

Coaching Efficacy Research

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1

2 Running Head: COACHING EFFICACY

3

4 **LITERATURE REVIEW**

5

6 **Coaching Efficacy Research: Learning from the Past and Looking to the Future**

7

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1 **Abstract**

2 Coaching efficacy (CE) represents the extent to which coaches believe they have the capacity to
3 affect the learning and performance of their athletes, and the CE model details antecedents,
4 dimensions and outcomes of CE. Based around the CE model, the present paper had two main
5 aims. First, to present a comprehensive and critical review of research underpinned by the CE
6 model. Studies were categorised by whether they investigated antecedents, outcomes or athletes'
7 perceptions of their coach. Twenty-one published studies were identified for the review. Overall
8 the review provides support for the main tenets of the CE model, with researchers establishing
9 links between CE and many of the antecedents and outcomes proposed in the model. The second
10 aim was to assimilate findings from the review, limitations in the CE model and relevant
11 conceptual models to present a revised CE model. Whilst retaining the essence of the original
12 model, the revised model also incorporates explicit processes linking coach beliefs and athlete
13 perceptions, antecedents of athlete perceptions and an intrarelationship source of CE. It also
14 incorporates specific categories of coach behaviour and athlete-/team-level outcomes. The paper
15 concludes by identifying limitations in the literature and review, and by proposing key directions
16 for future research.

17

18 **Keywords:** collective efficacy; motivation; confidence; self-efficacy; satisfaction

1 **Coaching Efficacy Research: Learning from the Past and Looking to the Future**

2 **Introduction**

3 Sport coaching is a multi-faceted social process that can be highly influential for
4 athletes' motivation, learning, performance and moral functioning (see Côté & Gilbert, 2009;
5 Horn, 2008). One model that considers psychological factors central to the coaching process
6 is the Coaching Efficacy (CE) Model developed by Feltz, Chase, Moritz and Sullivan (1999).
7 This model is of particular relevance to sport-psychology researchers because it considers
8 important psychological factors in both coaches and athletes. Given its clear utility, it is
9 perhaps not surprising this model has been used quite extensively to guide contemporary
10 research on the psychology of sport coaching. The overarching aims of the current article are
11 to present a comprehensive and critical review of the current body of research underpinned
12 by this model, and to use this review along with relevant conceptual models as the basis for
13 proposing a revised CE model.

14 ***The coaching efficacy model***

15 The CE model is grounded in Bandura's (1997) self-efficacy theory. Bandura (1997,
16 p.3) defines self-efficacy as '*the belief in one's capabilities to organise and execute the*
17 *courses of action to produce given attainments*'. As such, self-efficacy beliefs do not pertain
18 to the actual level of skill a person possesses, but to his/her belief in what he/she can
19 accomplish with his/her skills. Accordingly, Feltz et al. (1999) defined CE as '*the extent to*
20 *which coaches believe they have the capacity to affect the learning and performance of their*
21 *athletes*' (p.765). The work of Feltz and her colleagues was impactful not only because it
22 proposed a clear model of CE that outlined key antecedents, dimensions and outcomes of CE,
23 but also because it developed a valid and reliable tool to assess CE.

24 The CE model proposed certain specific sources of CE. First, fruitful past experiences
25 and performances as a coach (e.g., successful experiences, performances, and win/loss

1 records) were proposed to be key mastery experiences that should enhance coaches' CE.
2 Coaches who have gained considerable high quality experiences during their coaching
3 careers and have high win percentages are therefore expected to have increased levels of CE.
4 Athletes' perceived skill levels were also proposed as a potential influence of CE. Such
5 perceptions are likely to impact CE by acting as an indicator of mastery experiences as a
6 coach, with skill development in athletes being viewed as stemming from effective coaching.
7 Finally, perceived social support from schools, communities and parents was also suggested
8 as a possible antecedent of CE.

9 Feltz et al. (1999) proposed four specific dimensions of CE: Game Strategy (GS),
10 Motivation, Technique and Character Building (CB). First, GS efficacy represents coaches'
11 confidence in their abilities to lead teams to successful performances during competition.
12 Coaches high in GS efficacy have confidence in their abilities to select the right team, make
13 appropriate tactical decisions and outthink opposition coaches. Next, motivation efficacy
14 signifies coaches' confidence in their abilities to influence athletes' psychological skills and
15 states. Coaches high in motivation efficacy have confidence in their abilities to optimise
16 athlete/team confidence and cohesion. Third, technique efficacy concerns coaches'
17 confidence in their instructional and diagnostic abilities. Coaches high in technique efficacy
18 believe in their abilities to teach athletes new skills and identify and remedy deficits in
19 existing techniques. Finally, CB efficacy represents coaches' confidence in their abilities to
20 guide athletes' personal development and positive attitudes toward sport. Coaches high in CB
21 efficacy believe in their ability to coach in a way that encourages athletes to act appropriately
22 both on and off the field of play.

23 A number of outcomes of CE were also proposed in the model (Feltz et al., 1999). For
24 instance, higher levels of CE should result in more effective tactical decisions and
25 motivational and corrective feedback methods, as well as higher levels of commitment to

1 coaching. Also, athletes with high-efficacy coaches should be more confident, motivated and
2 satisfied, have more positive sportpersonship attitudes and higher levels of performance and
3 competitive success.

4 **Learning from the Past: A Review of CE Research**

5 The key tenets of the CE model outlined above have been the focus of considerable
6 research efforts over the past 17 years, and it is the findings from this research that this paper
7 now turns to. The primary purpose of this section is to provide the first review of research
8 testing the CE model. Subsidiary aims include critically analysing relevant aspects of specific
9 studies and identifying the main strengths and weaknesses of the literature base as a whole.
10 To structure the review, research outputs have been categorised into the following sections:
11 (a) antecedents, (b) outcomes and (c) athletes' perceptions of their coach.

12 *Locating relevant studies*

13 When sourcing articles for the review, all studies referring specifically to constructs
14 from the CE model in their aims/hypotheses and published in peer-reviewed-English-
15 language journals were targeted, excluding those that were purely methodological (e.g.,
16 Myers, 2013) or measured something other than levels of CE-based constructs (e.g., Duarte,
17 Garganta, & Fonseca, 2014). To identify such articles, a four-step process was followed:
18 identification, screening, eligibility and inclusion (see Figure 1). Identification consisted of
19 searching for all articles that had cited the original Feltz et al. (1999) article and searching for
20 all articles with the following keywords in their titles: Coaching Efficacy, Coaching
21 Effectiveness and Coaching Competency. Searches using Web of Science were first
22 conducted on 1 July 2015 and then repeated on 9 June 2016. Of the 333 articles that remained
23 once duplicates had been removed, screening revealed 32 of these articles referred
24 specifically to constructs from the CE model in their aims/hypotheses; the remaining 301
25 articles were therefore omitted. Further assessment of the eligibility of these 32 articles

1 indicated 11 of these were not within the inclusion criteria for the review. The 11 articles
2 excluded at this stage either had a purely methodological focus – addressing issues such as
3 exploratory structural equation modelling (e.g., Myers, 2013) – or investigated CE-based
4 constructs that were not part of the original CE model. For example, Duarte et al. (2014)
5 assessed Portuguese football players’ and coaches’ ratings of importance for CE dimensions
6 rather than their perceptions of CE per se. The exclusion of these 11 articles resulted in a total
7 of 21 articles for inclusion in the review. The main demographic information from all the
8 reviewed studies can be found in Table 1.

9 *Antecedents*

10 Articles selected for the antecedents section of the review were ones that identified
11 study aims/hypotheses that related to potential precursors of CE. Some of the antecedents of
12 interest were ones specifically identified in the seminal article of Feltz et al. (1999), whereas
13 others were not. In certain studies, potential determinants of overall CE were investigated,
14 whereas in others variables that potentially influenced specific dimensions of CE were looked
15 at. Unless otherwise stated, study variables were assessed using self-report questionnaires.

16 The first researchers to empirically test elements of the CE model were Feltz et al.
17 (1999). To empirically test elements of their proposed model, Feltz and colleagues
18 investigated a range of potential sources of CE by collecting pre-season data from male
19 basketball coaches. Pearson correlations identified moderate positive relationships between at
20 least one dimension of CE and last year win-loss record, years in coaching, perceived ability
21 of the team and community/parent support. Overall, GS and motivation efficacy had the
22 greatest number of meaningful relationships with antecedent variables, whereas CB had none.
23 Further, athletic-director/student/faculty support all failed to significantly correlate with any
24 dimension of CE. It should be acknowledged the study was statistically underpowered
25 though, and a larger sample may have revealed further significant relationships.

1 Malete and Feltz (2000) assessed the effects of a coach-education programme on
2 coaches' CE using a quasi-experimental design. The experimental group consisted of coaches
3 participating in the Program for Athletic Coaches (PACE; Seefeldt & Brown, 1990), whereas
4 the control group was a mix of coaches without formal coach education and coaching
5 preparation students. The PACE is a 12-hour programme covering topics (e.g., the role of the
6 coach, effective instruction and GS, motivating athletes, personal and social skills, positive
7 coaching and maintaining discipline) relevant to one or more CE dimension, and as such
8 programme completion was expected to result in increases in CE. The control group
9 continued coaching as normal and therefore changes in CE were not expected for this group.
10 CE was assessed in both groups prior-to and following the PACE program, and a 2 x 2
11 (Group x Pre-post) MANCOVA controlling for coaching experience and with repeated
12 measures on the second factor revealed a group by time interaction. Follow-up multivariate
13 contrasts showed no significant differences between the two groups at pre-test, but significant
14 differences between them at post-test, as well as a significant increase in CE for the
15 experimental group from pre- to post-test; GS and technique efficacy were found to
16 contribute most to this increase. Although this study supported the possibility that coach-
17 education programmes may increase CE, the absence of random group allocation, a fake
18 programme for the control group and a retention test, along with differences in age and
19 experience between the two groups all represent study limitations that should be kept in mind
20 when interpreting these findings.

21 Fung (2002) then investigated whether coaching experience, hours of coaching in the
22 past year and level of coaching accreditation were associated with CE in community coaches
23 in Hong Kong. For the first two variables, only one significant association was identified, a
24 weak-to-moderate positive association between years of coaching and motivation efficacy.
25 Regarding coaching accreditation, the study included coaches at the three levels of

1 accreditation in Hong Kong: Level 1 ($n = 148$), Level 2 ($n = 87$) and Level 3 ($n = 17$).
2 However, although mean levels on the four dimensions of CE increased from Level 1 to
3 Level 3 for all four CE dimensions, no significant differences across the three levels of
4 accreditation level were identified. These null findings may have resulted from a lack of
5 statistical power, but could also be due to increasing demands placed on coaches with higher
6 levels of accreditation, demands that could at times challenge coaches' CE beliefs. In a
7 related study, Tsorbatzoudis, Daroglou, Zahariadis and Grouios (2003) bifurcated data from
8 team-sport coaches to form groups based on whether they had more (i.e., experienced
9 coaches; 52.6% of sample) or less (i.e., inexperienced coaches) than five years of coaching
10 experience. *t* tests showed significant differences in technique and total CE, with higher
11 levels reported by experienced coaches compared to inexperienced coaches; effect sizes were
12 not reported.

13 Myers, Vargas-Tonsing and Feltz (2005) then identified positive meaningful and
14 significant relationships between perceived team ability, parental support, community
15 support, career winning percentage, and years as a collegiate head coach and specific
16 dimension/s of CE. Overall, stronger and a greater number of associations were present for
17 motivation efficacy, whereas technique efficacy had the fewest meaningful relationships.
18 Also, perceived team ability had the strongest associations with all dimensions of CE,
19 ranging from a weak-to-moderate effect for technique efficacy to a strong effect for
20 motivation efficacy. The weakest effects were seen for years as a collegiate coach.

21 Moving away from specific antecedents from the CE model, Short, Smiley and Ross-
22 Stewart (2005) investigated whether imagery may help coaches generate and uphold high
23 levels of CE. Regression analyses (controlling for career record and coaching experience)
24 tested whether specific functions of imagery (Hall, Mack, Paivio, & Hausenblas, 1998)
25 predicted coaches' CE. These analyses showed: (a) motivation general – mastery (MG-M;

1 imaging being confident in challenging situations) imagery positively predicted total CE, (b)
2 cognitive general (i.e., imaging strategies such as set plays and tactics) imagery positively
3 predicted GS, (c) cognitive specific (i.e., imaging performance of skills) imagery positively
4 predicted technique efficacy, (d) MG-M imagery positively predicted motivation efficacy and
5 (e) MG-M imagery positively predicted CB efficacy. The findings of this study support the
6 possibility that imagery may be an effective way of increasing CE, consistent with Bandura's
7 (1997) contention that imagery represents a key antecedent of self-efficacy beliefs.

8 Kavussanu, Boardley, Jutkiewicz, Vincent and Ring (2008) then investigated whether
9 coaching experience and sex predicted each of the dimension/s of CE. In contrast to
10 expectations, neither of these predictors had a significant predictive effect on motivation
11 efficacy. However, the small sample of coaches likely explains this, as coaching experience
12 had a meaningful – although non-significant – predictive effect on motivation and CB
13 efficacy. Other findings of note included positive predictive effects of coaching experience
14 on technique and CE, and stronger GS beliefs in male coaches compared to female coaches.
15 Regarding this latter finding, this may have been influenced by differences between male and
16 female coaches' views on what constitutes a good coach. More specifically, male coaches
17 tend to place a heavy emphasis on the ability to produce winners, whereas female coaches
18 prioritise being a good role model and understanding athletes' feelings (Molstad, 1993). Due
19 to these differences, male coaches may tend to work on improving their GS abilities more
20 than female coaches do.

21 Around the same time, Thelwell, Lane, Weston and Greenlees (2008) studied
22 emotional intelligence (EI; i.e., the ability to perceive, monitor, employ and manage emotions
23 both within the self and in others; Salovey, Mayer, & Caruso, 2002) as an antecedent of CE.
24 Multiple regression analyses identified which dimension/s of EI significantly predicted
25 dimension/s of CE. First, for motivation efficacy, regulation (i.e., the ability to control one's

1 emotions) and social skills (i.e., the ability to interact with others to optimise emotions) were
2 positive predictors. Next, for technique efficacy, appraisal of own emotions (i.e., the ability to
3 evaluate one's own emotions) was a positive predictor. Then, for CB efficacy, optimism (i.e.,
4 the ability to utilise emotions to think positively) was a positive predictor. Finally, for GS
5 efficacy, no significant predictors were identified. Hwang, Feltz and Lee (2013) also studied
6 EI as an antecedent of CE, using structural equation modelling (SEM) to demonstrate a
7 strong positive effect of EI on CE. Although these studies provided support for EI as a
8 possible antecedent of CE, low levels of internal consistency for some EI subscales were an
9 issue in both studies.

10 Subsequently, Feltz, Hepler, Roman and Paiement (2009) explored sources of CE in
11 volunteer youth-sport coaches. Using regression analyses they demonstrated: (a) internal
12 support and player improvement positively predicted CB, (b) coaching experience, internal
13 support and player improvement positively predicted motivation efficacy, (c) coaching
14 experience, playing experience, player improvement and internal support positively predicted
15 GS and (d) coaching experience, playing experience, player improvement and external
16 support positively predicted technique efficacy. Collectively the proposed antecedents
17 explained between 7.7% (i.e., CB) and 32.0% (i.e., technique) of the variance in the
18 dimensions of CE. An important contribution of this study was the identification of distinct
19 groups of antecedents for each dimension of CE in volunteer youth-sport coaches.

20 Myers, Feltz and Chase (2011) then used multiple-group confirmatory factor analysis
21 to show coach education, assistant coach experience, coaching experience, playing
22 experience, athletic experience, improvement of athletes, career winning percentage and
23 social support from athletes and the athletic director were all significant predictors of
24 dimension/s of CE. The strongest and most consistent effect across both male and female
25 coaches was for coach education. An associated study by Sullivan, Paquette, Holt and Bloom

1 (2012) studied the predictive effects of coach education (i.e., certified vs. not-certified) and
2 coaching context (i.e., community vs. competitive) on total CE using SEM. Data analyses
3 revealed no effect of coaching context on CE, but a moderate positive effect of coach
4 education on CE. Although offering further support for a positive effect of coach education
5 on CE, no distinction was made between different levels and types of coach education.
6 However, in concert with the findings of Malete and Feltz (2000), this study provides support
7 for Feltz et al.'s (1999) contention that coaching preparation may be a key antecedent of CE.

8 In summary, the studies reviewed in this section have identified several key
9 antecedents of CE. Potential antecedent variables specified in the original model of Feltz et
10 al. (1999) that were supported are coaching experience, prior competitive success, perceived
11 team ability, community and parental support and coach education. Beyond those drawn from
12 the original model, empirical support was also identified for sex, imagery use and EI as
13 further antecedents of CE. Research in this area has included high-school, volunteer and
14 collegiate coaches from the USA, Hong Kong and England, and those working in team and
15 individual sports. The dominant methodological approach has been cross-sectional designs
16 with self-report questionnaires. However, the work of Malete and Feltz (2000) was a
17 welcome exception to this as it was the only study to test the effects of a coaching
18 intervention on CE. Given the specific inclusion of factors proposed to impact CE in Feltz et
19 al.'s (1999) model, there is a definite need for more interventional research testing the causal
20 mechanisms proposed in the model.

21 ***Outcomes***

22 In addition to identifying key antecedents of CE, Feltz et al. (1999) also proposed
23 various key outcomes that should result from increased CE. Specific examples of these
24 include more effective (e.g., leading to increased competitive advantage, heightened player
25 motivation and correction of players' technical deficits) and appropriate (e.g., modelling high

1 levels of moral character) coaching behaviours, higher levels of player and team satisfaction,
2 increased player and team performance, and higher levels of player and team confidence.
3 Accordingly, numerous researchers have sought to provide empirical evidence for these
4 proposed outcomes of CE, as well as investigating the effects of CE on other potential
5 outcomes. This section reviews the main findings of such work.

6 Empirical analyses presented in Feltz et al.'s (1999) original paper were the first to
7 test outcomes of CE. Specific outcomes investigated included coaching behaviour, player
8 satisfaction, winning percentage, commitment to coaching and perceived amount of time
9 spent coaching during the past season. To investigate these outcomes, pre-season CE data
10 from basketball coaches were used to identify the 15 coaches with the strongest CE beliefs
11 and the 15 coaches with the weakest CE beliefs. The 30 coaches were then observed on two
12 occasions by a trained observer who recorded frequency of coaching behaviour (i.e., praise
13 and encouragement, instruction and organisation, punishment and control); mean behaviour
14 frequency across the sessions was used in data analysis. Further, on the latter of these two
15 occasions, the players being coached were assessed on satisfaction with their coach. Finally,
16 during the final coaching session of the season coaches were assessed for their commitment
17 to coaching and perceived amount of time spent coaching during the previous season.

18 Comparisons between high- and low-efficacy coaches using *t* tests identified several
19 significant differences. More specifically, high-efficacy coaches had higher winning
20 percentages, provided more praise and encouragement and less instruction and organisation
21 and had more satisfied players than their low-efficacy counterparts. In contrast, no
22 differences were identified between the two groups in terms of their commitment to coaching,
23 perceived amount of coaching and punishment and control behaviours. Overall, this research
24 identified some interesting differences in outcomes of CE between high- and low-efficacy
25 basketball coaches, providing initial support for this aspect of the CE model.

1 A frequently investigated outcome of CE is leadership style. Sullivan and Kent (2003)
2 used regression analyses to investigate this outcome, demonstrating technique and motivation
3 efficacy to be significant positive predictors of training and instruction and positive-feedback
4 behaviours. However, no dimension of CE predicted democratic behaviours, and poor
5 internal consistency for autocratic behaviour and social support meant predictive analyses for
6 these leadership styles were not conducted. A related study by Sullivan et al. (2012) used
7 SEM to demonstrate a strong positive effect of total CE on frequency of overall leadership
8 behaviours (i.e., incorporating positive feedback, training and instruction, social support and
9 situational consideration). Then, Hwang et al. (2013) also used SEM to demonstrate not only
10 a moderate-to-strong positive effect of CE on leadership style (i.e., incorporating positive
11 feedback, training and instruction, social support, democratic behaviour and situational
12 consideration), but also that CE partially mediated effects of EI on leadership style. Together
13 these studies demonstrate a robust positive predictive effect of CE on leadership style.

14 Myers et al. (2005) investigated efficacy-enhancing coaching behaviours as outcomes
15 of CE. To assess coaches' engagement in such behaviours, coaches reported their frequency
16 of engagement in 13 strategies suitable for increasing athletes' confidence. To investigate the
17 effect of CE on these behaviours, data were collected from coaches at the start of the season
18 ($n = 135$) and again three-quarters into the season ($n = 101$). Given coach gender is thought to
19 influence coaching behaviour (see Horn, 2008), the influence of total CE on efficacy-
20 enhancing behaviours was examined separately for males and females. Regression analyses
21 demonstrated total CE positively predicted use of efficacy-enhancing behaviours for both
22 male and female coaches. Also, moderate-to-strong associations between the behaviours and
23 all dimensions of CE were reported. However, when male coaches of women's teams ($n =$
24 24) were looked at in isolation, interrelations were weaker and non-significant; this was not
25 the case for the other three coach/athlete gender combinations.

1 Winning percentage was also investigated as an outcome of CE by Myers et al.
2 (2005). Regression analyses demonstrated total CE was a positive predictor of winning
3 percentage for men's but not women's teams. Also, within women's teams, no dimension of
4 CE was significantly associated with winning percentage for male or female coaches. In
5 contrast, in men's teams both CB and motivation efficacy had moderate-to-strong significant
6 positive associations with winning percentage. As well as identifying important links between
7 CE and coaching behaviour/winning percentage, this study highlights the importance of
8 considering coach/athlete gender match/mismatch when investigating outcomes of CE.

9 Such increases in coaches' efficacy-enhancing behaviours should lead to increases in
10 team and player efficacy beliefs, variables investigated as outcomes of CE by Vargas-
11 Tonsing, Warners and Feltz (2003). Regression analyses demonstrated collectively the four
12 dimensions of CE positively predicted team- but not self-efficacy. However, the null finding
13 for self-efficacy may have been affected by a lack of statistical power, as a meaningful (i.e.,
14 $R^2 = .20$) amount of variance in self-efficacy was explained by the four dimensions of CE.
15 There was also greater within-team agreement for team- as opposed to self-efficacy, which is
16 important given scores were aggregated at the team level before analyses were conducted. In
17 terms of the predictive ability of the four dimensions of CE for team efficacy, motivation and
18 CB efficacy were the best predictors; motivation efficacy was a positive predictor, whereas
19 CB efficacy was a negative predictor.

20 Chow, Murray and Feltz (2009) then investigated links between CE and players' self-
21 reported likelihood to aggress against an opponent. Multilevel modelling demonstrated
22 coaches' GS efficacy positively predicted athletes' likelihood to aggress, whereas CB
23 efficacy had no significant predictive effect. Chow et al. (2009) explained this unexpected
24 finding by suggesting coaches high in GS efficacy may be more likely to promote unfair but
25 strategically advantageous play by teaching unfair tactics (e.g., instrumental aggression),

1 positively reinforcing athletes for using them or ignoring such behaviour when it occurs. Also
2 of note is that increases in coach CB efficacy offered no apparent protective effect.
3 Interestingly, a similar study conducted in Botswana by Malete, Chow and Feltz (2013)
4 found neither GS nor CB efficacy significantly predicted athletes' self-reported likelihood to
5 aggress or peer cheating. Although the authors suggested the disparate findings between the
6 two studies may have been due to the inclusion of additional variables in the analyses of the
7 more recent study, it is worth noting that mean levels of self-reported likelihood to aggress
8 were considerably lower in Malete et al. (2013; i.e., $M = 2.84$) compared to Chow et al.
9 (2009; $M = 3.38$). As such, the moral climates in the two samples appear to have been quite
10 different, as in general the players in the Botswanan sample were less likely to act
11 aggressively to gain competitive advantageous than those from the US. Given that the moral
12 atmosphere in teams has been consistently linked with moral functioning in team sport (e.g.,
13 Stephens, 2001), coaching behaviours that promote aggressive behaviour in teams with lower
14 levels of moral functioning may not have the same effects in team cultures in which higher
15 levels of moral functioning are the norm. An alternative explanation relates to the low sample
16 sizes at the team level in both studies, which may lead to unreliable parameter estimates in
17 multilevel analyses such as those conducted in the two studies (see Maas & Hox, 2004).

18 To summarise, the studies reviewed in this section have identified several possible
19 outcomes of CE. Outcomes specified in Feltz et al.'s (1999) model with empirical support
20 include coaching behaviour (i.e., increased praise and encouragement and reduced instruction
21 and organisation), winning percentage and player satisfaction. However, whilst indicators of
22 coaching behaviour (i.e., through observation; Feltz et al., 1999) and winning percentage
23 represent objective outcomes of CE, changes in satisfaction have been based on athlete
24 perceptions which are clearly subjective. Future work should pursue more objective
25 indicators of satisfaction with the coach such as player attrition and training attendance rates

1 to further test the effect of CE on player satisfaction. Support was also evident for improved
2 leadership style (i.e., overall style as well as increased positive feedback and training and
3 instruction), greater use of efficacy-enhancing coach behaviours and increased likelihood to
4 aggress in players as outcomes of CE. Possible coach/athlete gender and cultural differences
5 in these latter two outcomes should be acknowledged though. Researchers have studied
6 outcomes of CE with high-school, collegiate, community, competitive and club coaches
7 working in team and individual sports. US-based research dominates this category, although
8 one study was conducted in Botswana. In terms of methodology, the overriding approach was
9 again a cross-sectional design using self-report questionnaires, although coach observation
10 was used in instances where coaching behaviour was directly measured.

11 *Athletes' perceptions of their coach*

12 Another category of CE research is that investigating athletes' perceptions of their
13 coach based upon the dimensions of CE. Conceptually such research is grounded upon the
14 dimensional aspects of coaching ability outlined in the CE model, and the premise that effects
15 of coaching behaviour on athletes' self-perceptions, motivation and performance are
16 mediated by athletes' assessments of their coach's behaviour (see Horn, 2008). Researchers
17 investigating athletes' perceptions of their coach based on the CE model have diverged in
18 terms of the specific perceptions assessed. Specifically, athletes' perceptions of their coach's
19 efficacy, competency and effectiveness have been investigated. First, perceptions of coach
20 efficacy represent the extent to which coaches are perceived by athletes to have the capacity
21 to influence athletes' learning and performance (Short & Short, 2004). Next, perceptions of
22 coach competency represent 'athletes' evaluations of their head coach's ability to affect their
23 learning and performance' (Myers, Feltz et al., 2006, p.113). Finally, perceptions of coach
24 effectiveness represent 'the extent to which coaches can implement their knowledge and
25 skills to positively affect the learning and performance of their athletes' (Boardley,

1 Kavussanu, & Ring, (2008, p.271). Importantly, factorial analyses have shown support for the
2 original dimensional structure from the CE model in such perceptions (Boardley et al., 2008;
3 Boardley, Jackson, & Simmons, 2015; Myers, Feltz et al., 2006). Research investigating
4 athletes' perceptions of their coach is reviewed next, with studies grouped by the specific
5 perception assessed.

6 *Coaching efficacy*

7 Short and Short (2004) compared coaches' assessments of their CE with the
8 perceptions of the athletes they coached. Analyses showed a tendency for coaches to rate
9 their CE higher than their athletes did, with seven (i.e., 78%) coaches rating themselves
10 higher than their athletes did on average. However, it is important to note that all coach
11 ratings fell within the 95% confidence interval of their athletes' ratings. Whilst interesting, a
12 small sample size and lack of sampling diversity limit the generalizability of these findings.

13 Subsequently, Boardley et al. (2015) conducted three studies investigating the
14 relationship between golfers' perceptions of their coach's motivation efficacy and golfers'
15 task self-efficacy. Across three separate studies, correlational and SEM analyses
16 demonstrated a consistent positive relationship between golfers' perceptions of their coach's
17 motivation efficacy and their task self-efficacy; the strength of association ranged from weak-
18 to-moderate (Study 1) to moderate-to-strong (Study 3). Whilst limited by a strong male
19 gender bias, collectively these three studies demonstrated a consistent and meaningful
20 positive link between golfers' perceptions of their coach's abilities to influence golfers'
21 psychological skills and states and players' efficacy beliefs regarding their golf ability.

22 *Coaching competency*

23 Myers, Wolfe, Maier, Feltz and Reckase (2006) used hierarchical linear modelling
24 (HLM) to show athletes' perceptions of their coach's motivation competency had a moderate-
25 to-large positive relationship with satisfaction with the coach at the athlete level. However,

1 no relationship was detected at the team level once within-team effects were accounted for.
2 Myers, Beauchamp and Chase (2011) also investigated the relationship between athletes'
3 perceptions of their coach's competency and satisfaction with the coach. Multilevel SEM
4 determined whether athletes' perceptions of their coach's competency were predictive of
5 satisfaction with the coach at the individual- and team-levels separately. Results from these
6 analyses demonstrated at the athlete-level, athletes' perceptions of their coach's motivation
7 and technique competency had statistically significant large positive effects on athletes'
8 satisfaction with their coach. In combination, these perceptions explained 51.8% of the
9 variance in satisfaction with the coach at the individual-level. At the team-level, perceptions
10 of total coaching competency had a large positive significant effect on satisfaction with the
11 coach, explaining 88.3% of its variance. Although findings were fairly consistent across these
12 two studies, direct comparisons cannot be made as they used different measures to assess
13 perceptions of coaching competency.

14 Boardley and Kavussanu (2009) studied links between athletes' perceptions of their
15 coach's CB competency, athletes' levels of moral disengagement (i.e., the tendency to justify
16 and rationalise behaviour that contravenes your moral standards; Bandura, 1991) and
17 frequency of prosocial (i.e., volitional acts intended to help or benefit another person;
18 Eisenberg & Fabes, 1998) and antisocial (i.e., volitional acts intended to harm or
19 disadvantage another individual (Sage, Kavussanu, & Duda, 2006) acts in sport. SEM
20 demonstrated athletes' perceptions of their coach's CB competency had a weak positive
21 effect on prosocial behaviour towards opponents and moderate and very strong negative
22 effects, respectively, on antisocial behaviour towards teammates and opponents; all effects
23 were mediated to some degree by moral disengagement. No effect was found for prosocial
24 behaviour towards teammates. These findings provide support for the possibility that athletes'
25 perceptions of their coach's CB competency may be important for on-pitch moral behaviour.

1 Subsequently, Bosselut, Heuze, Eys, Fontayne and Sarrazin (2012) investigated
2 relations between athletes' perceptions of their coach's competency in technique/GS and role
3 ambiguity (i.e., the lack of clear, consistent information regarding an individual's role; Kahn,
4 Wolfe, Quinn, Snoek, & Rosenthal, 1964). Four dimensions of role ambiguity (i.e., scope of
5 responsibilities, role behaviours, role evaluation, and role consequences; see Beauchamp,
6 Bray, Eys, & Carron, 2002) in offensive and defensive contexts were studied. Controlling for
7 gender, status and their interaction, HLM demonstrated at the individual-level the four
8 dimensions of role ambiguity explained between 6.90% (i.e., role consequences) and 12.86%
9 (i.e., scope of responsibilities) of the variance in technique competency in the offensive
10 context, and between 1.86% (i.e., role consequences) and 6.10% (i.e., role behaviours and
11 role evaluation) in the defensive context. At the team-level, only role evaluation in offensive
12 (i.e., 12.89%) and defensive (i.e., 12.44%) contexts explained variance in perceptions of
13 technique competency. Equivalent analyses for GS competency at the individual-level
14 demonstrated dimensions of role ambiguity explained between 5.44% (i.e., role
15 consequences) and 10.59% (i.e., scope of responsibilities) of the variance in GS competency
16 in the offensive context, and between 3.86% (i.e., role consequences) and 9.30% (i.e., role
17 behaviours) in the defensive context. At the team-level, in the offensive context role
18 behaviours (i.e., 1.69%), scope of responsibilities (i.e., 5.65%) and role evaluation (10.45%)
19 explained significant amounts of variance, whereas in the defensive context only role
20 evaluation (12.71%) explained variance in perceptions of GS competency. Overall, increased
21 ambiguity in offensive and defensive roles was linked with increased criticality of coach's
22 technique and GS competency.

23 Finally, Malette et al. (2013) investigated athletes' perceptions of their coach's GS and
24 CB competency as predictors of athletes' self-reported likelihood to aggress and peer
25 cheating. Multilevel analyses demonstrated athletes' perceptions of GS – but not CB –

1 competency were weak positive predictors of their self-reported likelihood to aggress and
2 peer cheating at the within-level. Thus, players who had favourable impressions regarding
3 their coach's abilities in GS reported increased tendencies to aggress and cheat. These
4 findings accord with those of Chow et al. (2009), who found high-school and club soccer
5 coaches' GS – but not CB – efficacy positively predicted players' likelihood to aggress.

6 *Coaching effectiveness*

7 Two studies have investigated athletes' perceptions of their coach's effectiveness.
8 First, Boardley et al. (2008) investigated relationships between male-rugby-union players'
9 perceptions of their coach's effectiveness and their effort, commitment, enjoyment, self-
10 efficacy and prosocial and antisocial behaviour. Regression analyses (controlling for playing
11 experience) demonstrated players' perceptions of their coach's motivation effectiveness were
12 positive predictors of players' effort, commitment and enjoyment; effect sizes were small-to-
13 medium. Further, perceptions of technique and CB effectiveness, respectively, positively
14 predicted players' rugby self-efficacy and prosocial behaviour; effects sizes were small. No
15 predictive effects were found for players' antisocial behaviour.

16 Kavussanu et al. (2008) also investigated athletes' perceptions of their coach's
17 effectiveness. Regression analyses demonstrated: (a) sport experience negatively predicted all
18 dimensions of coaching effectiveness; effect sizes were small to small-to-medium, (b)
19 mismatch in sex between athlete and coach negatively predicted motivation, CB and total
20 coaching effectiveness; effect sizes were small to small-to-medium, and (c) athlete sex did
21 not predict any dimension of coaching effectiveness. This study also provided support for the
22 findings of Short and Short (2004) by demonstrating on average athletes' ratings of coaching
23 effectiveness were significantly lower than coaches' ratings of CE for all CE dimensions.

24 In sum, the studies reviewed in this section have highlighted the potential importance
25 of athletes' perceptions of their coach based on CE dimensions. For perceptions of coach's

1 efficacy, researchers have shown player reports of their coach's efficacy tend to be lower
2 than levels reported by their coaches in American Football, and perceptions of coach's
3 motivation efficacy are consistent positive predictors of golfers' task self-efficacy. Regarding
4 perceptions of coach's competency, such perceptions have been linked with outcomes such as
5 satisfaction with the coach at the player- and team-level, prosocial and antisocial behaviour,
6 likelihood to aggress and role ambiguity. Next, sport experience and coach/athlete sex
7 mismatch have the potential to be key antecedents of athletes' perceptions of their coach's
8 effectiveness, and these perceptions have been positively linked with players' effort,
9 commitment, enjoyment, self-efficacy and prosocial behaviour in rugby union. Finally,
10 coaches' ratings of CE were shown to be higher than their athletes' ratings of coaching
11 effectiveness on all dimensions. Researchers have studied athletes' perceptions of their coach
12 on dimensions of CE with high-school, collegiate and competitive athletes from a wide range
13 of team- and individual-sports, and US- and UK-based research dominates this category,
14 although studies have been conducted in Botswana and France. The overriding
15 methodological approach was again a cross-sectional design using self-report questionnaires.

16 ***Summary of key findings***

17 This review has highlighted the breadth of research that has applied the CE model
18 since its inception in 1999. Literature searches unearthed 21 articles addressing conceptual
19 aims and/or hypotheses directly informed by the CE model. Studies were categorised based
20 upon whether they investigated antecedents, outcomes or athlete perceptions. This
21 categorisation illustrated a fairly even balance across these categories, with 12 articles
22 investigating antecedents, eight studying outcomes and nine considering athlete perceptions.

23 Collectively the reviewed studies support numerous antecedents of CE proposed in
24 the CE model. For instance, positive links between coaching experience and CE were found
25 with intercollegiate, high-school and volunteer coaches from the USA, UK and Hong Kong

1 (e.g., Fung, 2002; Myers et al., 2005). Similarly, coach education positively predicted CE in a
2 few studies (e.g., Malete & Feltz, 2000; Myers et al., 2011). Also, consistent with the tenets
3 of the CE model, a favourable win-loss record was consistently linked with higher levels of
4 CE (e.g., Myers et al., 2005; Short et al., 2005). Next, perceived athlete- and team-ability
5 were positively linked with CE (e.g., Feltz et al., 1999, 2009; Myers et al., 2005). Finally,
6 higher levels of CE were predicted by increased school/community support in various
7 coaching populations (e.g., Feltz et al., 1999, 2009; Myers et al. 2005, 2011). Thus, research
8 to date provides consistent support for the major antecedents of CE proposed in the model.

9 Several outcomes of CE proposed in the model have also been empirically supported.
10 In terms of coaching behaviour, stronger support was found for differences in praise and
11 encouragement (i.e., more frequent in higher-efficacy than in lower-efficacy coaches) and
12 instruction and organisation (i.e., less frequent in higher-efficacy than in lower-efficacy
13 coaches) than for punishment and control behaviours, where differences based on levels of
14 CE were not detected. Myers et al. (2005) also provided support for this aspect of the model
15 by showing all dimensions of CE were associated with more frequent use of efficacy-
16 enhancing behaviours. Interestingly though, this effect was not found in male coaches of
17 women's teams, suggesting gender mismatch between coaches and athletes may be a key
18 moderator of such outcomes (see also Kavussanu et al., 2008). That increases in player/team
19 satisfaction, performance and efficacy may result from higher levels of CE was also
20 supported. For instance, Feltz et al. (1999) found higher levels of player satisfaction and
21 higher winning percentages for high-CE coaches compared to low-CE coaches. Further,
22 Myers et al. (2011) and Myers, Wolfe et al. (2006) found athletes' perceptions of their
23 coach's competency were predictive of increased satisfaction with their coach, and Boardley
24 et al. (2008, 2015) showed heightened perceptions of coach's motivation effectiveness

1 positively predicted athletes' task self-efficacy in rugby and golf. Therefore, consistent with
2 the CE model, research has supported numerous outcomes of CE.

3 **Looking to the Future: A Revised Coaching Efficacy Model**

4 The breadth of research identified in the review is testament to the significant
5 contribution the CE model has made to date. However, it has also identified antecedents and
6 outcomes of CE that are beyond those specified in the original model, and identified ways in
7 which the model could be further developed to more effectively guide future research. Thus,
8 consistent with Feltz et al.'s (1999) acknowledgement that the original model represented a
9 preliminary starting point, the aim of the current section is to identify ways in which the
10 model could be extended and further tightened. In doing so, aspects of the original CE model
11 have been integrated with relevant conceptual models and frameworks that have emerged
12 since the CE model was developed. The arguments for and nature of this revised model are
13 presented over the coming paragraphs, and the overall model is displayed in Figure 2.

14 A key aspect of the original CE model was the specification of key sources of CE
15 information. One such source of information supported in the current review is the extent of
16 coaching experience/preparation. However, coaching is highly contextualised (see Côté &
17 Gilbert, 2009), so it may also be important to consider the situations in which coaches gain
18 experience/preparation. Specifically, Côté and Gilbert (2009) described four distinctive
19 situations in which coaches venture to progress athlete outcomes: (a) participation coaching
20 with children, (b) participation coaching with adolescents and adults, (c) performance
21 coaching with young adolescents and (d) performance coaching with older adolescents and
22 adults. Given the specific nature of efficacy beliefs (see Bandura, 1997), within the revised
23 conceptual model of CE coaching experience/preparation is considered most influential of
24 CE when it is specific to the coaching context in which CE is being considered. Further
25 antecedents of CE were also specified in the original model, including prior success,

1 perceived skill of athletes and community support. Empirical support for each of these has
2 since been provided, as it has been for imagery use and EI. Other psychological skills (self-
3 talk, goal setting, arousal regulation) may also be important coach-preparation strategies that
4 could bolster CE beliefs. As such, in addition to those originally specified, these latter
5 variables should also be considered as potential information sources of CE.

6 In terms of the four lower-order dimensions of CE, on the whole research has
7 supported the relevance and conceptual definitions for these. The one possible exception to
8 this is CB, as findings for this dimension have generally been weaker and less consistent than
9 they have been for the other three (e.g., Boardley et al., 2008; Chow et al., 2009; Maleté et
10 al., 2012). This could be due to the original conceptualisation of CB being overly focused on
11 positive aspects of CB coaching such as instilling good moral character, attitudes of fair play,
12 good sportsmanship and respect for others. However, deterring negative aspects of moral
13 character by punishing and not modelling poor sportsmanship and not prioritising winning
14 over sportsmanship are also key aspects of CB coaching (see Bolter & Weiss, 2012, 2013).
15 These dual aspects of CB coaching are reflective of research on moral behaviour in sport,
16 which highlights the importance of assessing both positive and negative social behaviours
17 (see Kavussanu & Boardley, 2009). The lack of consideration of coaches' confidence in their
18 ability to deter negative aspects of athletes' character may explain why the CB dimension has
19 been an inconsistent predictor of athlete outcomes such as antisocial behaviour (Boardley et
20 al., 2008) and athletes' self-reported likelihood to aggress (Chow et al., 2009; Maleté et al.,
21 2012). As such, in the revised model of CE, CB efficacy not only represents coaches'
22 confidence in their ability to guide athletes' personal development and positive attitudes
23 toward sport, but also their ability to deter athletes' engagement in unsportsmanlike conduct,
24 not demonstrate such behaviour themselves and not prioritise winning over sportsmanship.
25 Clearly broadening the breadth of the CB dimension requires development in psychometric

1 assessment, but until a revalidated CB subscale is available, researchers are directed towards
2 the relevant subscales from the Sportsmanship Coaching Behaviours Scale (Bolter & Weiss,
3 2012, 2013) for suitable items for assessing coaches' confidence in their ability to deter
4 athletes' engagement in unsportsmanlike conduct, not demonstrate such behaviour
5 themselves and not prioritise winning over sportspersonship.

6 Another aspect of the CE model that has come under some scrutiny is the need for
7 further articulation of how coach outcomes of CE (e.g., coaching behaviour) may link to
8 athlete outcomes such as player/team satisfaction, performance and efficacy (e.g., Myers,
9 Feltz et al., 2006; Boardley et al., 2008). By integrating aspects of Horn's (2002) model of
10 coaching effectiveness with outcomes proposed in the CE model, such researchers have
11 argued that coaches' behaviour directly affects athletes' perceptions and evaluations of their
12 coach's behaviour, and such perceptions and evaluations mediate the influence of coach
13 behaviour on athletes' self-perceptions and attitudes. Empirical support for the potential
14 mediating role of athletes' perceptions of their coach is provided in the relevant section of the
15 current review. As well as explicitly incorporating the mediating processes described above,
16 the revised model of CE also specifically identifies categories of coach behaviour that map
17 directly on to the four dimensions of CE based on Côté, Yardley, Sedgwick and Baker
18 (1999). Specifically, coaches' efficacy beliefs in GS, motivation, technique and CB are
19 proposed to influence athletes' perceptions of their coach's efficacy on the four dimensions
20 through coaches' competition strategy, mental preparation, technical skill and positive and
21 negative rapport coaching behaviours, respectively (see Figure 2).

22 An important consideration in any revised CE model that explicitly incorporates
23 athletes' perceptions of their coach is which perceptions to specify. As identified earlier, to
24 date researchers have assessed athletes' perceptions of coaches' efficacy (e.g., Boardley et
25 al., 2015), competency (e.g., Myers, Feltz, et al., 2006) and effectiveness (e.g., Boardley et

1 al., 2008) based on the four dimensions of CE. Although assessing slightly different athlete
2 perceptions may only marginally influence study findings, it does lead to a lack of conceptual
3 clarity, and also makes comparisons of related findings across studies harder to interpret. This
4 is also an issue when comparing coach beliefs and athlete perceptions within the same study
5 if different perceptions have been assessed (e.g., Kavussanu et al., 2008). As such, to allow
6 for more meaningful interpretations of findings within and between studies, in the revised
7 model athlete perceptions of their coach's efficacy are specified.

8 Given the revised model explicitly incorporates athletes' perceptions of their coach's
9 efficacy, athlete characteristics that may influence such perceptions have also be included
10 (see Horn, 2008). The majority of the characteristics specified in Figure 2 have been drawn
11 from Horn's (2008) model and empirical research reviewed presently (e.g., Kavussanu et al.,
12 2008). Also included is coach reputation, as CE-model based research looking at factors
13 influencing athletes' judgements of coaching competency has found coach reputation can
14 influence such judgements (Manley, Greenlees, Thelwell, & Smith, 2010; Thelwell, Page,
15 Lush, Greenlees, & Manley, 2013). However, the proposed antecedents in Figure 2 should
16 not be viewed as an exhaustive list, and researchers are encouraged to identify further
17 possible antecedents of athlete perceptions.

18 In addition to the extra-relationship sources of CE developed based on those
19 expounded in the original CE (i.e., sources of CE information), the revised model draws upon
20 more-recent theorising by Lent and Lopez (2002) to also incorporate a potentially important
21 intra-relationship source of CE. More specifically, Lent and Lopez (2002) proposed a
22 tripartite model of efficacy beliefs that identifies key sources of efficacy information thought
23 to be unique to close relationships such as those seen between coaches and athletes. Whilst
24 additional efficacy beliefs (e.g., other-efficacy) were also included in the model, the one most
25 relevant to the development of CE is Relation-Inferred Self-Efficacy (RISE). RISE beliefs

1 represent a person's perceptions regarding what another person in a close relationship
2 believes about his/her capabilities (Lent & Lopez, 2002). Applying this definition to CE
3 beliefs, RISE beliefs would represent the coach's perceptions about what his/her athletes
4 believe about his/her capabilities as a coach. Importantly, the work of Jackson and colleagues
5 has provided strong evidence for the relevance of Lent and Lopez's (2002) model to sport,
6 including research on the coach-athlete relationship (Jackson, Knapp & Beauchamp, 2009).
7 This research demonstrated how athletes developed RISE beliefs based on their interpretation
8 of their coach's verbal and nonverbal behaviours, and that RISE beliefs were viewed as a
9 source of self-efficacy. Whilst Jackson et al.'s (2009) study focussed on the formation of
10 athletes' self-efficacy beliefs, it is likely similar processes may influence coaches' CE beliefs.
11 Thus, in the revised CE model it is proposed athletes' perceptions of their coach's efficacy
12 lead to verbal and nonverbal social cues that coaches interpret to form RISE beliefs which
13 subsequently act as an intra-relationship source of CE information.

14 Finally, the revised model incorporates two further developments from the original
15 model, both relating to athlete outcomes. First, within the revised model athlete outcomes are
16 now grouped under the four C's (i.e., confidence, connection, competence and character)
17 categorisation of athlete-level outcomes of effective coaching proposed by Côté and Gilbert
18 (2009). Consistent with Côté and Gilbert (2009), it is proposed that categorising athlete-level
19 outcomes in this way facilitates the identification and evaluation of measurable indicators of
20 effective coaching. Second, given a significant proportion of coaching occurs with teams and
21 groups, it is also important to distinguish between athlete- and team- (or group-) level
22 outcomes when identifying outcomes representing the four C's. For instance, self-efficacy,
23 the coach-athlete relationship, individual performance and moral identity, respectively, are
24 examples of variables representing confidence, connection, competence and character at the
25 athlete-level. In turn, collective efficacy, cohesion, team performance and moral atmosphere

1 are representative outcomes at the team- (or group-) level. Thus, to fully examine the breadth
2 of impact increased levels of CE may have, over time researchers are encouraged to
3 investigate variables representing the four C's at both the athlete- and team- (or group-) level.

4 In summary, given the body of research reviewed presently and the emergence of
5 relevant conceptual models and frameworks since the original CE model was conceived, a
6 revised CE model is proposed. However, although numerous extensions of the original CE
7 model are included in the revised model, the essence of the original model is retained.

8 Similarly, in keeping with Feltz et al. (1999) when proposing the original model, the revised
9 model should be viewed as a working model that researchers are encouraged to build upon
10 and adapt as further relevant research and conceptual frameworks emerge.

11 *Limitations and future directions*

12 One of the main limitations of the reviewed literature is the narrow range of
13 methodological approaches represented. Although there are exceptions, the reviewed
14 literature is dominated by quantitative studies utilising self-report measures to collect data at
15 single time points. Thus, researchers to date have largely failed to effectively test the causal
16 pathways proposed in the CE model, instead merely testing for relationships supportive of
17 these pathways. Further, the current evidence base is likely to be contaminated to some
18 degree by socially desirable responses and method effects. To help address these issues,
19 future research employing experimental and longitudinal designs along with more diverse
20 and objective approaches to assessing antecedents and outcomes of CE is needed. In
21 particular, there is a pressing need for further applied research that tests the causal
22 propositions in the model in real-world settings. For instance, researchers could examine
23 whether coach-development activities (e.g., completing a coach education course) are
24 successful in boosting CE, and if so whether such changes lead to meaningful changes in
25 coach behaviour and/or athlete-outcomes (via athlete perceptions). Similarly, longitudinal

1 research could track the impact of context-specific coaching experience on CE and
2 consequent outcomes specified in the revised model.

3 Future research directions also stem from the two existing studies that have compared
4 coaches' and athletes' ratings (i.e., Short & Short, 2004; Kavussanu et al., 2008). Although
5 these studies have identified incongruences may exist between coaches' and athletes' ratings
6 of coach efficacy/effectiveness, what is currently not know are the implications of such
7 incongruences. For instance, research is needed to determine whether coach-athlete
8 relationships are less functional when coaches and athletes disagree on the coach's degree of
9 efficacy. Researchers pursuing such questions could also seek to understand why such
10 disparities exist, and to develop and evaluate interventions aimed at enhancing agreement
11 between coaches and athletes. Related to this topic, it would also be interesting to investigate
12 levels of agreement on coach efficacy between coaches in set-ups involving more than one
13 coach. Examples of such set-ups include situations involving head- and assistant-coaches or
14 ones that involve head coaches working with specialist coaches who focus on particular
15 aspects of a team (e.g., defence in American Football) or a specific position (e.g.,
16 goalkeeping coach in soccer). Such work would also progress CE research from a purely
17 sporting emphasis towards a more organizational focus.

18 Similarly, although several studies have utilised multilevel analyses to separate out
19 variance at the team- and individual-levels, researchers to date have not specifically
20 investigated factors that may lead to disparate effects of coaching behaviour on athletes'
21 perceptions of CE at the team- and individual-levels. For example, group variables such as
22 team cohesion and social identity may moderate the effects of coach behaviour on
23 perceptions of CE at the team-level. In contrast, individual-level factors such as the longevity
24 or strength of the coach-athlete relationship may be more likely to moderate effects at the
25 player-level. Future researchers are therefore encouraged to seek to answer such questions.

1 A direction for conceptual progression beyond the revised CE model proposed earlier
2 is the development of specific models targeting key aspects of CE. An example of this is seen
3 in recent work by Sullivan, Feltz, LaForge-MacKenzie and Hwang (2015) who developed a
4 model of doping confrontation efficacy based upon the CE model. Doping confrontation
5 efficacy represents the extent to which coaches believe in their abilities to effectively
6 confront athletes regarding doping issues and offer appropriate solutions to such issues
7 (Sullivan et al., 2015). Thus, given the relevance of doping to ethical and moral aspects of
8 coaching, doping confrontation efficacy could be viewed as a specific aspect of CB efficacy.
9 However, the increased specificity (see Bandura, 1997) afforded by the development of the
10 doping confrontation efficacy model should increase the predictive abilities of the model
11 when researchers look to link coaches' efficacy beliefs with coach behaviours relevant to
12 doping. As such, the development of further specific models of CE (e.g., a specific model of
13 CE for strength and conditioning coaches) are encouraged.

14 Finally, the review itself is subject to its own limitations. Although it was based on
15 extensive literature searches, there may be further relevant literature that was not included.
16 For instance, studies published in non-English journals or Masters and Doctoral theses may
17 have been excluded. Additionally, researchers may have not published some studies that
18 resulted in non-significant or weak effects. As such, readers should be aware when
19 interpreting the review, it may have a degree of bias towards studies with significant and/or
20 more meaningful effects.

21 **Conclusion**

22 The dual aims of the current paper were to present a comprehensive and critical
23 review of CE research and to integrate the findings from this review with relevant conceptual
24 models to inform a revised model of CE. In achieving the first aim, this review has
25 demonstrated the breadth of research that has applied the CE model since its inception in

1 1999. Importantly, this research has investigated links between CE and a wide range of
2 important psychological factors in both coaches and athletes. As such, the review highlights
3 the wide-ranging utility of Feltz et al.'s (1999) model for guiding research looking to
4 investigate psychological processes central to sport coaching. However, the review also
5 highlighted some limitations in the current literature and model, such as an overreliance on
6 cross-sectional and self-report-based approaches, and a lack of conceptual clarity on athletes'
7 perceptions of their coach and the processes that may explain how CE influences such
8 perceptions. Thus, to achieve the second aim of the paper, key aspects of conceptual models
9 of coaching effectiveness and relational efficacy beliefs were integrated with the original CE
10 model to propose a revised model. Future researchers are encouraged to adopt and test this
11 model, ideally through greater use of longitudinal and experimental approaches. Such work
12 will help continue the important research conducted to date using the CE model, further
13 developing our understanding of the processes that lead to – and the outcomes that stem from
14 – high levels of efficacy in sport coaches.

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Table 1

Sample Characteristics for Studies Investigating Antecedents, Outcomes and Athlete Perceptions Relevant to the Coaching Efficacy Model

Study (Location)	<i>M</i> Age (years)	<i>M</i> Experience (years)	Gender	Sample Size	Key Sample Characteristics
Antecedents					
Feltz, Chase, Moritz, & Sullivan (1999) (United States)	42.22	18.02	100% male	69	High-school-basketball coaches
Fung (2002) (Hong Kong)	34.40	8.80	73.8% male	252	Community coaches working with beginner and district-level athletes from a range of sports
Tsorbatzoudis, Daroglou, Zahariadis, & Grouios (2003) (Greece)	37.60	5.50	100% male	230	Team-sport coaches
Myers, Vargas-Tonsing, & Feltz (2005) (United States)	38.60	10.40	67% male	135	Division II and Division III collegiate team-sport coaches
Feltz, Hepler, Roman, & Paiement (2009) (United States)	37.70	3.51	94% male	492	Volunteer youth-sport team-sport (79% ice hockey) coaches
Kavussanu, Boardley, Jutkiewicz, Vincent, & Ring (2008) (United Kingdom)	33.84	8.75	73% male	26	Team- and individual-sport university coaches
Malete & Feltz (2000) (United States)	35.14	6.03		36	High-school coaches
	(Intervention)	(Intervention)		(Experimental)	
	21.21	1.25		24	
	(Control)	(Control)		(Control)	
Sullivan, Paquette, Holt, & Bloom (2012) (Canada)	41.09	12.87	76% male	172	Youth-sport coaches from a range of team and individual sports
Short, Smiley, & Ross-Stewart (2005)	36.61	12.21	64% male	89	Team- and individual-sport coaches

(United States)					
Thelwell, Lane, Weston, & Greenlees (2008)	28.60	7.11	75% male	99	Team- and individual-sport coaches
(United Kingdom)					
Hwang, Feltz, & Lee (2013)	39.77	14.42	87% male	323	High-school-basketball coaches
Myers, Feltz, & Chase (2011)	41.10	11.75	85% male	799	High-school coaches from 14 sports
(United States)					
Outcomes					
Feltz, Chase, Moritz, & Sullivan (1999)	NR	NR	100% male	30 (coaches)	High-school-basketball coaches
(United States)				353 (athletes)	
Sullivan & Kent (2003)	40.10	NR	74% male	224	Intercollegiate team- and individual-sport coaches
(United States / Canada)					
Sullivan, Paquette, Holt, & Bloom (2012)	41.09	12.87	76% male	172	Youth-sport coaches from a range of team and individual sports
(Canada)					
Hwang, Feltz, & Lee (2013)	39.77	14.42	87% male	323	High-school-basketball coaches
Myers, Vargas-Tonsing, & Feltz (2005)	38.60	10.40	67% male	135	Division II and Division III collegiate team-sport coaches
(United States)					
Vargas-Tonsing, Warners, & Feltz (2003)	NR (coaches nor athletes)	6.60 years (coaches) NR (athletes)	NR (coaches) 100% female (athletes)	12 (coaches) 133 (athletes)	Volleyball high-school players and their coaches
Chow, Murray, & Feltz (2009)	33.55	9.35 (coaches)	(coaches)	23 (coaches)	High-school and club soccer coaches and athletes
(United States)	(coaches)	8.71 (athletes)	61% female (athletes)	258 (athletes)	
Malete, Chow, & Feltz (2013)	31.36	4.82 (coaches)	96% male	24 (coaches)	

(Botswana)	(coaches)	5.45 (athletes)	(coaches)	506 (athletes)	
	15.91		77% female		
	(athletes)		(athletes)		
Athletes' Perceptions of Coach's Efficacy					
	32.40				
Short & Short (2004)	(coaches)	9.10 (coaches)	100% male	9 (coaches)	Division II American Football coaches and athletes at the University of North Dakota
(United States)	20.10	9.50 (athletes)	(coaches & athletes)	76 (athletes)	
Boardley, Jackson, & Simmons (2015): Study 1	27.74	9.52	67% male	197	Competitive golfers competing in the Midlands of England
(United Kingdom)					
Boardley, Jackson, & Simmons (2015): Study 2	36.07	NR	98% male	200	Competitive golfers competing in the Midlands of England
(United Kingdom)					
Boardley, Jackson, & Simmons (2015): Study 3	23.41	NR	94% male	212	Competitive golfers competing in the Midlands and South of England
(United Kingdom)					
Athletes' Perceptions of Coach's Competency					
			59% female		
Myers, Wolfe, Maier, Feltz, & Reckase (2006)	19.53	NR	(soccer)	403 (soccer)	Lower division intercollegiate teams in Midwestern USA
(United States)			100%	182 (ice hockey)	
			female (ice hockey)		
Myers, Beauchamp, & Chase (2011)	15.50	NR	57% male	491 (US)	High-school-sport-team athletes representing a range of sports
(United States / United Kingdom)				257 (UK)	
Boardley & Kavussanu (2009)	22.20	10.30	22% female	200 (hockey)	Competitive field hockey and netball players
(United Kingdom)			(hockey)	179 (netball)	
			100%		

			female (netball)		
	31.36		96% male		
Malete, Chow, & Feltz (2013)	(coaches)	4.82 (coaches)	(coaches)	24 (coaches)	
(Botswana)	15.91	5.45 (athletes)	77% female	506 (athletes)	
	(athletes)		(athletes)		
Bosselut, Heuze, Eys, Fontayne, & Sarrazin (2012)	23.09	10.95	82% male	243	French-speaking interdependent-sport participants representing a variety of sports
(France)					
Athletes' Perceptions of Coach's Effectiveness					
Boardley, Kavussanu, & Ring (2008)	23.34	12.87	100% male	166	Competitive rugby union players
(United Kingdom)					
Kavussanu, Boardley, Jutkiewicz, Vincent, & Ring	21.30 (male)	8.34 (male)			
(2008)	21.09 (female)	7.02 (female)	60% female	291	University athletes from eight individual- and seven team-sports
(United Kingdom)					

Note. NR = Not reported.

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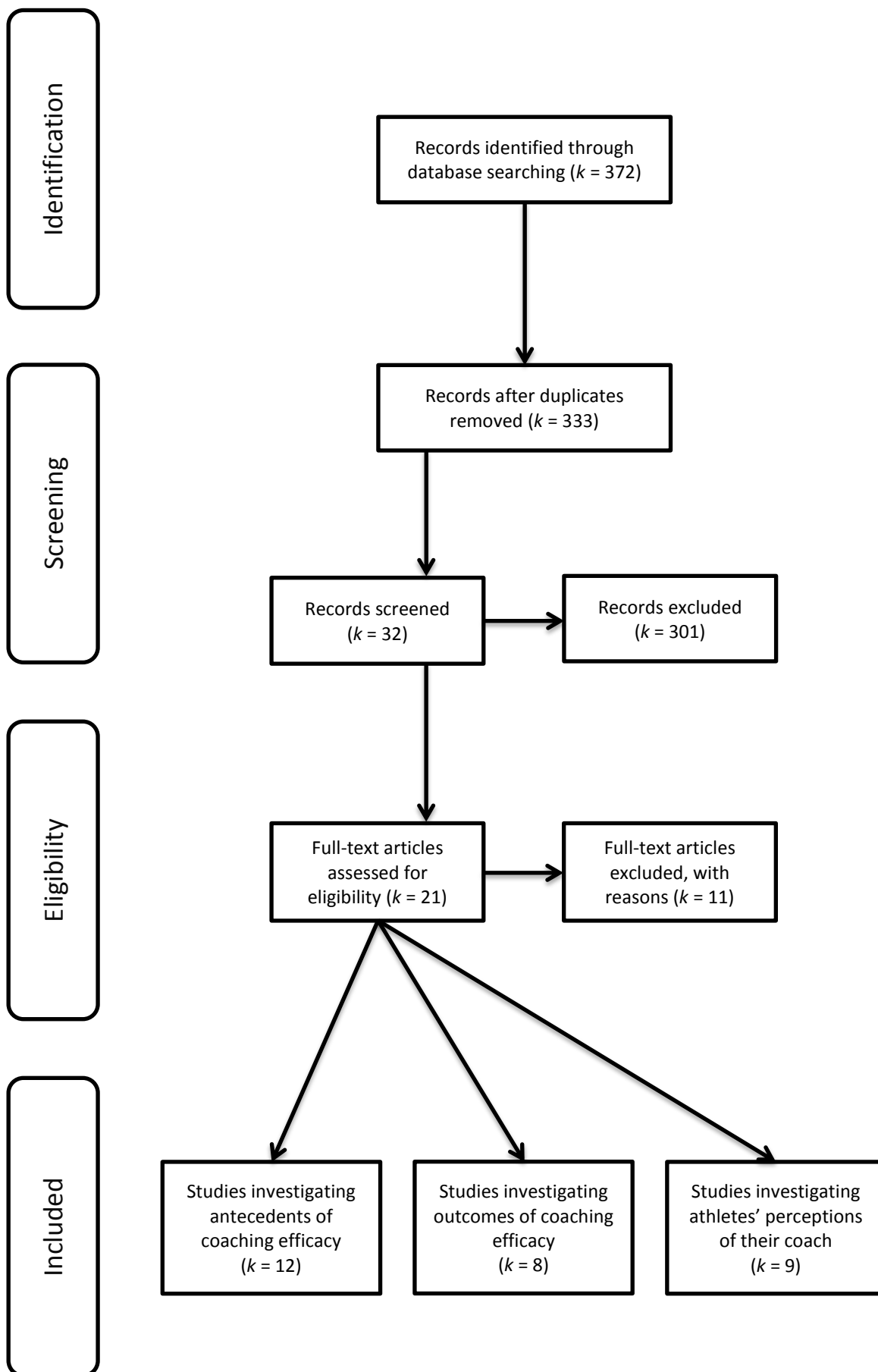


Figure 1. Procedures involved in selecting articles for review.

Note: Some studies investigated a combination of antecedents, outcomes and/or athletes' perceptions. This explains why the total for those included (i.e., 29) does not match that for those deemed eligible (i.e., 21).

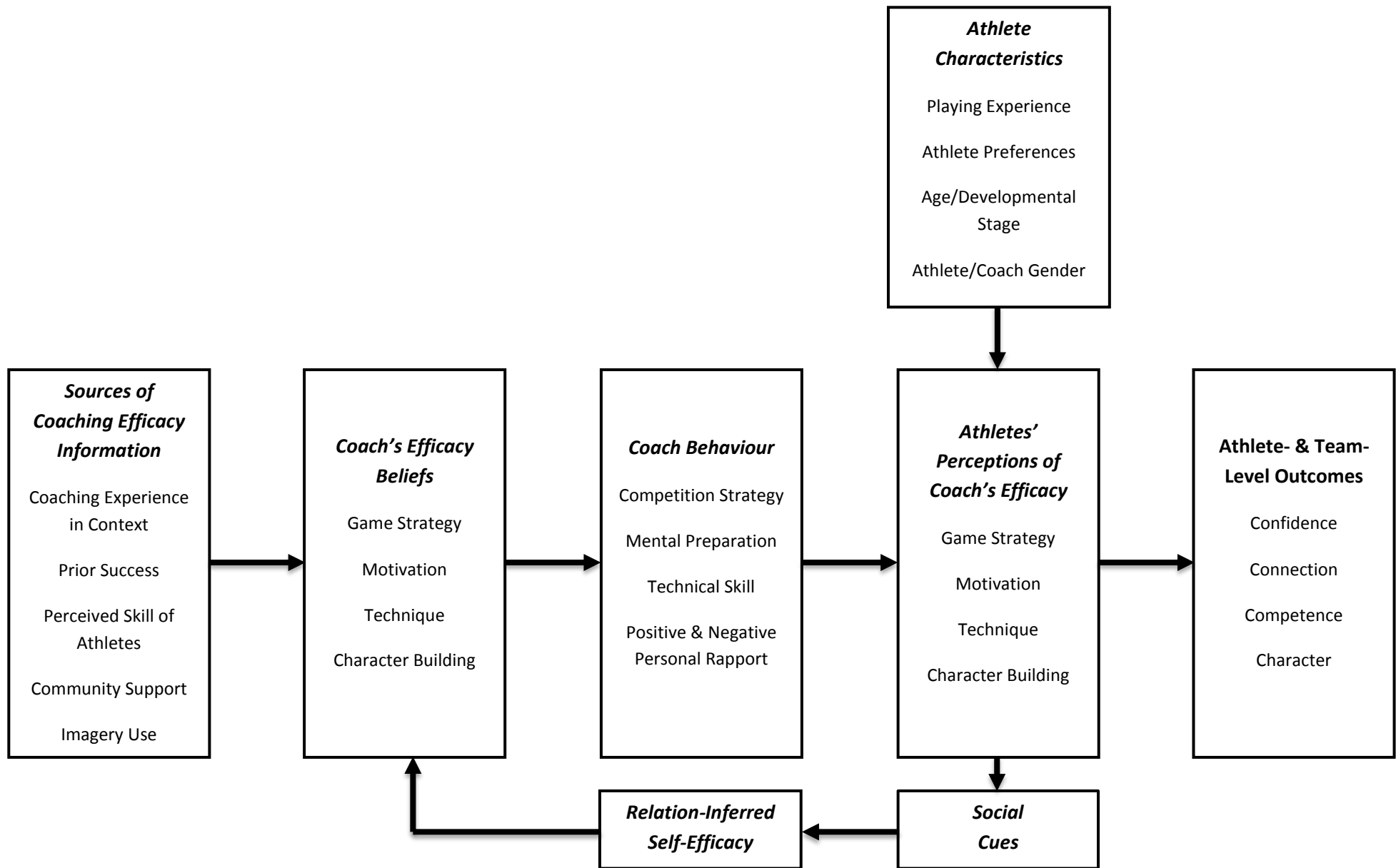


Figure 2. Revised conceptual model of coaching efficacy.