set more challenging goals, are more resilient when facing adversities, and ultimately perform better. This article reviews the existing literature in order to provide more clarity in terms of the conceptualization and the operationalization of team confidence. We thereby distinguish between collective efficacy (*i.e.*, process-oriented team confidence) and team outcome confidence (*i.e.*, outcome-oriented team confidence). In addition, both the sources as well as the outcomes of team confidence will be discussed. Furthermore, we will go deeper into the dispersion of team confidence and we will evaluate the current guidelines on how to measure both types of team confidence. Building upon this base, the article then highlights interesting avenues for future research in order to further improve both our theoretical knowledge on team confidence and its application to the field.

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"Believe in yourself" is an old saying that you have probably heard a million times, especially when you engage in sports. Numerous research studies have indeed evidenced that self-confidence can lead to significant performance improvements (for a review, see Ref. [1]). More recently, research attention has shifted to team confidence. Athletes having confidence in the abilities of their team constitutes an essential factor in the success of sports teams [2]. Especially in tight games, when the stakes are high and the mental pressure peaks, team confidence can make the difference between winning and losing. This review will summarize the latest advancements and trends in team confidence research. In addition, we will outline interesting avenues for future research.

Clarifying the construct of team confidence

Before going into detail on the advantages of team confidence, it is important to clearly define team confidence, as the existent literature is characterized by inconsistencies regarding the conceptualization, operationalization, and measurement of this construct [3]. Recent evolvements in the literature have provided more clarity by distinguishing between two types of team confidence: collective efficacy and team outcome confidence [4,5••]. Collective efficacy was originally defined by Bandura [6] as "a group's shared belief in its conjoint capability to organize and execute the courses of action required to produce given levels of attainment." In other words, collective efficacy is a clearly process-oriented type of confidence: it comprises athletes' confidence in the skills of their team required to accomplish a certain task. For example, athletes' collective efficacy can refer to their confidence in the team's ability to cope well with setbacks, to encourage each other in the game, to react enthusiastically as a team when making a point, and so on.

By contrast, the second type (*i.e.*, team outcome confidence) is clearly outcome-oriented: it refers to athletes' confidence in their team's abilities to obtain a given outcome (*e.g.*, the confidence that your team has the abilities to win the game or to finish in the top three of the ranking). Team outcome confidence should not be confused with Bandura's notion of outcome expectancies [6]. Outcome expectancies have been defined as the belief that certain behaviors will lead to certain outcomes (*e.g.*, the confidence that you will obtain approval from your coach if your team wins the game). By contrast, team outcome confidence refers to athletes' belief in *the team's abilities* to obtain their goal (*e.g.*, to win the game). In this review, we will focus on collective efficacy and team outcome confidence, thereby using the term 'team

confidence' as overarching construct encompassing both concepts.

Team confidence as dynamic construct

It is important to emphasize that team confidence is not a fixed trait, but rather a dynamic construct [7••]. In other words, athletes' confidence in the capabilities of their team may fluctuate in the course of weeks, days, or even during a game. Nevertheless, most studies on team confidence are cross-sectional in nature and measure team confidence as a trait concept. Only few studies succeeded in mapping the dynamics of team confidence over the course of a season (*e.g.*, [8–10]). Although these studies examined rather long-term fluctuations in team confidence, it is often the changes within a single game that make the difference between winning and losing [11••]. Unfortunately, these in-game dynamics have only rarely been examined. This lack of research on in-game dynamics is related to feasibility concerns [7••]: it is challenging to obtain permission by coaches and athletes to administer questionnaires during a competitive game.

Two exceptions can be noted. First, Edmonds *et al.* [12] measured athletes' collective efficacy at three time points during an adventure race. Their study findings highlight the dynamic nature of collective efficacy: the collective efficacy of the more successful teams increased throughout the race, whereas the collective efficacy of the less succesful teams decreased. Second, Fransen *et al.* [11••] measured athletes' collective efficacy and team outcome confidence at three time points within competitive soccer games (*i.e.*, before the game, at half-time, at the end of the game). Their findings corroborated the dynamic nature of both types of team confidence: all correlations between team confidence before the game, during half-time, and after the game were below 0.50, with exception of the correlation between collective efficacy at half time and collective efficacy after the game ($r = 0.67$). These insights highlight the importance of mapping the in-game dynamics of both collective efficacy and team outcome confidence. Unfortunately, repeated measurement of these constructs within a single game is impeded by the usage of (usually) long questionnaires. Short questionnaires or observational assessments may constitute a promising alternative to capture the in-game dynamics of team confidence. We will discuss these options more in detail in the future research section.

Dispersion of team confidence

In this section, we will focus on collective efficacy because, to our knowledge, no former evidence on the dispersion of team outcome confidence exists. Watson *et al.* [13] found support for collective efficacy as a shared belief by revealing within-team agreement and interdependence of team members' collective efficacy beliefs. However, team members do not always agree in their beliefs about their team's collective capabilities. Moreover, different sport teams do not necessarily have the same degree of within-team variation. Even though collective efficacy is defined as a shared belief [6], various authors have argued that collective efficacy does not need to have a particular level of consensus to be considered as a team concept [7••,14,15]. The dispersion of efficacy perceptions within a team – that is, the within team-level variability in the magnitude of collective efficacy perceptions [16] – can reveal interesting relationships between collective efficacy and team effectiveness. In fact, it might be misguided to ignore the individual, within-team perceptions of collective efficacy because this approach disregards interesting within-team variability that could be partitioned and explained [14].

Further, although the magnitude of the efficacy dispersion is important to consider when trying to understand how collective efficacy shapes team functioning, this magnitude ignores the different forms of dispersion in collective efficacy. For example, DeRue *et al.* [16] noted that team members in different positions on a team (*e.g.*, forwards, defenders, *etc.*) may differ in how they view the team's capabilities in a bimodal form of dispersion. For example, the beliefs in the team's capabilities might be lower in one subgroup than in the rest of the team. In this case, the social categorization theory [17] argues that team members tend to increase social interaction within their own subgroup while decreasing the communication with the rest of the team. Increased conflict and less social integration within the team often result (*e.g.*, [18]).

Other forms of dispersion (*e.g.*, minority view, fragmented dispersion) are hypothesized to lead to different effects on team functioning [16], which are too detailed to explain in this paper (the interested reader is directed to Ref. [16]). However, all forms of efficacy dispersion may also affect team functioning differently at different phases of team performance. For example, DeRue *et al.* [16] argued that collective efficacy dispersion is especially important in the preparatory phase of team performance. More specifically, as dispersion causes team members to reappraise the team's task strategies, a greater dispersion was suggested to lead to enhanced team effort and improved performance.

Despite these theoretical suggestions, there are no known published studies within sport that have investigated the dispersion of collective efficacy or team outcome confidence. One unpublished field experiment [19] did manipulate the dispersion of collective efficacy beliefs (bimodal form) in rugby scrum teams performing against a scrum sled. The results suggested that even when dispersion of collective efficacy beliefs occurs in sports teams, it may not significantly affect the strength of the relationship between collective efficacy and team performance. Future research should examine the impact of collective efficacy dispersion on team-level processes, such as

communication, cohesion, and satisfaction, not only in the short term but also in the long term. Furthermore, it would be interesting to investigate whether these findings also apply to the dispersion of athletes' team outcome confidence.

Outcomes of team confidence

Research findings demonstrated that athletes who were more confident in their team's abilities exerted more effort [20], set more challenging goals [21], and were more resilient when facing adversities [2,20]. In addition, teams with a strong team confidence were shown to be more cohesive [22,23]. Furthermore, when analyzing the difference between the outcomes of process-oriented collective efficacy and of outcome-oriented team outcome confidence, recent research specifies that in particular athletes' collective efficacy, rather than their team outcome confidence, is predictive for both the task and social cohesion within the team [24•]. Moreover, athletes who reported higher levels of team confidence (both collective efficacy and team outcome confidence) ultimately performed better [11••,12,25,26,27•]. Whereas team outcome confidence appeared to be the best predictor for the performance of student teams on a course assignment [4], collective efficacy was demonstrated to be the best predictor of performance in sports teams [11••]. Nevertheless, we can conclude that both types of team confidence are important predictors for the team's functioning and, as a consequence, for the team's success.

Sources of team confidence

As noted above, team confidence is a dynamic construct, susceptible to change. Given the beneficial effect of athletes' team confidence on their performance, it is important to identify the factors that shape and influence their team confidence. Research on the sources of team confidence was inspired by the work of Bandura [6]. He identified four important sources of one's situation-specific self-confidence (*i.e.*, self-efficacy), sources which also appeared to be predictive for one's team confidence; (1) mastery experiences or past performance (*i.e.*, previous team successes boost athletes' team confidence); (2) vicarious experiences (*i.e.*, seeing similar teams succeed can strengthen athletes' team confidence); (3) social persuasion (*i.e.*, verbal persuasion by others that the team has the requested abilities); and (4) physiological and emotional states (*e.g.*, stress or arousal can influence athletes' team confidence). Given the specificity of a team sports context, additional sources of athletes' team confidence were identified. For example, preparation effort, practice performance, and perceptions of cohesion fostered athletes' team confidence (*e.g.*, [28]), while team conflict hampered athletes' confidence in the team's abilities [29,30]. Overall, comparing more than 100 potential sources of team confidence, confident leadership was consistently identified as one of the most important sources [13,31,32••,33–35].

Confident leadership can be provided by both coaches and athlete leaders (*i.e.*, athletes within the team who occupy a leadership role). Fransen *et al.* [32••] revealed that both coaches and athlete leaders emerged as key triggers of both upward and downward spirals of team confidence, thereby affecting all team members. While team confidence expressed by athlete leaders was most predictive for an upward spiral, a lack of confidence expressed by coaches was found to be one of the main instigators of a downward spiral. These findings applied to both collective efficacy and team outcome confidence. Fransen *et al.* [24•] highlighted that athlete leaders, rather than the coach, impacted collective efficacy. By contrast, both coaches and athlete leaders impacted team outcome confidence. The significant influence of athlete leaders was further corroborated in various experimental studies. These experiments demonstrated that when the leader expressed high (rather than neutral or low) team confidence, team members perceived their team to be more efficacious and were more confident in the team's ability to win [26,27•].

Going deeper into the mechanisms underpinning this effect, it was shown that coaches can impact the collective efficacy of their athletes by setting up a mastery climate. In such a mastery climate coaches provide positive reinforcements to athletes on the basis of hard work, improvement, and good team work [36]. Furthermore, it was found that both coaches and athlete leaders impact athletes' team confidence by fostering athletes' identification with their team. In other words, leaders are able to inspire a shared feeling of 'us' within the team, rather than feeling like a bunch of individuals. And it is in particular this strengthened team identification that fosters both athletes' collective efficacy and their team outcome confidence [24•,26,27•,37].

Measuring team confidence

It is important to distinguish between measures of collective efficacy and measures of team outcome confidence. Although team outcome confidence clearly lacks the process-oriented focus that Bandura stressed, many researchers have used this outcome-oriented measure to allegedly assess collective efficacy (*e.g.*, [31,38,39–41]). When measuring both types of team confidence, it is important to keep in mind that, although team confidence is a group's shared belief, it still reflects individuals' perceptions of the group's capabilities [6].

The measurement of collective efficacy has followed two approaches. The first has been to take an aggregate of the individual efficacies of the team members. If the interdependence of team members is low, such as might be found in golf teams, this method may have some merit [6]. However, most groups, especially in sport, are interactive. A better method to capture a group's beliefs in their collective abilities is to ask team members about their

perceptions of the group's abilities, not about their individual abilities [10]. This method has been adopted, either by having players rate *their own* confidence in their team (*e.g.*, [10,11••]), or by having them rate how they think *their team* feels (*e.g.*, [42]). Fransen *et al.* [5••] demonstrated a high correlation between both stems. Because teams do not necessarily have the same degree of within-team variation, researchers should consider using multi-level modeling (HLM), which analyzes collective efficacy at both individual and group level [7••].

Much of the collective efficacy research in sport has utilized specific measurement scales for different sports (*e.g.*, [10] for hockey and [36] for rowing). While these sport-specific collective efficacy scales have been useful, more recently two general questionnaires have been developed to measure collective efficacy across different sports, namely the Collective Efficacy Questionnaire for Sports (CEQS; [43]) and the Observational Collective Efficacy Scale for Sports (OCESS; [5••]). Their utility may be tied to the fact that they are specific to sport but not limited to just one sport. That is, they allow for a comparison of collective efficacy levels within and across sports [43]. As these general collective efficacy questionnaires can target participants across all sports, more participants can be involved in the studies. As a result, these measures can also provide more power to investigate the network of variables that correlate with collective efficacy beliefs.

However, it should be noted that only four subscales of the CEQS (*i.e.*, Effort, Preparation, Persistence, and Unity) clearly assess the process-oriented collective efficacy, which is the aim of the CEQS. In contrast, the 'Ability' subscale of the CEQS (with items focusing on outplaying the opposing team) is clearly outcome-oriented. Therefore, this subscale should be considered as a measure of team outcome confidence, rather than as a measure of collective efficacy. However, the most frequent used method to assess team outcome confidence is by using single items, such as "I believe that our team has the abilities to win the upcoming game" [5••].

Suggestions for future research

Although team confidence is a dynamic construct, which fluctuates even within a single game, longitudinal studies on these in-game fluctuations are sparse. This is unfortunate since also the relation between team confidence and performance tends to vary within the game. For example, Fransen *et al.* [11••] found no relation between soccer players' team confidence before the game and their performance of the first half. By contrast, players' team confidence at half-time did predict their performance in the second half. These remarkable in-game dynamics clearly underpin the need for longitudinal studies examining the short-term in-game fluctuations of team confidence (*e.g.*, each 10 min). Such studies would also allow simultaneous measures of team confidence and performance, thereby providing maximal information on their dynamic interplay in competition. Given that feasibility concerns often prevent in-game administration of questionnaires, observational measures might pave the way to more continuous in-game monitoring of team confidence. The Observational Collective Efficacy Scale for Sports [5••] might provide a first step in this direction.

A second avenue for future research would be to identify potential moderators of the relationship between team confidence and performance. In their meta-analysis on self-confidence, Woodman and Hardy [44] revealed that both sex and competitive level moderated the relationship between self-confidence and performance. More specifically, for male athletes and high-level athletes (*i.e.*, active at national or international level) the relationship was stronger. Previous studies that investigated the relationship between team confidence and performance used a sample of either exclusively male athletes (*e.g.*, [11••,45]) or exclusively female athletes (*e.g.*, [25]). Moreover, the samples were restricted to a specific performance level. With regard to the sources of team confidence, it has been found that the same sources are generally perceived as most predictable for team confidence, regardless of athletes' age, sex, previous sport experience, or competitive level [32••]. Nevertheless, some interesting differences emerged. For example, younger athletes considered positive coaching as more predictive for their collective efficacy than older athletes did. Similarly, future studies could verify whether age, sex, and competitive level also moderate the relationship between team confidence and performance.

Third, the current literature lacks intervention studies in which collective efficacy is built throughout a season. Numerous authors have observed the dynamics of team confidence throughout the season in a qualitative way [8,9] or have provided suggestions on how to foster athletes' team confidence (*e.g.*, by focusing on the role of imagery or observation; [46,47]). Nevertheless, only few intervention or experimental studies have been conducted to apply their suggestions in a competitive sports setting. Those experimental studies that do exist have focused on athlete leaders and social observation (*i.e.*, a form of vicarious experience) as important sources of team confidence [26,27•,48]. For example, two experiments demonstrated that when athlete leaders were asked to express confidence in their team, they had an instant positive effect on the team confidence and performance of their teammates [26,27•]. Likewise, when the athlete leader expressed a discouraged body language, team members' team confidence significantly dropped and their performance deteriorated. Additional studies should be conducted to identify alternate sources of team confidence. Furthermore, on-field intervention studies would allow to verify how these short-term effects

(*e.g.*, asking an athlete leader to express team confidence) can be used to build team confidence in existing competitive teams.

Conclusion

A thorough knowledge on team confidence is important given that teams with higher levels of team confidence demonstrate a better team functioning, are better able to cope with setbacks, and ultimately perform better. Amongst other sources, leaders in the team (both coaches and athlete leaders) have been demonstrated to be key triggers of both upward and downward spirals of team confidence, thereby affecting the team performance. This knowledge, gained over the past years, can be used as a strong empirical foundation to underpin future on-field intervention studies.

An important gap in the current understanding remains the lack of knowledge on the in-game fluctuations of team confidence and on how these fluctuations can impact on athletes' performance. As in other domains of sport psychology, the challenge consists in gaining real-time access to athletes within competitive games. Only in these situations, where the ecological validity is maximized, a deeper insight into the dynamical relation between team confidence and performance can be obtained. An important step forward in this pursuit would be to develop new measures that allow a measurement of team confidence through observation.

If these in-game studies corroborate the existing knowledge on the link between team confidence and performance, then coaches and athlete leaders have a very powerful tool to maximize their team's performance. Indeed, team confidence is a dynamic process that can to some extent be controlled and steered in the right direction. Therefore, by optimizing the different sources of team confidence, coaches and athlete leaders will be able to inspire their athletes to 'believe in us'. And it is in particular this strengthened team confidence that carves out a path to success and transforms a bunch of individuals into a championing team.

Conflict of interest

The authors declare that they have no competing interests.

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Papers of particular interest, published within the period of review, have been highlighted as:

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The main aim of this study was to test the validity of previous collective efficacy measures, as the field was characterized by inconsistency and ambiguity when it came to measuring the construct. An online survey was completed by 4451 players and coaches from nine different team sports. This study was the first to conceptually distinguish between collective efficacy and team outcome confidence. Furthermore, the validity of the Observational Collective Efficacy Scale for Sports (OCESS) was established as short measure of process-oriented collective efficacy.

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