Youth athletes' perceptions of coaching effectiveness

Kyran Clements

A thesis submitted for the degree of

MSD Sport and Exercise Psychology

School of Sport, Rehabilitation and Exercise Sciences

University of Essex

January 2021

SUMMARY

The aim of this thesis was to investigate the concept of coaching effectiveness, with a specific focus on the development of youth athletes through youth athlete perceptions of effective coaching behaviours. The current thesis consists of five chapters. Chapter I is an introduction that gives some initial insight into coaching effectiveness, and explains the layout of the thesis, including aims and hypotheses. Chapter II is a critical review that provides a comprehensive summary of the effective coaching literature relevant to this thesis. This chapter identifies the origins of effective coaching research, including conceptual models and frameworks, and provides an overview of studies that have investigated effective coaching. This chapter also highlights limitations of the existing literature and outlines areas for future research. Chapter III reports Study One of this thesis, which developed the Youth Coaching Effectiveness Scale (YCES), an integrated 33-item measure of youth athletes' perceptions of coaching effectiveness. Findings showed that of the four theoretically relevant factor structures tested, a more optimal fit was provided by a first-order seven-factor model. Chapter IV reports Study Two of this thesis, which investigated youth academy football players' perceptions of coaching effectiveness using the dimensions of the developed YCES. Findings identified links between such perceptions and players' perceived competence, confidence, connection, and character across the competitive football season. Chapter V is a general discussion of the findings from the present thesis, discussing the contributions to literature, as well as stating limitations of the work and proposed directions of future research. The findings of this thesis helped to advance our knowledge and understanding of effective coaching behaviours and how youth athletes' perceptions of coaching effectiveness are important for youth athlete development.

ACKNOWLEDGEMENTS

First, I would like to thank my supervisor Dr John P Mills for the continual support, help and guidance throughout this process. I am extremely grateful for the time, dedication and encouragement that you have provided me with from the start of this process. Thank you for enhancing my skills as a researcher, as well as facilitating my development as a person.

Second, I would like to thank my Mum, Dad, and Brother for always believing in me and supporting me in everything that I do. You have consistently encouraged me to strive for excellence and I greatly appreciate all that you have done for me since I began this journey.

My thanks are also extended to my fellow students within the Team Research Lab group. It has been great to conduct my research in an environment alongside many great people, and your support, advice and motivation has helped me to keep on track and ensured the completion of this thesis.

I would also like to extend my thanks to the football clubs, the local schools, and their respective staff members for their cooperation and willingness in providing the participants for this research.

Finally, I would like to give a special thanks to all the participants that took part in this research, and enabled it to be possible.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

Introduction to Effective Coaching

Effective coaching

Research investigating coaching effectiveness is of great importance to ensure the sporting experience and development of athletes is optimised. Coaches are significant figures for the athletes they coach, especially for youth athletes within youth sport programmes (1). Therefore, understanding what makes an 'effective coach' in terms of leadership and coaching behaviours will only aid positive youth development and help ensure youth athletes are afforded the best opportunities to enhance their skills and attributes. Since sport coaches hold positions that can majorly contribute to an athletes learning, it is essential that coaches are effective across all areas of development, positively influencing athletes' physical performance alongside their psychosocial development (2, 3). For a coach to be effective in their role, a range of coaching behaviours will be required to most appropriately meet the needs of individual athletes in a variety of situations (1).

The concept of coaching efficacy, and specifically the coaching efficacy model (4), provides an origin for much of the coaching effectiveness research. Coaching efficacy has been defined as 'the extent to which coaches believe they have the capacity to affect the learning and performance of their athletes' (4). Empirical research has provided considerable support for the coaching efficacy model, with higher levels of coaching efficacy leading to more effective coaching behaviours. Research in this area has tended to focus upon coaches' perceptions of their own efficacy, in an attempt to establish the sources of coaching efficacy and the outcomes for coaches and athletes which can result from different levels of coaching efficacy.

More recently, coaching effectiveness models (2, 3) and an integrative definition of coaching effectiveness (1) have been proposed, which consider the role of the athlete in

effective coaching. The integrative definition states that coaching effectiveness is "the consistent application of integrated professional, interpersonal, and intrapersonal knowledge to improve athletes' competence, confidence, connection, and character in specific coaching contexts" (1). Coaching effectiveness research has focused on athletes' perceptions of their coach's behaviour using the dimensions of coaching efficacy, investigating how athlete perceptions are impacted by specific sources and the impact of such perceptions upon athlete and coach outcomes. The research in this area has also investigated how perceptions of effective coaching behaviours differ between coaches and athletes. Further development of the effective coaching literature has seen the proposal of a revised conceptual model of coaching efficacy (5), building upon the existing model of coaching efficacy (4), and incorporating elements of the integrative definition of coaching effectiveness (1).

Discussed in greater detail in Chapter II of this thesis, the existing work within the coaching psychology literature has provided an insight into effective coaching behaviours, including their sources and outcomes as well as highlighting the importance of coaching behaviours in shaping an athlete's psychological development and well-being. However, despite the important existing work, it is felt that there is a need to further develop our understanding of coaching effectiveness from a youth development perspective. Given the large body of research recognising the important role of coaches for youth athlete development, and the significance of athletes' perceptions of their coach's behaviours; it is anticipated that exploring coaching behaviours and their impact has the potential to provide a more comprehensive understanding of coaching effectiveness within youth sport.

Thesis aims and hypotheses

The purpose of the present thesis is to explore the concept of coaching effectiveness, with a specific focus on the development of youth athletes through effective coaching behaviours based upon the perceptions of youth athletes. The current thesis consists of a critical review and two quantitative research studies.

Critical Review (Chapter II)

The critical review aimed to provide an up-to-date and comprehensive summary of the effective coaching literature conducted within the coaching psychology domain. Firstly, this chapter presents a summary of the origins of effective coaching research, including conceptual models and proposed definitions. Subsequently, the chapter goes on to provide an overview of studies that have investigated effective coaching. Lastly, the chapter identifies the limitations of the existing research in this area, while outlining areas for future research and the rationale for exploring coaching effectiveness.

Study One (Chapter III)

Following the review of the literature, Study One of the thesis sought to develop a comprehensive other-report measure of youth athletes' perceptions of their coach's effectiveness based on the integrative definition of coaching effectiveness proposed by Côté and Gilbert (1). For Study One, it was hypothesised that the developed scale would show satisfactory psychometric properties in terms of factorial structure and reliability. It was further hypothesised that there would be a correlational relationship between the subscales of coaching effectiveness.

Study Two (Chapter IV)

Based on the findings from the critical review and the results from Study One, the second study aimed to investigate youth academy football players' perceptions of coaching effectiveness using the dimensions of the developed youth coaching effectiveness scale, as predictors of their competence, confidence, connection, and character across the competitive football season. For the second study, five main hypotheses were generated and tested. First, that players' perceptions of coaching effectiveness would positively predict athletes' perceptions of competence over time. Secondly, that players' perceptions of coaching effectiveness would positively predict athletes' perceptions of sport confidence over time. Third, that players' perceptions of coaching effectiveness would positively predict athletes' perceptions of the coach-athlete relationship (coach connection) over time. Fourth, that players' perceptions of coaching effectiveness would positively predict athletes' perceptions of athlete-athlete relationships (team-mate connection) over time. Finally, that players' perceptions of coaching effectiveness would positively predict athletes' perceptions of character over time.

CHAPTER II

Effective Sport Coaching: A Systematic Search and Critical Review

Introduction

Coaches play an influential role in guiding the learning and development of athletes, and are often described as leaders of the athletes they coach (6-8). Particularly important in youth development programmes (1), coach leadership behaviours can impact upon performance and developmental outcomes in athletes (7, 9, 10). Within sport psychology, and specifically coaching science literature; there has been a pursuit to understand and recognise what it means to be an "effective coach" (1-3). The literature suggests that effective coaches are those who exert a positive influence on their athletes through their behaviours (2, 11, 12). An initial definition of coaching effectiveness was proposed by Boardley et al (13), who defined coaching effectiveness as 'the extent to which coaches can implement their knowledge and skills to positively affect the learning and performance of their athletes'. The coaching science literature further suggests that effective coaches not only guide the development of sport specific skills and knowledge, but are in fact instrumental in the overall development of athletes, including areas such as psychological well-being and moral development (1, 2, 14). The purpose of the present review was to provide an up-to-date and comprehensive summary of the effective coaching literature, reviewing studies that encompass the origins and development of effective coaching.

A significant contribution to this area of research is the work of Côté and Gilbert (1), who presented an integrated definition of coaching effectiveness. Extending on the work of Lyle (15), as well as the research on effective teaching, Côté and Gilbert (1) distinguished between coaching expertise, effective coaching, coaching effectiveness and what constitutes being an expert coach. They suggested that coaching expertise refers to specific knowledge in particular contexts, whereas effective coaching is the ability to apply and align coaching

expertise to particular athletes and situations in order to maximize athlete learning outcomes. Côté and Gilbert (1) defined coaching effectiveness as "the consistent application of integrated professional, interpersonal, and intrapersonal knowledge to improve athletes' competence, confidence, connection, and character in specific coaching contexts". They stated that a coach can be considered effective if they demonstrate coaching effectiveness, and those who demonstrate coaching effectiveness over an extended period of time may then be considered an expert coach.

Côté and Gilbert (1) proposed that there are three key components that provide the foundations of their definition of coaching effectiveness: coaches' knowledge, athletes' outcomes, and coaching contexts. They indicated that coach knowledge not only includes the commonly investigated area of professional knowledge (sport-specific knowledge), but also extends to include both interpersonal (interaction with others) and intrapersonal (understanding of oneself and the ability for introspection and reflection) forms of knowledge. The athletes' outcomes component incorporates the 4C's framework (competence, confidence, connection and character) of positive youth development. Côté and Gilbert (1) propose that these four constructs should be developed in athletes as a result of effective coaching. They stated competence consisted of sport-specific technical and tactical skills, performance skills, improved health and fitness and healthy training habits. Confidence was defined as an internal sense of overall positive self-worth. Connection was identified as the development of positive bonds and social relationships with people inside and outside of sport. Lastly, character was referred to as respect for the sport and others (morality), integrity, empathy and responsibility.

The third and final component, coaching contexts, concerns the varied sport settings in which coaching can take place. They identified four coaching contexts, based on a

participation-performance continuum and the developmental spectrum of athletes from children to adults. The four contexts are: 1) participation coaches for children (sampling years), 2) participation coaches for adolescents and adults (recreational years), 3) performance coaches for young adolescents (specializing years), and 4) performance coaches for older adolescents and adults (investment years).

Côté and Gilbert (1) proposed that even though the type of knowledge required by coaches in different sporting contexts varies, the 4C's remain stable as indicators of athlete outcomes and coaching effectiveness. The definitions adopted by Côté and Gilbert (1) for the four outcomes of effective coaching (4C's) are more broad in comparison to others traditionally adopted in the sport psychology literature. This may reflect a view that they deem coaching effectiveness to extend further beyond the impact of coaching within the specific environment or situation in which it occurs. Therefore, the integrative definition of coaching effectiveness proposed by Côté and Gilbert (1) suggests that effective coaches are those who in any context, apply an appropriate blend of professional, interpersonal and intrapersonal knowledge to develop the 4C's in athletes and meet specific athlete needs.

The work of Côté and Gilbert (1) expands upon the model of coaching effectiveness proposed by Horn (2, 3). This model of coaching effectiveness is based on three assumptions. The first is that the sociocultural context, the organisational climate and the coach's personal characteristics influence a coach's behaviour indirectly through a coach's expectancies, values, beliefs and goals. Second, is that coach behaviour directly influences athletes' perceptions and evaluations of their coach's behaviour, with such perceptions being affected by athletes' personal characteristics or individual differences. Third, athletes' perceptions and evaluations of their coach's behaviour will impact upon athletes' self-perceptions, beliefs and attitudes, which in turn affects athletes' motivation and performance. This model highlights

the fundamental importance of athletes' perceptions and evaluations of their coach in determining coaching effectiveness with regard to the influence of coaching behaviours on athlete-level outcomes.
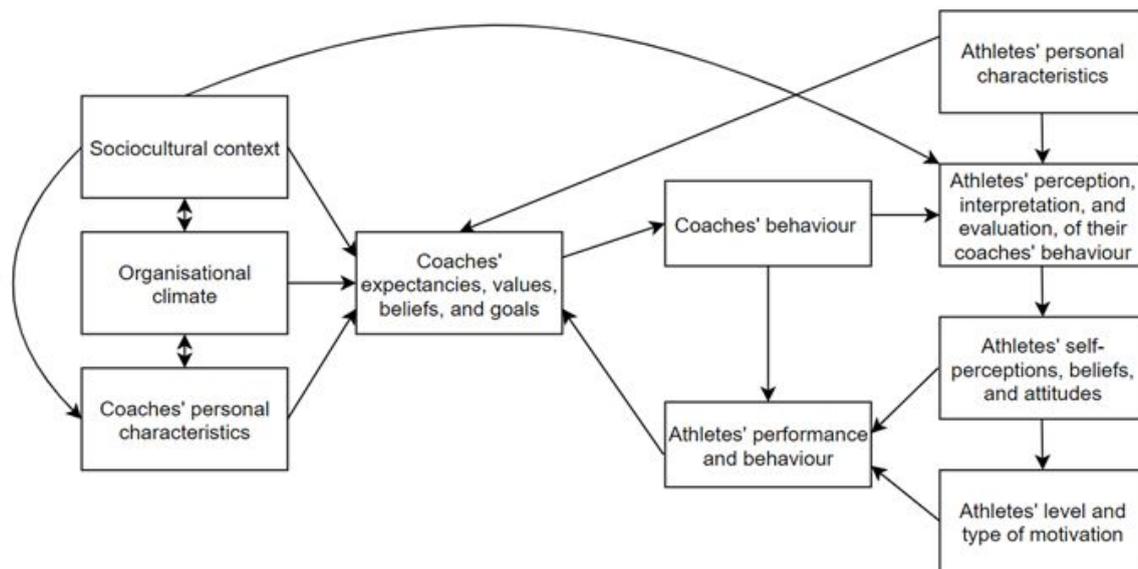
Figure 1. Horn's (3) working model of coaching effectiveness

To form the model of coaching effectiveness, Horn (2, 3) included elements of the Mediational Model of Leadership (12). The work of Smoll and Smith (12) similarly suggested that coaches' behaviours exert influence on athletes via athletes' perceptions. They found that athlete-related outcomes (e.g. athlete participation and satisfaction) as a result of coaching behaviours, were frequently mediated by the meaning that players gave to such behaviours. The framework proposed that coaching effectiveness is determined by the evaluative reaction of athletes' based on their perception and recall of a coaches' behaviour. Situational factors, (e.g., nature of the sport,level of competition, etc.), coach/athlete personal characteristics and individual differences (e.g., age, sex, goals, sport experience, etc.) and the

coach's perception of athletes attitudes were included in the model as mediating variables which may have an affect on the central process.

Another framework that has been useful in guiding research on coaching effectiveness is the coaching efficacy model; a conceptual model introduced by Fetlz et al (4) which considers factors central to the coaching process. The model was conceptualised based upon Park's (16) initial measure of coaching confidence and Denham and Michael's (17) model of teacher efficacy. Bandura's (18) theory of self-efficacy was also used as a key guiding framework in the development of the coaching efficacy model and the construct of 'coaching efficacy' itself. Bandura (18-20) defined self-efficacy as 'the belief in one's capabilities to organise and execute the courses of action to produce given attainments'. Self-efficacy is described as one of the most powerful psychological constructs deemed to mediate achievement endeavours in sport (21).
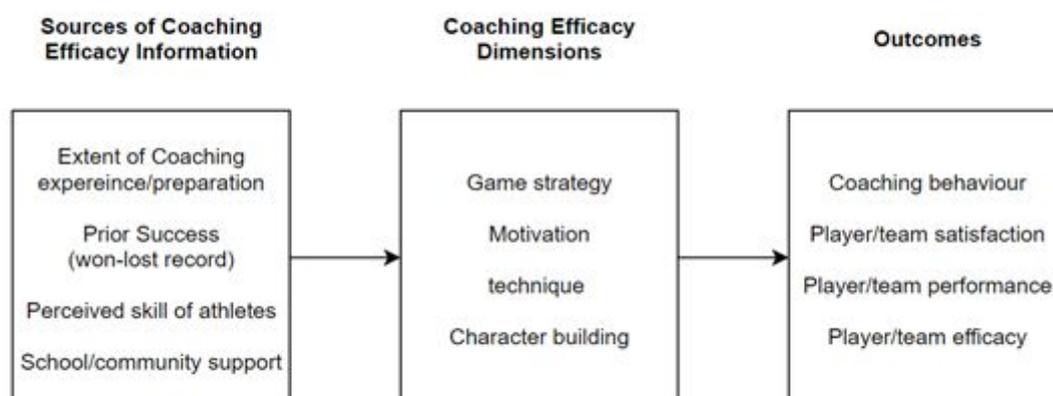
Figure 2. Feltz et al's (4) conceptual model of coaching efficacy

Viewing coaching efficacy as a coach-specific form of self-efficacy, Feltz et al (4) defined coaching efficacy as 'the extent to which coaches believe they have the capacity to affect the learning and performance of their athletes'. Coaching efficacy was stated to be multidimensional, consisting of four dimensions that contribute to a coach's total coaching

efficacy: motivation, game strategy, technique and character-building. Motivation efficacy is the confidence coaches have in their ability to affect the psychological skills and motivational states of their athletes. Game strategy efficacy refers to the confidence coaches have in their ability to coach during competition and lead their team to a successful performance. Technique efficacy is the belief coaches have in their instructional and diagnostic skills. Lastly, character-building efficacy concerns the confidence coaches have in their ability to influence the personal development of their athletes and promote a positive attitude towards sport. These four dimensions were devised as the result of a 5-week seminar involving 11 coaches who were graduate students in sport psychology with varying levels of coaching experience. The National Standards for Athletic Coaches (22) and Park's (16) exploratory factor analysis of coaching confidence were used as the grounding for discussions of the key components of coaching efficacy. Aspects of effective coaching repeatedly mentioned throughout the coaching education literature were also identified, and following the discussions with coaches, were reduced to the four key dimensions used in the model. As a result, the dimensions of coaching efficacy are consistent with essential elements of effective coaching.

The coaching efficacy model proposed that there are certain sources of coaching efficacy which influence coaching efficacy dimensions. These sources include the extent of coaching experience and preparation, prior success, perceived skills of athletes, and perceived social support from schools and the community. The model also suggests that high levels of coaching efficacy should lead to a number of desirable outcomes for both coaches and athletes. Coaching efficacy should influence coaching behaviour, including the type of feedback used, management strategies, and coaching styles. It was also proposed that higher

levels of coaching efficacy should also result in higher levels of athlete and team satisfaction, increased athlete and team performance, and higher levels of athlete and team efficacy.

In addition to proposing a conceptual model that outlined the main sources, dimensions and outcomes of coaching efficacy; Feltz et al (4) also developed a valid and reliable tool to assess coaching efficacy. The Coaching Efficacy Scale (CES), a 24-item multidimensional self-report questionnaire, measures the four dimensions of coaching efficacy that emerged from the seminar. The seminar led to the generation of 41 items, but following factor analysis results, 17 of the original items were later dropped. The stem "How confident are you in your ability to…" preceded the items, with each of the 24 items corresponding to a specific dimension of coaching efficacy.

Boardley (5) recently proposed a revised conceptual model of coaching efficacy. Incorporated within the revised model is the work of Côté and Gilbert (1), with developments in the revised model linking to the coaching contexts and athlete outcomes components of coaching effectiveness. One development is that in the revised conceptual model, coaching experience as a source of coaching efficacy information is deemed to be most influential when it is specific to the coaching context in which coaching efficacy is being considered. A second development from the original model is that athlete outcomes are now grouped under the 4 C's categorisation of athlete-level outcomes of effective coaching. The revised model proposes that coaching efficacy influences athlete-level outcomes through athletes' perceptions of their coach's efficacy based on their coach's behaviour. This is consistent with Côté and Gilbert's (1) work, where perceptions of coaching effectiveness may be predictive of athletes' outcomes. Categorising athlete-level outcomes in this 4 C's format enables the identification and evaluation of measurable indicators of effective coaching. A further development of the revised model is that it distinguishes between athlete- and team-level

outcomes when identifying the 4 C's due to a large proportion of coaching being delivered in team or group environments.
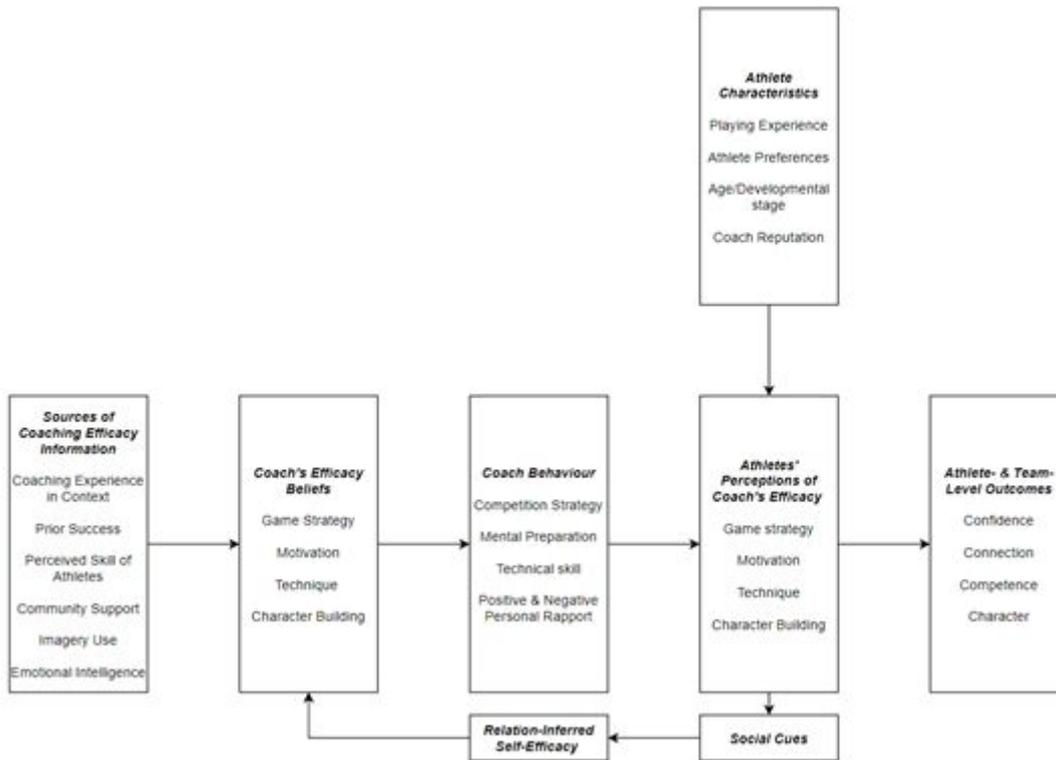
Figure 3. Boardley's (5) revised conceptual model of coaching efficacy

Methodology

Inclusion and exclusion criteria

The general inclusion criteria for this review required that studies were: (a) published in English, (b) published in peer-reviewed journals (c) within sport and psychology-based contexts. Further inclusion criteria stipulated that studies: (d) were original research or reports published in peer-reviewed journals (e) examined the mechanisms, processes, and outcomes of coaching (f) published between 1975-2020. Exclusion criteria for this review were: (a) paper not published in English, (b) paper published before 1975, (c) paper not relevant to sport coaching.

Identification of papers

A systematic search of four electronic databases was conducted for relevant documents aligning with the aims of this review. The databases searched were ESBSCOhost (which included PsychARTICLES, PsychINFO, and SPORTDiscus) and Web Of Science. To search these databases, a combination of keywords and search terms were employed. These keywords and search terms constituted two groups: (a) coaching effectiveness or coaching efficacy or effective coaching and (b) competence or confidence or connection or character, with each database search combining the keywords from both groups. Quotation marks were used to surround search terms to ensure terms were searched as an exact phrase. The search was conducted in December 2019 and updated in February 2020. To supplement the database searches, the reference lists of all extracted articles were scanned to identify any additional relevant studies.

Study screening and selection

Papers concerning coaching effectiveness, coaching efficacy, effective coaching and athlete development, identified from the electronic search of the aforementioned databases, were screened in a process following the PRISMA guidelines (23) for systematic reviews and meta-analyses. In phase 1, all extracted articles were combined into a single folder, with duplicates being removed. Titles and abstracts were screened in phase 2, excluding any immediate unrelated articles. In phase 3, the full text of articles was reviewed, scanning and reviewing their adherence to the inclusion criteria. Phase 4 involved the screening of the reference lists of the full-text articles assessed.

Data extraction

Studies meeting the review criteria were re-reviewed and specific information from the articles were extracted and collated into a separate standardised form. The extracted information and data included: (a) author, (b) year of publication, (c) sample characteristics (i.e. number of participants, gender, age), (d) study aims, (e) study method, (f) measures of coaching behaviour, (g) study findings. Collectively, this information enabled the assessment of the state of the current literature and to provide directions for future research.

Results

Search results

The initial search identified 137 studies (PsychArticles = 2, PsychINFO = 43, SPORTDiscus = 47, and Web of Science = 45). After excluding duplicates there were 84

articles. The abstracts and titles of these articles were screened, where 51 articles were excluded from the review. The full-text and reference list was screened for each of the 33 selected articles. 22 papers from the reference lists were selected. A total of 46 papers were included in the review (Figure 4).
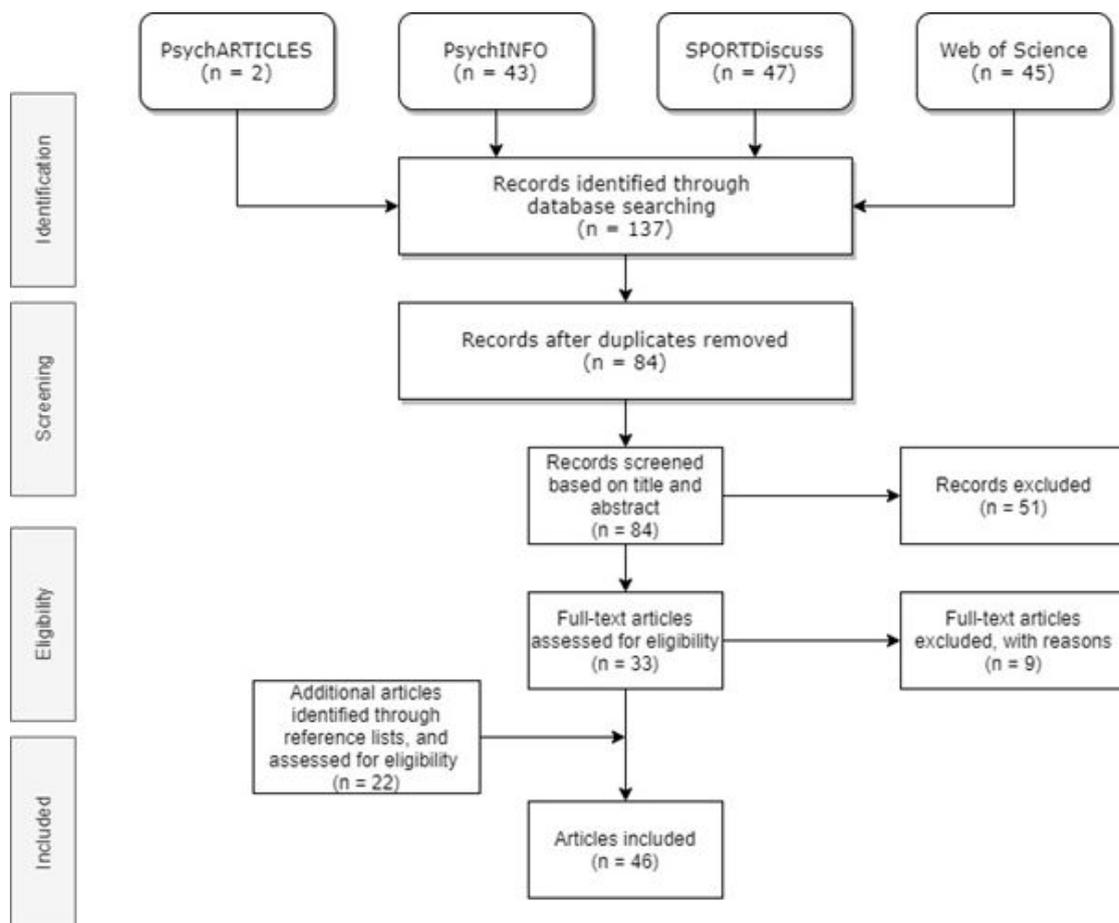
Figure 4. PRISMA flow diagram of the systematic literature search (Adapted from Moher et al (23))

Description of studies

Out of the 46 papers included in this review, a total of 18 studies assessed coaches' perceptions of coaching efficacy, utilising the original coaching efficacy scale proposed by Feltz et al (4) to assess coaching efficacy. Of these 18 studies, eight investigated sources of coaching efficacy (10, 24-30), six investigated outcomes of coaching efficacy (31-36), and three investigated both sources and outcomes of coaching efficacy (4, 37, 38). One study investigated levels of coaching efficacy to plan for future coach preparation programmes (39).

Of the 46 papers included in this review; 10 studies involved assessing coaching efficacy through either evaluations of, and/or revisions to, the original coaching efficacy scale (4). Specifically, two studies evaluated the psychometric properties of the CES (27, 40). Two studies (41, 42) tested the condensed rating scale of the CES proposed by Myers, Wolfe et al (2005). Two studies used the condensed rating scale of the CES to assess sources of coaching efficacy (41, 43). Two studies proposed revised versions of the CES (44, 45). Two studies used the CES II-HST to investigate coaching efficacy (46, 47). One study conducted a meta-analysis (48).

Of the 46 papers included in this review, 21 studies investigated athletes' perceptions of their coach. Specifically, four studies examined athlete perceptions of coach behaviour (49-52). Four studies investigated athletes' perceptions of their coach's efficacy (53-56). Eight studies investigated athletes' perceptions of their coach's competency (35, 57-63). Five studies investigated athletes' perceptions of their coach's effectiveness (6, 10, 13, 14, 64).

Critical Review

Coaches' perceptions of coaching efficacy

Utilisation of the coaching efficacy scale (CES)

Feltz et al (4) provided preliminary support for the conceptual model of coaching efficacy using the CES and a separate sample of male high school basketball coaches ($n = 69$) to what was used in the preliminary scale development and internal factor structure of the model. Preseason data was collected to investigate a range of sources of coaching efficacy. Pearson correlations found that a coach's past success, coaching experience, perceived team ability and perceived social support from parents and the community had moderate positive relationships with at least one dimension of coaching efficacy. The motivation efficacy dimension of coaching efficacy was found to have the highest number of meaningful positive relationships with the sources investigated, whereas the character building efficacy dimension failed to show any meaningful relationships. Feltz et al (4) also investigated the outcomes of coaching efficacy proposed in the coaching efficacy model. The pre season data collected from the 69 coaches was used to identify the 15 coaches with the highest coaching efficacy beliefs, and the 15 coaches with the lowest coaching efficacy beliefs. A trained observer then observed two training sessions of 29 of the 30 coaches identified, recording the frequency of various coaching behaviours. The players being coached were assessed on their satisfaction with their coach during the second training session observed, and postseason, coaches were then assessed for how much time they perceived they had spent coaching during the season and for their commitment to coaching. Comparisons between high and low efficacy coaches using t-tests found that high-efficacy coaches had higher win percentages, provided more praise and encouragement, used less instructive and organisational behaviour and had more

satisfied players compared to low-efficacy coaches. However, no differences were identified between high and low efficacy coaches in terms of their commitment to coaching, amount of perceived coaching effort and their use of punishment and control behaviours. A considerable amount of research has since used the CES as a measuring tool to determine coach perceptions of their own coaching efficacy, aiming to provide empirical evidence for the sources, dimensions and outcomes of coaching efficacy proposed by Feltz et al (4). Researchers have also sought to use the CES questionnaire to investigate the effects of coaching efficacy on other potential outcomes.

Malete and Feltz (24) examined the effect of participation in a coaching education programme on coaches' perceived coaching efficacy. A quasi-experimental design was used, with an experimental group consisting of high school coaches, and a mix of coaching preparation students and coaches without any formal coaching education forming a control group. Coaches in the experimental group were exposed to the 'Program for Athletic Coaches Education' (PACE) (65) a 12-hour programme covering areas relevant to the coaching efficacy dimensions. Both groups were administered the CES (4) questionnaire pre and post PACE programme. Analyses revealed significant differences between both groups post-test, and found a significant increase in coaching efficacy for coaches exposed to the programme pre and post-test, with game strategy and technique efficacy showing the strongest increase. Although providing additional construct validity for the CES (4), the CES scores of all participants were rather high, even at pre-PACE participation, with no significant differences between the two groups at pre-test.

Campbell and Sullivan (25) similarly used the CES (4) when examining the effect of a coaching education programme on coaches' efficacy, whilst simultaneously investigating gender differences in this effect. Coaches completed the CES prior to the beginning of the

coaching programme and immediately following the programme. Their results provided further support for the CES (4), finding that there was a significant increase in the four coaching efficacy dimensions (motivation, technique, game strategy and character building) after completing the programme. The results further suggested that in terms of the motivation and character building subscales, females perceived themselves to be significantly more efficacious than males.

In a study of 252 community coaches working with beginner and district-level athletes in a variety of sports in Hong Kong, Fung (26) used the CES (4) questionnaire to establish a profile of coaching efficacy. The coaching efficacy dimension in which coaches reported the greatest efficacy was motivation, but coaches with less coaching experience were less confident about motivating their athletes compared to their more experienced counterparts. No association was found between coaching accreditation level and hours of coaching in the past year and coaching efficacy. A further study by Fung (39) assessed 74 high school coaches attending a school coach certification programme offered by an official body responsible for a territory-wide coach accreditation system in Hong Kong. To gain an insight for planning future coach preparation programmes, the CES (4) questionnaire was administered to identify the level of coaching efficacy of the coaches in the sample. Participating coaches reported themselves as most efficacious for the character-building dimension, but the dimension they felt the least efficacious was game strategy.

Tsorbatzoudis et al (27) used the Greek translation of the CES (66) to examine the impact of coaching experience upon perceived coaching efficacy of 230 Greek male team-sport coaches. The questionnaires were administered during four annual seminars organised by the Greek handball, basketball, volleyball and soccer federations, with participants being asked to report how confident they were about their skills to lead their

team successfully and how supported they were by team members. During analysis, coaches were divided into experienced and less experienced groups. Experienced coaches, 52.6% of the total sample, had more than 5.5 years of coaching experience. Results from a *t* test analysis showed significant differences between experienced and less experienced coaches for the technique dimension and for overall coaching efficacy, with more experienced coaches having significantly higher scores.

A study by Sullivan and Kent (31) used the CES (4) as a tool to examine the relationship between the efficacy of 223 male and female American and Canadian intercollegiate coaches and their leadership style. Results demonstrated motivation and technique efficacy to be significant positive predictors of training and instruction engagement, as well as positive feedback behaviours. They also reported that democratic behaviours were not predicted by any dimension of coaching efficacy, and predictive analyses of autocratic behaviour and social support were not conducted due to poor internal consistency of these leadership behavioural styles. Kent and Sullivan (32) explored the relationship between organisational commitment (commitment to coaching) and coaching efficacy using the CES (4). In their analyses, a second order factor model of coaching efficacy significantly predicted both affective and normative commitment of the 212 participating intercollegiate head coaches.

Additional support for the coaching efficacy model (4) is the work of Vargas-Tonsing et al (33). They explored team-efficacy and players self-efficacy beliefs as outcomes of coaching efficacy in a study with female volleyball coaches and athletes. Multiple regression analyses revealed coaching efficacy significantly predicted team-efficacy, but there was no meaningful association between coaching efficacy and player self-efficacy. Motivation efficacy and character building efficacy were found to be the strongest predictors of

team-efficacy. Motivation efficacy was a positive predictor, whereas character building efficacy was a negative predictor of team-efficacy.

Imagery was investigated as a source of coaching efficacy in a study by Short et al (28). Regression analyses identified that motivation general – mastery imagery positively predicted overall coaching efficacy, motivation efficacy and character building efficacy. Analyses found that cognitive general imagery positively predicted game strategy efficacy, and cognitive specific imagery positively predicted technique efficacy, suggesting imagery may be an effective method if improving coaching efficacy.

Myers, Vargas-Tonsing et al (37) investigated sources and outcomes of coaching efficacy. Male and female head coaches of intercollegiate athletes from softball, baseball, soccer and basketball teams reported their frequency of engagement in 13 strategies suitable for increasing athletes' confidence. This study offers support for the coaching efficacy model and the CES (4) by showing relationships between the sources and dimensions of coaching efficacy. Significant positive relationships were found between years as a collegiate head coach, career winning percentage, perceived team ability, parental support, and community support and specific dimensions of coaching efficacy. Motivation efficacy was found to have the strongest and greatest number of associations, whereas technique efficacy was found to have the least meaningful associations. The source of coaching efficacy identified to have the strongest association with all dimensions of coaching efficacy was perceived team ability, whereas the weakest effects were seen for collegiate coaching experience. They also identified that total coaching efficacy positively predicted outcomes such as coaching behaviour, team satisfaction and winning percentage for men's teams. However, total coaching efficacy predicted only coaching behaviour across women's teams, and was only

significant for female coaches. This highlights the importance of considering coach/athlete gender match or mismatch when investigating the outcomes of coaching efficacy.

Kavussanu et al (10) measured coaches' perceptions of their own coaching efficacy using a sample of head coaches of British university athletes. They identified that neither coaching experience nor sex of coach significantly predicted motivation or character building efficacy. However, results did show that coaching experience positively predicted technique efficacy and sex of coach predicted game strategy efficacy, with male coaches in the sample reporting significantly higher game strategy efficacy than their female counterparts. A possible explanation for the latter finding is that males emphasize winning more than females, and therefore male coaches may tend to spend more time developing athletes in terms of their skills to lead them to success during competition.

Further research using the CES (4) as a measuring tool to determine coach perceptions of their own coaching efficacy includes the work of Thelwell et al (29). They explored how emotional intelligence constructs relate to the dimensions of coaching efficacy. They found that both the coaches' appraisals of their own emotions and regulation of emotions were significantly correlated with all subscales of the CES (4), as well as total coaching efficacy. Thelwell et al (29) also found that regulation of emotions and social skills were significant predictors of motivation efficacy, optimism significantly predicted character building efficacy, and coaches' appraisal of their own emotions was a significant predictor of technique efficacy. However, they did not identify any significant predictors of game strategy efficacy. Hwang et al (38) similarly investigated the relationships between the emotional intelligence and the coaching efficacy of head coaches of high school basketball teams, with structural equation modelling identifying a strong positive effect of emotional intelligence on coaching efficacy. A moderate-to-strong positive effect was also found between coaching

efficacy and leadership style. Leadership behaviours included: training and instruction, democratic, social support, positive feedback, and situation consideration. It was also found that coaching efficacy partially mediated the effects of emotional intelligence on leadership style.

Malete and Sullivan (30) investigated sources of coaching efficacy, finding that playing and coaching experience were significant sources, and that there was a significant difference between certified and non-certified coaches in terms of their reported coaching efficacy. Chow et al (34) investigated the relationship between coaching efficacy and players' self-reported likelihood to aggress. Results from the study demonstrated soccer coaches' game strategy efficacy positively predicted soccer players' likelihood to aggress, whereas character building efficacy had no significant positive effect. This unexpected finding was suggested to be due to coaches with a high level of game strategy efficacy potentially being more likely to promote and positively reinforce unfair but strategically advantageous aggressive or impulsive behaviours to overcome a challenging competitive situation in order to win. Malete et al (35) investigated the influences of coaches' perceptions of their own coaching efficacy on two anti-social athlete behaviours: peer cheating and aggression. Analyses in this study revealed that neither game strategy nor character building efficacy were found to significantly predict athletes' self-reported likelihood to engage in the anti-social behaviours assessed. The difference in findings between Chow et al (34) and Malete et al (35) may have been due to additional variables included in the analyses conducted by Malete et al (35), or possibly due to differing moral climates between samples.

Examining Botswana Premier League soccer players and their coaches, Keatlholetswe and Malete (36) aimed to identify if coaching efficacy beliefs were predictive of player perceptions of their coaches' leadership styles, team atmosphere and team performance. They

found that overall, coaches rated themselves high on all four of the coaching efficacy dimensions, particularly character building and technique efficacy. Keatlholetswe and Malete (36) also found that coaches' technique efficacy beliefs predicted player perceptions of the coaches' use of all six investigated leadership styles, including autocratic leadership behaviour. On the other hand, results showed that coaches' self-reported motivation efficacy did not significantly predict player perceptions of the coaches' use of any of the leadership styles. Findings also showed that character building efficacy was negatively associated with the leadership styles assessed, whilst game strategy efficacy beliefs predicted higher team atmosphere and team performance.

Evaluations and revisions of the coaching efficacy scale

Tsorbatzoudis et al (27) examined the psychometric properties of the CES, using the Greek translation of the CES (66). A first-order confirmatory factor analysis supported the basic factorial structure of the scale. A second-order confirmatory factor analysis showed satisfactory fit for a higher order model consisting of an overall coaching efficacy factor. Their findings supported the construct validity and internal consistency of the original form of the CES (4), and also supported the reliability and validity of the Greek version of the scale (66).

Myers, Wolfe et al (40) evaluated the psychometric properties of the CES (4) instrument from previously collected data on high school and college level coaches from the United States. They demonstrated the ineffectiveness of the original rating scale structure, reporting that coaches were being asked to distinguish between too many levels of coaching efficacy. They recommended the use of a reduced category rating scale structure, because their analysis of the original rating scale suggested coaches did not systematically employ the

10-point rating scale structure. Finding that only 1% of coaches used the lower end of the scale from 0-4, they suggested that users of the CES should implement a 4-category rating scale structure. Myers, Wolfe et al (40) further suggested that a 5-category structure may be effective for coaches of youth sports because they may be more likely to employ categories on the lower end of the scale. It was also concluded from their analysis that there was limited discriminant validity among the game strategy and technique efficacy dimensions, and that the operational definition for each dimension should be reconsidered. The authors further concluded that several items needed to be revised and/or dropped, and that the resulting measures were relatively imprecise.

Employing the condensed rating scale recommendations of Myers, Wolfe et al (40); Hepler et al (41) assessed the validity of the CES among 492 volunteer youth sport coaches from various sports including ice hockey, basketball, football, softball, volleyball, and soccer. A confirmatory factor analysis (CFA) was conducted, indicating that the CES was a marginally acceptable fit for the data, supporting previous findings regarding the validity of the CES (4, 40). Hepler et al (41) also explored the sources of coaching efficacy and how they predicted the coaching efficacy of youth sport coaches. Multivariate multiple regression and canonical correlation analyses indicated that more efficacious coaches had greater playing and coaching experience, perceived their players to have improved more throughout the season, and perceived they received more support than less efficacious coaches. This was particularly evident in regards to the technique and game strategy efficacy dimensions of coaching efficacy.

To extend the validity for the coaching efficacy measures derived from the CES, Myers, Feltz et al (42) also tested the condensed rating scale recommendations of the CES (40). This research, using 492 youth sport coaches, provided confirmatory cross-validation

evidence for the use of both 5-category and 4-category structures. It was concluded by the authors that when CES items are used to measure coaching efficacy, the 4-category structure is more suitable. The condensed 5-category structure of the CES recommended by Myers, Wolfe et al (40) was utilised in a study by Feltz et al (43), to examine the sources that predict the dimensions of coaching efficacy in volunteer youth sport coaches. The authors found that internal support and perceived player improvement positively predicted character building efficacy, and coaching experience, playing experience, internal support, and perceived player improvement positively predicted game strategy efficacy. Feltz et al (43) also found coaching experience, playing experience, player improvement and external support positively predicted technique efficacy. The results of this study support existing research, and also identify specific sources of coaching efficacy for the population investigated.

With coaching efficacy being an important variable in models of coaching effectiveness, Myers, Feltz, Chase et al (44) put forth a revised version of the CES (4) aiming to improve the measurement of coaching efficacy. The Coaching Efficacy Scale II—High School Teams (CES II-HST), was developed for head coaches of high school teams in accordance with the existing relevant literature and under the guidance of content experts. Myers, Feltz, Chase et al (44) added a new dimension of coaching efficacy within the CES II-HST, 'physical conditioning', and provided validating evidence for close model-data fit and for factorial invariance by gender of the coach.

Evidence in support of the validity of the CES II-HST was provided by Myers, Feltz et al (46) in a study investigating whether sources of coaching efficacy predict the measures derived from the CES II-HST. Analyses in this study found that the size of the effect sources had upon the dimensions of coaching efficacy differed by coach gender. In addition, each of the effects Myers, Feltz et al (46) identified were only significant for females. Career winning

percentage was found to have a positive effect on game strategy and physical conditioning, but motivation was negatively affected by the team's prior success. They reported that in comparison to male coaches, female coaches prior success was a stronger source of game strategy and motivation efficacy, and female coaches perceived skill of athletes was a stronger source of technique efficacy.

Using Structural equation modelling (SEM), Sullivan et al (47) assessed the predictive effects of coaching context and coach education on coaching efficacy using the CES II-HST (44). Analysis demonstrated no effect of coaching context on coaching efficacy, but revealed a moderate positive effect of coach education on coaching efficacy. Coaching efficacy was found to positively predict coach leadership behaviours, including: training and instruction, positive feedback, social support, and situational consideration. These findings provide support for the use of the CES II-HST and for the positive effect coach education has as a source of coaching efficacy upon total perceived coaching efficacy.

A substantive-methodological synergy was provided by Myers, Chase et al. (45), where a revised version of the CES (4) was developed for head coaches of youth sport teams in order to improve the measurement of coaching efficacy. Exploratory structural equation modelling (ESEM) was used to develop the CES II-YST. Myers, Chase et al (46) offered evidence for close model-data fit using single-group ESEM, and provided evidence for partial factorial invariance by coach gender using multiple-group ESEM.

A meta-analysis was conducted by Myers et al (48) to empirically amalgamate findings from existing literature in order to estimate relationships between the proposed sources and dimensions of coaching efficacy. A total of 20 studies were included in the analysis, with a total sample size across all studies equal to 3,597 participants, of which 76.93% were male. Overall, a positive relationship was found between the proposed sources

and each dimension of coaching efficacy, with each relationship ranging from small to medium in effect size. The analysis revealed coach gender and level coached moderated the overall relationship between the proposed sources of coaching efficacy and each of the dimensions. In each case, the relationship was stronger for female coaches in comparison to male coaches, and in the majority of cases, the relationship seemed to be strongest at the collegiate level. Findings from the meta-analysis provided some supporting evidence for the coaching efficacy model (4), in which the proposed sources of coaching efficacy relate to the dimensions of coaching efficacy. Providing reinforcement for the use of the model, and the revisions to the model that have been proposed, the work by Myers et al (48) suggests the model continues to be competent for determining the most important sources of coaching efficacy among different coaching categories and levels.

Athletes' perceptions of their coach

With Feltz et al (4) proposing that high levels of coaching efficacy lead to more effective coaching behaviours; the coaching efficacy model and the CES have also been used as a basis and measurement tool respectively, for research investigating athletes' perceptions of their coach. This category of research also uses Horn's (3) work and model of coaching effectiveness as a foundation, where coach behaviour is stated to influence athletes' perceptions of such behaviour, and these perceptions impact athletes' self-perceptions and ultimately an athletes' motivation and performance. So with the importance of athletes' perceptions being highlighted in effective coaching models, researchers have sought to investigate the various perceptions athletes have of their coach, and what impact this may have for certain athlete outcomes.

Smith et al (49) were among the first researchers to examine coach behaviours and

compare coach and athlete ratings. They found that the relationship between observed coaching behaviours and the coaches' perceptions of their behaviours were generally low and nonsignificant suggesting coaches had little awareness of how frequently they behaved in various ways. On the other hand, athletes' perceptions of coaching behaviours correlated more highly with observed coaching behaviour, with athletes preferring coaches who provided more technical instruction, reinforcement, and mistake contingent reinforcement behaviours. Kenow and Williams (50, 51) also assessed coach behaviours and athlete perceptions. They found coaches rated their behaviours more positively than athletes did. Further findings from this study were that athletes experiencing higher trait anxiety, higher state cognitive anxiety and lower state self-confidence evaluated their coach's behaviour more negatively than other athletes (50). Kenow and Williams (51) also found support for somatic anxiety and coach-athlete compatibility as variables associated with athletes' perceptions and evaluations of coaching behaviours. A study by Vargas-Tonsing et al (52) also compared coaches' and athletes' perceptions. This study used an alternative method to the CES to assess coaches' and players' perceptions of the frequency and effectiveness of efficacy enhancing techniques, finding that perceptions were generally incongruent between coaches and athletes.

Athletes' perceptions of coaching efficacy

One area One area of focus for research investigating athletes' perceptions of their coach, has been athletes' perceptions of their coach's efficacy, typically investigating either the comparison between athlete and coach perceptions (53, 54), or solely athlete perceptions of their coach (55, 56). With coaching efficacy being proposed as a central component of effective coaching, much of this area of research has been based upon the elements of the

coaching efficacy model proposed by Feltz et al (4). In a study by Short and Short (53), male football coaches' assessments of their coaching efficacy were compared with the perceptions of the athletes from the teams they coached. Following the last game of the season, Short and Short (53) administered the CES (4) to the coaches, and a modified version of the CES to the athletes. Analyses demonstrated that, on average, coaches rated themselves high on all coaching efficacy subscales and ultimately for total coaching efficacy. The majority of coaches (78%) rated themselves higher than their athletes did in terms of their total coaching efficacy, although all coach ratings fell within the 95% confidence interval of their athletes' ratings.

Using the CES (4) and a modified version of the CES (53), Teatro et al (54) investigated the relationships between American high school coaches' efficacy beliefs and stakeholders' views of coaching efficacy. They found that the coaches rated themselves significantly higher on all four efficacy domains compared to the ratings of athletes and parents, but there were no differences between athlete and parent scores. Further findings in this study were that although relatively high levels of coaching efficacy were reported by coaches, they reported the lowest efficacy for the motivation dimension, which was echoed by athletes who also scored coaches the lowest in motivation efficacy. The highest efficacy dimension reported by athletes in this study was of their perception of their coaches' character building efficacy.

Across three separate studies, Boardley et al (56) assessed the relationship between golfers' perceptions of their coach's motivation efficacy and golfers' task self-efficacy. As a collective, the three studies showed consistent and meaningful positive links between golfers' perceptions of their coach's motivation efficacy and their task self-efficacy. The strength of association ranged from weak-to-moderate in Study One, to moderate-to-strong in study 3. In

a study by Atkinson et al (55) examining the relationship among college soccer players' perceptions of their coach's efficacy and their team's efficacy, a canonical correlation analysis indicated the relationship to be statistically significant. Specifically, athletes' perceptions of their coach's motivation and game strategy efficacy were the most predictive of athletes' belief in their team's ability to prepare, persist and unite during competition. The overall consensus from the research regarding athletes' perceptions of their coach's efficacy matches the findings of research investigating coaches' self-reported coaching efficacy in terms of the positive athlete-related outcomes associated with higher coaching efficacy levels, and thus suggesting high efficacy coaches to be more effective coaches.

Athletes' perceptions of coaching competency

Athletes' perceptions of their coaches' competency has been an area of research where athletes' perceptions of their coach have been investigated. Coaching competency is an important element in models of coaching effectiveness (2), which makes the measurement of this construct a key focus area. Perceptions of coach competency represent 'athletes' evaluations of their head coach's ability to affect their learning and performance' (57). Much of the coaching competency research is derived from the work and findings of studies using the coaching efficacy model (4).

In a study examining athletes' perceptions of their coach's competency in college ice-hockey and football players, Myers, Feltz et al (57) found that coaching competency consists of the same four dimensions that make up coaching efficacy. Conceptualising that athletes' perceptions of their coach's competency are multidimensional and multilevel, Myers, Feltz et al (57) provided initial validation for the multidimensional measures of coaching competency derived from the coaching competency scale (CCS). Myers, Feltz et al

(57) created the CCS as an instrument to measure coaching competency by making minor revisions to the CES (4).

Further validating evidence for the multidimensional measures of coaching competency derived from the CSS, came from a study by Myers, Wolfe et al (58). This study examined the original rating scale structure for the CSS and found positive validity evidence for a condensed post hoc rating scale structure. Myers, Wolfe et al (58) also tested how the measures of coaching competency related to athletes' satisfaction with their head coach within and between teams. Athletes' perceptions of their coach's motivation competency had a moderate-to-large positive relationship with athletes' satisfaction with their coach at the athlete level, whereas no relationship was detected at the team level after controlling for athlete-level effects. In a sample of field hockey and netball athletes, Boardley and Kavussanu (59) examined the relationships between athletes' perceptions of their coach's character building competency (using the character building subscale of the CCS), athletes' perceived motivational climate, athletes' levels of moral disengagement, and the frequency of athletes' prosocial and antisocial behaviours in sport. Athletes' perceptions of their coach's character building competency was found to have very strong negative effects on antisocial opponent and team-mate behaviour, and a weak positive effect upon athletes' prosocial opponent behaviour. Moral disengagement fully mediated the effects of perceived character building competency on prosocial and antisocial opponent behaviours, and partially mediated antisocial team-mate behaviour.

A revised version of the CCS was developed for athletes of high school teams (APCCS II-HST) in a study conducted by Myers et al (60) to improve the measurement of athletes' evaluations of their head coach's coaching competency. Exploratory multilevel CFA provided evidence for close fit for a five-factor within-teams structure, and a one-factor

between-teams structure. Multigroup CFA provided evidence for factorial invariance, except for one for one residual variance, by athlete gender. Evidence for the predictive validity for the ability of the measures derived from the APCCS II-HST to predict satisfaction with the head coach was provided by a study by Myers, Beauchamp et al (61). This study assessed the relationship between athletes' perceptions of their coach's competency using the APCCS II-HST and satisfaction with the coach. Findings demonstrated that at the athlete-level, athletes' perceptions of their coach's motivation and technique competency had large positive statistically significant effects on athletes' satisfaction with their coach, explaining 51.8% of the variance. At the team-level, athletes' perceptions of their coach's total coaching competency had a large positive statistically significant effect on athletes' satisfaction with their coach, explaining 88.3% of its variance.

Bosselut et al (62) assessed relations between athletes' perceptions of their coach's technique and game strategy competency and four dimensions of role ambiguity in offensive and defensive contexts. Analyses highlighted that overall, when controlling for gender, status, and their interaction, increased ambiguity in offensive and defensive contexts was linked with increased criticality of coach's technique and game strategy competency. Specifically, findings showed that at the individual level in the offensive context, 12.86% of the variance in technique competency was explained by scope of responsibilities, 7.82% by role behaviors, 7.43% by role evaluation, and 6.90% by role consequences. At the individual level in the defensive context, 3.58% of the variance in technique competency was explained by scope of responsibilities, 6.10% by role behaviors and by role evaluation, and 1.86% by role consequences. Whereas, at the team-level, the variance in perceptions of technique competency was only explained by role evaluation in offensive (i.e. 12.89%) and defensive (i.e. 12.44%) contexts.

Analyses also demonstrated that at the individual level in the offensive context, 10.59% of the variance of game strategy competency was explained by scope of responsibilities, 6.72% by role behaviors, 8.15% by role evaluation, and 5.44% by role consequences. In the defensive context, 8.30% of the variance in game strategy competency was explained by scope of responsibilities, 9.30% by role behaviors, 8.44% by role evaluation, and 3.86% by role consequences. However, at the team-level, role behaviours (i.e. 1.69%), scope of responsibilities (i.e. 5.65%) and role evaluation (i.e. 10.45%) explained significant amounts of variance in perceptions of game strategy competency in the offensive context. Only role evaluation (i.e. 12.71%) explained variance in perceptions of game strategy competency in the defensive context.

Malete et al (35) examined the influence of athletes' perceptions of coaching competency on peer cheating and aggression. Analyses demonstrated that athletes' perceptions of their coach's game strategy competency was a weak but positive predictor of players' self-reported likelihood to aggress and peer cheating at the within-level. However, athletes' perceptions of their coach's character building competency were not associated with either anti-social behaviours. Re-analysing data from previous coaching competency studies (35, 60), Myers (63) provided a substantive-methodological synergy. This work demonstrated that the ESEM framework should be considered in subsequent validity studies for new and/or existing instruments (e.g. APCCS II-HST and CCS) in the psychology of sport and exercise. The findings from research investigating coaching competency suggest that positive athlete-related outcomes are associated with more competent coaches, and thus suggesting highly competent coaches to be more effective coaches. The research findings have also highlighted the need for the measurement of athletes' evaluations of their coach's competency within the conceptual models of effective coaching.

Athletes' perceptions of coaching effectiveness

The effective coaching literature has been heavily dominated by research using the coaching efficacy model as a foundation. The dimensionality of the coaching efficacy model (4) and the use of the CES (4) and it's adaptations (44, 60) have been heavily supported over the past two decades of research investigating both coaching efficacy and coaching competency. This framework and measurement tool, as well as conceptual models of coaching effectiveness (2, 3), have also been supported when athletes' perceptions of their coach's effectiveness have been studied (6, 10, 13).

Kavussanu et al (10) conducted a study investigating athletes' perceptions of coaching effectiveness and coaches' reported coaching efficacy, comparing between the two and also examining predictors. British university athletes ($n = 291$) and their head coaches ($n = 26$) from eight individual and seven team sports participated in the study. Kavussanu et al (10) modified the CES to assess athletes' perceptions of their coach's effectiveness. The stem from the original CES was altered to "How effective is your coach in his/her ability to…", with athletes rating how effective they perceived their coach to be for the 24 items of the original CES (4). Findings from the study showed that sport experience of the athlete negatively predicted their perception of their coach's effectiveness for overall coaching effectiveness and for all four dimensions of coaching efficacy. In other terms, the more experience an athlete had, the lower they rated their coach's effectiveness. Effect sizes were small to small-to-medium for this finding, with the finding explained through the assumption that athletes with increased sporting experience are more likely to have been exposed to a greater variety of coaching styles and behaviours that may facilitate a more critical evaluation

of coaches. Kavussanu et al (10) found no effect of athlete sex on athletes' perceptions of their coach's effectiveness for any dimension of coaching effectiveness. This is contrasting to Horn's model of coaching effectiveness (2), which proposes athlete sex may influence athletes' perception of their coach's behaviour.

Another finding from this study is that coaches rated themselves significantly higher regarding overall coaching efficacy and for all coaching efficacy dimensions in comparison to their athletes ratings of coaching effectiveness. For example, 42% and 58% of the coaches' rated themselves higher regarding the motivation and technique constructs respectively, in comparison to their athletes' ratings. This finding is consistent with the work of Short and Short (53), and also suggests that coaching efficacy levels do not necessarily transfer to athletes, so consideration of athletes' perceptions of their coach is also required. A further finding from this study was that a mismatch in sex between coach and athlete negatively predicted perceived motivation, and character building. When athletes were coached by coaches of the opposite sex, they perceived their coach to be less effective on the two aforementioned dimensions in comparison to athletes who were coached by coaches of the same sex. It is thought that this may potentially be due to differing instructional and behavioural preferences between males and females.

Kavusannu et al (10) also found that athletes from individual sports rated their coaches as more effective in technique effectiveness compared to team-sport athletes, however ratings did not differ between individual and team-sport athletes for the three other coaching effectiveness dimensions. It was suggested that this finding may be due athletes from individual sports receiving more one-on-one coaching than those in team sports, resulting in individual athletes experiencing more frequent coaching of technique and skills.

Boardley et al (13) used the adapted CES (10) to measure male rugby union players'

perceptions of their coach's effectiveness. They investigated the players' perceptions of their coach on the dimensions of coaching effectiveness as predictors of numerous athlete-level outcomes. Regression analyses (controlling for playing experience) identified players' perceptions of their coach's motivation effectiveness positively predicted player effort, commitment and enjoyment, with small-to-medium effect sizes. Players' perceptions of their coach's technique effectiveness positively predicted players' task self-efficacy, and perceptions of their coach's character building effectiveness positively predicted prosocial behaviours within players (small effect sizes). These findings highlight the positive relationship that exists between players' perceptions of coaching effectiveness and athlete-level outcomes, where perceiving the coach to be high in effectiveness makes athletes more likely to demonstrate or experience desired outcomes to aid or enhance performance or positive behaviour. As well as offering comparative and validating findings to the initial work of Feltz et al (4), and support for the coaching efficacy model (4), this study by Boardley et al (13) also identifies the importance of assessing each dimension of coaching effectiveness separately, with each dimension relating to different athlete-level outcomes.

Other studies using the adapted version of the CES (10) to investigate athletes' perceptions of coaching effectiveness include the work of Broodryk and Van Den Berg (64) and Broodryk et al (14). When investigating high school rugby players' perceptions of their coach's effectiveness, Broodryk and Van Den Berg (64) found that the coaches from larger schools were rated average by players for all coaching effectiveness dimensions except for motivation effectiveness which players perceived their coach to be below average. The players from smaller schools reported their coach to be average for all coaching effectiveness dimensions. Results from the study by Broodryk et al (14) echoed the previous findings of Short and Short (53) and Kavussanu et al (10) indicating that coaches and players'

perceptions on coaching effectiveness differ. In this study, Broodryk et al (14) found that 62% of coaches rated themselves higher than their players' perceived them to be in terms of their coaching effectiveness.

Research by Kassim and Boardley (6) investigated whether athlete perceptions of coaching effectiveness predicted athlete-level outcomes in team and individual sports cross-culturally. In this study, the outcomes assessed were the four athlete-level outcomes of effective coaching outlined by Côté and Gilbert (1). Hierarchical multiple regression analyses (controlling for sex, sport expereince and sport type) indicated that athletes' perceptions of their coach's motivation effectiveness positively predicted athletes' perceived sport confidence and connection with their coach. Athletes' perceptions of their coach's technique effectiveness positively predicted athletes' sport competence, and athletes' perceptions of their coach's character building effectiveness positively predicted athletes' moral identity, an indicator of character. Effect sizes of the findings were consistently larger in the Malaysia sample compared to the UK sample. By linking coaching effectiveness perceptions with athlete-level outcomes, the findings of this study offer support for the conceptual framework outlined by Côté and Gilbert (1), whereby effective coaching should result in the positive development of athletes' competence, confidence, connection and character.

Summary of key findings from within the literature

This review demonstrated the numerous ways that effective coaching has been investigated within the coaching science literature. The systematic literature search revealed 46 papers investigating effective coaching. These studies were then categorised based upon whether they assessed coaches' perceptions of coaching efficacy utilising the original

coaching efficacy scale proposed by Feltz et al (4), evaluated and/or revised the original CES (4), or assessed athletes' perceptions of their coach.

As a whole, the reviewed studies utilising the original CES offered support for a number of sources of coaching efficacy. For example, positive relationships were found between coaching experience and coaching efficacy (4, 26, 27, 30, 37). Next, coach education was found to be a positive predictor of coaching efficacy (24, 25). Also, higher levels of coaching efficacy were found for coaches with a greater career winning percentage (4, 37). The reviewed studies also revealed perceived athlete-ability (4) and team-ability (4, 37) were positively linked with coaching efficacy. School support (4), community support (4, 37), and parental support (37) were identified as positive predictors of coaching efficacy. Additionally, emotional intelligence was found to be a positive predictor of coaching efficacy (29, 38). Finally, it was found that higher levels of coaching efficacy were predicted by imagery use (28).

Support for numerous outcomes of coaching efficacy has also been provided in the studies reviewed utilising the original CES. For example, higher winning percentages and higher levels of player satisfaction were found for high-efficacy coaches in comparison to low-efficacy coaches (4). High-efficacy coaches were also found to display more frequent praise and encouragement behaviours, and less instructive and organisational behaviour than low-efficacy coaches (4). No differences were identified between high and low efficacy coaches in terms of their commitment to coaching, amount of perceived coaching effort and their use of punishment and control behaviours (4). Motivation and technique dimensions of coaching efficacy were found to be significant predictors of coaches' training and instruction engagement, as well as positive feedback behaviours (31). Game strategy efficacy positively predicted athletes' likelihood to aggress in one study (34), but not in another (35). Game

strategy efficacy was also found to positively predict team performance and atmosphere (36). One study identified a positive relationship between coaching efficacy and leadership style (38), with another identifying that technique efficacy specifically, predicted player perceptions of coach leadership style (36). Further studies showed that commitment to coaching (32) and team-efficacy (33) were positively predicted by coaching efficacy. Gender match or mismatch between athletes and coaches was identified to be a moderator of coaching efficacy outcomes (37). Specifically, Myers, Vargas-Tonsing et al (37) found that total coaching efficacy positively predicted coaching behaviour, team satisfaction and winning percentage for men's teams. However, total coaching efficacy predicted only coaching behaviour across women's teams with female coaches.

An evaluation of the psychometric properties of the original CES recommended a reduced category rating scale structure (40), with support for the condensed rating scale of the CES being provided (41, 42). Studies employing the condensed rating scale identified playing and coaching experience, perceived player improvement, and perceived support to be sources of coaching efficacy (41, 43). The CES II-HST (44) and CES II-YST (45) were proposed as revised versions of the original CES to improve the measurement of coaching efficacy. Utilisation of the CES II-HST identified career winning percentage was positively linked to game strategy and physical conditioning efficacy, but teams' prior success had a negative relationship with motivation efficacy, with significant effects evident for female coaches only (46). Further utilisation of the CES II-HST found coach education positively predicted coaching efficacy, and coaching efficacy positively predicted coach leadership behaviours (47). A meta-analysis supported positive relationships between the sources and dimensions of coaching efficacy proposed in the coaching efficacy model (4), and identified coach gender and level coached moderated the overall relationship.

Studies investigating athletes' perceptions identified differences between coach and athlete perceptions of effective coaching (10, 50-54), with coaches generally rating themselves higher. Further, the reviewed studies highlighted a range of outcomes that result from athletes' perceptions of their coach. With regards to athletes' perceptions of coaching efficacy, positive links were found between golfers' perceptions of their coach's motivation efficacy and task self-efficacy (56). A positive relationship was also found between athletes' perceptions of coaching efficacy and their team's efficacy.

With regards to athletes' perceptions of coaching competency, athletes' perceptions of their coach's motivation (58) and technique (58, 61) competency were found to be positive predictors of athletes' satisfaction with their coach. Also, a negative relationship was identified between athletes' perceptions of their coach's character building competency and antisocial opponent and team-mate behaviour (59). One study found a negative relationship between athletes' perceptions of their coach's technique and game strategy competency and role ambiguity (62). Another study identified that athletes' perceptions of their coach's game strategy competency positively predicted players' self-reported likelihood to aggress and peer cheating (35).

With regards to athletes' perceptions of coaching effectiveness, it was found that athletes' sport experience negatively predicted their perception of their coach's effectiveness (10). Studies have also highlighted multiple outcomes that result from athletes' perceptions of coaching effectiveness. For example, rugby players' perceptions of their coach's motivation effectiveness positively predicted player effort, commitment and enjoyment (13). Additionally, their perceptions of their coach's technique effectiveness and character building effectiveness positively predicted players' task self-efficacy and prosocial behaviours respectively (13). Another study found that athletes' perceptions of their coach's motivation

effectiveness positively predicted athletes' perceived sport confidence and connection with their coach. This study further identified that athletes' perceptions of their coach's technique and character building effectiveness positively predicted athletes' sport competence and moral identity respectively (6). These findings therefore demonstrate the variety in which effective coaching has been investigated, especially regarding the many sources that impact upon and the multiple outcomes that result from effective coaching.

Limitations of the literature

Despite helping to extend and improve coaching science by further developing the understanding of effective coaching behaviours, including their sources and outcomes, the reviewed literature is not without limitations. Firstly, one limitation is that despite efforts such as the integrative definition of coaching effectiveness proposed by Côté and Gilbert (1), research has not consistently followed a shared conceptual understanding of coaching effectiveness. In particular, there has been a diverse range of ways in which effective coaching has been explored with regards to sources, dimensions and outcomes. This has also meant that there has been a lack of precise and consistent terminology used throughout the research in this field (1). For example, the terms 'effectiveness' and 'efficacy' have not always been used in a consistent manner across studies. Coaching effectiveness has typically been used when referring to athlete outcomes of effective coaching, and the ability of coaches to implement their knowledge and skills to influence such outcomes, with athletes' perceptions of their coaches' behaviours acting as a critical variable (1, 13). Whereas, coaching efficacy refers to coaches' own beliefs of their own knowledge and skills, and what they can do with them (4, 13). However, there have been studies that have used the term 'efficacy' to assess athletes' perceptions of their coaches' behaviours when in fact

'effectiveness' may have been more appropriate (53-56).

A second limitation of the reviewed literature is that the majority of studies have used self-report measures to collect data, which means the accuracy of the findings of these particular studies are in part reliant on the honesty of participants, as well as participants' introspective ability to provide an accurate response to questionnaire items. Even with the use of fully validated measures, there is still a possibility that findings from studies employing self-report techniques were affected by issues including social desirability (67, 68) and method effects such as anchoring effects, primacy and recency effects, time pressure, and consistency motivation. (69).

A third limitation is that many of the studies in the reviewed literature have used a cross-sectional design, collecting data at single time-points. Although this design method is useful for conducting initial exploratory studies and identifying prevalences of outcomes within populations at a given time point, such designs are limited in that they are unable to establish cause and effect relationships between study variables (70, 71).

Another limitation concerns the studies reviewed comparing coach and athlete ratings (10, 50-54). Such studies have only identified that differences may exist between perceptions of effective coaching behaviours; they have not identified what the implications of such differences may be. Understanding the reasoning behind and the impact of differing perceptions between coaches and athletes regarding effective coaching behaviours is important for both coaches and athletes to ensure optimal coach-athlete functionality and the achievement of positive coach and athlete outcomes.

A final limitation of the reviewed literature is that although reliable and valid, the measurement scales that have been developed to assess effective coaching mainly focus on coaches' professional knowledge. These scales do not include subscales that completely

reflect the forms of interpersonal or intrapersonal knowledge deemed necessary for coaching effectiveness based on the integrative definition proposed by Côté and Gilbert (1). Therefore, the literature has not specifically investigated all elements of coaching effectiveness, and the impact of such dimensions for each of the four athlete-level outcomes outlined as outcomes of effective coaching by Côté and Gilbert (1).

Lastly, even though the review was based on a comprehensive systematic search of four relevant electronic databases, the review itself is not without its own limitations. It is possible that there is some published literature that may not have been identified and included in this review. There may also have been research studies conducted but not published by researchers due to finding non-significant or weak effects between study variables, resulting in the review potentially having a degree of bias towards studies reporting significant and stronger effects. The review should therefore be interpreted with this in mind.

Future research

To help address the limitations identified within the existing literature, future research should look to follow a consistent and shared conceptual and methodological approach to continue to move the field of literature forward. Aligning individual studies within an integrative theoretical framework of effective coaching will enable the integration of findings and result in a more coherent understanding of effective coaching. This will then allow coaching practice to advance and ultimately lead to athletes and coaches experiencing more positive and beneficial outcomes in sport coaching environments. The integrative definition of coaching effectiveness proposed by Côté and Gilbert (1) is recommended as an avenue for such cohesion of future studies, where consideration should be given to all elements suggested within the definition (i.e. coaches' knowledge, athletes' outcomes and coaching

contexts). Future studies should continue to refine existing models of effective coaching, and validate measures in a variety of different samples.

Future research should look to employ more experimental and longitudinal research designs to examine relationships between variables, testing the causal nature between sources, dimensions and outcomes of effective coaching proposed in conceptual models. For example, aspects of effective coaching could be manipulated (e.g. through coach development programmes) to determine their effect on athlete outcomes. Utilisation of longitudinal designs will allow for the temporal ordering of the effects identified between variables to be investigated. Alternative or additional methods of assessment such as other-report and objective measures should also be considered in future research investigating the sources, dimensions and outcomes of effective coaching.

To further address the limitations highlighted within the existing effective coaching literature, future research should develop a measurement scale that incorporates assessment of professional, interpersonal and intrapersonal forms of coach knowledge, deemed essential for coaching effectiveness (1). This will allow future studies to investigate all proposed elements of effective coach knowledge and the impact each form of knowledge has upon specific athlete outcomes, particularly the 4C's, which have been highlighted as desirable outcomes in the effective coaching literature (1, 5).

Conclusion

The aim of this review was to provide an up-to-date and comprehensive overview of the effective coaching literature. This review highlights that the field is in its infancy, and there are many ways that effective coaching can be assessed and explored. This review offers a framework identifying the revisions made within the literature and how effective coaching has been narrowed down over time into key areas. It has been identified within this review that there are two main areas of the effective coaching literature. One is coaches' perceptions of their own coaching behaviour. This can be broken down into sub-areas focusing on the sources and outcomes of coaches' perceptions of coaching efficacy. The other main area of effective coaching is athletes' perceptions of their coach's behaviour. This area can be broken down into sub-areas focusing on the sources and outcomes of athletes' perceptions of coaching efficacy, competency and effectiveness.

Although the reviewed literature offers significant information and insight with regards to the importance of coaching behaviours (e.g. in shaping an athlete's psychological development and well-being), it does highlight some limitations that exist within the existing literature. From a systematic review or meta-analysis perspective, the literature is not yet at a point where we could meta-analyse or systematically review the literature and gain much from it. This is because there is little alignment across the few studies with regards to the specifics of how effective coaching is being explored. The assessment of coaching efficacy, competency, and effectiveness, and the perspective from which they have been assessed (i.e. coach or athlete) has consisted of multiple measurements being used across studies to assess a range of sources and outcomes of effective coaching.

To help continue and advance the important research conducted thus far in this

domain, a consistent and shared conceptual and methodological approach is needed for the

way that effective coaching is assessed to further enhance our understanding of effective

coaching. It appears that the field of literature is now taking steps forwards in achieving this,

as further refinements are made to the models and the validation of measures in multiple

different samples. As the field matures, it will enable more coherence around the different

key areas of effective coaching and allow the use of consistent measures so we then can start

to see how effective coaching and the frameworks that have been proposed actually influence

positive developmental outcomes for athletes and coaches.

CHAPTER III

Study One: Development of Youth Coaching Effectiveness Scale

Introduction

Coaching effectiveness has been recognised as an important construct for positive youth development within the sporting environment. Coaches are key figures within youth sport programmes, so understanding what makes a coach 'effective' is critical to ensuring optimal developmental provisions for youth athletes (1, 6, 7, 10). Through their knowledge and behaviours, effective coaches exert a positive influence on their athletes (2, 11, 12), enhancing athlete learning, performance, and personal development. Effective coaching improves the overall development of athletes, including sport specific skills and knowledge, psychological well-being, moral development, and athletes' perceived sporting ability (1, 2, 14). So with the importance of coaching effectiveness being identified within the coaching science literature, research has attempted to determine effective coach behaviours and the impact of such behaviours for particular athlete outcomes. The increasing attempts to understand effective coaching has resulted in studies adopting a variety of research methods, and a lack of precision in terminology existing across studies. This has resulted in the need for a clear and precise conceptualisation and measurement of coaching effectiveness to be developed.

Côté and Gilbert (1), proposed an integrative definition of coaching effectiveness "the consistent application of integrated professional, interpersonal, and intrapersonal knowledge to improve athletes' competence, confidence, connection, and character in specific coaching contexts". They suggest coaching effectiveness consists of three key components: coaches' knowledge, athletes' outcomes, and coaching contexts. The coaches' knowledge component includes three forms of knowledge: professional (sport-specific knowledge), interpersonal (interaction with others) and intrapersonal (understanding of oneself and the ability for

introspection and reflection). The athletes' outcomes component includes four athlete-level

outcomes that should be developed as a result of effective coaching: competence, confidence,

connection and character. Together, these outcomes represent the 4C's framework of positive

youth development, but have been modified within this integrative definition to reflect the

sporting context. Côté and Gilbert (1) referred to 'Competence' as sport specific technical

and tactical skills, performance skills, improved health and fitness and healthy training

habits.'Confidence' was defined as an internal sense of overall positive self-worth.

'Connection' was identified to be the development of positive bonds and social relationships

with people inside and outside of sport. Finally, 'character' was identified as having respect

for the sport and others (morality), integrity, empathy and responsibility. The third and final

component of the proposed integrative definition, coaching contexts, includes four different

sport settings in which coaching can take place. The four contexts are based on a

participation-performance continuum and the developmental spectrum of athletes from

children to adults: participation coaches for children (sampling years), participation coaches

for adolescents and adults (recreational years), performance coaches for young adolescents

(specialising years), and performance coaches for older adolescents and adults (investment

years). This integrative definition suggests that the 4C's remain fixed indicators of athlete

outcomes and coaching effectiveness, even though the type of coach knowledge required for

effective coaching varies for different sporting contexts.

To date, studies investigating effective coaching behaviour have developed and used

several different measurement tools (4, 10, 44). Many of these measures used within the

literature to investigate effective coach behaviour stem from the coaching efficacy model and

the coaching efficacy scale (CES) proposed by Feltz et al (4). The coaching efficacy model is

a framework that considers factors central to the coaching process. Coaching efficacy was

defined by Feltz et al (4) as 'the extent to which coaches believe they have the capacity to affect the learning and performance of their athletes'. The model consists of four dimensions that contribute to a coach's total coaching efficacy: motivation, game strategy, technique and character-building. Motivation efficacy refers to the confidence coaches have in their ability to affect the psychological skills and motivational states of their athletes. Game strategy efficacy relates to the confidence coaches have in their ability to coach during competition and lead their team to a successful performance. Technique efficacy is the belief coaches have in their instructional and diagnostic skills. The last dimension, character-building efficacy, concerns the confidence coaches have in their ability to influence the personal development of their athletes and promote a positive attitude towards sport. The coaching efficacy model proposed that the dimensions are influenced by certain sources, including the extent of coaching experience and preparation, prior success, perceived skills of athletes, and perceived social support from schools and the community. The model also suggests there are a number of desirable outcomes for athletes and coaches that result from high levels of coaching efficacy. These include higher levels of athlete and team satisfaction, increased athlete and team performance, and higher levels of athlete and team efficacy.

The CES developed by Feltz et al (4), is a 24-item scale that has been frequently used within the literature to determine coach perceptions of their own coaching efficacy (4, 10, 24-39). When developing the scale, Feltz et al (4) found that confirmatory factor analysis supported the four dimensions of the CES, with marginal support also found for a general coaching efficacy factor that explained the intercorrelations among the first-order factors. Although there have been studies to support the reliability and validity of the CES (4, 25, 37), there have been studies that have suggested modifications may be necessary to improve the measure. For example, a reduced category rating structure was recommended by Myers,

Wolfe et al (40) when evaluating the psychometric properties of the instrument from previously collected data on high school and college coaches. Another example of an attempt to improve the measurement of coaching efficacy is the development of the coaching efficacy scale II-high school teams (CES II-HST). To develop this scale, Myers et al (44) revised the original CES, collecting data from 799 high school coaches of 14 high school sports. Using exploratory factor analysis with a subset of the sample, an 18-item scale was developed. This scale included the addition of a new dimension of coaching efficacy, 'physical conditioning'. A single-group confirmatory factor analysis was conducted which proposed evidence for close model-data fit. Myers et al (44) also conducted a multigroup CFA, which provided evidence for factorial invariance by gender of the coach. Support for the CES II-HST was provided by studies investigating the predictive effects of sources of coaching efficacy upon the coaching efficacy dimensions (46, 47).

Models of coaching effectiveness suggest that a coach's behaviour affects an athletes' perception of the coach's behaviour. The perception formed by athletes of their coach's behaviour affects athletes' self-perceptions and as a result athlete's own motivation and performance are affected. The highlighted importance of athlete perceptions has resulted in the original CES being adapted to measure athlete perceptions of their coaches behaviour. The CES has been adapted in order to assess athletes' perceptions of coaching efficacy (53-56), and perceptions of coaching competency (35, 57-63). By making minor revisions to the CES, Myers et al (57) developed the Coaching Competency Scale (CCS) to measure coaching competency. The dimensions of coaching efficacy, motivation, technique, game strategy and character-building make up the subscales of the CCS. Using a confirmatory factor analysis approach to model-data fit, Myers et al (57) provided initial validity evidence for multidimensional measures of coaching competency derived from the CCS. Further

support for the validity of the CCS has been provided by studies assessing athletes'

perceptions of their coach's competency and the impact such perceptions have for

athlete-level outcomes (35, 58, 59). Another measurement tool, the athletes' perceptions of

coaching competency scale II-high school teams (APCCS II-HST), has been developed and

used within the coaching literature. This scale was developed by Myers et al (60), guided by

the CSS (57), CES (4) and CES II-HST (44). The scale was developed in an attempt to

improve the measurement of athletes' perceptions of their coach's coaching competency.

Multilevel confirmatory factor analysis provided evidence for close data-model fit of an

oblique five-factor within-team structure, and a one-factor between-teams structure,

maintaining the five subscales used within the CES II-HST (44).

The concept of coaching efficacy has been particularly influential in guiding coaching

effectiveness research. One measurement tool that has been developed to assess athletes'

perceptions of their coach's effectiveness is the modified version of the CES proposed by

Kavussanu et al (10). This scale asks athletes to rate how effective they perceive their coach

to be for the 24 items of the original CES. Kavusannu et al (10) used confirmatory factor

analysis to test the factor structure of the modified scale, and found that the adapted scale

maintained the same factor structure as the original instrument developed by Feltz et al (4).

All 24 items were used in the modified version of the CES to specify the same intercorrelated

four first-order factors found in the original CES (4). Moderate to high correlations found

between each factor, with the model achieving an acceptable fit to the data. With the

construct consisting of interrelated factors, Kavusannu et al (10) then examined whether the

four first-order factors were subsumed under a second-order factor, finding the fit of the

second-order model similar to that of the first-order model.

Kavussanu et al (10) used the scale to assess predictors of athletes' perceptions of coaching effectiveness, and to examine whether athletes' perceptions of coaching effectiveness and coaches' perceptions of their coaching efficacy differ. One finding from the study was that the sport experience of the athlete negatively predicted athletes' perception of their coach's effectiveness for overall coaching effectiveness and for all four dimensions. Another finding from this study was that coaches rated themselves significantly higher regarding overall coaching efficacy and for all coaching efficacy dimensions in comparison to their athletes ratings of coaching effectiveness. Findings also showed that a mismatch in sex between coach and athlete negatively predicted perceived motivation, and character building. A further finding was that coaching experience positively predicted technique efficacy and sex of coach predicted game strategy efficacy. Male coaches in the sample reported significantly higher game strategy efficacy than their female counterparts, and athletes from individual sports rated their coaches as more effective in technique effectiveness compared to team-sport athletes. The adapted CES proposed by Kavusannu et al (10) has been used in a number of different research studies investigating athletes' perceptions of coaching effectiveness (6, 13, 14, 64). One study using Kavussanu et al's (10) adapted version of the CES is Boardley et al's (13) work investigating male rugby unions players' perceptions of their coach's effectiveness as predictors of athlete-level outcomes. They found players' perceptions of their coach's motivation effectiveness positively predicted player effort, commitment and enjoyment, and that players' perceptions of their coach's technique effectiveness positively predicted players' task self-efficacy. They also found that players' perceptions of their coach's character building effectiveness positively predicted prosocial behaviours within players. Research by Kassim and Boardley (6) used Kavussanu et al's (10) adapted CES to investigate whether athlete perceptions of coaching

effectiveness predicted athlete-level outcomes in team and individual sports cross-culturally. Results from the study indicated that athletes' perceptions of their coach's motivation effectiveness positively predicted athletes' perceived sport confidence and connection with their coach. Results also showed that athletes' perceptions of their coach's technique effectiveness positively predicted athletes' sport competence, and that athletes' perceptions of their coach's character building effectiveness positively predicted athletes' moral identity.

Youth sport is a unique context that offers an opportunity to facilitate many developmental outcomes, with coaches playing an important role in facilitating these outcomes through their coaching behaviours (72). The interactions that occur between coaches and their athletes can have important implications for an athletes' development, including their performance, participation and personal development (73). The effectiveness of a coach's interaction with their athletes represents the coach's level of interpersonal knowledge, a form of knowledge proposed by Côté and Gilbert (1) to be important for effective coaching. Interpersonal knowledge can be linked to the transformational leadership theory; an avenue of research with follower-centered origins and an emphasis on followers' performance and personal development (74). Transformational leadership theory echoes the fundamental aim of effective coaching in facilitating an athlete's acquisition of positive developmental outcomes (1). This shared goal, and the relation to interpersonal knowledge, suggests that transformational leadership behaviours may be linked to coaching effectiveness and form part of effective coaching.

Transformational leadership is a follower-centered form of leadership, in which leaders develop followers to their fullest potential by expanding and enriching followers' capacities through personal, emotional, and inspirational exchanges (75, 76). Through their behaviours, transformational sport coaches facilitate optimal athlete learning and

development (77, 78). Transformational leadership has been conceptualised to consist of four dimensions referred to as the 4I's: idealised influence, inspirational motivation, intellectual stimulation, individual consideration (79). 'Idealised influence' refers to gaining an athlete's trust and respect by acting as a positive role model. 'Inspirational motivation' involves inspiring athletes with a compelling vision of the future by fostering perceptions of meaning and team unity. 'Intellectual stimulation' can be defined as the encouragement of critical thinking and creativity through the engagement of athletes in the learning process. 'Individual consideration' represents the genuine care and concern for each athlete's unique needs and abilities (74).

Various tools have been developed to measure transformational leadership behaviours, including the Multifactor Leadership Questionnaire (MLQ) (80), the MLQ-5X (adaptation of the MLQ) (81), and the Transformational Leadership Inventory (TLI) (82). Based on items from the TLI (82) and items from the MLQ-5X (81), Hardy et al (83) developed a Differentiated Transformational Leadership Inventory (DTLI) for the military setting. Using confirmatory factor analysis, Hardy et al (83) identified the scale demonstrated an adequate factor structure. Using an adapted version of the DTLI (83), Callow et al (84) measured transformational leadership within an adult population in a sporting context. The adapted DTLI (84) was shown to be a valid and reliable instrument that could be used to measure seven key areas of coach transformational leadership behaviour; individual consideration, inspirational motivation, intellectual stimulation, fostering acceptance of group goals and teamwork, high performance expectations, appropriate role model, and contingent reward. Vella et al (85) validated the adapted version of the DTLI within a participation youth sport context. They presented the Differentiated Transformational Leadership Inventory for Youth Sport (DTLI-YS), which retained six of the subscales proposed by

Callow et al's (84) adapted DTLI. In a sample of 322 athletes aged between 11 and 18 years, Vella et al (85) conducted a confirmatory factor analysis, finding that the DTLI yielded an underlying factor structure that fell short of cut-off criteria for adjudging model fit. This resulted in theoretical and data-driven changes to the DTLI, with the revised version of the DTLI proving to be a good fit for the obtained data in a subsequent confirmatory factor analysis. The DTLI-YS development by Vella et al (85) provides a measure of specific coaching behaviour that are strong predictors of positive developmental outcomes for young athletes.

There are numerous studies across a range of domains that demonstrate the potential benefits of transformational leadership (86). Research specifically focusing on the sporting domain has shown that a coaches' transformational leadership behaviour is positively correlated with athletes' satisfaction with their coach, and the effort that athletes put into training (77). Transformational coach leadership has also been found to result in higher levels of athlete intrinsic motivation, commitment, task and social cohesion, performance, collective efficacy, well-being, and intra-team communication (77, 78, 84, 87-92). The research investigating transformational leadership in a youth sport setting suggests that the components of transformational leadership play a key role in determining positive developmental outcomes for young athletes (85). The culmination of this research has led to the conclusion that coaches engaging in transformational leadership behaviours should be viewed as more effective coaches, and that transformational leadership is extremely important within a youth sport context (78).

Another area of research within the coaching science literature that can be linked to coaching effectiveness is the topic of coach reflection. Studies have investigated the influence of a coach's self-reflection upon coach development (93-98), highlighting the importance of

intrapersonal knowledge. Intrapersonal knowledge is one of the three forms of knowledge that make up the coaches' knowledge component of Côté and Gilbert's (1) integrative definition of coaching effectiveness. Intrapersonal knowledge represents a coach's understanding of themselves, and an ability for introspection and reflection during and post coaching scenarios and events.

The Self-Reflection and Insight Scale (SRIS) (99) is a measurement tool that has been used to assess intrapersonal knowledge across different domains. The SRIS was developed across a series of studies. The first study reported on an initial factor analysis, finding the scale comprised two separate factors of Self-Reflection (SRIS-SR) and Insight (SRIS-IN). Analyses found that "need for self-reflection"and "engagement in self-reflection" loaded on the same factor, suggesting that these logically autonomous factors appear to be separately related (99). The second study examined test-retest reliability, and found strong, positive test-retest correlations over seven weeks for SRIS-SR and SRIS-IN factors. The final study examined convergent validity, finding that the SRIS-IN demonstrated good convergent and discriminant validity, and that there were positive correlations between the SRIS-SR and measures of anxiety.

Within the sport setting, the SRIS has been proposed as a potentially valid and reliable way to assess a coach's intrapersonal knowledge as an element of their coaching effectiveness (100). Determining and developing a coach's intrapersonal knowledge is important for coaching effectiveness, as a coach's openness to continued learning and self-reflection can have a considerable impact upon an athlete's development. More effective coaches have a better understanding of their coaching environment, assessing and being able to recognise what specific parts of their coaching drills and interactions work best for enhancing athlete development. Coaches with a greater level of intrapersonal knowledge may

review what has taken place within their coaching sessions, and consider adapting their coaching practices and behaviours to best suit athletes' sport-specific and psycho-social skill development.

Currently, a reliable and valid instrument measuring coaching effectiveness that assesses all forms of coach knowledge (professional, interpersonal, intrapersonal) proposed by Côté and Gilbert (1) to be elements of coaching effectiveness does not exist. The purpose of this research was to develop a comprehensive other-report measure of youth athletes' perceptions of their coach's effectiveness. The development of such an instrument should make an important contribution to the literature because it will allow research that fully captures the concept of coaching effectiveness in different sports and thereby produce more generalisable findings across youth sporting environments. For this study, it was hypothesised that the developed scale would show satisfactory psychometric properties in terms of factorial structure and reliability. It was further hypothesised that there would be a correlational relationship between the subscales of coaching effectiveness.

Methodology

Initial scale construction

To determine youth athletes' perceptions of their coach's effectiveness, the Youth Coaching Effectiveness Scale (YCES) was developed. The initial stages of the scale development involved a review of the effective coaching literature. From this review, a list of 33 items were generated that intended to measure the three areas of coaching knowledge (professional, interpersonal, and intrapersonal) proposed by Cote and Gilbert (1) to be critical to coaching effectiveness. The items generated for use in the YCES were derived from existing reliable

scales that have been used in the coaching science literature, including: the modified CES

(10), the CES II-HST (44), the DTLI-YS (85), and the SRIS (99). Items formed subscales of

technique effectiveness (CES), game strategy effectiveness (CES), and physical preparation

effectiveness (CES II-HST), representing athletes' perceptions of their coach's professional

knowledge. To measure athletes' perceptions of their coach's interpersonal knowledge, items

also formed the following subscales: individual consideration effectiveness (DTLI-YS),

intellectual stimulation effectiveness (DTLI-YS), and fostering acceptance of group goals

effectiveness (DTLI-YS). Finally, items also formed a self-reflection effectiveness (SRIS)

subscale with the intention of measuring athletes' perceptions of their coach's intrapersonal

knowledge. The items were, with minor word changes where necessary, the same as those

used in the original scales. The items were preceded by the generic stem "how effective is

your coach in his/her ability to..," with participants responding on a 9-point Likert scale

ranging from 1 (not at all effective) to 9 (extremely effective). Higher values represented

higher levels of perceived coaching effectiveness. This format is congruent with other

measures of coaching effectiveness, coaching efficacy and transformational leadership used

in the coaching science literature. Table 3 shows the items of the YCES.

Participants

Three hundred and fifty four ($n = 354$) youth athletes ($n = 88$ female, $n = 266$ male)

participated in the study. Participants were aged between 11-19 years (M = 15.3 , SD = 1.5

years) and competed in a range of team ($n = 324$) and individual ($n = 30$) sports. Participants

were asked to report their primary sport with the majority playing football ($n = 270$). Other

team sports such as rugby ($n = 9$), netball ($n = 18$), hockey ($n = 4$), cricket ($n = 10$), rowing ($n = 1$), korfball ($n = 1$), volleyball ($n = 11$) were also represented. Individual sports included:

swimming ($n = 4$), tennis ($n = 1$), gymnastics ($n = 1$), boxing ($n = 1$), athletics ($n = 5$), shot

put ($n = 1$), cross country ($n = 4$), kickboxing ($n = 1$), dance ($n = 2$), equestrian ($n = 1$), road

cycling ($n = 1$), badminton ($n = 2$), squash ($n = 2$), karate ($n = 1$), motocross ($n = 1$), golf ($n =$

1), roller hockey ($n = 1$).

Procedure

After receiving institutional ethics approval, participants were approached by

contacting the staff members of local schools and sports teams. The emails distributed

informed staff members of the nature and purpose of the study. Each staff member of the

respective school or sports team contacted agreed to allow their athletes to participate upon

receiving appropriate consent and assent. A time and date was arranged for data collection,

with data collected either at the university campus or at each participating team's respective

training facilities. Before completing the questionnaire, participants were distributed an

information sheet and gave their consent. Parental consent was also obtained from

participants attending local schools. Participants were informed that participation was

voluntary, given assurance that all data would be kept strictly confidential, and used for

research purposes only. Participants were encouraged to provide honest answers, told there

were no right or wrong answers, and informed that they were able to withdraw from the study

at any time up until the time allotted for final data analysis. Participants then completed the

Youth Coaching Effectiveness Scale, which took approximately 10-15 minutes to complete.

On completion, participants were debriefed and were encouraged to to ask any remaining

questions they had about the study.

Statistical analysis

Prior to testing factor models of the YCES, the data were screened for missing values, outliers and indices of non-normality. Confirmatory factor analysis (CFA), using AMOS 25 (101), examined the factor structure of the YCES, with each model tested using maximum likelihood estimation. The first model tested was a first-order one-factor model (unidimensional), where all 33 coaching effectiveness items were loaded onto a single coaching effectiveness factor. Secondly, a first-order seven-factor model, reflecting game strategy, technique, physical conditioning, self-reflection, individual consideration, intellectual stimulation, and fostering acceptance of group goals dimensions of coaching effectiveness was tested. A seven-factor model with a single second-order factor representing global coaching effectiveness, and a seven-factor model with three second-order factors of professional, interpersonal, and intrapersonal knowledge were also tested.

Each model was examined using the same criteria. To assess the fit of all models, multiple indices were examined to ensure robust assessment of model fit. These included: the chi-square statistic (χ^2), the comparative fit index (CFI), the Tucker-Lewis index (TLI), the standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA). Generally, a non-significant chi-square signifies good data model fit. However, the statistic is sensitive to sample size, and often proves to be statistically significant in large samples (102). Therefore, the chi-square statistic was not used as a standalone CFA index, and other indexes were used for evaluating the adequacy of model fit. For assessing the fit indices, values of TLI and CFI greater than .90 were judged to be acceptable, although those greater than .95 would be more desirable (102-104). Values of RMSEA and SRMR less than .10 and .08 respectively, were interpreted as indicating

adequate fit, although a value close to .06 for RMSEA would be more desirable (102, 104, 105). For RMSEA, the 90% confidence interval (CI) was included.

For each model, standardised factor loadings, standardised residuals, and the modification indices for the covariance between measurement errors were explored. Descriptive statistics, Cronbach's alpha coefficients, and zero-order correlations between the YCES dimensions and total YCES were also calculated to further assess the psychometric properties of the YCES.

Results

Descriptive statistics, scale reliabilities and correlation analyses

Descriptive statistics, Cronbach's alpha coefficients, and zero-order (Pearson) correlations for all of the subscales of coaching effectiveness measured and the total YCES are displayed in Table 1. Perceived physical conditioning effectiveness demonstrated the lowest mean and largest standard deviation score among the subscales ($M = 6.20$, $SD = 1.52$). Perceived technique effectiveness demonstrated the highest mean score among the subscales ($M = 7.30$, $SD = 1.03$). Cronbach's alpha coefficients indicated that all seven dimensions and the total YCES demonstrated acceptable to excellent levels of internal reliability (106), ranging from 0.74 to 0.96. Inter-correlations were interpreted in accordance with Cohen's (107) guidelines for psychological investigations. Correlations of 0.10, 0.30, and 0.50 were interpreted as small, medium and large effect sizes respectively. The correlations revealed that all seven dimensions of coaching effectiveness, and the total YCES were positively and significantly related ($p < .001$), with moderate to strong relationships.

Table 1. Descriptive Statistics, Alpha Coefficients and Zero-Order Correlations between Coaching Effectiveness Dimensions ($n = 354$)

Scale	M	SD	1	2	3	4	5	6	7	8
YCES	6.99	0.98	**0.96**							
AGG[+]	7.24	1.26	0.83***	**0.78**						
GS[+]	7.19	1.06	0.88***	0.73***	**0.89**					
IC[+]	7.09	1.20	0.88***	0.74***	0.73***	**0.82**				
IS[+]	7.03	1.14	0.89***	0.71***	0.74***	0.79***	**0.82**			
PC[+]	6.20	1.52	0.63***	0.39***	0.46***	0.48***	0.46***	**0.74**		
SR[+]	6.63	1.20	0.84***	0.62***	0.63***	0.66***	0.75***	0.53***	**0.86**	
T[+]	7.30	1.03	0.88***	0.72***	0.76***	0.80***	0.76***	0.44***	0.63***	**0.85**

Note. YCES = Youth Coaching Effectiveness Scale total. AGG = Fostering acceptance of group goals. GS = Game strategy. IC = Individual consideration. IS = Intellectual stimulation. PC = Physical conditioning. SR = Self-reflection. T = Technique. + = Perceived Coaching Effectiveness. Alpha coefficients are displayed in bold. *** $p < .001$

Confirmatory factor analyses

The unidimensional, first-order one-factor model indicated poor fit for TLI and CFI indices, adequate fit for RMSEA, and good fit for SRMR, $\chi 2$ (495, $N = 354$) = 1623.395, $p < .001$ (TLI = .821, CFI = .832, RMSEA = .080 [90% CI = .076 to .085], SRMR = .058), suggesting a poor overall fit. The first-order seven-factor model indicated good fit for TLI, CFI, RMSEA and SRMR, $\chi 2$ (474, $N = 354$) = 1037.744, $p < .001$ (TLI = .906, CFI = .916, RMSEA = .058 [90% CI = .053 to .063], SRMR = .044). Exploring the standardised residual covariance matrix, the majority of the residual covariances were between -2 and 2, which means the estimated model represents good fit (108). Exploration of factor loadings revealed that items were positive, possessed moderate to high loadings (i.e., above 0.4), and were significant ($p < .001$).

Fit indices for the seven-factor model with a single second-order factor representing global coaching effectiveness demonstrated good fit TLI, CFI, RMSEA and SRMR, $\chi 2$ (488, $N = 354$) = 1100.836, $p < .001$ (TLI = .901, CFI = .909, RMSEA = .060 [90% CI = .055 to

.064], SRMR = .048). The majority of residual covariances were between -2 and 2, and factor loadings were positive, moderate to high and significant ($p < .001$).

Similar fit indices were observed for the seven-factor model with three second-order factors of professional, interpersonal, and intrapersonal knowledge when compared to the seven-factor model with a single second-order, demonstrating an acceptable overall fit. Fit indices for the nine-factor model with three second-order factors showed good fit for TLI, CFI, RMSEA and SRMR, $\chi2$ (486, $N = 354$) = 1094.232, $p < .001$ (TLI = .902, CFI = .909, RMSEA = .060 [90% CI = .055 to .064], SRMR = .048). The standardised residual covariance matrix for this model also revealed the majority of residual covariances were between -2 and 2. Factor loadings were positive, moderate to high and significant ($p < .001$).

The fit statistics for the models tested are shown in Table 2. When comparing the fit indices of the models, analyses indicate that a more optimal fit was provided by the first-order seven-factor model. The standardized factor loadings for the first-order seven-factor model are shown in Table 3.

Table 2. Fit Statistics for First-Order and Second-Order Models

Models	χ^2	df	TLI	CFI	RMSEA (90% CI)	SRMR
First-order one-factor	1623.359***	495	0.821	0.832	0.080 (0.076-0.085)	0.058
First-order seven-factor	1037.744***	474	0.906	0.916	0.058 (0.053-0.063)	0.0440
Seven-factor with single second-order factor	1100.836***	488	0.901	0.909	0.060 (0.055-0.064)	0.0483
Seven-factor with three second-order factors	1094.232***	486	0.902	0.909	0.060 (0.055-0.064)	0.0483

Note. χ^2 = Chi-square. df = degrees of freedom. TLI = Tucker-Lewis Index. CFI = Comparative Fit Index. RMSEA = Root-Mean-Square Error of Approximation. SRMR = Standardized Root-Mean-Square Residual.
*** p < .001

Table 3. Completely Standardized Factor Loadings for the First-Order Seven-Factor Model

	Item Factor Loadings						
Items	**AGG**	**GS**	**IC**	**IS**	**PC**	**SR**	**T**
9. Encourage his/her players to be team players?	.69						
13. Get the team to work together for the same goal?	.79						
26. Develop a strong team attitude and spirit among team members?	.72						
3. Make critical decisions during competition?		.67					
12. Understand competitive strategies?		.74					
18. Maximise his/her team's strengths during competition?		.75					
20. Recognise opposing team's weakness during competition?		.67					
25. Adapt to different game situations?		.75					
28. Adjust his/her game strategy to fit the team's talent?		.74					
29. Recognise opposing team's strengths during competition?		.74					
11. Recognise that different players have different needs?			.75				
16. Consider that you have different strengths and abilities from others?			.68				
21. Treat each team member as an individual?			.70				
30. Help team members to develop their strengths?			.77				
10. Show players how to look at difficulties from a new angle?				.70			
19. Challenge players to think about problems in new ways?				.73			
31. Get you to rethink the way you do things?				.76			
33. Help team members to work out how to solve problems?				.73			
2. Implement an appropriate endurance program for his/her players during the season?					.62		
4. Prepare an appropriate plan for his/her players off-season physical conditioning?					.72		
24. Accurately assess his/her players' physical conditioning?					.76		
5. Spend time in self-reflection?						.55	
6. Think about the way he or she feels about things?						.71	
15. Think about his or her thoughts?						.81	
22. Think about why he/she behaves in the way that they do?						.74	
27. Examine his/her feelings?						.78	
32. Take time to reflect on his/her thoughts?						.75	
1. Coach individual players on technique?							.64
7. Teach the skills of his/her sport?							.72
8. Recognise talent in his/her players?							.67
14. Demonstrate the skills of his/her sport?							.66
17. Detect skill errors in his/her players?							.74
23. Develop his/her players' abilities?							.79

Note. AGG = Acceptance of group goals. CB = Character building. GS = Game strategy. IC = Individual consideration. IS = Intellectual stimulation. M = Motivation. PC = Physical Conditioning. SR = Self-reflection. T = Technique.

Discussion

Sport coaches are pivotal within a youth sporting environment, often fulfilling numerous roles to enhance the learning and development of their athletes. It is therefore important to identify what effective coaching looks like, in order to ensure youth athletes are provided with an optimal environment and opportunity for development. With models of coaching effectiveness also highlighting the importance of athlete perceptions (1-3), there is a clear need for a comprehensive measurement of coaching effectiveness to evaluate how effectively coaches are fulfilling their roles from the youth athlete perspective. Existing measures used within this area of research do not capture the full extent of coaching effectiveness, particularly from a youth athlete perspective. Consequently, the purpose of this study was to develop a reliable and valid measure of youth athletes' perceptions of their coach's effectiveness. The developed scale aimed to assess all forms of coach knowledge (professional, interpersonal, intrapersonal) proposed by Côté and Gilbert (1) in their integrative definition of coaching effectiveness.

Côté and Gilbert (1) suggest that coaches' knowledge, athletes' outcomes and coaching contexts coaching are the three key components that make up coaching effectiveness. The literature (2, 3) proposes that athletes' outcomes, such as self-perceptions, beliefs and sporting performance, are affected by the evaluations and perceptions that athletes have of their coach's behaviours. In Côté and Gilbert's (1) integrative definition of coaching effectiveness, the athlete outcomes component represents the 4C's framework of positive youth development within a sporting context. In order to further understand how youth athletes' development is influenced by coaching behaviours, it is important to identify effective coaching behaviours and how such behaviours are perceived by youth athletes.

Consequently, we identified seven subscales from four existing valid and reliable instruments that have been used within the coaching science literature (10, 44, 85, 99). The subscales identified, reflected the types of coaching behaviours and knowledge that are suggested to be important for coaching effectiveness. These seven subscales were collated to form the 33-item YCES, assessing youth athlete's perceptions of their coach's effectiveness.

To analyse the psychometric properties of the YCES, multiple models were tested: first-order one-factor (unidimensional), first-order seven-factor, seven-factor with a single second-order factor, and seven-factor with three second-order factors. The results suggested that the first-order one-factor (unidimensional) model had a poor overall fit. Evaluation of the seven-factor model with a single second-order factor, and the seven-factor model with three second-order factors identified that both had an acceptable model fit. However, analyses identified a superior fit for the first-order seven-factor model. This model consisted of seven factors, reflecting game strategy, technique, physical conditioning, self-reflection, individual consideration, intellectual stimulation, and fostering acceptance of group goals dimensions of coaching effectiveness. The factor loadings for the first-order seven-factor model were acceptable and significant ($p < .001$), ranging from 0.55 to 0.81. Cronbach's alpha coefficients indicated acceptable to excellent levels of internal reliability (106) for the seven dimensions of coaching effectiveness and the total YCES, ranging from 0.74 to 0.97.

The findings in this study provide support for the proposed hypothesis that the developed scale would show satisfactory psychometric properties in terms of factorial structure and reliability. The findings in this study also support the hypothesis that there would be a correlational relationship between the subscales of coaching effectiveness. Zero-order correlational analyses revealed moderate to strong relationships between the seven

dimensions of coaching effectiveness and the total YCES, and that all relationships were positive and significant ($p < .001$).

The results of this study are consistent with the coaching effectiveness literature, with the positive intercorrelations between the seven subscales supporting the idea that effective coaching includes a combination of professional, interpersonal and intrapersonal knowledge. In particular, the findings suggest that transformational leadership behaviours, focusing on the relational aspects of coaching, form part of effective coaching with the goal of facilitating positive developmental outcomes in youth athletes. The inclusion of subscales used to measure the three critical types of coach knowledge within the YCES, is particularly useful within a youth sport setting, as it helps to determine athletes' perceptions of the ability of a coach to be effective in the overall development of an athlete. Positive youth development focuses on developing sport specific skills and knowledge alongside psychological well-being and moral development. It is therefore important that the effectiveness of a coach's ability to build positive relations with their athletes, as well as a coach's openness to continued learning and self-reflection are understood and not overlooked, as these can have a significant impact upon an athlete's development.

The development of the YCES provides a measurement tool that can be utilised for several avenues of future research, specifically centred around positive youth development through sport, and understanding effective coaching behaviour from the perspective of youth athletes. The YCES can be used to complement existing measures of coach behaviour, for example, measures from a coach or parent perspective regarding effective coaching. It is also recommended that the YCES is used in future research to investigate the impact of coaching effectiveness on youth athlete development longitudinally across different youth sport environments.

Limitations and future research

Although the first-order seven-factor model had acceptable fit, and a superior fit in comparison to the other models tested, it would be more desirable to have CFI and TLI values closer to 0.95 as recommended by Hu and Bentler (104). Future studies should continue to examine and improve the validity of the YCES to further enhance understanding of coaching effectiveness within a youth sport environment. Another potential limitation is that although the sample provides a good spread across a range of sports, a majority of the sample were youth football players. This may limit the transfer of findings to alternate samples, and future research should seek to extend the findings in this study with other youth athlete populations.

Conclusion

The results of the present study provide evidence for the psychometric properties of the YCES. The development of the YCES is congruent with relevant research within the coaching science literature regarding effective coaching. Evidence for the construct validity and internal consistency was provided. The YCES includes subscales measuring a coach's professional, interpersonal and intrapersonal knowledge from the perspective of a youth athlete, which is not evident in existing measures. These forms of coach knowledge form a key component in the integrative definition of effective coaching proposed by Côté and Gilbert (1), and are influential in the developmental outcomes experienced by youth athletes. The YCES offers contribution to the literature, providing researchers with a new instrument to investigate coaching effectiveness from the perspective of youth athletes, which can be used to further understand avenues including positive youth development and the outcomes of effective coaching behaviours within a variety of youth sporting environments.

CHAPTER IV

Study Two: A Longitudinal Examination of the Influence of Coaching Effectiveness on

Youth Academy Footballers

Introduction

Sport coaches are responsible for guiding the learning, development and performance of the athletes they coach (6), which makes understanding the effectiveness of sport coaches with regards to their knowledge, actions, and behaviours an important area of investigation within the sport psychology literature. Coaches have been described in the literature as leaders of their athletes (7), and are key figures in youth sport programmes (1). Youth sport programmes are used to foster positive youth development (72), where coach leadership behaviours can influence athlete performance and developmental outcomes (7, 10). Effective coaches are those who positively affect their athletes, developing them holistically, focusing on the development of psychological well-being and moral development alongside sport specific skills and knowledge (1, 2, 14). With coaches being central to talent and personal development, research into effective coaching is increasing. It is important to investigate effective coaching to ensure athletes are provided with the best opportunities to enhance their psychosocial skills, and to fulfil their talent and potential.

A key contributor to the coaching effectiveness literature has been the work of Côté and Gilbert (1), who presented an integrated definition of coaching effectiveness. They defined coaching effectiveness as "the consistent application of integrated professional, interpersonal, and intrapersonal knowledge to improve athletes' competence, confidence, connection, and character in specific coaching contexts". When breaking this definition down, it can be seen that Côté and Gilbert (1) suggest coaching effectiveness to be comprised of three key components: coaches' knowledge, athletes' outcomes, and coaching contexts. The coaches' knowledge component consists of professional (sport-specific knowledge), interpersonal (interaction with others) and intrapersonal (understanding of oneself and the

ability for introspection and reflection) forms of knowledge. The coaching contexts component refers to the varied sport settings in which coaching can take place. Côté and Gilbert (1) identified four coaching contexts: participation coaches for children (sampling years), participation coaches for adolescents and adults (recreational years), performance coaches for young adolescents (specialising years), and performance coaches for older adolescents and adults (investment years).

The athletes' outcomes component incorporates the 4C's framework (competence, confidence, connection and character) and concerns the development of such constructs in athletes as a result of effective coaching. These four outcomes were drawn directly from the conceptualisation of positive youth development and modified to reflect the sporting context. In their work, Côté and Gilbert (1) stated that 'competence' referred to sport-specific technical and tactical skills, performance skills, improved health and fitness and healthy training habits. They defined 'confidence' as an internal sense of overall positive self-worth, and 'connection' as the development of positive bonds and social relationships with people inside and outside of sport. Lastly, they defined 'character' as respect for the sport and others (morality), integrity, empathy and responsibility. The work of Côté and Gilbert (1) indicates that even though the type of knowledge required by coaches varies in different sporting contexts, the 4C's remain fixed as indicators of athlete outcomes and ultimately coaching effectiveness.

The importance of athletes' perceptions of their coach has been highlighted in models of effective coaching (2, 3), which propose that a coach's behaviour influences an athlete's perception of the coach's behaviour, and the perception formed impacts upon an athlete's self-perception and in turn the athlete's own motivation and performance. Research has been

conducted aiming to identify associations between athletes' perceptions of coaching effectiveness and relevant athlete outcomes (6, 13). A framework useful in guiding research investigating coaching effectiveness has been the coaching efficacy model (4). This conceptual model considers the psychological factors central to the coaching process, and is based upon a combination of a measure of coaching confidence (16), a previously established model of teaching efficacy (17), and the theory of self-efficacy (19). Feltz et al (4) defined coaching efficacy as 'the extent to which coaches believe they have the capacity to affect the learning and performance of their athletes', viewing the construct as a coach-specific form of self-efficacy.

The coaching efficacy model proposed by Feltz et al (4) consists of four dimensions that contribute to a coach's total coaching efficacy: motivation, game strategy, technique and character-building. When the model has been used in research investigating athletes' perceptions of their coach's effectiveness, the motivation dimension relates to athletes' perceptions of their coach's ability to affect the psychological skills and motivational states of their athletes. The game strategy dimension represents athletes' perceptions of their coach's ability to coach during competition and lead their team to a successful performance. The technique dimension represents athletes' perceptions of their coaches instructional and diagnostic skills. Lastly, the character building dimension relates to athletes' perceptions of the coach's ability to influence the personal development of their athletes and promote a positive attitude towards sport. The coaching efficacy model (4) suggests that these four dimensions are influenced by sources such as: the extent of the coach's experience and preparation, prior success, the coach's perceived skill level of athletes, and the coach's perceived level of social support. The model also proposes that there should be multiple desirable outcomes that occur as a result of effective coaching, including increased athlete

and team satisfaction, improved athlete and team performance, and higher levels of athlete and team efficacy.

An adapted version of the coaching efficacy scale (CES), a 24-item questionnaire developed by Feltz et al (4) to assess the dimensions coaching efficacy, was developed by Kavussanu et al (10) and has been used as the measurement tool in research investigating athletes' perceptions of their coach's effectiveness. Using the modified version of the CES, Kavussanu et al (10) assessed athletes' perceptions of their coach's effectiveness and their predictors. Findings showed that sporting experience of the athlete negatively predicted the athletes' perception of their coach's effectiveness for all four dimensions of the coaching efficacy model. Boardley et al (13) investigated male rugby union players' perceptions of their coach's effectiveness using the adapted CES (10). They identified that players' perceptions of their coach's motivation effectiveness positively predicted players' effort, commitment and enjoyment. They also found that players' perceptions of their coach's technique effectiveness positively predicted players' task self-efficacy, and that players' perceptions of their coach's character building effectiveness positively predicted prosocial behaviours within players.

Kassim and Boardley (6) used the adapted version of the CES to study athletes' perceptions of their coach's effectiveness in team and individual sports. They found that athletes' perceptions of their coach's motivation effectiveness positively predicted athletes sport confidence and connection with their coach. Athletes' perceptions of their coach's technique effectiveness was found to positively predict athletes' sport competence, and athletes' perceptions of their coach's character building effectiveness was found to be a positive predictor of athletes' moral identity. Moral identity is the degree to which a person's moral character is experienced as a central part of their overall self-concept (109). Moral

identity is an important indicator of athletes' moral development, a key aspect of coaching. On the whole, the findings of the existing research highlight the positive relationship that exists between athletes' perceptions of coaching effectiveness and athlete-level outcomes.

In addition to perceptions of effectiveness, studies have also used the coaching efficacy model as a framework to investigate athletes' perceptions of their coach's behaviours in terms of coaching efficacy (56) and coaching competency (59), and the influence these perceptions have on athlete-related outcomes. For example, Boardley et al (56) identified consistent and meaningful positive links between golfers' perceptions of their coach's motivation efficacy and golfers' own task self-efficacy across three separate studies using the original CES. Studies have shown athletes' perceptions of their coach's motivation competency (58, 61) and technique competency (61) to have significant positive relationships with athletes' satisfaction with their coach at the athlete level. In one particular study, Boardley and Kavussanu (59) used the character building subscale of the CCS (57) to examine field hockey and netball athletes' perceptions of their coach's character building competency. They found that such perceptions were negative predictors of athletes' antisocial opponent and team-mate behaviour, mediated fully by moral disengagement. Athletes' perceptions of their coach's character building competency positively predicted athletes' prosocial opponent behaviour, with effects being mediated partially by moral disengagement.

With the importance of athletes' perceptions being evidenced within the coaching science literature, Boardley (5) recently proposed a revised model of coaching efficacy which includes an athlete perception component. The revised model proposes that coaching efficacy influences athlete-level outcomes through athletes' perceptions of their coach's efficacy based on their coach's behaviour. The model also incorporates the work of Côté and Gilbert

(1), where athlete outcomes are grouped under the 4'C's categorisation of athlete-level outcomes of effective coaching. This enables consistency in the identification and evaluation of measurable indicators of effective coaching.

Understanding effective coaching behaviours and their outcomes is of particular importance to youth development programmes and environments such as competitive youth football academies. Football academies are highly organised and structured youth developmental training systems (110) that aim to develop young football players with the skills and attributes needed to perform at a first team level. Academies tend to consist of 'schoolboys' (8-16 years), 'apprentices 'or 'scholars' (16-19 years), and 'young professionals' (17-23 years) (110), where players can be nurtured over long periods of time and given an opportunity to develop professionally and personally (111). It is the objective of the English Football Association (FA) to support and grow the grassroots game, and to strive for success at the elite level (112). Achieving this objective depends on the opportunities afforded to talented young footballers enabling them to fulfil their talent and potential.

Attempts to enhance the opportunities for youth development within football have been taken with the implementation of regulations such as home-grown player quotas and UEFA's financial fair play (FFP) ruling. To further support the development of home-grown youth football players, the Elite Player Performance Plan (EPPP) was launched following consultation between governing bodies such as the English Premier League (EPL), the English Football league (EFL), the FA, individual football clubs, and other key football stakeholders (113). The EPPP is a long-term strategy with three stages of development that precede the senior professional stage: Foundation Phase (5-11), Youth Development Phase (12-16), Professional Development Phase (17-21) (113). Academies are independently audited, being awarded a category status of 1 (most elite) to 4 (113). Criteria for category

grading includes training facilities, productivity rates, and the provision of the development phases, coaching, education, and welfare (113).

The FA's four corner model of player development (114) is a framework integrated within youth football academies. The model encompasses four key areas that players should be developed in: Physical, Technical/Tactical, Psychological and Social (114). The ability of a coach to develop players in the physical and technical/tactical areas of the four corner model can be linked to the professional coach knowledge element of coaching effectiveness. A coach's ability to develop players in the psychological and social areas, can be linked to the interpersonal knowledge element of coaching effectiveness (1). The 4C's framework which represents the athletes' outcomes component of Côté and Gilbert's (1) work regarding coaching effectiveness, can also be linked to each area of the four corner model of player development. Coaches are central to talent development (115) and coaches working within youth football academies play a pivotal role in the psycho-social developmental experiences of young footballers (110). Academy coaches are critical to the effective implementation of developmental guidelines and rulings and have a significant role in the quality of the developmental environment and opportunities provided. This has led to a focus on the role coaches play and how their actions and behaviours can impact the attainment of the goals and objectives set by governing bodies relevant to player development and performance (6). In turn, this has highlighted the need to understand what effective coaching is within the youth football domain.

The original coaching efficacy model and CES (4) as well as their revisions and modifications (5, 10) have been useful in providing support and evidence for the importance of athletes' perceptions of coaching effectiveness within the coaching science literature. However, there is no current literature assessing athletes' perceptions of coaching

effectiveness and the impact on athlete level outcomes (4C's categorisation) using a measurement tool that fully incorporates the professional, interpersonal and intrapersonal knowledge elements of the coach knowledge component of coaching effectiveness proposed by Côté and Gilbert (1). Also, much of the coaching effectiveness research to date has not investigated competitive youth football environments.

With this in mind, the present study aimed to investigate youth academy football players' perceptions of coaching effectiveness using the dimensions of the developed youth coaching effectiveness scale, as predictors of their competence, confidence, connection, and character across the competitive football season. Based on the reviewed literature, five main hypotheses were generated and tested. First, players' perceptions of coaching effectiveness would positively predict players' perceptions of competence over time. Secondly, players' perceptions of coaching effectiveness would positively predict players' perceptions of sport confidence over time. Third, players' perceptions of coaching effectiveness would positively predict players' perceptions of the coach-athlete relationship (coach connection) over time. Fourth, players' perceptions of coaching effectiveness would positively predict players' perceptions of athlete-athlete relationships (team-mate connection) over time. Finally, players' perceptions of coaching effectiveness would positively predict players' perceptions of character over time.

Methodology

Participants

153 male youth academy football players from five football academies participated in this study. Academy 1 ($n = 37$) and Academy 2 ($n = 29$) were category two academies, Academy 3 ($n = 34$) and Academy 4 ($n = 19$) were category three academies, and Academy 5 ($n = 34$) was a non-league academy. At the start of the season, players were aged between 14-18 years (M = *16.1*, SD = 0.9 years). Players' football experience ranged from 4-15 years (M = 10.8, SD = 2.3 years), and their time with their current team ranged from less than a year to 11 years (M = 3.5, SD = 3.0 years). Competitive standards of players varied, represented by players' current level of competition (i.e., regional = 22, sub-national = 20, national = 84, international = 1) and highest level of competition played (i.e., regional = 17, sub-national = 15, national = 87, international = 8).

At the end of the season, players were aged between 14-18 years (M = 16.6, SD = 1.1 years). Players' football experience ranged from 4-15 years (M = 11.0, SD = 2.2 years), and their time with their current team ranged from less than a year to 11 years (M = 3.7, SD = 3.0 years). Competitive standards of players varied, represented by players' current level of competition (i.e., regional = 25, sub-national = 5, national = 87, international = 1) and highest level of competition played (i.e., regional = 13, sub-national = 7, national = 87, international = 11). 69 (54%) and 78 (66.1%) players reported having a contract to play at their current football club next season at the start and end of season respectively. 18 (14.2%) and 24 (20.3%) players reported they were seeking an alternative club for next season at the start and end of season respectively.

Research design

A repeated measures, mixed between-within subjects design was used in this study to examine players' perceptions of coaching effectiveness and athlete-related outcomes across teams and over time.. A survey pack was developed to measure player perceptions on the following variables: coaching effectiveness, competence, confidence, connection, and character. Data were collected at the beginning and end of the 2019/2020 academy football season. Data were collected from each team between 15-17 weeks from the previous time-point of data collection.

Measures and materials

Participant information sheets and informed consent forms were provided, containing information about the procedure and the purpose of the study. The information sheet also contained the lead researcher's contact details to allow players to ask any questions about the project at any time. To aid anonymity, a collection box was used to allow players to post completed consent forms and questionnaires. The survey pack contained the subsequent measures to help answer the research question:

Perceived Coaching Effectiveness

The Youth Coaching Effectiveness Scale, developed in Study One, was used to measure players' perceptions of their coach's effectiveness. All seven subscales from the developed scale were used: game strategy (7-items), technique (6-items), physical conditioning (3-items), self-reflection (6-items), intellectual stimulation (4-items), individual consideration (4-items), and fostering acceptance of group goals (3-items). Players were asked to consider the extent to which their coach can implement their knowledge and skills to

positively affect and improve the learning and performance of their players. Players were then instructed to rate how effective their coach was for each item on a 9-point Likert scale (1 = not at all effective; 9 = extremely effective). The stem for each item was "how effective is your coach in his/her ability to...". Example items for each subscale were:"understand competitive strategies" (game strategy), "teach the skills of his/her sport" (technique), "accurately assess his/her players' physical conditioning"(physical conditioning), "examine his/her feelings" (self-reflection), "recognise that different players have different needs" (individual consideration), "challenge players to think about problems in new ways" (intellectual stimulation), and "get the team to work together for the same goal" (fostering acceptance of group goals). Cronbach alpha coefficients for the original subscales were: 0.89 for game strategy, 0.85 for technique, 0.74 for physical conditioning, 0.86 for self-reflection, 0.82 for individual consideration, 0.82 for intellectual stimulation and 0.78 for fostering acceptance of group goals.

Competence

Players' perceived footballing competence was measured using an adapted 6-item scale of the intrinsic motivation inventory (116). Players were asked to report how true each item was on a 7-point Likert scale (1 = not at all; 7 = very true). Items assessing competence included "I think I am pretty good at football" and "I think I do pretty well at football, compared to other academy players". Cronbach's alpha for the original scale was 0.85.

Confidence

Players' perceived footballing confidence was measured using an adapted self-efficacy scale (117) containing 13 items that referred to skills in line with the technical/tactical, physical, social, and psychological corners of the FA's four corner model

of player development (114). Players were asked to indicate how confident they were in their ability to perform the skills on a 100% scale, with 0% being no confidence and 100% being total confidence. Item content included the following: dribble past an opponent, pass the ball accurately, challenge an opponent for the ball, beat (trick) an opponent, protect the ball, head the ball accurately, recover the ball, provide support under pressure, drive (strike) the ball, instigate a foul and take a foul, be a positive influence on team-mates, physically prepare for the demands of regular football, tactically adjust your game to meet the team's needs. Cronbach's alpha for the original scale was 0.86.

Connection

Players' feelings of connection to their team-mates and coaches was assessed using a modified version of the Need for Relatedness Scale (118). The modified stems; "In my relationships with my team-mates I feel.." and "In my relationships with my coach I feel.." were followed by 10 items. Five items represented the intimacy subscale, and five items represented the acceptance subscale. Items include "supported", "close to them", "listened to", etc. Players were asked to indicate their level of agreement with the items on a 7-point Likert scale (1 = do not agree at all; 7 = very strongly agree). The Cronbach alphas for the original intimacy and acceptance subscales were 0.91 and 0.89 respectively.

Character

Players' perceptions of their character was assessed using the 5-item moral identity scale developed by Aquino and Reed (109). The scale starts by listing nine moral characteristics that may describe a person (caring, compassionate, fair, friendly, generous, helpful, hardworking, honest, and kind). Players are first instructed to visualise a person who

has these characteristics, and imagine how this person would think, feel and act. Then the players are asked to answer the five items on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree). Example items include ''It would make me feel good to be a person who has these characteristics'', and ''Being someone who has these characteristics is an important part of who I am''. Cronbach's alpha for the original scale was 0.73.

Procedure

After obtaining institutional ethics approval, a survey pack was developed that consisted of the developed youth coaching effectiveness scale from Study One, along with existing reliable scales to measure the 4C's. Emails detailing the purpose and nature of the study were delivered to full-time youth football academy staff working for numerous football clubs. Staff contacted included: Academy Managers, Head's of Education and Welfare (HoEW), and Head's of Coaching. In total, there were seven football academies (one category one, three category two, two category three, and one non-league) who agreed to participate in the study, with convenient times being arranged throughout the season with each individual academy for data collection to take place. Data were collected from all seven football academies at the start of the season. However, due to the 2019–20 coronavirus (COVID-19) pandemic, data were only collected at the early conclusion of the season from five of the recruited academies, and no data were collected at what would traditionally be the end of the normal competitive football season.

Data collection took place at the respective academy's training facilities in a quiet classroom-like environment, using pencils and paper survey copies. Upon arrival at each club's respective training facilities for data collection at the start of the season; informed consent was obtained from the relevant staff members of each football club and from players

which confirmed their understanding of the purpose of the study and their agreement to participate. The survey packs were then administered under the supervision of the staff member(s). The supervised onsite data collection ensured that all questions (i.e. each separate subscale) on the survey had been answered.

At the onset of administration of the participant information sheets, consent forms and questionnaires; players were given assurances about the confidentiality of their responses, being encouraged to provide honest answers and were also informed that there were no right or wrong answers. Players were told they were able to withdraw from the study at any time up until the time scheduled for final data analysis. Following the completion of the questionnaires, all participants were debriefed and were able to ask any questions if necessary. To help ensure anonymity, participants were not allowed to provide any identifiable details. Instead, players were asked to provide a memorable word that would be used as their participant ID to allow data collected at each time point of the season to be compared. The participant ID could also be used for data withdrawal. It took players approximately 15-20 minutes to complete the survey pack.

Statistical analyses

Analysis was conducted on the 153 academy players from the academies who took part in the study at the start and end of the season. All data analyses were conducted using Jamovi (Version 1.1.9.0). The first analysis conducted assessed the internal consistency of the measures in the current sample using the Cronbach Alpha statistic. Descriptive statistics, including scale means, standard deviations and skewness and kurtosis were calculated for all study variables. To standardise data across all of the measures, mean Z-scores were calculated and used for correlational and regression analyses. All figures also report Z-scores

on the Y-axis. To test the relationships among variables used in this study, Pearson's r correlations were conducted. To establish the relationship between the coaching effectiveness subscales and athlete-related outcomes, multiple linear mixed model analyses were employed. This type of analysis was conducted as it allows multiple predictor variables to be simultaneously investigated in relation to a dependent variable.

Results

Descriptive statistics and scale reliabilities

Descriptive statistics and Cronbach's alpha coefficients of all study variables at the beginning and end of the season are presented in Table 4. Cronbach's alpha coefficients indicated that all but one variable fell between acceptable to excellent levels of internal reliability (106). The only variable that failed to meet this threshold was 'physical conditioning' at the beginning of the season (0.63) and at the end of the season (0.68). Skewness for each variable fell within an acceptable range across both time points, and the majority of variables were also termed acceptable with regards to Kurtosis (119). However, athletes' perceptions of fostering acceptance of group goals, individual consideration and technique effectiveness failed to meet the kurtosis threshold at the end of the season.

Table 4. Descriptive Statistics and Alpha Coefficients for Study Two Variables (*n* = 153)

Variable	Beginning of Season					End of Season				
	α	M	SD	Skew	Kurtosis	α	M	SD	Skew	Kurtosis
Character	0.75	4.24	0.50	-0.32	-0.33	0.72	4.26	0.49	-0.35	-0.55
Coach connection	0.92	4.57	1.04	-0.36	0.07	0.92	4.80	0.95	-0.38	0.06
Competence	0.81	5.58	0.73	-0.22	0.01	0.82	5.64	0.69	-0.58	0.13
Confidence	0.88	75.90	13.30	-0.81	1.30	0.86	76.10	11.00	-0.71	0.99
Team Connection	0.92	5.12	0.93	-0.82	1.87	0.92	5.31	0.90	-0.78	0.91
AGG⁺	0.73	6.92	1.14	-1.08	1.72	0.85	6.97	1.25	-1.38	3.43
GS⁺	0.84	6.96	0.89	-0.81	0.23	0.90	6.91	1.13	-1.11	1.35
IC⁺	0.80	6.84	1.13	-0.48	-0.35	0.87	6.91	1.22	-1.29	2.40
IS⁺	0.77	6.90	0.97	-0.72	1.26	0.77	6.92	1.01	-0.48	-0.01
PC⁺	0.63	6.38	1.17	-0.46	-0.11	0.68	6.64	1.13	-0.83	0.44
SR⁺	0.83	6.66	1.05	-0.71	0.13	0.89	6.72	1.10	-1.27	1.81
Technique⁺	0.83	7.00	0.94	-0.77	1.05	0.88	6.95	1.10	-1.19	2.29

Note. AGG = Acceptance of group goals. CB = Character building. GS = Game strategy. IC = Individual consideration. IS = Intellectual stimulation. M = Motivation. PC = Physical Conditioning. SR = Self-reflection. T = Technique. + = Perceived Coaching Effectiveness. Skew = skewness

Correlation analyses

Pearson correlations were calculated to determine the relationships between the variables examined in this study. The correlations are presented in Table 5. Cohen's (107) guidelines for psychological investigations were used to interpret the inter-scale correlations. Correlations of 0.10, 0.30, and 0.50 were interpreted as small, medium and large effect sizes respectively. These analyses provide support for the development of the youth coaching effectiveness scale (Study One), as they identified that all seven dimensions of perceived coaching effectiveness were strongly and positively interrelated (*p* < 0.001). In this current study, all seven dimensions of perceived coaching effectiveness should be positively interrelated with one other, so the scale can be deemed appropriate for use in this study.

Small and positive correlations were observed between players' perceptions of their confidence and all but one of the perceived coaching effectiveness dimensions: technique

PCE ($r = 0.16$, $p < 0.05$), physical conditioning PCE ($r = 0.13$, $p < 0.05$), self-reflection PCE ($r = 0.18$, $p < 0.05$), individual consideration PCE ($r = 0.17$, $p < 0.01$), intellectual stimulation PCE ($r = 0.13$, $p < 0.05$), fostering acceptance of group goals PCE ($r = 0.15$, $p < 0.05$). Small and positive correlations were identified between players' perceptions of team-mate connection and all of the perceived coaching effectiveness dimensions: game strategy PCE ($r = 0.19$, $p < 0.01$), technique PCE ($r = 0.15$, $p < 0.05$), physical conditioning PCE ($r = 0.12$, $p = 0.07$), self-reflection PCE ($r = 0.19$, $p < 0.01$), individual consideration PCE (r = 0.26, p < 0.001), intellectual stimulation PCE ($r = 0.16$, $p < 0.05$), fostering acceptance of group goals PCE ($r = 0.23$, $p < 0.001$).

These analyses also identified medium positive correlations between players' perceptions of coach connection and technique PCE ($r = 0.48$, $p < 0.001$), physical conditioning PCE ($r = 0.33$, $p < 0.001$), self-reflection PCE ($r = 0.48$, $p < 0.001$), individual consideration PCE ($r = 0.49$, $p < 0.001$), and intellectual stimulation PCE ($r = 0.48$, $p < 0.001$). Large and positive correlations were identified between players' perceptions of coach connection and game strategy PCE ($r = 0.51$, $p < 0.001$), and fostering acceptance of group goals PCE ($r = 0.53$, $p < 0.001$). However, players' perceptions of competence were not associated with any of the seven perceived coaching effectiveness dimensions. Moderate positive correlations were observed between players' perceptions of competence and confidence ($r = 0.45$, $p < 0.001$), perceptions of competence and team-mate connection ($r = 0.30$, $p < 0.001$), as well as perceptions of team-mate connection and coach connection ($r = 0.44$, $p < 0.001$). Small positive correlations were also found between players' perceptions of confidence and coach connection ($r = 0.18$, $p < 0.01$), perceptions of competence and character ($r = 0.15$, $p < 0.05$), perceptions of competence and coach connection ($r = 0.26$, $p < 0.001$), and perceptions of character and team-mate connection ($r = 0.14$, $p < 0.05$).

Table 5. Zero-Order Correlations between Study Two Variables (*n* = 153)

Variable	1	2	3	4	5	6	7	8	9	10	11	12
Character	-											
Coach connection	0.13	-										
Competence	0.15 *	0.26 ***	-									
Confidence	0.06	0.18 **	0.45 ***	-								
Team connection	0.14 *	0.44 ***	0.30 ***	0.10	-							
AGG⁺	0.01	0.53 ***	0.05	0.15 *	0.23 ***	-						
GS⁺	0.02	0.51 ***	0.06	0.09	0.19 **	0.75 ***	-					
IC⁺	0.01	0.49 ***	0.07	0.17 **	0.26 ***	0.78 ***	0.77 ***	-				
IS⁺	0.06	0.48 ***	0.10	0.13 *	0.16 *	0.71 ***	0.72 ***	0.76 ***	-			
PC⁺	0.05	0.33 ***	-0.04	0.13 *	0.12	0.55 ***	0.62 ***	0.62 ***	0.57 ***	-		
SR⁺	0.09	0.48 ***	0.12	0.18 *	0.19 **	0.66 ***	0.70 ***	0.69 ***	0.75 ***	0.51 ***	-	
T⁺	0.08	0.48 ***	0.04	0.16 *	0.15 *	0.76 ***	0.80 ***	0.83 ***	0.76 ***	0.64 ***	0.71 ***	-

Note. AGG = Acceptance of group goals. CB = Character building. GS = Game strategy. IC = Individual consideration. IS = Intellectual stimulation. M = Motivation. PC = Physical Conditioning. SR = Self-reflection. T = Technique. + = Perceived Coaching Effectiveness. * $p < .05$, ** $p < .01$, *** $p < .001$

Linear mixed model

To test the main study hypotheses, a series of linear mixed model analyses were performed in accordance with the advice and guidance of Meteyard and Davies (120). For each separate model, an initial step was taken to enter time (i.e., beginning and mid-season) and academy as fixed factors in order to control for any effects they may have on the dependent variable. Time represents a within-subjects factor (i.e. sample change over time), and academy represents a between-subjects factor (i.e. how changes vary between academies). In a subsequent step, individual participants were entered as a cluster variable,

followed by selecting the coefficient associated with intercept as random across subjects. Following this, the nine coaching effectiveness dimensions were entered as covariates (continuous) in order to calculate the effect of each covariate on the dependent variable, whilst also controlling for the fixed factors (time and academy). The dependent variable for each model was one of the 4C's athlete-related outcomes - competence, confidence, connection, and character. Connection was split and entered separately for coach connection and team-mate connection.

Competence

The first model examined the influence of players' perceptions of coaching effectiveness on perceived competence. The quality of the model fit was determined as good (AIC = 646.10), with 64% of the variance (R^2 conditional) in players' perceptions of competence explained by all model predictors. Relationships between perceived competence and players' perceptions of their coach's game strategy ($\beta = 0.15$, SE = 0.11, $p = 0.18$), physical conditioning ($\beta = 0.04$, SE = 0.08, $p = 0.63$), self-reflection ($\beta = 0.08$, SE = 0.10, $p = 0.42$), intellectual stimulation ($\beta = 0.07$, SE = 0.10, $p = 0.50$), and fostering acceptance of group goals ($\beta = 0.05$, SE = 0.10, $p = 0.61$) effectiveness were positive but not statistically significant. Relationships between perceived competence and players' perceptions of their coach's technique ($\beta = -0.20$, SE = 0.12, $p = 0.10$), and individual consideration ($\beta = -0.06$, SE = 0.11, $p = 0.56$) effectiveness were negative and not statistically significant. Results from the LMM for the relationship between competence and the fixed effects are shown in Figure 5.
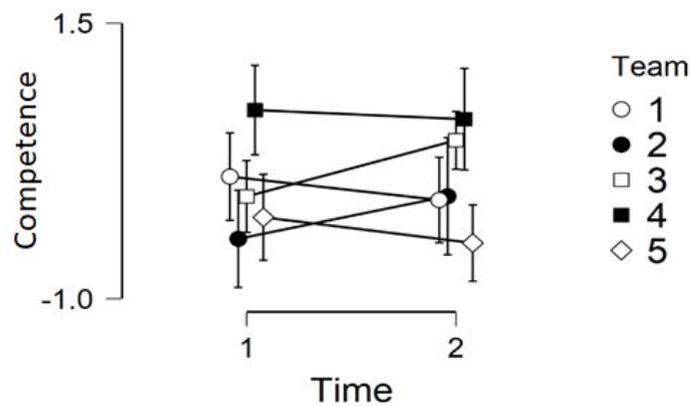
Figure 5: Player-reported competence across two time points for five youth football academy teams ($n = 153$)

Note. Time 1 = Beginning of season and Time 2 = End of season. Error bars represent the 95% confidence intervals.

Confidence

The second model examined the influence of players' perceptions of coaching effectiveness on perceived confidence. The quality of the model fit was determined as good (AIC = 626.32), with 76% of the variance (R^2 conditional) in players' perceptions of confidence explained by all model predictors. Relationships between perceived confidence and players' perceptions of their coach's game strategy ($\beta = 0.03$, SE = 0.10, $p = 0.79$), self-reflection ($\beta = 0.16$, SE = 0.09, $p = 0.08$), individual consideration ($\beta = 0.01$, SE = 0.10, $p = 0.95$), intellectual stimulation ($\beta = 0.02$, SE = 0.09, $p = 0.86$), and fostering acceptance of group goals ($\beta = 0.14$, SE = 0.09, $p = 0.12$) effectiveness were positive but not statistically significant. A significant positive relationship was evident between perceived confidence and players' perceptions of their coach's physical conditioning effectiveness ($\beta = 0.16$, SE = 0.07,

p < 0.05). A significant negative relationship was evident between perceived confidence and

players' perceptions of their coach's technique effectiveness (β = -0.26, SE = 0.11, *p* < 0.05).

Results from the LMM for the relationship between confidence and the fixed effects are

shown in Figure 6.
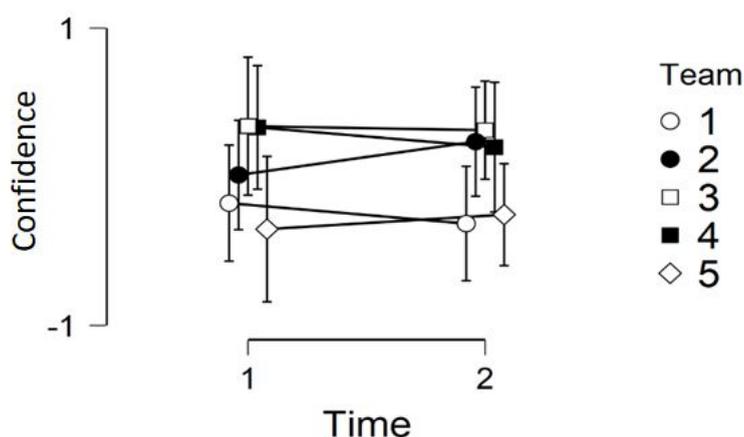
Figure 6. Player-reported confidence across two time points for five youth football academy

teams (*n* = 153)

Note. Time 1 = Beginning of season and Time 2 = End of season. Error bars represent the 95% confidence

intervals.

Coach connection

The third model examined the influence of players' perceptions of coaching

effectiveness on perceived coach connection. The quality of the model fit was determined as

good (AIC = 587.74), with 63% of the variance (R^2 conditional) in players' perceptions of

coach connection explained by all model predictors. Relationships between perceived coach

connection and players' perceptions of their coach's game strategy ($\beta = 0.19$, SE = 0.10, $p = 0.06$), self-reflection ($\beta = 0.16$, SE = 0.09, $p = 0.07$), individual consideration ($\beta = 0.06$, SE = 0.10, $p = 0.57$), intellectual stimulation ($\beta = 0.03$, SE = 0.09, $p = 0.70$), and fostering acceptance of group goals ($\beta = 0.16$, SE = 0.09, $p = 0.07$) effectiveness were positive but not statistically significant. Relationships between perceived coach connection and players' perceptions of their coach's technique effectiveness ($\beta = -0.05$, SE = 0.11, $p = 0.68$) were negative and not statistically significant. No relationship was evident between perceived coach connection and players' perceptions of their coach's physical conditioning effectiveness ($\beta = 0.00$, SE = 0.07, $p = 0.99$) Results from the LMM for the relationship between coach connection and the fixed effects are shown in Figure 7.
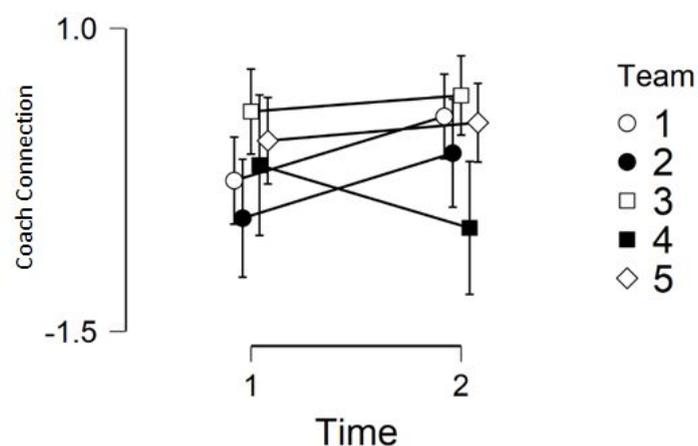

Figure 7. Player-reported coach connection across two time points for five youth football academy teams (n = 153)

Note. Time 1 = Beginning of season and Time 2 = End of season. Error bars represent the 95% confidence intervals.

Team-mate connection

The fourth model examined the influence of players' perceptions of coaching effectiveness on perceived team-mate connection. The quality of the model fit was determined as good (AIC = 641.30), with 66% of the variance (R^2 conditional) in players' perceptions of team-mate connection explained by all model predictors. Relationships between perceived team-mate connection and players' perceptions of their coach's self-reflection effectiveness ($\beta = 0.12$, SE = 0.10, $p = 0.23$) were positive but not statistically significant. A significant positive relationship was evident between perceived team-mate connection and players' perceptions of their coach's individual consideration effectiveness ($\beta = 0.36$, SE = 0.11, $p < 0.01$). Relationships between perceived team-mate connection and players' perceptions of their coach's game strategy ($\beta = -0.02$, SE = 0.11, $p = 0.86$), technique ($\beta = -0.07$, SE = 0.12, $p = 0.59$), physical conditioning ($\beta = -0.11$, SE = 0.08, $p = 0.15$), and intellectual stimulation ($\beta = -0.05$, SE = 0.10, $p = 0.58$) effectiveness were negative and not statistically significant. No relationship was evident between perceived team-mate connection and players' perceptions of their coach's fostering acceptance of group goals effectiveness ($\beta = 0.00$, SE = 0.10, $p = 0.98$). Results from the LMM for the relationship between team-mate connection and the fixed effects are shown in Figure 8.
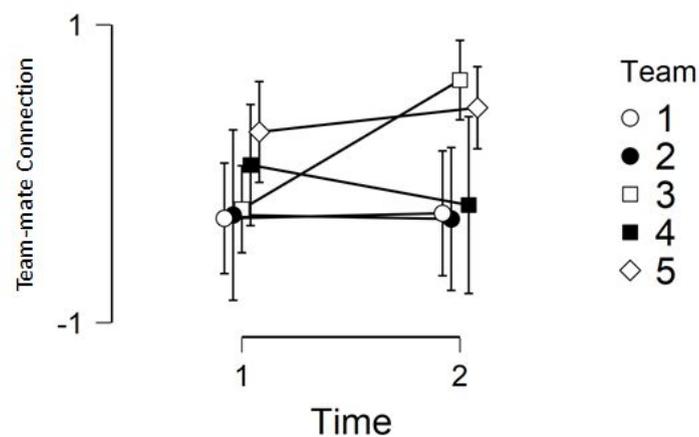
Figure 8. Player-reported team-mate connection across two time points for five youth

football academy teams (n = 153)

Note. Time 1 = Beginning of season and Time 2 = End of season. Error bars represent the 95% confidence

intervals.

Character

The fifth model examined the influence of players' perceptions of coaching

effectiveness on perceived character. The quality of the model fit was determined as good

(AIC = 687.98), with 50% of the variance (R^2 conditional) in players' perceptions of

character explained by all model predictors. Relationships between perceived character and

players' perceptions of their coach's game strategy ($\beta = 0.05$, SE = 0.12, $p = 0.67$), technique

($\beta = 0.12$, SE = 0.13, $p = 0.37$), physical conditioning ($\beta = 0.14$, SE = 0.09, $p = 0.12$), and

self-reflection ($\beta = 0.06$, SE = 0.11, $p = 0.57$) effectiveness were positive but not statistically

significant. Relationships between perceived character and players' perceptions of their

coach's individual consideration ($\beta = -0.13$, SE = 0.12, $p = 0.31$), intellectual stimulation ($\beta = $

-0.07, SE = 0.11, p = 0.53), and fostering acceptance of group goals (β = -0.02 , SE = 0.11, p = 0.84) effectiveness were negative and not statistically significant. Results from the LMM for the relationship between character and the fixed effects are shown in Figure 9.
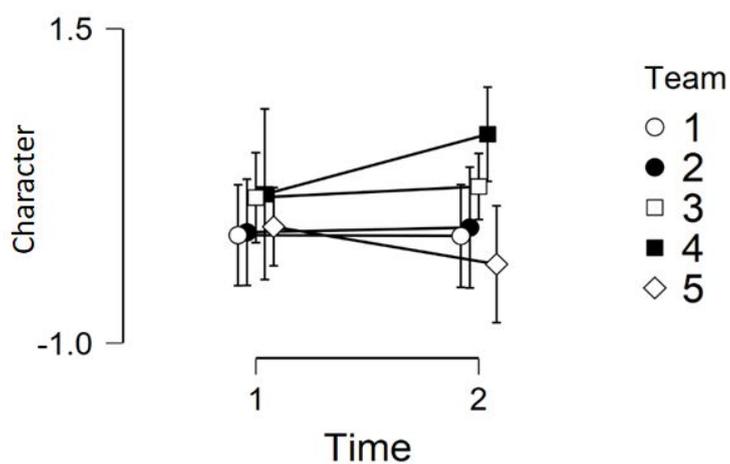

Figure 9. Player-reported character across two time points for five youth football academy teams (n = 153)

Note. Time 1 = Beginning of season and Time 2 = End of season. Error bars represent the 95% confidence intervals.

Discussion

Sport coaches are critical to the development of youth athletes, with coaches often required to fulfil a diverse range of roles and responsibilities (1, 6, 7). Effective coaches are those who guide the development of knowledge, skills and psychological well-being of the athletes they coach, resulting in their athletes attaining a range of desired outcomes (1, 10, 13, 84). Evaluating the effectiveness of coaches can be achieved by assessing athletes' perceptions of their coach's behaviour, alongside athletes' self-perceptions regarding desired athlete-related outcomes that are proposed to result from effective coaching. The existing coaching effectiveness literature has provided support and evidence for the importance of athletes' perceptions of coaching effectiveness, and specifically, the impact of such perceptions on athlete-level outcomes using the 4C's categorisation. However, this literature has not used a measurement tool that fully incorporates the professional, interpersonal and intrapersonal knowledge elements of the coach knowledge component of coaching effectiveness proposed by Côté and Gilbert (1). Building upon the existing coaching effectiveness literature, the purpose of this study was to investigate youth academy football players' perceptions of coaching effectiveness using the dimensions of the developed youth coaching effectiveness scale, as predictors of their competence, confidence, connection, and character across the competitive football season. The following paragraphs review and discuss the findings relating to the study aim.

First, it was hypothesised that players' perceptions of coaching effectiveness would positively predict athletes' perceptions of competence over time. Support for this hypothesis was provided by the linear mixed model analysis in which players' perceptions of their coach's game strategy, physical conditioning, self-reflection, intellectual stimulation and

fostering acceptance of group goals effectiveness positively influenced players' perceived competence. This finding supports Côté and Gilbert's (1) coaching effectiveness work, where coaches perceived to be effective by their athletes, are those who apply professional, interpersonal and intrapersonal knowledge, resulting in greater athlete competence levels in a specific coaching context (i.e., youth academy football). Contrary to the first hypothesis, players' perceptions of their coach's technique and individual consideration effectiveness negatively influenced players' perceived competence. However, zero-order correlations indicated positive associations between perceived technique effectiveness and competence, as well as perceived individual consideration effectiveness and competence.

The finding that players' perceptions of their coach's technique effectiveness negatively influenced players' perceived competence, is not consistent with previous findings. Previous literature has reported that athletes' perceptions of their coach's technique effectiveness positively predicted athletes' sport competence (6), where perceiving the coach to be effective in instructional and diagnostic skills resulted in athletes perceiving themselves to be more competent in technical, tactical and physical aspects of sport. A possible explanation for the finding in this study is that the players are in a competitive environment; therefore perceiving their coach to provide them with frequent specific feedback for correcting technical errors and reinforcement about correcting technique, may result in players not perceiving themselves to be as competent in their ability if they are having errors in their performance regularly highlighted. Players will compare themselves to other academy players, and if a coach is effective in highlighting technical errors, then the more errors are highlighted in a players performance which may negatively influence a players' perceived competence.

Secondly, it was hypothesised that players' perceptions of coaching effectiveness would positively predict athletes' perceptions of sport confidence over time. Linear mixed model analysis provided support for this hypothesis, with players' perceptions of their coach's game strategy, self-reflection, individual consideration, intellectual stimulation, and fostering acceptance of group goals effectiveness positively influenced players' perceived sport confidence. Players reporting greater confidence in executing key football skills when perceiving their coach to be effective in interpersonal behaviours is consistent with past transformational leadership research, which identified that transformational leadership behaviors are positively related to self-efficacy (121). Previous research that has investigated the impact of athletes' perceptions of their coach's effectiveness upon sport confidence, has reported that athlete's perceptions of motivation effectiveness positively predicted athletes' perceived sport confidence (6). Other research investigating the closely linked construct of efficacy as an outcome of effective coaching, has found a positive association between motivation efficacy and players' perceptions of task self-efficacy and team efficacy (33, 56).

In further support of the second hypothesis, the linear mixed model analysis identified a significant positive relationship between players' perceptions of their coach's physical conditioning effectiveness and sport confidence. Thus, when players perceived their coach to be effective in preparing their athletes physically for participation in academy football, players perceived themselves as more confident. However, the linear mixed model analysis also found that players' perceptions of their coach's technique effectiveness negatively influenced player reported confidence. These findings do not support the respective hypothesis, suggesting that when players perceived their coach to be effective in developing the technical skills of players, they tended to perceive themselves as less confident. Zero-order correlations however, identified significant positive associations between

perceived technique effectiveness and confidence. This finding does not support previous literature which has reported that rugby players' perceptions of their coach's technique effectiveness positively predicted players' task self-efficacy (13). It is thought that the findings in this study may potentially be due to the players being coached by coaches who displayed different behaviours to coaches in other studies, and the players perceiving and reporting these behaviours differently due to the nature of competitive youth football environments.

Nevertheless, the findings demonstrate the potential importance of coach game strategy, physical conditioning, self-reflection, individual consideration, intellectual stimulation, and fostering acceptance of group goals effectiveness for player confidence. Confidence is a desirable athlete outcome and a positive psychological response to coaching deemed important to possess to be successful within youth academy football. These findings are supportive of Côté and Gilbert's integrative definition of coaching effectiveness (1), where players' perceiving their coach to be effective across specific professional, interpersonal and intrapersonal knowledge components, leads to greater reported player confidence.

Next, it was hypothesised that players' perceptions of coaching effectiveness would positively predict athletes' perceptions of the coach-athlete relationship (connection) over time. Consistent with the hypothesis, linear mixed model analysis found that when players perceived their coach to be high in game strategy, self-reflection, individual consideration, intellectual stimulation and fostering acceptance of group goals effectiveness, players reported a greater level of connection to their coach. The finding that players' perceptions of interpersonal knowledge elements such as individual consideration, intellectual stimulation and fostering acceptance of group goals effectiveness had a positive influence on coach

connection, supports findings from previous transformational coach leadership research. Transformational coach leadership has been found to result in higher levels of athlete athletes' satisfaction with their coach (77), as well as task and social cohesion (84). Also, past research investigating athletes' connection to their coach as an outcome of effective coaching has found that when athletes perceived their coach to be effective in developing the psychological skills and motivational states of athletes, they tended to report greater connection with their coach (6). This suggests the importance of a coach's interpersonal knowledge and interaction with their players for the development of a positive developmental outcome such as a positive coach-athlete connection.

The linear mixed model analysis also indicated that players' perceptions of their coach's technique effectiveness negatively influenced players' connection to their coach. This is not consistent with the hypothesis, suggesting that when players' perceived their coach to be more effective in instructional and diagnostic skills they reported lower levels of connection to their coach. Zero-order correlations however, indicated significant positive associations between perceived technique and physical conditioning effectiveness and coach connection. The results from this analysis support the work of Côté and Gilbert (1), where effective coaches utilise elements of professional, interpersonal and intrapersonal forms of coach knowledge which translate into a form of positive change in athletes' connection to their coach (coach-athlete relationships) and facilitating positive coaching environments.

It was also hypothesised that players' perceptions of coaching effectiveness would positively predict athletes' perceptions of athlete-athlete relationships (team-mate connection) over time. In support of this hypothesis, the linear mixed model analysis found that players' perceptions of their coach's self-reflection effectiveness positively influenced players' perceived connection to their team-mates. Also consistent with this hypothesis was the

finding that players' perception of their coach's individual consideration effectiveness had a significant positive influence on players' perceived connection to their team-mates. Thus, when players perceived their coach to be effective in reflective practice and showing genuine care and concern for each athlete's unique needs and abilities, they tended to report greater levels of connection to their team-mates. Zero-order correlations indicated significant positive associations between players' perceptions of their coach's game strategy, technique, physical conditioning and intellectual stimulation effectiveness and player reported connection to team-mates. However, linear mixed model analysis showed that players' perceptions of their coach's game strategy, technique, physical conditioning and intellectual stimulation effectiveness negatively influenced player reported connection to team-mates.

Côté and Gilbert (1) propose the athlete outcome 'connection', to consist of positive bonds and social relationships with people inside sport, that is influenced by the effectiveness of a coach. Forming a key part of the social corner of the FA four corner model (114), a strong positive connection between a player and their team-mates has been identified as an important element within football which youth coaches should aim to develop. Previous research has not investigated team-mate connection as an outcome when investigating the influence of athlete perceptions of coaching effectiveness, and therefore future researchers are encouraged to specifically investigate the influence of athletes' perceptions of coaching effectiveness on team-mate connection within team sports environments.

Lastly, it was hypothesised that players' perceptions of coaching effectiveness would positively predict athletes' perceptions of character over time. Consistent with this hypothesis, were the findings from the linear mixed model that players' perceptions of their coach's game strategy, technique, physical conditioning, and self-reflection effectiveness positively influenced players' perceptions of their character. Thus, it can be inferred that

when players perceived their coach to be effective in leading the team to success during competition, providing opportunities to develop technical, tactical and physical sports skills, preparing their athletes physically for participation in academy football, and effective in reflection of their behaviour; players reported higher levels of character. The linear mixed model analysis also found that players' perceptions of their coach's individual consideration, intellectual stimulation, and fostering acceptance of group goals effectiveness had a negative influence on player reported character. This finding is not consistent with the hypothesis, although zero-order correlations found positive associations between players' perceptions of their coach's individual consideration, intellectual stimulation, and fostering acceptance of group goals effectiveness and player reported character.

The result that the interpersonal coach knowledge elements negatively influenced player reported character is also not consistent with previous research that has investigated athlete perceptions of coach behaviour upon moral development (6) and pro social behaviour (13). These studies investigated character building effectiveness as an element of interpersonal knowledge, finding athletes' perceptions of their coach's character building effectiveness positively predicted athletes' moral identity and prosocial behaviours within players (13). Attributes of the social corner of the FA four corner model (114) can be associated with a player's character, so understanding the influence of particular coaching behaviours from the player perspective will help the process of developing players with optimal character to excel within and outside of a sporting environment.

Overall, the findings highlight the impact that coaches can have upon the development of youth athletes. The findings offer support for the effective coaching framework proposed by Côté and Gilbert (1), linking athletes' perceptions of coaching effectiveness with the athlete outcomes of competence, confidence, connection and character.

The findings also provide initial support for the use of the YCES to assess athlete perceptions of coaching effectiveness. The study supports the existing frameworks within the football environment (113, 114) regarding player development, of which coaches play an integral part. The analyses conducted provide information that can be utilised by the club's participating in the study to identify areas their coaches are perceived to be effective by players, and areas for improvement. Comparisons can be made between the participating clubs across the football season, to determine which areas of coaching need to be improved upon to most affect the competence, confidence, connection and character of players. Improving the effectiveness of coaching will then allow clubs to advance the development of their players within academies.

Limitations and future research

Despite reporting some interesting findings, this study does have some limitations. Although fully validated measures were used to assess competence, confidence, connection and character, the YCES used in this study has not been previously used to assess youth athletes' perceptions of their coach's effectiveness. With this study being the first use of a newly developed measure, any findings should be interpreted with this in mind, and future research should look to use the YCES and replicate the study to test the scale's validity and reliability.

A second limitation of this study is due to the self-report measures used to assess study variables. It is possible that the study findings may have been affected to some degree by issues such as social desirability (67, 68), anchoring effects primacy and recency effects and time pressure (69). Future research could look to employ alternate methods of assessment (i.e. other-reports and objective measures) alongside the measures used in this study to

further investigate coaching effectiveness and athlete outcomes.

One limitation of this study is that power was not calculated. The preferable period to calculate power fell within a short window of time between the conclusion of my undergraduate degree and the start of the 2019/2020 football season, with participants having to be approached in a pre season period in preparation for data collection at the beginning of the season. Therefore, results and their significance in this study should be interpreted with this in mind and treated with caution. Future research should calculate power to determine the probability of avoiding Type II errors when investigating the longitudinal effects of youth athletes' perceptions of their coach's effectiveness upon the desired athlete outcome assessed in this study.

A further limitation is that the alpha coefficient for the 'physical conditioning' subscale of the YCES, fell below the acceptable level at the beginning of the season (.63) and the end of the season (.68). This may have been in part due to the small number of items used in the scale (i.e. three). Nevertheless, findings involving this subscale should be interpreted with caution. Future research should look to achieve acceptable levels of internal reliability for the physical conditioning subscale.

A final limitation of this study is that a third time point of data was not collected as planned at the traditional season end. This was a result of the early curtailment of the 2019/2020 competitive season due to the COVID-19 pandemic, and therefore the findings of this study have been affected. Future research should seek to assess youth academy footballers' perceptions of coaching effectiveness and the impact upon the 4C's across a full competitive season.

Conclusion

In conclusion, the current study linked youth academy football players' perceptions of their coach's effectiveness with desirable athlete outcomes that should emerge as a result of effective coaching. This research helps to advance the coaching effectiveness literature, improving our understanding of youth development within a competitive youth footballing environment from the player's perspective. This study has provided support for the work of Côté and Gilbert (1), as well as the relevance of existing conceptual models and frameworks that can be linked to coaching effectiveness. Overall, the findings in this study provide initial support for the use of the YCES, and highlight the potential importance of youth academy football players' perceptions of their coach's effectiveness for the optimal development of the 4 C's as important athlete-level outcomes. Since coaches can impact the developmental experiences of the athletes they coach through their knowledge and behaviours, it is important that they are aware of their influence. It is critical that coaches are aware of what behaviours affect certain aspects of players' psychological functioning, and how they can alter or improve their knowledge and behaviours with regards to the dimensions of effective coaching, to ensure they provide optimal opportunities for quality development.

CHAPTER V

General Discussion

The development of youth athletes is affected by the relationships that they experience, as well as the environments and opportunities that are provided to them. Sport coaches hold particularly important roles for the development of youth athletes, as a coach's knowledge and behaviour can influence athlete learning and contribute to a range of developmental outcomes (1). This has led to a focus within the coaching science literature to understand and identify effective coaching behaviours, and the resulting outputs of such behaviours that best aid development and enhance athlete skills and attributes. Effective coaches positively influence youth athletes, enhancing overall development across areas of learning, performance and personal development through improvements in sport specific skills and knowledge, psychological well-being, moral development, and athletes' perceived sporting ability (1, 2, 11, 12, 14). Conceptual models of effective coaching (2, 3) have highlighted that athletes' perceptions of their coach's behaviour plays an integral part of the influence a coach has upon athlete developmental outcomes, and ultimately in determining coaching effectiveness. Therefore, the overall aim of this thesis was to explore the concept of coaching effectiveness, with a specific focus on youth athlete perceptions of effective coaching behaviours and perceptions of positive developmental outcomes.

Summary of Critical Review (Chapter II)

The purpose of the review was to explore, in-depth, the existing effective coaching literature. The review aimed to provide a summary of the origins and developments of effective coaching research, and provide an overview of studies that have investigated the sources, dimensions and outcomes of effective coaching. A systematic search of four electronic databases was conducted to identify research papers that aligned with the aims of the review. After screening and selecting relevant papers, data was extracted from the

articles, which enabled the current state of the effective coaching literature to be assessed. The review identified that Feltz et al's (4) conceptual model of coaching efficacy, Horn's (3) working model of coaching effectiveness, and Côté and Gilbert's (1) integrative definition of coaching effectiveness have provided the origins and guiding frameworks for research investigating effective coaching behaviours. The review demonstrated that the field of literature is growing, although it is still within its infancy. The review also identified that there are many ways in which effective coaching has been investigated, with two main areas of assessment being highlighted: coaches' perceptions of their own coaching behaviour, and athletes' perceptions of their coach's behaviour. Within these areas, research has investigated a range of sources, dimensions, and outcomes of effective coaching, using a variety of measurement tools. The review exposed gaps in the current literature base, with a major finding that the existing measurement scales used to assess effective coaching do not fully reflect all forms of coach knowledge that are necessary for coaching effectiveness (1). There has tended to be more of a focus on coaches' professional knowledge, often lacking sufficient measures of interpersonal and intrapersonal forms of coach knowledge that are needed to effectively develop youth athletes across a range of positive developmental outcomes. This demonstrates the importance, relevance and rationale for exploring coaching effectiveness in this research project, and the need for a consistent and shared conceptual approach that will help to evolve understanding of effective coaching behaviours and their impact upon the development of youth athletes.

Summary of Study One (Chapter III)

Based on the findings of the reviewed literature, the purpose of Study One was to develop a comprehensive other-report measure of youth athletes' perceptions of their coach's

effectiveness. Specifically, this study aimed to produce a valid and reliable instrument that assesses all forms of coach knowledge (professional, interpersonal, intrapersonal) proposed in Côté and Gilbert's integrative definition of coaching effectiveness (1). Building on existing reliable scales that have been used in the coaching science literature (10, 44, 85, 99), an integrated 33-item measure of youth athletes' perceptions of coaching effectiveness was developed. Items were split across seven subscales that intended to measure elements of professional, interpersonal and intrapersonal coach knowledge and behaviours. The seven subscales were: technique effectiveness, game strategy effectiveness, physical conditioning effectiveness, self-reflection effectiveness, individual consideration effectiveness, intellectual stimulation effectiveness, and fostering acceptance of group goals effectiveness. Youth athletes/players from a range of team and individual sports completed the developed scale (YCES). Confirmatory factor analyses examined the factor structure of the YCES, testing the plausibility of four separate models. Findings highlighted that fit indices supported three of the four models tested. An acceptable data model fit was found for a seven-factor model with three second-order factors of professional, interpersonal, and intrapersonal knowledge and behaviours, as well as a seven-factor model with a single second-order factor representing global coaching effectiveness. A more optimal fit was provided by a first-order seven-factor model. Results indicated that factor loadings for the first-order seven-factor model were acceptable and significant, and that this model also showed acceptable to excellent levels of internal reliability for the seven dimensions of the scale. Positive intercorrelations were evident between the seven subscales, supporting the previous coaching effectiveness literature that has proposed effective coaching to include a combination of professional, interpersonal and intrapersonal knowledge (1). Subsequently, the findings of Study One provide evidence for the psychometric properties of the YCES. The YCES contributes to the

existing literature by providing a new measurement tool that is useful in determining youth athletes' perceptions of effective coach knowledge and behaviours that are critical for the overall development of youth athletes.

Summary of Study Two (Chapter IV)

Based on the findings of the reviewed literature and the findings from Study One, the purpose of Study Two was to use the developed YCES to investigate how youth academy football players' perceptions of coaching effectiveness impacts players' perceptions of developmental outcomes across the football season. Specifically, the outcomes assessed were the athlete-level outcomes proposed by Côté and Gilbert (1) to stem from effective coaching (i.e., competence, confidence, connection, and character). Youth football players from five football academies completed surveys at two time points during the 2019/2020 season. Results identified that all seven dimensions of perceived coaching effectiveness were strongly and positively interrelated ($p < 0.001$). This finding provides initial support for the use of the YCES, as well as support for Côté and Gilbert's integrative definition of coaching effectiveness (1). The findings revealed that players' perceptions of their coach's game strategy, physical conditioning, self-reflection, intellectual stimulation and fostering acceptance of group goals effectiveness positively predicted player reported competence. Results showed that players' perceptions of their coach's game strategy, physical conditioning, self-reflection, individual consideration, intellectual stimulation and fostering acceptance of group goals effectiveness positively predicted player reported confidence. Results also showed that players' perceptions of their coach's game strategy, self-reflection, individual consideration, intellectual stimulation and fostering acceptance of group goals

effectiveness positively predicted player reported coach connection. Another finding was that players' perceptions of their coach's self-reflection and individual consideration effectiveness positively predicted player report team-mate connection. Findings further identified that players' perceptions of their coach's game strategy, technique, physical conditioning and self-reflection effectiveness positively predicted player reported character.

These results build upon the findings of existing research that has investigated and established links between athletes' perceptions of their coach and athlete-level outcomes (6, 13, 33, 56, 59), with the results of this study highlighting how youth academy football players' perceptions of their coach may have important implications for youth players' development.

Implications

The findings of the critical review and the two research studies add to the body of literature which has investigated effective coaching. This research builds upon the initial components of the coaching efficacy model proposed by Feltz et al (4), by considering athletes' perceptions of their coach's behaviour. This research supports Boardley's (5) revised conceptual model of coaching efficacy, Horn's (2, 3) model of coaching effectiveness, and Côté and Gilbert's integrative definition of coaching effectiveness (1), which suggest that athletes' perceptions of their coach are based upon the coaching behaviours they observe, which in turn may impact upon athlete-level outcomes.

For this research, key aspects of the existing effective coaching research (1-5, 10, 44) were integrated with elements of other existing frameworks, theories and tools that can be linked to coaching effectiveness (85, 86, 99, 100) to develop a new measure of coaching effectiveness. The developed measure assesses youth athletes' perceptions of their coach's

effectiveness, consisting of 7 dimensions of coaching behaviour. It is proposed that these dimensions (i.e., game strategy, technique, physical conditioning, self-reflection, individual consideration, intellectual stimulation and fostering acceptance of group goals), encompass key behaviours linked with effective coaching, across professional, interpersonal and intrapersonal forms of coach knowledge. The developed scale was then used in the second study of this research project to assess youth football players' perceptions of coach effectiveness and how such perceptions influence players perceptions of positive developmental outcomes. The findings of Study Two are consistent with research proposing that coaches play an influential role in fostering a mixture of positive developmental outcomes in athletes (72), and that outcomes such as the 4C's represent elements of athlete development that should be the objectives of many youth sport development programmes.

Collectively the findings of the studies in this thesis help to further improve understanding and knowledge of coaching effectiveness. The findings support the need for coach development across professional, interpersonal and intrapersonal knowledge and behaviours if coaches are to be effective in developing youth players in terms of learning, performance and personal development (1). This further supports existing literature that has proposed transformational leadership to be a particularly relevant concept for effective coaching (78, 85), where transformational leadership behaviours that focus on the relational aspect between coach and athlete, can be key for positive developmental outcomes in youth athletes.

This thesis provides support the FA four corner model of player development (114), in terms of the need to develop athletes across a range of key areas, as well as the EPPP (113) with regard to the integral role coaches play in the development of youth players and the need to ensure coaches are educated about coaching effectiveness to be able to provide optimal

development opportunities for players. The enhanced understanding of levels of coaching effectiveness within a range of youth football academies can be of great benefit to the academies, who can identify areas of coaching behaviour and knowledge that players' perceive coaches to be less effective in, highlighting the need for improvement in order to increase optimal player development. Levels of coaching effectiveness can be monitored by academies over long periods of time, throughout the time each academy player is with a respective club. It can then be assessed whether player perceptions of coaching effectiveness have any influence on whether a player is retained and progresses each year through the academy system, and ultimately whether they are awarded professional contracts or reach the first team of their respective club.

Limitations and future directions

Across the two studies, there are several limitations that should be considered when interpreting study findings. Firstly, with the use of self-report subjective measures of youth athlete perceptions, it is possible that the study findings in this thesis were affected to some degree by issues such as social desirability (67, 68) and method effects (69). Future research could look to use alternate methods of assessment (i.e. other-reports and objective measures) in conjunction with the measures used in this thesis, to assess coaching effectiveness and its influence on developmental outcomes for youth athletes. For example, an observational system could be used to measure coach behaviour, and compare it to how youth athletes perceive such behaviour.

Secondly, the YCES is a newly developed measure and has not been used in any previous studies, and is therefore not a fully validated measure of youth athletes' perceptions of coaching effectiveness. Consequently, any results from its use in Study Two to investigate

the influence of youth football players' perceptions of their coach's effectiveness upon development outcomes should be treated with caution. The findings of Study Two should also not be generalised beyond this population. Future research should continue to examine and improve the validity of the YCES.

Next, although the sample in Study One offers a good spread of participants across a range of sports, a majority of the sample reported football as their primary sport. This may limit generalisability and the transfer of findings to alternate samples. Therefore, further studies should look to utilise the developed scale using alternate samples, to further develop understanding of coaching effectiveness when considering the perspective of youth athletes.

Another limitation is that in Study Two, the alpha coefficient for the 'physical conditioning' subscale of the YCES fell below the acceptable level at the beginning (.63) and end (.68) of the season. Therefore, any findings involving this subscale should be interpreted with caution. It is possible that the low alpha coefficients may have been in part due to the small number of items used in the scale (i.e. three).

One further limitation is that due to the limited window between the completion of my undergraduate degree and the start of the 2019/2020 football season, power was not calculated for Study Two. As a result, findings and their significance in Study Two should be interpreted with this in mind and treated with caution. Future longitudinal research investigating youth athletes' perceptions of coaching effectiveness and the influence upon athlete outcomes should calculate power before commencing data collection.

A final limitation is that the data collected in Study Two could have been affected by the premature ending of the 2019/2020 competitive season due to the COVID-19 pandemic. Without a third time point of data collection at the traditional season end, the data gathered may not be truly representative of relationships across a football season. Future research

should look to collect across a normal full season with additional time points.

It is also recommended that future research investigate the effect of different demographic variables relative to youth academy football. For example, variables such as a youth player's living arrangements, the age of players or the academy year group, whether a player is full-time or part time, how long a player has been at the academy or the age that they joined could all be investigated. Future research could also investigate coach development. For example, the implementation of a coaching programme to improve coaching effectiveness and assessing the effect this has upon youth players' perceptions of coaching effectiveness over time, and any resultant changes in player development.

Conclusion

This thesis explored the concept of coaching effectiveness, and through a combination of a critical review and two quantitative studies, helped to advance our knowledge and understanding of effective coaching behaviours and how youth athletes' perceptions of coaching effectiveness are important for youth athlete development. First, the critical review reported the current state of the field of literature, identifying the many ways effective coaching has been explored. The review identified the gaps in the existing literature and the need for a more consistent and shared conceptual and methodological approach. The review demonstrated that to move the literature forward, there needs to be development of a scale that measures all forms of coach knowledge that are deemed necessary for coaching effectiveness (1). Then, Study One developed an integrated measure of youth athletes' perceptions of coaching effectiveness. This scale incorporated elements assessing all three forms of coaching knowledge deemed essential for coaching effectiveness. Analyses

identified an optimal data model fit for a first-order seven-factor model. Last, Study Two linked youth academy football players' perceptions of their coach's effectiveness with players' perceptions of their own competence, confidence, connection and character. This thesis makes an important contribution to the coaching effectiveness literature by integrating existing models and theories linked to effective coaching, to build a clearer picture of coaching effectiveness and youth development through the eyes of youth athletes. In particular, support was provided for Côté and Gilbert's (1) integrative definition of coaching effectiveness and Horn's (2, 3) model of coaching effectiveness, as well as further support for the relevance of the coaching efficacy model (4) and elements of transformational leadership theory (73-75, 78, 79, 85, 86) for research on coaching effectiveness. Several implications were discussed whilst also highlighting potential avenues for future research to ensure that the quality of youth athletes' development is optimised by coaches and their behaviours.

REFERENCES

1. Côté J, Gilbert W. An integrative definition of coaching effectiveness and expertise. International journal of sports science & coaching. 2009 Sep;4(3):307-23.

2. Horn TS. Coaching effectiveness in the sports domain. In TS Horn (Ed.), Advances in Sport Psychology. 2nd Ed. Chicago, IL: Human Kinetics. 2002, 309-354.

3. Horn TS. Coaching effectiveness in the sports domain. In TS Horn (Ed.), Advances in Sport Psychology. 3rd Ed. Champaign, IL: Human Kinetics. 2008, 239-267.

4. Feltz DL, Chase MA, Moritz SE, Sullivan PJ. A conceptual model of coaching efficacy: Preliminary investigation and instrument development. Journal of educational psychology. 1999 Dec;91(4):765.

5. Boardley ID. Coaching efficacy research: learning from the past and looking to the future, International Review of Sport and Exercise Psychology. 2018;11(1):214-237

6. Mohd Kassim AF, Boardley ID. Athlete Perceptions of Coaching Effectiveness and Athlete-Level Outcomes in Team and Individual Sports: A Cross-Cultural Investigation. The Sport Psychologist. 2018 Sep 1;32(3):189-98.

7. Vella SA, Oades LG, Crowe TP. The application of coach leadership models to coaching practice: Current state and future directions. International Journal of Sports Science & Coaching. 2010 Sep;5(3):425-34.

8. Mills JP, Boardley ID. Development and initial validation of an indirect measure of transformational leadership integrity. Psychology of Sport and Exercise. 2017 Sep 1;32:34-46.

9. Mills JP, Boardley ID. Advancing leadership in sport: Time to 'actually' take the blinkers off?. Sports Medicine. 2017 Mar 1;47(3):565-70.

10. Kavussanu M, Boardley ID, Jutkiewicz N, Vincent S, Ring C. Coaching efficacy and coaching effectiveness: Examining their predictors and comparing coaches' and athletes' reports. The Sport Psychologist. 2008 Dec;22(4):383-404.

11. Smith RE, Smoll FL, Curtis B. Coach effectiveness training: A cognitive-behavioral approach to enhancing relationship skills in youth sport coaches. Journal of Sport and Exercise Psychology. 1979 Mar 1;1(1):59-75.

12. Smoll FL, Smith RE. Leadership Behaviors in Sport: A Theoretical Model and Research Paradigm 1. Journal of applied social psychology. 1989 Dec;19(18):1522-51.

13. Boardley ID, Kavussanu M, Ring C. Athletes' perceptions of coaching effectiveness and athlete-related outcomes in rugby union: An investigation based on the coaching efficacy model. The sport psychologist. 2008 Sep;22(3):269-87.

14. Broodryk R, Van den Berg PH, Kruger A, Ellis SM. Comparing club level rugby coaches and players' perceptions of coaching effectiveness:: sport psychology. African Journal for Physical Health Education, Recreation and Dance. 2014 Jun 1;20(Issue-22):780-92.

15. Lyle J. Sports coaching concepts: A framework for coaches' behaviour. Psychology Press; 2002.

16. Park JK. Construction of the Coaching Confidence Scale. Unpublished doctoral dissertation. Michigan State University, East Lansing. 1992.

17. Denham CH, Michael JJ. Teacher Sense of Efficacy: A Definition of the Construct and a Model for Further Research. Educational Research Quarterly. 1981;6(1):39-63.

18. Bandura A. Self-efficacy: The exercise of control. New York: wH Freeman; 1997.

19. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. Psychological review. 1977 Mar;84(2):191.

20. Bandura A. Social foundations of thought and action. Englewood Cliffs, NJ. 1986.

21. Feltz DL. Self-confidence and sports performance. 423-457. Exercise and Sport Sciences Reviews. MacMillan, New York. 1988.

22. National Association for Sport and Physical Education. Quality coaches, quality sports: National standards for athletic coaches. Dubuque, IA: Kendall/Hunt. 1995.

23. Moher D, Liberati A, Tetzlaff J, Altman DG, Prisma Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLoS med. 2009 Jul 21;6(7):e1000097.

24. Malete L, Feltz DL. The effect of a coaching education program on coaching efficacy. The Sport Psychologist. 2000 Dec;14(4):410-7.

25. Campbell T, Sullivan P. The Effect of a Standardized Coaching Education Program on the Efficacy of Novice Coaches. Avante. 2005 Mar 1;11(1).

26. Fung L. Task familiarity and task efficacy: A study of sports coaches. Perceptual and motor skills. 2002 Oct;95(2):367-72.

27. Tsorbatzoudis H, Daroglou G, Zahariadis P, Grouios G. Examination of coaches' self-efficacy: Preliminary analysis of the coaching efficacy scale. Perceptual and motor skills. 2003 Dec;97(3_suppl):1297-306.

28. Short SE, Smiley M, Ross-Stewart L. The relationship between efficacy beliefs and imagery use in coaches. The Sport Psychologist. 2005 Dec 1;19(4):380-94.

29. Thelwell RC, Lane AM, Weston NJ, Greenlees IA. Examining relationships between emotional intelligence and coaching efficacy. International Journal of Sport and Exercise Psychology. 2008 Jan 1;6(2):224-35.

30. Malete L, Sullivan P. Sources of coaching efficacy in coaches in Botswana. International Journal of Coaching Science. 2009 Jan 1;3(1).

31. Sullivan PJ, Kent A. Coaching efficacy as a predictor of leadership style in intercollegiate athletics. Journal of Applied Sport Psychology. 2003 Jan 1;15(1):1-1.

32. Kent A, Sullivan PJ. Coaching efficacy as a predictor of university coaches' commitment. International Sports Journal. 2003;7(1):78.

33. Vargas-Tonsing TM, Warners AL, Feltz DL. The Predictability of Coaching Efficacy on Team Efficacy and Player Efficacy in Volleyball. Journal of sport behavior. 2003 Dec 1;26(4).

34. Chow GM, Murray KE, Feltz DL. Individual, team, and coach predictors of players' likelihood to aggress in youth soccer. Journal of Sport and Exercise Psychology. 2009 Aug 1;31(4):425-43.

35. Malete L, Chow GM, Feltz DL. Influence of coaching efficacy and coaching competency on athlete‑level moral variables in Botswana youth soccer. Journal of Applied Social Psychology. 2013 Oct;43(10):2107-19.

36. Keatlholetswe L, Malete L. Coaching Efficacy, Player Perceptions of Coaches' Leadership Styles, and Team Performance in Premier League Soccer. Research quarterly for exercise and sport. 2019 Jan 2;90(1):71-9.

37. Myers ND, Vargas-Tonsing TM, Feltz DL. Coaching efficacy in intercollegiate coaches: Sources, coaching behavior, and team variables. Psychology of Sport and Exercise. 2005 Jan 1;6(1):129-43.

38. Hwang S, Feltz DL, Lee JD. Emotional intelligence in coaching: Mediation effect of coaching efficacy on the relationship between emotional intelligence and leadership

style. International Journal of Sport and Exercise Psychology. 2013 Sep 1;11(3):292-306.

39. Fung L. Assessment: Coaching efficacy as indicators of coach education program needs. Athletic Insight. 2003 Mar;5.

40. Myers ND, Wolfe EW, Feltz DL. An evaluation of the psychometric properties of the coaching efficacy scale for coaches from the United States of America. Measurement in Physical Education and Exercise Science. 2005 Sep 1;9(3):135-60.

41. Hepler TJ, Feltz DL, Roman N, Paiement CA. Validating the coaching efficacy scale for youth sport coaches. Journal of Sport & Exercise Psychology. 2007 Jul 2;29.

42. Myers ND, Feltz DL, Wolfe EW. A confirmatory study of rating scale category effectiveness for the coaching efficacy scale. Research Quarterly for Exercise and Sport. 2008 Sep 1;79(3):300-11.

43. Feltz DL, Hepler TJ, Roman N, Paiement C. Coaching efficacy and volunteer youth sport coaches. The sport psychologist. 2009 Mar 1;23(1):24-41.

44. Myers ND, Feltz DL, Chase MA, Reckase MD, Hancock GR. The coaching efficacy scale II—High school teams. Educational and Psychological Measurement. 2008 Dec;68(6):1059-76.

45. Myers ND, Chase MA, Pierce SW, Martin E. Coaching efficacy and exploratory structural equation modeling: A substantive-methodological synergy. Journal of Sport and Exercise Psychology. 2011 Dec 1;33(6):779-806.

46. Myers N, Feltz D, Chase M. Proposed modifications to the conceptual model of coaching efficacy and additional validity evidence for the coaching efficacy scale II-high school teams. Research quarterly for exercise and sport. 2011 Mar 1;82(1):79-88.

47. Sullivan P, Paquette KJ, Holt NL, Bloom GA. The relation of coaching context and coach education to coaching efficacy and perceived leadership behaviors in youth sport. The sport psychologist. 2012 Mar 1;26(1):122-34.

48. Myers ND, Park SE, Ahn S, Lee S, Sullivan PJ, Feltz DL. Proposed sources of coaching efficacy: a meta-analysis. Journal of Sport and Exercise Psychology. 2017 Aug 1;39(4):261-76.

49. Smith RE, Smoll FL, Curtis B. Coaching behaviors in little league baseball. Psychological perspectives in youth sports. 1978;173:201-8.

50. Kenow LJ, Williams JM. Relationship between anxiety, self-confidence, and evaluation of coaching behaviors. The Sport Psychologist. 1992 Dec 1;6(4):344-57.

51. Kenow L, Williams JM. Coach-athlete compatibility and athlete's perception of coaching behaviors. Journal of Sport Behaviour. 1999 Jun 1;22:251-9.

52. Vargas-Tonsing TM, Myers ND, Feltz DL. Coaches' and athletes' perceptions of efficacy-enhancing techniques. The Sport Psychologist. 2004 Dec 1;18(4):397-414.

53. Short SE, Short MW. Coaches' assessment of their coaching efficacy compared to athletes' perceptions. Perceptual and Motor Skills. 2004 Oct;99(2):729-36.

54. Teatro C, Thompson M, Kulinna PH, Mars HV, Kwan J. Coaching behaviors and stakeholders' views of coaches' efficacy. International Journal of Sports Science & Coaching. 2017 Aug;12(4):452-60.

55. Atkinson F, Short SE, Martin J. College Soccer Players' Perceptions of Coach and Team Efficacy. The Sport Psychologist. 2018 Sep 1;32(3):237-43.

56. Boardley ID, Jackson B, Simmons A. Changes in Task Self-Efficacy and Emotion Across Competitive Performances in Golf. Journal of Sport and Exercise Psychology. 2015;37(4):393-409.

57. Myers ND, Feltz DL, Maier KS, Wolfe EW, Reckase MD. Athletes' evaluations of their head coach's coaching competency. Research quarterly for exercise and sport. 2006 Mar 1;77(1):111-21.

58. Myers ND, Wolfe EW, Maier KS, Feltz DL, Reckase MD. Extending validity evidence for multidimensional measures of coaching competency. Research Quarterly for Exercise and Sport. 2006 Dec 1;77(4):451-63.

59. Boardley ID, Kavussanu M. The influence of social variables and moral disengagement on prosocial and antisocial behaviours in field hockey and netball. Journal of Sports Sciences. 2009;27(8):843-854

60. Myers ND, Chase MA, Beauchamp MR, Jackson B. Athletes' perceptions of coaching competency scale II-High school teams. Educational and Psychological Measurement. 2010 Jun;70(3):477-94.

61. Myers ND, Beauchamp MR, Chase MA. Coaching competency and satisfaction with the coach: A multi-level structural equation model. Journal of sports sciences. 2011 Feb 15;29(4):411-22.

62. Bosselut G, Heuzé JP, Eys MA, Fontayne P, Sarrazin P. Athletes' perceptions of role ambiguity and coaching competency in sport teams: A multilevel analysis. Journal of Sport and Exercise Psychology. 2012 Jun 1;34(3):345-64.

63. Myers ND. Coaching competency and (exploratory) structural equation modeling: A substantive-methodological synergy. Psychology of Sport and Exercise. 2013 Sep 1;14(5):709-18.

64. Broodryk R, Van Den Berg PH. High School Rugby Players' Perception of Coaching Effectiveness. Online Submission. 2011.

65. Seefeldt V, Brown EW. Program for athletic coaches' education (PACE). Benchmark Press; 1990.

66. Tsorbatzoudis H, Zahariadis P, Daroglou G, Grouios G. Preliminary study of Coaches' Self-efficacy Scale. Proceedings of the 6th Greek Congress on Sport Psychology. Athens: Congress. 2000 Pp. 58-61.

67. Gucciardi DF, Jalleh G, Donovan RJ. Does social desirability influence the relationship between doping attitudes and doping susceptibility in athletes?. Psychology of sport and exercise. 2010 Nov 1;11(6):479-86.

68. Reynolds WM. Development of reliable and valid short forms of the Marlowe-Crowne Social Desirability Scale. Journal of clinical psychology. 1982 Jan;38(1):119-25.

69. Paulhus DL, Vazire S. The self-report method. Handbook of research methods in personality psychology. 2007;1:224-39.

70. Carlson MD, Morrison RS. Study design, precision, and validity in observational studies. Journal of palliative medicine. 2009 Jan 1;12(1):77-82.

71. Levin KA. Study design III: Cross-sectional studies. Evidence-based dentistry. 2006 Mar;7(1):24-5.

72. Fraser-Thomas JL, Côté J, Deakin J. Youth sport programs: An avenue to foster positive youth development. Physical Education & Sport Pedagogy. 2005 Feb 1;10(1):19-40.

73. Côté J, Turnnidge J, Vierimaa M. A personal assets approach to youth sport. Routledge handbook of youth sport. 2016 Jan 8:243-55.

74. Turnnidge J, Côté J. Transformational coaching workshop: Applying a person-centred approach to coach development programs. International Sport Coaching Journal. 2017 Sep 1;4(3):314-25.

75. Avolio BJ, Bass BM. Developing potential across a full range of leadership. Mahwah, N.J.: Lawrence Erlbaum Associates; 2002.

76. Avolio BJ, Bass BM. Multifactor Leadership Questionnaire. Manual and sampler set. (3rd ed.) Redwood City, CA.: Mind Garden; 2004.

77. Rowold J. Transformational and transactional leadership in martial arts. Journal of applied sport psychology. 2006 Dec 1;18(4):312-25.

78. Vella SA, Oades LG, Crowe TP. The relationship between coach leadership, the coach–athlete relationship, team success, and the positive developmental experiences of adolescent soccer players. Physical education and sport pedagogy. 2013 Nov 1;18(5):549-61.

79. Bass BM, Avolio BJ. Transformational leadership and organizational culture. The International Journal of Public Administration. 1994; 17(3-4), 541-554.

80. Avolio BJ, Bass BM, Jung DI. Multifactor Leadership Questionnaire technical report. Redwood City, CA.: Mind Garden; 1995.

81. Bass BM, Avolio BJ. MLQ, Multifactor Leadership Questionnaire sampler set. Redwood City, CA.: Mind Garden; 2000.

82. Podsakoff PM, MacKenzie SB, Moorman RH, Fetter R. Transformational leader behaviors and their effects on followers' trust in leader, satisfaction, and organizational citizenship behaviors. The leadership quarterly. 1990 Jun 1;1(2):107-42.

83. Hardy L, Arthur CA, Jones G, Shariff A, Munnoch K, Isaacs I, Allsopp AJ. The relationship between transformational leadership behaviors, psychological, and training outcomes in elite military recruits. The Leadership Quarterly. 2010 Feb 1;21(1):20-32.

84. Callow N, Smith MJ, Hardy L, Arthur CA, Hardy J. Measurement of transformational leadership and its relationship with team cohesion and performance level. Journal of Applied Sport Psychology. 2009 Oct 27;21(4):395-412.

85. Vella SA, Oades LG, Crowe TP. Validation of the differentiated transformational leadership inventory as a measure of coach leadership in youth soccer. The sport psychologist. 2012 Jun 1;26(2):207-23.

86. Turnnidge J, Côté J. Applying transformational leadership theory to coaching research in youth sport: A systematic literature review. International Journal of Sport and Exercise Psychology. 2018 May 4;16(3):327-42.

87. Arthur CA, Woodman T, Ong CW, Hardy L, Ntoumanis N. The role of athlete narcissism in moderating the relationship between coaches' transformational leader behaviors and athlete motivation. Journal of sport and exercise psychology. 2011 Feb 1;33(1):3-19.

88. Charbonneau D, Barling J, Kelloway EK. Transformational leadership and sports performance: The mediating role of intrinsic motivation 1. Journal of applied social psychology. 2001 Jul;31(7):1521-34.

89. Price MS, Weiss MR. Relationships among coach leadership, peer leadership, and adolescent athletes' psychosocial and team outcomes: A test of transformational leadership theory. Journal of applied sport psychology. 2013 Apr 1;25(2):265-79.

90. Smith MJ, Arthur CA, Hardy J, Callow N, Williams D. Transformational leadership and task cohesion in sport: The mediating role of intrateam communication. Psychology of sport and exercise. 2013 Mar 1;14(2):249-57.

91. Stenling A, Tafvelin S. Transformational leadership and well-being in sports: The mediating role of need satisfaction. Journal of applied sport psychology. 2014 Apr 3;26(2):182-96.

92. Saybani H, Yusof A, Soon C, Hassan A, Zardoshtian S. Athletes' satisfaction as mediator of transformational leadership behaviors of coaches and football players' sport commitment relationship. World Applied Sciences Journal. 2013;21(10):1475-83.

93. Knowles Z, Gilbourne D, Borrie A, Nevill A. Developing the reflective sports coach: A study exploring the processes of reflective practice within a higher education coaching programme. Reflective practice. 2001 Jun 1;2(2):185-207.

94. Knowles Z, Tyler G, Gilbourne D, Eubank M. Reflecting on reflection: exploring the practice of sports coaching graduates. Reflective Practice. 2006 May 1;7(2):163-79.

95. Nelson LJ, Cushion CJ. Reflection in coach education: The case of the national governing body coaching certificate. The Sport Psychologist. 2006 Jun 1;20(2):174-83.

96. Gilbert WD, Trudel P. Learning to coach through experience: Reflection in model youth sport coaches. Journal of teaching in physical education. 2001 Oct 1;21(1):16-34.

97. Gilbert WD, Trudel P. Role of the coach: How model youth team sport coaches frame their roles. The sport psychologist. 2004 Mar 1;18(1):21-43.

98. Gilbert WD, Trudel P. Learning to coach through experience: Conditions that influence reflection. The Physical Educator. 2005 Jan 26;62(1).

99. Grant AM, Franklin J, Langford P. The self-reflection and insight scale: A new measure of private self-consciousness. Social Behavior and Personality: an international journal. 2002 Jan 1;30(8):821-35.

100. Gilbert W, Dubina N, Emmett M. Exploring the potential of assessment efficacy in sports coaching: A commentary. International Journal of Sports Science & Coaching. 2012 Jun;7(2):211-4.

101. Arbuckle J L. Amos 22.0 User"s Guide. Chicago, IL: SPSS, Inc. 2017.

102. Kline RB. Principles and practice of structural equation modeling (2nd ed.). New York, NY: Guilford Press. 2005.

103. Byrne BM. Structural equation modeling with AMOS, EQS, and LISREL: Comparative approaches to testing for the factorial validity of a measuring instrument. International journal of testing. 2001 Mar 1;1(1):55-86.

104. Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural equation modeling: a multidisciplinary journal. 1999 Jan 1;6(1):1-55.

105. Browne MW, Cudeck R. Alternative ways of assessing model fit. In KA Bollen & JS Long (Eds.), Testing structural equation models (pp. 136–162). Newbury Park, CA: Sage. 1993.

106. Nunnally JC. Psychometric Theory: 2d Ed. McGraw-Hill; 1978.

107. Cohen J. A power primer. Psychological bulletin. 1992 Jul;112(1):155.

108. Jöreskog KG. Testing structural equation models. Sage focus editions. 1993;154:294-.

109. Aquino K, Reed II. The self-importance of moral identity. Journal of personality and social psychology. 2002 Dec;83(6):1423.

110. Harwood C. Developmental consulting in a professional football academy: The 5Cs coaching efficacy program. The sport psychologist. 2008 Mar;22(1):109-33.

111. Mills A, Butt J, Maynard I, Harwood C. Identifying factors perceived to influence the development of elite youth football academy players. Journal of sports sciences. 2012 Nov 1;30(15):1593-604.

112. The FA. [Internet]. 2020 [accessed 2020 May 18]. Available from: https://www.thefa.com/about-football-association/what-we-do/strategy

113. The Premier League, *The Elite Player Performance Plan*, The Premier League, London, 2011. Available from: https://www.premierleague.com/youth/EPPP

114. The FA. [Internet]. 2020 [accessed 2020 May 27]. Available from: https://www.thefa.com/bootroom/resources/coaching/the-fas-4-corner-model

115. Cushion C, Ford PR, Williams AM. Coach behaviours and practice structures in youth soccer: Implications for talent development. Journal of sports sciences. 2012 Nov 1;30(15):1631-41.

116. McAuley E, Duncan T, Tammen VV. Psychometric properties of the Intrinsic Motivation Inventory in a competitive sport setting: A confirmatory factor analysis. Research quarterly for exercise and sport. 1989 Mar 1;60(1):48-58.

117. Bray SR, Balaguer I, Duda JL. The relationship of task self-efficacy and role efficacy beliefs to role performance in Spanish youth soccer. Journal of sports sciences. 2004 May 1;22(5):429-37.

118.   Richer S, Vallerand RJ. Construction et validation de l'´echelle du sentiment

d'appartenance sociale [Construction and validation of the perceived relatedness

scale]. Revue Europeenne de ´Psychologie Applique´. 1996;48, 129–137.

119.   George D, Mallery M. SPSS for Windows Step by Step: A Simple Guide and

Reference, 17.0 update (10a ed.) Boston: Pearson. 2010.

120.   Meteyard L, Davies RA. Best practice guidance for linear mixed-effects models in

psychological science. Journal of Memory and Language. 2020 Jun 1;112:104092.

121.   Rafferty AE, Griffin MA. Dimensions of transformational leadership: Conceptual

and empirical extensions. The leadership quarterly. 2004 Jun 1;15(3):329-54.

APPENDICES

Appendix A: Ethics Application

Note. Due to University rulings regarding COVID-19, the hard copy version of the ethics application was not able to be accessed in order to be scanned and uploaded at the time of submission. Please contact Hazel Cromar (h.cromar@essex.ac.uk) to access an online version of the ethics application.

Appendix B: Survey Pack

University of Essex   School of Sport, Rehabilitation, and Exercise Sciences

The Influence of Coaching Effectiveness on Player Development

Thank you for your interest in this study. Please circle the relevant answer to each of the following six questions:

1. I have been informed of and understand the purposes of the study.

   Yes   No

2. I have been given an opportunity to ask questions about the study.

   Yes   No

3. I understand I can withdraw at any time from the study without prejudice.

   Yes   No

4. After discussion with the investigator to my knowledge I do not have any medical conditions that might affect me participating in this study.

   Yes   No

5. Any information which might potentially identify me will not be used in published material.

   Yes   No

6. I agree to participate in the study as outlined to me.
   Yes   No

   Name (printed) _____

   Signature_____ Date_____

If you have any questions about our project, either now or in the future, please feel free to contact:

Kyran Clements: kc16499@essex.ac.uk

Dr John P Mills: john.mills@essex.ac.uk

University of Essex   School of Sport, Rehabilitation, and Exercise Sciences

Dear Participant,

Thank you for choosing to participate in this study. Before you complete the following questionnaire pack we would first like to ask you a few demographic questions:

Please provide a memorable word: _____
This will be used as your participant ID, so it is important that you remember this for time points 2, 3 or to withdraw your data from the study.
What is your age? _____

What is your current level of competition (please circle)?

Local / Regional / Sub-National / National / International

What is the highest level of competition you have played (please circle)?

Local / Regional / Sub-National / National / International

How long have you been involved in football (total years)? _____

How many months/years have you been with your current team? _____

Do you have a contract to play next season at this football club?

Yes / No / Other _____

Are you seeking an alternative club for next season?

Yes / No / Other _____

Please state the name of your main coach (i.e., the coach you most closely work with)

_____

Out of 100, with 0 being no confidence and 100 being total confidence, please mark the scale with a line to indicate how confident you are in your ability to perform the following tasks:

Task	Scale
1. Dribble past an opponent	0----------------------------------50----------------------------------100
2. Pass the ball accurately	0----------------------------------50----------------------------------100
3. Challenge an opponent for the ball	0----------------------------------50----------------------------------100
4. Beat (trick) an opponent	0----------------------------------50----------------------------------100
5. Protect the ball	0----------------------------------50----------------------------------100
6. Head the ball accurately	0----------------------------------50----------------------------------100
7. Recover the ball	0----------------------------------50----------------------------------100
8. Provide support under pressure	0----------------------------------50----------------------------------100
9. Drive (strike) the ball	0----------------------------------50----------------------------------100
10. Instigate a foul and take a foul	0----------------------------------50----------------------------------100
11. Be a positive influence on team mates	0----------------------------------50----------------------------------100
12. Physically prepare for the demands of regular football	0----------------------------------50----------------------------------100
13. Tactically adjust your game to meet the team's needs	0----------------------------------50----------------------------------100

University of Essex   School of Sport, Rehabilitation, and Exercise Sciences

The following questions ask you to consider the extent to which your main coach can implement their knowledge and skills to positively affect and improve the learning and performance of their athletes. Please rate his/her effectiveness for each question by circling the appropriate number. 1= Not at all effective and 9 = Extremely effective.

1	2	3	4	5	6	7	8	9
Not at all effective								Extremely effective

How effective is your coach in his/her ability to . . . ?

	1	2	3	4	5	6	7	8	9
1. Coach individual players on technique?	1	2	3	4	5	6	7	8	9
2. Implement an appropriate endurance program for his/her players during the season?	1	2	3	4	5	6	7	8	9
3. Make critical decisions during competition?	1	2	3	4	5	6	7	8	9
4. Prepare an appropriate plan for his/her players off-season physical conditioning?	1	2	3	4	5	6	7	8	9
5. Spend time in self-reflection?	1	2	3	4	5	6	7	8	9
6. Think about the way he or she feels about things?	1	2	3	4	5	6	7	8	9
7. Teach the skills of his/her sport?	1	2	3	4	5	6	7	8	9
8. Recognise talent in his/her players?	1	2	3	4	5	6	7	8	9
9. Encourage his/her players to be team players?	1	2	3	4	5	6	7	8	9
10. Show players how to look at difficulties from a new angle?	1	2	3	4	5	6	7	8	9
11. Recognise that different players have different needs?	1	2	3	4	5	6	7	8	9
12. Understand competitive strategies?	1	2	3	4	5	6	7	8	9
13. Get the team to work together for the same goal?	1	2	3	4	5	6	7	8	9
14. Demonstrate the skills of his/her sport?	1	2	3	4	5	6	7	8	9
15. Think about his or her thoughts?	1	2	3	4	5	6	7	8	9
16. Consider that you have different strengths and abilities from others?	1	2	3	4	5	6	7	8	9
17. Detect skill errors in his/her players?	1	2	3	4	5	6	7	8	9
18. Maximize his/her team's strengths during competition?	1	2	3	4	5	6	7	8	9
19. Challenge players to think about problems in new ways?	1	2	3	4	5	6	7	8	9
20. Recognise opposing team's weakness during competition?	1	2	3	4	5	6	7	8	9
21. Treat each team member as an individual?	1	2	3	4	5	6	7	8	9
22. Think about why he/she behaves in the way that they do?	1	2	3	4	5	6	7	8	9
23. Develop his/her players' abilities?	1	2	3	4	5	6	7	8	9
24. Accurately assess his/her players' physical conditioning?	1	2	3	4	5	6	7	8	9
25. Adapt to different game situations?	1	2	3	4	5	6	7	8	9
26. Develop a strong team attitude and spirit among team members?	1	2	3	4	5	6	7	8	9
27. Examine his/her feelings?	1	2	3	4	5	6	7	8	9
28. Adjust his/her game strategy to fit the team's talent?	1	2	3	4	5	6	7	8	9
29. Recognise opposing team's strengths during competition?	1	2	3	4	5	6	7	8	9
30. Help team members to develop their strengths?	1	2	3	4	5	6	7	8	9
31. Get you to rethink the way you do things?	1	2	3	4	5	6	7	8	9
32. Take time to reflect on his/her thoughts?	1	2	3	4	5	6	7	8	9
33. Help team members to work out how to solve problems?	1	2	3	4	5	6	7	8	9

For each of the following statements, please indicate how true it is for you, using the following scale:

1 = Not at all	2	3	4 = Somewhat true	5	6	7 = Very true

1. I think I am pretty good at football. _____
2. I think I do pretty well at football, compared to other academy players. _____
3. After working at this activity for a while, I felt pretty competent. _____
4. I am satisfied with my footballing performance. _____
5. I am pretty skilled at football. _____
6. Football is an activity I am not very good at. _____

University of Essex   School of Sport, Rehabilitation, and Exercise Sciences

Listed below are some characteristics that may describe a person:
Caring, compassionate, fair, friendly, generous, helpful, hardworking, honesty, and kind.

For a moment, visualize in your mind the kind of person who has these characteristics. The person with these characteristics could be you or it could be someone else. Imagine how that person would think, feel, and act. When you have a clear image of what this person would be like, answer the following questions using the scale below (please circle your answer):

1 = strongly disagree	2 = disagree	3 = neutral	4 = agree	5 = strongly agree

1) It would make me feel good to be a person who has these characteristics.	1	2	3	4	5
2) Being someone who has these characteristics is an important part of who I am.	1	2	3	4	5
3) A big part of my emotional well-being is tied up in having these characteristics.	1	2	3	4	5
4) I would be ashamed to be a person who has these characteristics.	1	2	3	4	5
5) Having these characteristics is an important part of my sense of self.	1	2	3	4	5

Here is a list of statements about how you may feel in your relationships with your team mates and coaches. Please indicate to what extent you agree with each of the following items.

1 = Do not agree at all	2 = Very slightly agree	3 = Slightly agree	4 = Moderately agree	5 = Agree	6 = Strongly agree	7 = Very strongly agree

In my relationships with my **team mates**, I feel ...
Supported.____
Close to them. ____
Understood. ____
Attached to them. ____
Listened to. ____
Bonded to them. ____
Valued. ____
Close-knit. ____
Safe. ____
As a friend. ____

In my relationships with my **coaches**, I feel ...
Supported.____
Close to them. ____
Understood. ____
Attached to them. ____
Listened to. ____
Bonded to them. ____
Valued. ____
Close-knit. ____
Safe. ____
As a friend. ____

Thank you for completing this part of the assessment!