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Psychosocial factors associated with talent development in football: A systematic review

Talent development in football is an increasingly 'hot topic' for researchers and practitioners (Pain & Harwood, 2013). There is a general acceptance that football has seen an increased professionalization of players at a younger age which may be detrimental to a player's development (Relvas, Littlewood, Nesti, Gilbourne & Richardson, 2010; Roderick, 2006). Many criticisms of talent development practices in football are centred on English football and have evoked relatively widespread concern that professional clubs' talent development programmes are not as productive as they should be, based on the small number of English academy graduates that progress to a club's senior team (e.g., Green, 2009; Richardson, Helvas & Littlewood, 2013; Williams, 2009). In 2014 the number of homegrown players per English Premier League squad was 9.4% and only 23 English players played in UEFA Champions League teams (Football Association, 2015). Further, in the 2014/15 season, English Premier League clubs spent €3.4bn on signing squad members, most of whom were overseas players (Poli, Ravenel, & Besson, 2015). Therefore, further understanding of psychosocial factors and their influence in talent development may support researchers and practitioners to revise and develop their talent development practices. Drawing on different definitions (e.g., Martikainen, Bartley & Lahelma, 2002) we view the term *'psychosocial'* as pertaining to the interrelation of individual psychological characteristics with social influences and to the ways in which these may shape or guide behaviours. By way of example within the context of talent development in football, this definition suggests that social influences (such as parents or peers) interact with individual psychological characteristics (such as discipline or commitment) to shape or guide behaviours (such as lifestyle choices or deliberate play) which may then influence talent development in football.

It has long been acknowledged that effective athlete development should consider the complex interaction between the whole person, the task, and the environment (e.g., Hackfort, 2006; Wylleman & Lavallee, 2004) and that psychosocial factors can influence talent development in football (e.g., Holt & Dunn, 2004). Despite this, football has tended to centre its attention primarily on the physical, technical and tactical development of players (Richardson et al., 2013) and has historically been reluctant to change (Pain & Harwood, 2004). Combining this with the understanding that the junior-to-senior career transition is often the most difficult for athletes (e.g., Stambulova 2009; Wylleman & Lavallee, 2004), a systematic review of psychosocial factors associated with talent development in football may offer potential solutions or strategies to support players through this transition. A football-specific review (i.e. one which is drawn solely from football literature) is warranted as practitioners require context-specific information on which to base their sport psychology research and practice (Ryba, Stambulova, Si & Schinke, 2013). To this end, three recent football-specific research reviews have been completed (Fernández-Rio & Mendez-Giménez, 2014; Freitas et al., 2013; Haugaasen & Jordet, 2012) which furthered our levels of multidimensional understanding of expertise, talent and player development in football.

Haugaasen and Jordet (2012) examined the development of expertise in football players from the perspective of the Developmental Model of Sport Participation (DMSP; Côté, 1999; Côté et al., 2003, 2007; Côté & Fraser-Thomas, 2007; Côté, Horton, MacDonald & Wilkes, 2009). Based on 115 studies returned from SportDiscus, four key themes relating to expertise development emerged: a) career length and peak performance age; b) the amount and content of football specific practice; c) non-specific practice, with specific focus on the relationship between diversification, specialisation, and skill transfer; and d) dropout from football.

Moreover, the authors argued that, for the DMSP and arguments associated with early specialisation versus early diversification to be relevant in the football context, football specific nuances (e.g., the requirement for football-specific formal versus informal play) may need to be integrated into the model.

Although it provides valuable insight, elements of Haugaasen and Jordet's approach to conducting their review support the rationale for further systematic reviewing of psychosocial factors associated with talent development in football. First, the shortage of methodological detail suggests their review lacks 'auditability', making replication of the study problematic for scholars. For example, the authors cited that literature searching resulted in "a total of 115 articles for further analysis" (p.181), however it was not clear how many of these were included in the final review or the full contribution made by some studies. Further, best practice recommendations (Moher, Liberati, Tetzlaff, & Altman, 2009) suggest that the role of authors and the process of screening and reviewing articles should be clear. These details were largely absent from Haugaasen and Jordet's work. Further, only one database was searched, suggesting potentially valuable data may have been excluded (Forsdyke, Smith, Jones & Gledhill, 2016). Finally, all studies reviewed were based on male football players. Although well rationalised by the authors, this suggests that questions regarding talent development in other football populations (e.g., female football players, disabled football players) remain unanswered. This latter critique is noteworthy given the changing nature of football in countries worldwide. For example the holistic and inclusive growth of football can be indicated by women's football now being a major participation sport for women worldwide. UEFA recently noted a five-fold increase in participation with there now being 750,000 registered female players under the age of 18 and participation growth more than

400% in parts of Europe (UEFA, 2015). There has also been a rapid growth in impairment specific football in England with over 38,000 players now registered across over 400 teams (Football Association, 2010). For example, the English Football Association (FA) currently operates seven international impairment specific squads (amputee, blind, cerebral palsy, deaf and hearing impaired [male and female], learning disability, and partially sighted). Arguably, given the growth and development of football on a more inclusive and global scale, an inclusive systematic review may advance current understanding.

Freitas et al. (2013) reviewed methodological approaches to examining psychological skills training (PST) in football. They reported that experimental, longitudinal designs dominated the literature, as did the sampling of football players under 16 years old. Studies adopted both qualitative and quantitative approaches, and some studies reported how psychological skill training was used to increase playing quality. As such, studies reported by Freitas and colleagues demonstrate links to talent development. The range of searched databases and the auditable and replicable nature of the study ensured that Freitas and colleagues contributed a comprehensive understanding by enlightening the reader to the methodological approaches. Fernández-Rio & Mendez-Giménez (2014) conducted a review of talent detection and development in football. We raise three considerations pertaining to this work which contribute to the rationale for further systematic reviewing of this body of research. First, psychosocial skills do receive attention; however, their coverage is limited to approximately one column. Second, there is a lack of discussion of the quality or nature of the studies reviewed. This suggests a need for a more systematic understanding of psychosocial factors and how this understanding has been created. Finally, whilst this purported to be a football-specific review, non-football findings were included. For example, Martindale,

Collins and Abraham's (2007) study of elite coach perspectives on talent development in UK sport was included. Whilst Martindale and colleagues' work provides excellent insight into the perspectives of elite coaches with experience of talent development, these coaches were drawn from 13 different sports and their findings were not delineated to football.

Drawing on the above, we contend there is a need for a more fulsome and inclusive systematic review of psychosocial factors associated with talent development in football which draws together key understanding and develops the area by building on the cited limitations of existing reviews. More specifically, we are going to: (a) appraise existing research in psychosocial factors associated with talent development in football (i.e. what these factors are and how they influence talent development); (b) examine the applied implications of research; to (c) provide salient future research and applied directions.

Method

The method for this systematic review was informed by Lloyd Jones (2004) and the PRISMA (2009) guidelines.

Search strategy

Identification of relevant work involved the following process: 1) searching e-journal databases (Science Direct, Sport Discus, PsychARTICLES and Psycinfo) using the inclusion/exclusion criteria; 2) the bibliographic screening of reference sections of eligible studies; and 3) forward citation searching of eligible studies.

Search terms in e-journal searches were: Talent Development AND soccer OR football NOT Relative age effect NOT Physiol* NOT Anthrop* NOT Birth date. Search terms were agreed a priori, with exclusions rationalised by the author team, and were intentionally broad to

reduce the risk of relevant literature being removed at initial e-journal searching (Gough, Oliver & Thomas, 2012).

Inclusion and exclusion of studies

The following inclusion/exclusion criteria were deployed in this study: (a) papers were published in the English language to ensure consistency in appraising articles (cf. Tod, Hardy & Oliver 2011); (b) between January 2004 and 25th February 2016 as the majority of work in this area has taken place since 2004 and it is be appropriate to only include more recent literature in such instances (e.g., Booth, 2016); (c) papers were original, peer-reviewed articles; (d) full-text article available (Knipschild, 1995); (e) papers must present original data on psychosocial factors associated with talent development in football.

Studies were excluded if they were multi-sport studies that included football as a sport of interest, but did not report football-specific findings. Due to the proximity of this systematic review to that of Freitas et al. (2013); combined with the auditability and transparency of their review, studies examining PST in football players were excluded from our review.

Sifting articles and study eligibility

Sifting was carried out in three stages (see Figure 1); papers were first reviewed by title, then by abstract, and finally by full-text (Lloyd Jones, 2004; Meade & Richardson, 1997). At each stage, articles were excluded if they did not meet the inclusion criteria (reasons for full-text rejection are available from the first author). To enhance methodological rigor, a peer-review team of the lead author, a senior academic from an affiliated institution (the second author) and a senior academic from an external institution (the third author) was established. Eligibility of inclusion of the final studies was conducted via peer-debriefing (cf. Forsdyke et al., 2016).

Data extraction and synthesis of study results

Our first step for data analysis was indwelling (cf. Swann et al., 2012) where we read each study several times to become fully immersed with the research context, finding and inferences. The extracted data included classification of research methodology (quantitative, qualitative or mixed), country in which the study was conducted, and sample characteristics (number/size, age, and gender – see table 1). Studies were appraised using the Mixed Methods Appraisal Tool (MMAT; Pluye, Gagon, Griffiths & Johnson – Lafleur, 2009; Pluye et al., 2011). This is a reliable tool that demonstrates excellent inter-rater reliability (e.g., Pluye & Hong, 2014). The MMAT was originally designed based on critical examination of 17 health-related reviews and subsequently revised based on a comprehensive framework for assessing the quality of mixed-methods research (O'Cathain, 2010). Following this, it is important to note that the MMAT does not provide or infer the overall 'quality' of a research paper (e.g. quality of writing or conclusions), it is used to determine whether a study's method achieves pre-determined criteria which can be used to indicate methodological quality. Specifically, we selected the MMAT as it has been recognised as the most reliable tool for appraising mixed methods research (Crowe & Sheppard, 2011) and recently been successfully adopted in contemporary literature centered on psychosocial considerations in sport environments (e.g. Forsdyke et al., 2016).

We adopted the updated (Pluye et al., 2011) version of the MMAT. It has four criteria for the evaluation of qualitative and different forms of quantitative studies, whereas three criteria are applied to the mixed-methods studies. The output from the MMAT is a star (*) rating ranging from 0 – 4 which can also be reported as a percentage value ranging from 0 – 100, at 25% increments. The MMAT guidance documents do not present thresholds for risk of bias in reporting, therefore the research term agreed the following thresholds a priori (cf. Forsdyke et al., 2016): 0 – 24% = high risk of bias; 25 – 49% = high to moderate risk of bias; 50 – 74% =

moderate to low risk of bias; and 75 – 100% = low risk of bias. There is debate over the concept of risk of bias (e.g., Malterud, 2001) and the use of criterion-based approaches to gauging the methodological quality of qualitative research (e.g., Tracey, 2010). Despite this, considerations such as outlining philosophical assumptions and existing preconceptions, and discussing elements of reflexivity are important considerations. Without these being clearly reported in qualitative studies, they can be considered examples of increasing risk of bias (Malterud, 2001).

The data extraction and synthesis of study results was conducted during peer review team meetings. This process involved two authors (first and third) independently appraising papers (Weir, Rabia & Ardern, 2016) then reaching a consensus over the final study appraisal through debate. Inter-rater reliability of appraisals was assessed using a two-way mixed, absolute agreement intraclass correlation coefficient (Shrout & Fleiss, 1979). In instances where there was disagreement, this was noted by the lead author and a final consensus was reached. This consensus reaching was informed by the MMAT guidance notes, playing 'devil's advocate' or through referral to the second author. The MMAT appraisals can be found in table 2.

A two-step convergent thematic analysis (CTA; Centre for Reviews and Dissemination – CRD, 2009) followed to synthesize data. A CTA consists of identifying the main or recurring themes from a body of research and is typically used for detecting, grouping and summarizing findings from studies (Pope, Mays, & Popay, 2007). Alongside the CTA, we used concept mapping (e.g., Novak, 1980) to extend the output from the CTA.

We adopted concept mapping (see figure 2) to provide a visual representation of thematic relationships, including their cross-connections and how these relate to talent development in football (Eppler, 2006). The combination of CTA and concept mapping allowed us to interpretively understand and visually depict how we interpreted the different psychological,

social and behavioural factors identified through the systematic review to interconnect with each other. Concepts within the map are drawn from the results of included studies. The arrows (i.e. the hypothesized relationships) between concepts were created from a synthesis of discussion sections of included studies and wider research to demonstrate how concepts might link together, to allow us to interpret how they might influence talent development in football. This latter synthesis was created by critical debate within the author team with a view to providing the research area with a series of hypothesized relationships which could then be examined in future research or to inform future applied practices. We allowed the concept map to grow as we engaged with different aspects of the systematic review (e.g., Novak & Cañas, 2007) including re-positioning concepts within the map and redefining relationships through critical debate. The final concept map (Figure 2) is the sixth iteration.

Results

Literature identification

The electronic database searches produced 3490 results with a further nine being returned from forward and backward citation searching. Following the screening and sifting processes, we deemed 43 studies eligible for inclusion. The eligible studies (N=43) contained qualitative (n=12), quantitative (n=29) and mixed-methods (n=2) studies (see table 1).

MMAT appraisal

For all eligible studies, methodological quality ranged from 25 – 100% (m= 53.41%). Owing to the high number of studies adjudged to demonstrate a high risk of bias in reporting, we did not conduct a meta-analysis as doing so in such situations serves to increase the risk of bias (Weir et al., 2016). For qualitative studies, methodological quality ranged from 25 – 75% (M=68.75%). For quantitative studies, methodological quality ranged from 25 – 100%

(M=45.69%). Mixed methods studies ranged from 25 – 75% (M=50%). Inter-rater reliability of independent study appraisals was excellent (.906; 95% CI = .825 - .949).

The most prominent designs in quantitative studies are descriptive, correlational and cross-sectional. There is also significant use of retrospective methods when examining football players' developmental practices (e.g., Ford & Williams, 2012). Utilising the MMAT quality criteria, we found that quantitative studies report their samples with clarity, but the sampling procedures less-so (see Table 2). There was scant evidence of sample size or statistical power calculations being conducted, with select studies (e.g., Zibung & Conzelmann, 2013) giving attention to the representative nature of the sample. Quantitative research also has sporadic limitations in measurement tools, such as low Cronbach's alpha values (e.g., Kavassanu et al., 2011; Mills et al., 2014b).

Qualitative research demonstrates a dominance of retrospective interview methods (e.g., Gledhill & Harwood, 2015). Applying the MMAT criteria to qualitative research indicated that few studies reported the researcher's influence in data collection or the analysis process (e.g., how researchers interacted with participants; how the researcher's background may have influenced data interpretation).

Demographic characteristics

The participants (N = 14977) were players (n= 14869), coaches (n = 81) and other social agents (e.g. teachers, school sport co-ordinators; n=27). Table 3 contains a detailed demographic breakdown. The studies reviewed (N=43[1]) gleaned data from participants in: Australia (n=2); Brazil (n=1); Canada (n=2); Denmark (n=4); England (n=18); France (n=2); Germany (n=1); Ghana (n=1); Greece (n=1); Mexico (n=1); Netherlands (n=3); Norway (n=5); Portugal (n=1);

[1] Some studies were multi-nation studies, hence the disparity between total number of studies and countries represented.

Spain (n=1); Sweden (n=1); Switzerland (n=2); United States (n=4); and country not reported (n=2). Of the 43 studies, 14% (n=6) reported the ethnicity of participants, 2.3% (n=1) partially reported the ethnicity, and 83.7% (n=36) did not report ethnicity.

Convergent thematic analysis

The concept map has the central concept of increased chances of career progression (e.g., progression from academy to senior team; [encircled and shadowed]) as, pragmatically, this can be viewed as the preferred result of effective talent development programmes in football (cf. Henriksen, Stambulova & Roessler, 2011). Leading toward the central concept, we constructed three higher order themes of: (1) psychological factors, such as specific psychological characteristics, associated with talent development in football (containing 22 lower order themes); (2) external social factors associated with talent development in football (containing 21 lower order themes); and (3) player-level behavioural indicators associated with talent development in football (containing five lower order themes). We hypothesize that these behavioural indicators enhance coach perceptions and recognition of a player as more ‘talented’, thus increasing the chances of a player being recommended for career progression.

The concept map demonstrates these psychological, social and behavioural themes, and our interpreted hypothesized relationships between them, which contribute to a player progressing their career. For example, we have synthesized the hypothesis that self-regulation may increase adaptive volitional behaviours, which in-turn may increase quality of practice and play behaviours, which in-turn increases the chances of consistently high level of football performance, which in-turn increases the chance of career progression. Table 1 shows the psychosocial factors present in individual studies and describes how they may influence talent development in football.

Psychological factors. We identified 22 internal psychological factors that are associated with talent development in football: discipline, self-control, self-awareness, adaptive perfectionism, self-acceptance, task/mastery orientation, commitment, determination, intrinsic motivation, self-regulation, resilience, grit, non-verbal intelligence, fear of failure, psychological wellbeing, reflective skills, enjoyment, perceived competence, anticipatory skills, decision making skills, delaying gratification and coping strategies.

External social factors. We identified 21 external social factors associated with talent development in football: sibling relationships, autonomy supportive coaching, peer experiences, parenting styles, parent climate, player-parent relationships, socioeconomic background, perceptions of team cohesion, dual career demands, parent-teacher relationships, social support, coach-player relationships, coach perceptions of player's playing ability, role strain, effective learning environment, coach self-efficacy beliefs, appropriate types and levels of challenge, talent development environments, family structure and football culture.

Player-level behavioural indicators. We identified five player-level behavioural indicators of talent development in football (indicated by emboldened lines in figure 2): adaptive lifestyle choices and volitional behaviours, amount of football behavioural engagement, quality of football specific practice and play, appropriate use of coping strategies and consistently high levels of football technical and tactical performance. As demsontrated in the concept map, the first four behavioural indicators integrate to lead to the final behavioural indicator of 'consistently high levels of football technical and tactical performance', which is viewed as the foremost outcome variable of this review contributing to the central concept of career progression. This is because it is the factor most valued by coaches when deciding whether a

player should progress at a football club, such as from academy to senior team (e.g., Morley, Morgan, Nicholls & McKenna, 2014).

Discussion

The aim of this systematic review was to understand psychosocial factors associated with talent development in football, and how they influence talent development. Our findings suggest that psychological and social factors are interrelated and associated with player-level behavioural factors. The main outcome variable is the behavioural factor of consistently high levels of football performance, as this appears to determine whether elite level coaches will recommend a player for the next stage of their career (e.g., transitioning from academy to senior team).

Our concept map presents a series of hypothesized relationships between the different psychological, social and behavioural factors which may explain how a player can achieve and maintain a consistently high level of football performance. This presents practitioners with an opportunity to reflect on areas of their practice which may be developed and presents researchers with opportunities to consider how they can continue to advance the body of literature.

In the following sections we: (a) critically narrate the concept map, specifically discussing the interpreted hypothesized relationships and how the different factors may contribute to consistently high levels of performance; (b) highlight key limitations of existing research which may influence the application of research findings and provide salient summary future research directions; (c) offer summary applied implications in addition to those discussed within individual themes in the review; (d) provide a critical appraisal of our review; and (e) close with summary take-home messages. To facilitate the flow of the discussion and provide ease of use for the reader, we have integrated applied implications and future research directions within different sections of the discussion.

Concept map: Discussion and narration of concepts and hypothesized relationships

The most commonly investigated behavioural factor associated with talent development in football is the *football-specific practice and play activities* that players engaged with. Contrary to previous review findings from Haugaasen and Jordet (2012, p.194) who argued that there was "no evidence" that different developmental activities "differentiate who eventually reaches top senior levels", our review suggests that the types of activities that players engage with or the way coaches structure their sessions may influence the level of ability a player can attain and the level to which they can progress their careers. Male players who attain and maintain a professional football career have more football specific play and game-play activities in childhood than those who do not reach an elite level (e.g., Ford & Williams, 2012; Ford, Ward, Hodges and Williams, 2009; Hornig, Aust & Güllich, 2016). Moreover, Roca, Williams and Ford (2012) reported that football play was more predictive of football ability than football practice. In all likelihood, our conclusions differ from Haugaasen and Jordet's as findings in their review were drawn predominantly from male players under the age of 16, whereas recent research included in our review has sampled senior, elite male players (e.g., Hornig et al., 2016).

Based on these findings, we highlight our first theoretical and applied implications. On a theoretical level, these findings support the notion of the Early Engagement Hypothesis (EEH; Ford et al., 2009) which posits that football-specific practice and play between the ages of six and 12 will strongly contribute to talent development. On an applied level, we can conclude that game or match-play developmental activities which deliberately prepare players for football may be most beneficial for talent development (e.g., Haugaasen, Toering & Jordet, 2014; Singer & Janelle, 1999) and should form the majority of coaching activities. In making this applied recommendation, we are mindful that it is based on retrospective data drawn from descriptive or

correlational research which has a moderate risk of bias. It is plausible, however, that these types of developmental activities will result in consistently higher levels of performance due to their potential to develop optimal motoric, cognitive, perceptual, and social skills (e.g., Roca et al., 2012). This is a salient applied recommendation as the study of coach practices in football indicates that coaches tend to spend more time leading activities deemed less relevant to football match performance (e.g., physical training, skills practice) and less time on activities deemed more relevant, such as game-based activities (Ford, Yates & Williams, 2010).

Within the theme of coaching practices, the types of activities are also important as they can influence key psychological characteristics which can differentiate between elite and non-elite youth players, such as *motivational orientation* (e.g., Zuber, Zibung & Conzelmann, 2015). Notwithstanding the importance for motoric, cognitive, perceptual and social development, game and match-play activities are also viewed as most enjoyable by players (Ward et al., 2007). As well as being *enjoyable*, game-play can also be used to provide appropriate *levels of challenge* and competition for players (Singer & Janelle, 1999). This is important as appropriate levels of challenge are likely to enhance *intrinsic motivation* and *task-orientated behaviours* (Abuhamdeh & Czisentmihalyi, 2012), both of which are associated with medium-term, international age-group progression in youth football players (Zuber et al., 2015). In addition to motivation, coaches creating an appropriate level of challenge for their players, or allowing players to create this for each other during game play, can enhance *resilience*, increase player *self-awareness*, instigate the use of social support seeking behaviours, and initiate problem-focussed *coping behaviours* (e.g., Collins & MacNamara, 2012). Each of these qualities is identified in football literature as desired or requisite for talent development (e.g., Holt & Dunn, 2004; Holt & Mitchell, 2006; Mills et al., 2012; Morley et al., 2014; Van Yperen, 2009). Engagement in

problem-focussed coping behaviours and seeking *social support* differentiated between Dutch players who made it to an elite level and those that did not (Van Yperen, 2009), whilst a lack of coping strategies was reported by players on the verge of being released from English professional football (Holt & Mitchell, 2006). Coping behaviours are also important for modulating *fear of failure*, reducing its negative effect on performance (Sagar et al., 2010), with effective social support seeking and provision by parents as a coping resource was interpreted as important for talent development (Holt & Dunn, 2004). Finally, appropriate levels of challenge also contribute to an effective learning and development environment for players, which interpretive qualitative evidence has linked to enhanced *psychological wellbeing*, a drive to succeed, basic psychological need satisfaction, and *self-regulation* (Gledhill & Harwood, 2015).

The above is an important consideration as self-regulation can differentiate between elite and non-elite football players (Toering et al., 2009) and a determination to succeed is a quality that coaches view as important for talent development in football (e.g., Morley et al., 2014). Further, a desire to succeed can manifest itself in players adopting more *volitional behaviours* (Gledhill & Harwood, 2014) and seeking more *high quality practice and play opportunities* (Toering et al., 2011) which, based on our earlier observations, would appear to be game-based or match-play activities. However, coaches expect a conforming dedication to their instructions (Holt & Dunn, 2004) and often view players not following instructions and any subsequent mistakes as signs of a weak player (Toering et al., 2011). Consequently, there may be a disparity between preferred and actual coaching behaviours in football, and coaches may be reducing a player's opportunity to self-regulate and act in a volitional manner. This is an important observation as research with male (Holt & Mitchell, 2006) and female (Gledhill & Harwood, 2015) using negative case players noted a lack of volitional behaviours.

An applied implication of the findings related to coach behaviours and the potential impact they may have on self-regulation is that coaches and potentially other key stakeholders may benefit from education into what self-regulation is, how it can influence a player's talent development and how coaches can support players' self-regulation development. This is also noteworthy as this expected conforming dedication can be viewed as autonomy thwarting.

Autonomy-thwarting coach behaviours (e.g., not providing a clear rationale for decisions, not valuing player input, not affording player decision making; Stebbings, Taylor & Spray, 2011) have been linked to failed attempts by players to pursue a football career and higher levels of behavioural disengagement (Gledhill & Harwood, 2015). Conversely, *autonomy supportive coaching* is linked to higher levels of behavioural engagement (Curran et al., 2013), enjoyment (Quested et al., 2013) and reduced dropout (Quested et al., 2013). Therefore, we conclude that by working with players in an autonomy supportive manner, coaches are more likely to facilitate talent development for many psychological, social and behavioural reasons.

In closing the section on coach-related factors, the applied implications of these finds are that coaches are more likely to facilitate talent development if behaviourally they: (a) include and encourage formal and informal football-specific game and match-play activities in formal training sessions; (b) use functionally relevant challenges with their players; (c) promote a task-orientated motivational climate; and (d) adopt more autonomy supportive coach behaviours. We make these applied recommendations as evidence suggests they may enhance talent development and stimulate consistently high levels of performance due to a combination of metacognitive (e.g., enhanced self-regulation; Toering et al., 2011), emotional (e.g., modulated fear of failure; Sagar et al., 2010), social (e.g., enhanced *peer relationships*; Gledhill & Harwood, 2015),

behavioural (e.g., enhanced *quality of practice behaviours*; Ward et al., 2007), and technical and tactical reasons (e.g., Ford et al., 2010).

Whilst the *coach recognition of players* is undoubtedly a significant external social factor who influences talent development in football, there are also other people who may need to optimally interact to influence talent development in football (Gledhill & Harwood, 2015). Results of this systematic review suggest that *parents, siblings, peers,* and *teachers* all play influential roles in talent development due to their interrelations players which in-turn may directly or indirectly influence important psychological and behavioural characteristics (e.g., Kavassanu, White, Jowett & England, 2011; Sapeija, Dunn & Holt, 2011; Ullrich-French & Smith, 2009).

Consistently, parents are recognized as initiating or supporting opportunities to engage and maintain football participation through *tangible support* (e.g., Holt & Dunn, 2004). Typically, elite football players view fathers are the more prominent parent with respect to tangible support provision (e.g., Gledhill & Harwood, 2014; Holt & Dunn, 2004; Kavassanu et al., 2011), whereas mothers tend to be the more prominent emotional support provider (e.g., Holt & Dunn, 2004). Recently, Gledhill and Harwood's (2014) study with elite female football players forwarded the idea of 'football fathers' (i.e. fathers who have/had experience of playing and/or coaching professional football). Players interpreted that this football experience was an important developmental resource as it helped to develop desired player-level qualities, such as reflection and self-awareness. The football-father's football experience was also interpreted by players to be important for enhancing *coach-player relationships*, reinforcing coach advice, and being able to alter football-specific guidance matching the player's developmental stage.

Some evidence from parenting literature also suggests that elite level football players tend to have parents who create a climate of appreciation of success through hard-work and learning (Kavassanu et al., 2011). This may aid talent development in football due to player-level task-orientated and self-determined motivation (e.g., Ullrich-French & Smith, 2006) associated with this parenting climate. This may, in turn, breed a culture of *unconditional self-acceptance* in talented football players (Hill, Hall, Appleton & Kozub, 2008) and an increased self-awareness. Coaches view self-acceptance as an important player-level psychological asset for talent development as it is perceived to foster a healthy *goal commitment* (Mills et al., 2012). As well as goal commitment being a quality valued by elite level coaches (e.g., Holt & Dunn, 2004; Mills et al., 2012), it is also a quality that longitudinal, prospective evidence has shown to differentiate between players who make it to an elite level in men's football, and those who do not (Van Yperen, 2009). It is likely that goal commitment influences talent development as it can affect engagement with quality practice behaviours (Haugaasen & Jordet, 2012) which will most likely enhance the overall quality of football performance.

There is also a small body of football-specific evidence which can be linked to support the potential developmental benefits of authoritative parenting (e.g., Sapeija et al., 2011). This is a *parenting style* which conveys high expectations of children, but not so high that children feel pressurized or compelled to meet them (Speirs Naumeister, 2004). Sapeija et al. (2011) reported that exposure to heightened authoritative parenting styles may play a role in developing healthy perfectionist orientations, or at least may reduce the likelihood of developing unhealthy perfectionist orientations in youth football players. This has the potential to aid performance and wellbeing of youth football players as unhealthy perfectionism has been linked to burnout (e.g., Hill et al., 2008) whereas healthy *perfectionism* is more positively associated with greater

engagement with football practice and play-based activities (Larkin, O'Connor & Williams, 2015a). Despite these findings there is contemporary debate in perfectionism literature whether perfectionism as a disposition can ever be considered healthy or unhealthy, or whether healthy perfectionism in its current guise is anything more than conscientious achievement striving (Hall, Jowett & Hill, 2014; Hill, 2016).

The notion of *dual career demands* has gained recent attention in football (e.g., Christensen & Sørenson, 2009; Gledhill & Harwood, 2015) and appears to be an area where parents can exert a developmental influence. Player-level data from female football players indicates that *parent-teacher relationships* and interactions and *player-teacher interactions* regarding football and academic careers can influence whether dual career demands are facilitative or debilitative and can have a subsequent impact on a player's psychological wellbeing. This issue can also be interpreted as having gender specific nuances. Christensen and Sørenson's (2009) research highlighted that dual career challenge was compounded by the intense competition for professional careers in professional Danish men's football, whereas the dual career challenge in Gledhill and Harwood's (2015) study was compounded by parents' and teachers' perceptions that professional career in English women's football is not viable.

In closing this discussion section on the role of parents in talent development, we offer the following applied recommendations: Parents should be supported to (a) have appropriately high expectations of their child-players, if the player's aim is to reach an elite level; (b) create a *parenting climate that fosters task orientation*; (c) have football-related conversations with players that encourage players to generate questions about their development; (d) support the *coach-player relationship*; and (e) support their daughter-players to alleviate or more adaptively manage dual career challenges. These will give players a better chance of talent development as

players are more likely to develop a higher level of goal commitment as well as intrinsic and task-orientated motivation (Kavassanu et al., 2011); a higher level of healthy perfectionism (Sapeija et al., 2011); better developed reflective skills and a healthier coach-athlete relationship (Gledhill & Harwood, 2014); and greater dual-career management which will likely influence a player's lifestyle choices and psychological wellbeing (Gledhill & Harwood, 2015). However, in making these recommendations we do caution that they are based on predominantly descriptive, cross-sectional or correlational evidence which was adjudged to have a moderate to high risk of bias, based on the MMAT criteria achieved. We also caution that, to our knowledge, no studies have collected data from parents regarding their perceptions of their roles in talent development, although one study (Gledhill & Harwood, 2015) did omit parents on ethical grounds. Consequently, it is not possible to triangulate parent-level data with data gleaned from players and coaches. Future research should seek to address this limitation.

Drawing on these applied implications, future applied research may seek to develop and evaluate parent education programmes centered on parents' roles in talent development in football. This is noteworthy as many player development programmes are coach-facing, with parents often neglected in this respect (Larsen, Henriksen, Alfermann & Christensen, 2014). Using the findings of this review in combination with Harwood and Knight's (2015) position paper on parenting expertise would serve as a platform to launch such a programme.

The next social influences on talent development in football identified through the review are peers and siblings (e.g., Eliot & Weedon, 2010; Gledhill & Harwood, 2014; Van Yperen, 2009). Peers can influence psychological factors including players' enjoyment, motivational orientation and perfectionistic tendencies (Ommundsen, Roberts, Lemyre & Miller, 2005; Ullrich-French & Smith, 2006; 2009). Better relations with peers within football has been

associated with higher intrinsic, self-determined and task-orientated motivation (e.g., Ommundsen et al., 2005; Ullrich-French & Smith, 2006), which are associated with football continuation (Ullrich-French & Smith, 2009) and progression through international age group football (Zibung et al., 2015). As well as augmenting positive psychological qualities, peer relationships may also be a protective mechanism against negative psychological qualities as Ommundsen et al. (2005) noted that higher relationship quality is negatively correlated with maladaptive perfectionism. Finally, findings from UK female football noted that peers can encourage (or discourage) *adaptive lifestyle behaviours* (Gledhill & Harwood, 2014; 2015). This suggests that peers can affect a player's discipline levels which is noteworthy given that *discipline* is a frequently cited pre-requisite for talent development in football (e.g., Holt & Dunn, 2004; Mills et al., 2012; Morley et al., 2014).

The potential importance of siblings has been highlighted in both men's (e.g. Van Yperen, 2009) and women's (e.g., Gledhill & Harwood, 2014). Van Yperen's (2009) study highlighted that players who progressed to an elite level had more siblings than those who did not progress. It may be that siblings had an influence in these elite players' development because children with one or more siblings tend to have better developed social skills than those without siblings (e.g., Dawney, Condron & Yucel, 2013) and social skills are directly linked to fostering effective team cohesion (e.g., Bruner, Eys, Wilson & Côté, 2014).

Peers and siblings have both also been highlighted in football talent development literature as potential learning resources for football players (e.g., Eliot & Weedon, 2010; Gledhill & Harwood, 2014). The elite female youth football players in Gledhill and Harwood's study each had at least one older brother who had been involved in high level football, and served as a source of informational support for the developing players as well as supporting them

with their engagement in deliberate play activities (e.g., match-play activities against male players, outside of organized football). The female players noted that they could learn several lessons from their football-brothers, ranging from lifestyle choices to technical and tactical football understanding. In a study unique to the English Premier League (EPL), foreign migrant players were perceived by EPL representatives to be more technically competent than their English counterparts in EPL academies, whereas English players were deemed to be more physically capable (Eliot & Weedon, 2010). The concept of 'feet exchange' was forwarded, suggesting that players with different competencies could act as learning resources for other players, aiding talent development. However, players' perceptions of this notion were not sought and it was not clear from the reported method whether behavioural observations were adopted.

The discussion thus far has centered on the player and individual social factors around them. However, in the last five years there has been a growing appreciation that talent development in football is not the responsibility of a single person within an environment, more the collective responsibility of the environment (e.g., Larsen, Alfermann & Christensen, 2012; Larsen, Alfermann, Henriksen & Christensen, 2013; Mills et al., 2014a; 2014b). In their study of a successful talent development environment (TDE) in men's football in Denmark, Larsen et al. (2013) stated that the environment was characterized by a strong, open and cohesive organizational structure that considered the player on a holistic level (i.e. considering the whole person as opposed to centering on football). Similarly, Mills et al. (2014a) reported UK-based coach opinions from male academy football that a successful TDE requires: (a) a coherent philosophy and clear values; (b) promoting whole person development; (c) empowering key stakeholders; (d) forming positive relationships; (e) prioritizing player wellbeing; (f) maintaining well integrated personnel with clear links to senior progression; (g) having clear communication;

(h) being adaptable and committed to innovation; and (i) constructing an achievement focused climate with explicit opportunities to progress. Collectively, these studies from Denmark and the UK demonstrate a consistent perspective on the characteristics of a successful TDE in football. As yet, there is scarce literature that has examined these preferred qualities for TDEs against measurable outcomes of a successful TDE (e.g., player progression from academy to senior teams [cf. Henriksen et al. 2011]). There is now, however, a new avenue of research which has begun to examine players' perceptions of their TDEs in football (e.g., Mills et al., 2014b) and, despite the cited perceived qualities of successful TDEs, player level evidence suggests that male and female football TDEs do not always demonstrate these qualities (e.g., Gledhill & Harwood, 2015; Larsen et al., 2012; Mills et al., 2014b).

One of the cited qualities of successful TDEs states the requirements for clear links to senior progression. Despite this, in Mills and colleagues' (2014b) study of 50 UK-based male academy football players, 65% of respondents felt that they were written off before having the opportunity to reach their full potential. Other cited qualities of successful TDEs included a whole person approach to development and prioritising player wellbeing. Yet, as noted earlier in this discussion, literature from male football in Denmark (Christensen & Sørenson, 2009) and female football in England (Gledhill & Harwood, 2015) has highlighted the potential negative impact of mis-management of dual career challenges on players (e.g. creating an imbalance in the dual-careers which creates a sense that players must choose between football or education). When managed in this way, these challenges during the investment years appear to be a threat to holistic player development, can impact on junior-to-senior career transitions, and impact on player psychological wellbeing by increasing perceptions of phenomena such as *role strain* (Christensen & Sørenson, 2009; Gledhill & Harwood, 2015). In addition to this, further evidence

that TDEs may not be adopting a whole person approach to talent development can be found in Larsen et al's (2012) study which highlighted that whilst psychosocial skills were perceived as important within a TDE, they were rarely actively practiced within the TDE. Cumulatively, these points suggest that football TDEs may still be reluctant to change their psychosocial development practices (cf. Pain & Harwood, 2004). There is a trend in some TDEs of 'practice-based evidence' (Christensen, Laursen & Sørenson, 2011) which supports the notion that there a significant lag between research findings/recommendations and their adoption within football still exists (e.g., Cushion, Ford & Williams, 2012).

Adding to the critiques of TDEs evident in existing literature, there are some limitations of the key measure used. Mills and colleagues' (2014b) examined male players' perceptions of their TDEs using the Talent Development Environment Questionnaire (TDEQ; Martindale et al., 2010). The TDEQ has previously been cited as an ecologically valid tool to measure perceptions of TDEs (e.g., Martindale, Collins, Douglas & Whike, 2012). However, there are concerns over the psychometric properties of the measure (e.g., Mills et al., 2014b; Wang, Sproule, McNeill, Martindale & Lee, 2011) and its sensitivity to football environments (Mills et al., 2014b).

Applied implications

As outlined at the start of this discussion, we have integrated applied implications throughout the different sections. In addition to these, one summary applied implication for practitioners is that there may be value in monitoring certain psychological characteristics in players for talent development purposes. Characteristics such as self-regulation have been shown to differentiate between elite and non-elite male players (e.g., Toering et al., 2009) and can be measured using Toering, Jordet and Ripegutu's (2013) football-specific self-regulation questionnaire, which is appropriate for players during sampling and investment years. This could

be used to monitor the effectiveness of strategies utilized to enhance reflection, evaluation and planning skills in young football players. Equally, as role-strain is a consideration which has been suggested to negatively impact on player wellbeing in football (Gledhill & Harwood, 2015), using an inventory such as the Role Strain Questionnaire for Junior Athletes (RSQ-JA; van Rens, Borkoles, Farrow, Curran & Polman, 2016) as part of player wellbeing monitoring may support TDEs in considering the holistic development of their players.

Current research limitations and future directions

Clarity of definitions. There is a lack of clarity over some operational terms and classification of playing or coaching levels in studies. For example, the classification of 'elite' players ranged from international youth players (e.g., Gledhill & Harwood, 2014; Holt & Dunn, 2004) to semi-professional players (e.g., Roca et al., 2012). Greater clarity in defining player levels is required (cf. Swann, Moran & Piggott, 2015). Defining the term 'psychosocial' is also challenging given that, despite its prominence in talent development literature at present, has yet to be defined in a universally accepted manner. Drawing on literature from different domains (e.g., Martikainen et al., 2002) we have produced an operational definition for the purposes of this review and invite readers to evaluate the applicability of this definition within their work.

Research designs. The bias towards descriptive, correlational and cross-sectional research designs in quantitative literature restricts our ability to establish causal relationships between psychosocial factors and talent development in football. Moreover, restrospective methods dominate the qualitative literature which presents concerns over recall bias and recall error associated with retrospective methods (e.g., Krosnick, 1999). Future quantitative research should seek to explore causal relationships between psychosocial factors and talent development in football. Well-controlled longitudinal, prospective studies would serve to address these issues

and may also serve to provide a more developmental understanding from a lifespan perspective. Variations of self-report measures also dominate the literature (e.g., semi-structured interviews, participant history questionnaires) which introduces the potential for concerns over social desirability or self-serving bias (van de Mortel, 2008). Finally, there is an absence of behavioural observation data to triangulate other data collection methods; thus, observational research conducted in a wider range of TDEs (cf. Larsen et al., 2013) may serve to extend understanding.

Grounded theory approaches. The literature provides three grounded theories which theorize how players will increase their chances of progressing to an elite level in male (Holt & Dunn, 2004; Holt & Mitchell, 2006) and female (Gledhill & Harwood, 2015) football. The predictive validity of these theories remains untested. Future longitudinal, prospective research could address this limitation; as could sampling senior elite football players.

Sample characteristics. Consistent with other areas of sport research (e.g., Forsdyke et al., 2016), female athletes are significantly underrepresented. Given the growth in popularity (e.g., UEFA, 2015), strategic global development plans for female football (e.g., FIFA, 2014), and the increased professionalization of football (e.g., English FA Women's Super League), greater representation of female players is warranted (Gledhill & Harwood, 2015). Equally, given the growth of impairment specific football (e.g. FA, 2010), greater representation of players from the various forms of impairment specific football is also warranted.

Consistent with recent systematic reviews (e.g., Park, Lavallee, & Tod, 2012; Sheridan, Coffee & Lavallee, 2014), most studies were conducted in central and western European countries. Further, despite the American Psychological Association (2010) recommending that race and ethnicity of research participants is included in studies, less than 20% of the studies included in this review provide this information. In studies where the information is provided,

Caucasian is the dominant ethnicity reported, mirroring research from other areas of psychology (e.g., Delgado-Romero, Galván, Maschino & Rowland, 2005). We conclude therefore that the predominance of male, able-bodied, Caucasian, mid-adolescent European football players has created a bias within talent development in football which may undermine professional, evidence-based practice for many practitioners. We conclude that there is more to be learned from examining culturally diverse backgrounds and this should be a priority for researchers seeking to extend this body of research (cf. Park et al., 2012; Ryba et al., 2013).

Strengths and limitations of this review

This systematic review has provided original contributions to the body of research by highlighting research trends and providing a detailed methodological appraisal of included studies. It also provides a concept map of testable hypotheses for future investigation. A final strength is the rigorous method adopted which included the independent appraisal of papers by multiple reviewers using a robust appraisal tool, an analysis of inter-rater reliability of appraisals, and consensus-reaching amongst the research team (Weir et al., 2016). This methodological approach has built on some of our critiques of previous reviews.

A limitation of this review is only including studies that were published in English language may have excluded relevant high quality literature. We accepted this limitation to ensure consistency in critiquing literature (cf. Tod et al., 2011). Finally, the issue of 'quality checking' literature is a contentious one (e.g., Glasziou, Vandenbroucke, & Chalmers, 2004); hence, we accept that appraisals made within this review may be a function of the appraisal tool.

Conclusions

We identified 48 interrelated psychological, social and behavioural factors which are associated with talent development in football. In the form of a concept map we offered a series

of testable hypotheses for future research, as well as offering future research and applied recommendations. Psychological characteristics of self-regulation, resilience, commitment and discipline appear to be the most impactful on player development either through their ability to differentiate between elite and non-elite players, their correlation with engagement in adaptive football practice, play and lifestyle behaviours, and/or the relative importance placed on them by coaches. Multiple stakeholders including coaches, parents, peers and siblings all play roles in helping players develop these characteristics, via the provision of tangible, emotional and informational support or through creating a learning environment underpinned by functionally relevant challenges. However, given that the research included in this study had a cumulative moderate risk of bias, we suggest a note of caution when utilizing these suggestions. Future research should broaden the range of research participants and designs to examine the veracity of these findings for talent development in football.

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Table 1.

Descriptive summary of final included studies

Authors	Participants	Age	Data collection tool(s) / method(s)	Key findings
Holt & Dunn (2004)	20 Canadian youth male players 14 English professional youth players 6 English coaches	16.8 16.2	Semi-structured interviews	Discipline, Resilience, Commitment and Social Support central to success in elite youth soccer
Ommundsen, Roberts, Lemyre & Miller (2005)	1231 male players 488 female players All experienced Norwegian players.	14.3 13.9	Perceived Motivational Climate in Sport Questionnaire (Seifrez et al. 1992) Perception of Success in Sport Questionnaire (Roberts et al. 1992) Multidimensional Perfectionism Scale (Frost, Marten, Lahart, & Rosenblate (1990) Sport Friendship Quality Scale (SFQS; Weiss & Smith, 1999) Self-Perception Profile for Adolescents (SPA; Harter, 1998)	Task orientated females who scored negatively on maladaptive perfectionism and perceived a mastery orientated climate reported better peer relations in soccer; Maladaptive perfectionist males who scored negatively on task orientation and perceived a performance orientated climate had negative peer relationships.
Holt & Mitchell (2006)	9 male players 3 male coaches English professional third division club	18.75	Semi-structured interview	Unsuccessful players lacked volitional behaviour, delaying gratification, determination to succeed, strategic career planning, and tangible support.
Macbeth & Magee (2006)	10 elite English partially sighted male players	Adult; age not reported	Questionnaire Focus Groups	Partially sighted soccer players are prevented from experiencing a normalized career path; Three key ways into partially sighted football are educational institutions; pan-disability football; and professional football clubs.
Moran & Weiss (2006)	67 male players 71 female players 8 male coaches 2 female coaches United States competitive high school teams	16.1	Sport Leadership Behaviour Inventory (Glen & Horn, 1993) SPA (Harter, 1988) Sport Friendship Quality Scale (SFQS; Weiss & Smith, 1999) Personal Attributes Questionnaire (Spence & Helmreich, 1978)	Playing ability strongly linked to teammate and coach ratings of leadership ability in male and female players; Coaches ratings of leadership quality wholly dependent on playing ability; Peer leaders demonstrate skills to direct activities, get on well with people, be confident in football ability, and engage in positive peer-relationships.
Ullrich-French & Smith (2006)	99 male players 87 female players United States	11.6	SFQS (Weiss & Smith, 1999) Self-Perception Profile for Children (Harter, 1985) Sport Enjoyment Scale (Scanlan et al. 1993) Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1985) Sport Motivation Scale (Pelletier et al. 1995)	Low stress levels were predicted by high peer acceptance and father-child relationships; Higher self-determined motivation predicted by higher peer acceptance, higher father-child relationship, friendship quality and mother child relationship.
Ward, Hodges, Starkes & Williams (2007)	203 male elite and sub-elite players from national level academies in	Not reported	Retrospective domain specific participation	Accumulated football practice hours consistently discriminate between skill levels across ages;

	England		history questionnaire	Elite players spend more time in decision-making activities during team practice, have higher levels of motivation, and have greater parental support; Maturational indices, time spent in playful activities, sporting diversity and time at which specialization occurred did not differentiate between elite and sub-elite; Deliberate engagement with football specific activities is likely to lead to an elite status.
Hill, Hall, Appleton & Kozub, 2008)	144 male centre of excellence players from England	14.4	Athlete Burnout Questionnaire (Raedeke & Smith, 2001) Multidimensional Perfectionism Scale (Hewitt & Flett, 1991) Unconditional Self-Acceptance (Chamberlain & Haga, 2001)	Unconditional self-acceptance partly mediates the relationship between perfectionism and burnout; Self-worth is central to socially prescribed and self-orientated perfectionism, and this association potentially underpins maladaptive achievement striving behaviours, increasing a football player's vulnerability to burnout.
Christensen & Sørenson (2009)	25 male talented academy players from Denmark (aged 15-19 years)	Mean not reported	Focus groups Interviews	Football and education presents significant dual career demands for talented football players in Denmark. The importance place on education by key social agents can create personal player-level concern, lower exam results, stress, dropout and mental breakdown. School and football have in-built dichotomous demands and expectations that affect progression in both when not well managed.
Ford, Ward, Hodges and Williams (2009)	11 "still elite" male players 11 "ex-elite" male players 11 recreational male players All players from English football.	Not reported	Retrospective sports and physical activity participation questionnaire	Elite groups average more hours per year in football practice compared to those who do not progress to elite levels; Practice and play in football between six and 12 years old contributes to the development of expert performance in English football.
Toering, Elferink-Gemser, Jordet & Visscher (2009)	159 elite male (Highest national standard in the Netherlands) 285 non-elite male (Regional standard)	14.5	Generalized Self-efficacy Scale (Schwarzer & Jerusalem, 1995) Inventory of Metacognitive Self-regulation (Howard et al. 2000) Reflective Learning Continuum (Peltier et al. 2006) Self-regulatory Inventory (Hong & O'Neill, 2001) Self-regulation Trait Questionnaire (Herl et al. 1999)	Higher self-regulatory scores discriminate between elite and non-elite players; High scores on reflection and effort are associated with a higher level of performance.
Ullrich-French & Smith (2009)	148 male and female competitive football players from the United States	11.7	SFQS (Weiss & Smith, 1999; 2002) Self-perception Profile for Children (Harter, 1985) Sport Enjoyment Scale (Scanlan et al. 1993) Perceived Stress Scale (Cohen et al. 1983) Sport Motivation Scale (Pelletier et al. 1995)	Perceived competence, positive friendship quality, and the combination of mother relationship quality and peer relationships predict continued participation within a football team.
Van Yperen (2009)	65 Dutch male players (18 professional) 47 non-professional)	16.58	Ways of Coping Questionnaire (Folkman & Lazarus, 1985) Self-report Measure of Goal Commitment	Goal commitment, problem-focussed coping behaviours, and social support seeking predict career success.

			(Hollenbeck et al. 1989) Seeking Social Support Measure (Folkman & Lazarus, 1985)	
Weiss, Amorose, & Wilko (2009)	141 female competitive high school players in the United States	16	Perceived Coach Behaviour Scale (Black & Weiss, 1992) SPA (Harter, 1988) Perceived Motivational Climate in Sport Questionnaire – 2 (Newton et al. 2000) Motivational Orientation in Sport Scale (Weiss et al. 1985) 5-point scale items of enjoyment	Coaching feedback and motivational climate contribute to female football players' continued involvement; Perceptions of greater positive and informational feedback provided by coaches after successful performance attempts, greater emphasis on mastery climate, and less emphasis on a performance climate, are significantly related to greater ability perceptions, enjoyment and intrinsic motivation.
Elliot & Weedon (2010)	English Premier League Academy representatives	Not reported	Not reported	Representatives viewed foreign migrants to EPL academies as positive for the development of English players due to the influence they could have on developing English players' technical ability and goal commitment.
Ford, Yates & Williams (2010)	25 male coaches ranging from amateur clubs to the English Premier League)	31.7	Observation checklist Time use	Coaches provide high levels of instruction, feedback, and management, irrespective of the activity in which players engaged; Significant gap between literature and practice in coaching youth football players.
Konter (2010)	312 male players of three levels (levels not specified)	14.71	Adapted Toni-2 questionnaire (Konter & Yurdabakan, 2010)	Nonverbal intelligence levels increase with age and skill level.
Sagar, Busch, & Jowett (2010)	81 male players from English football academies (levels not specified)	14.22	Performance Failure Appraisal Inventory (Conroy et al. 2002) Semi-structured interviews	Fear of failure affects adolescent male football players' football performance and interpersonal behaviours; Players demonstrated ineffective coping behaviours to deal with a fear of failure.
Christensen, Laursen & Sørensen (2011)	Danish male football players (number not reported)	Not reported	Participant observation Semi-structured interviews	Small group and position-specific community of practice creates opportunities for players to extend playing opportunities, mirror older players, and have greater feelings of being recognised by the coach; Small group and position-specific community of practice assumed ownership of their long-term development as football players.
Kavassanu, White, Jowett, & England (2011).	118 male players 69 elite (professional club centre of excellence of academy) 49 non-elite (recreational)	13.93	Task and Ego Orientation in Sport Questionnaire (Duda & Nicholls, 1992) Parent Initiated Motivational Climate Questionnaire-2 (White, 1996)	Elite players were significantly higher in task orientation, had higher perceptions that their mother valued a motivational climate that emphasized learning and enjoyment, and had lower perceptions that both parents created in which success and effort were valued, than non-elite players; Task orientation and parenting climate that values effort and learning may facilitate high levels of football achievement.
Sapeija, Dunn & Holt (2011)	194 male players from the highest level of age-group football in Canada	13.64	Sport Multidimensional Perfectionism Scale – 2 (SMPS; Gotwals & Dunn, 2009) Parenting Style Inventory – 2 (Darling & Toyokawa, 1997)	Exposure to heightened authoritative parenting may play a role in developing healthy perfectionist orientations; Exposure to heightened authoritative parenting may decrease the likelihood of developing unhealthy perfectionist orientations.
Toering, Elferink-Gemser, Jordet, Jorna, Pepping & Visscher (2011)	6 male coaches (Working at the highest level of national competition in the Netherlands)	37.2 16	Semi-structured interviews Behavioural observations Self-regulation of Learning Self-report Scale	Player's practice environment plays a key role in developing self-regulated learning where players take responsibility for learning.

	13 male players (Highest national level of competition in the Netherlands)		(Toering et al. 2012)	
Ford et al. (2012)	328 elite academy level male players at the top level in the following countries: Brazil, England, France, Ghana, Mexico, Portugal, and Sweden.	Under-16	Participation History Questionnaire	Developmental activities of elite youth football players follow early engagement or specialisation pathways, rather than early diversification.
Ford & Williams (2012)	16 elite youth male football players from the academies of five football clubs in the Premier League in England 16 male players who had been released from the same five football academies	15	Participation History Questionnaire (Ford et al. 2010)	Elite youth players who reach a professional level take part in significantly more football play and practice activities than elite youth players who did not progress to professional level, offering support for the early engagement hypothesis.
Larsen, Alfremann, & Christensen (2012)	1 manager of sports 1 club manager 2 youth coaches 4 male youth players 3 school sport co-ordinators 1 consultant From a Danish male football club	Not reported	Semi-structured interviews Fieldwork	Different implicit (management of outcomes, utilization of team-working skills, general social skills) and explicit (motivation, hard work and self-awareness) psychosocial skills are important for career transitions in football; Despite the expectation for football players to display these implicit and explicit skills, they are not directly practiced.
Mills, Butt, Maynard, & Harwood (2012)	10 male English premier league and championship coaches (split not reported)	47.5	Semi-structured interviews	Six interrelated categories either positively or negatively influence talent development: awareness; resilience; goal-directed attributes; intelligence; sport-specific attributes; environmental factors.
Roca, Williams, & Ford (2012)	48 male players	20.7	Participant History Questionnaire (PHQ) Video clips Response accuracy scores	Football specific play activity the strongest predictor of cognitive-perceptual expertise
Taylor & Bruner (2012)	133 elite male youth players from three academies of clubs in the second tier of English football and one academy from a club from the fourth tier of English Football	14.23	Coach Behaviour Scale for Sport (Côté et al. 1997) Youth Sport Environment Questionnaire (Eys et al. 2009) Basic Needs Satisfaction in Relationships Scale (LaGuardia et al. 2000) Youth Experiences Survey (Hanson & Larsen, 2005) Basic Need Satisfaction in Sport Scale (BNSSS; Ng et al. 2011) Engagement vs. Disaffection with Learning scale (Skinner et al. 2009)	Players who report more coach rapport and task cohesion experience greater psychological need satisfaction; Psychological need satisfaction positively associated with more goal setting experiences, leadership opportunities and better emotional regulation.
Larsen, Alfermann, Henriksen & Christensen (2013)	Case-study of a Danish male football club. Number of participants not reported	Not reported	Participant observation Semi-structured interviews	A successful talent development environment is characterized by the interaction between players and a staff of coaches, assistants and managers that helped players to focus on: (1) A holistic lifestyle

				(2) Handling dual careers (sport and school) (3) Developing the ability to work hard (4) Being self-aware and responsible
Curran, Hill, & Niemiec (2013)	202 male 79 female Club level (country not reported)	13.67	Social Context Questionnaire (Belmont et al. 1988) BNSSS (Ng et al. 2011) Engagement vs. Disaffection with Learning Scale (Skinner et al. 2009)	Coaches providing structure (e.g. guidance, expectations and feedback) in an autonomy supportive way (e.g. respecting a player's volition) relates positively to player-level behavioural engagement and negatively to player – level behavioural disaffection; with relationships mediated by basic psychological need satisfaction.
Quested et al. (2013)	6641 male 1020 female Club players from France, Greece, Norway, Spain, and England	11.56	Health Care Climate Questionnaire (Reinboth et al. 2004) Basic Need for Autonomy Statements (Standage et al. 2005) Need Relatedness Scale (Richer & Vallerand, 1998) Intrinsic Motivation Inventory (McAuley et al. 1989) Intentions to Dropout Items (Sarrazin et al. 2002).	Perceptions of autonomy support strongly predict psychological need satisfaction, which in turn predicts enjoyment. Higher levels of football enjoyment is a strong predictor of intention to dropout; Substantial indirect effects found from psychological need satisfaction on intention to dropout; (5) Substantial indirect effects were shown from autonomy support on enjoyment and intention to dropout.
Zibung & Conzelman (2013)	159 male players who had played for a Swiss national team	Not reported	Retrospective questionnaire	Comprehensive football practice and play inside and outside of club settings forms the basis for subsequent football expertise.
Gledhill & Harwood (2014)	4 elite female youth players currently playing at the highest level of club football in England and/or age-group international level	16.75	Semi-structured interviews Fieldwork	Football experience of football-fathers and football-brothers played a significant role in player development through age-and level-specific advice and guidance as well as significant positive or negative role modelling; Football-fathers play a significant role in reinforcing coach-player relationships; Football-friends and non-football friends helped talented female players to lead a disciplined lifestyle; Self-regulation and adaptive volitional behaviours appear to be key intra-individual factors associated with talent development.
Haugassen, Toering & Jordet (2014)	66 professional 425 non-professional All from elite football clubs within the Norwegian Premier League (player gender not reported)	18.6 16.5	Retrospective Practice History Questionnaire	Differences in football performance attainment may be due to variations in the amount and type of football practice at the earliest years of participation; There was no significant difference in total football practice hours accumulated between professionals and non-professionals.
Mills, Butt, Maynard and Harwood (2014a)	Ten expert academy coaches (Gender not reported)	Not reported	Semi-structured interviews	Organisational core, adaptability, player welfare, key stakeholder relationships, involvement and being achievement orientated are sub-components of an optimal development environment.
Mills, Butt, Maynard and Harwood (2014b)	50 elite male academy players	17.01	Talent Development Environment Questionnaire	Academies are viewed as strong in areas related to coaching organisation and sport-related support Academies were viewed as somewhat deficient in athlete understanding, links to senior progression, and key stakeholder relationships
Morley, Morgan, Nicholls & McKenna (2014)	Five coaches	36 – 64 (mean not	Delphi poll technique	Players and coaches reached consensus over the importance of consistently high level of football performance

		reported)		Discipline is an important player development feature
	Six male academy players from an English Premier League	13 – 18 (mean not reported)		
Gledhill and Harwood (2015)	13 former female players	19.61	Semi-structured interviews	Multiple social agents need to interact to ensure that an optimal talent development and learning environment is created.
	Four coaches (three male, one female)	Age not reported		This will provide a supportive talent development environment that incorporates appropriate levels of challenge which will then lead to adaptive player-level development; thus increasing the chances of successful athletic and dual career development.
	Eight teachers (six male, two female)	Age not reported		
	13 peers			
Larkin, O'Connor and Williams (2015a)	385 elite male youth football players from Australia		Short Grit Scale (Duckworth & Quinn, 2009) PHQ (Ward et al., 2007)	Players with higher levels of grit accumulate higher levels of sport-specific activities
	113 U13	12.9		Higher levels of grit are associated with better decision making
	139 U14	13.9		
	133 U15	14.7		
Larkin, O'Conner & Williams (2015b)	419 elite male youth players from Australia		SMPS Personal Standards Scale PHQ (Ward et al., 2007)	Higher perfectionist strivings accumulated more time in sport specific activities when compared to players with lower perfectionistic tendencies
	133 U13	12.84		
	166 U14	13.89		
	120 U15	14.80		
Toering and Jordet (2015)	639 male professional players from Norway	23.6	Brief Self Control Scale (Tangneyet al. 2004)	Self-control is positively related to football performance
Zuber, Zibung and Conzelman (2015)	97 Swiss male talented players	12.24	Achievement Motives Scale-Sport (Weinhold, et al. 2009) Sport Orientation Questionnaire (Gill & Deeter, 1988) Sport Motivation Scale (Pelletier et al., 1995)	Players higher on intrinsic, achievement orientation are significantly more likely to achieve U15 international level
Hornig, Aust and Güllich (2016)	102 male German players		Questionnaire to measure developmental activities	Bundesliga and national team players had greater proportions of match play, performed less organised practice and performed less physical conditioning
	52 Bundesliga including 18 senior internationals	30.7		
	50 4th to 6th tier players	24.8		National team players played in more non-organised leisure football during childhood, more engagement in other sports during adolescence, and had later specialisation in football than amateur players. Of all football (organised and non-organised); ~86% in childhood, ~73% in adolescence and ~43% in adulthood was match play.

Table 2.

MMAT appraisal of studies (chronological order)

Study	Rating[2]	Screening questions	Qualitative (all)	Quantitative (descriptive)	Mixed-methods	Final[3] quality score.	Notes[4]	Themes present
Holt and Dunn (2004)	***	✓ ✓	✓ ✓ ✓ --			75%		Psychological (Discipline, resilience, commitment and resilience) and social (social support)
Ommundsen, Roberts, Lemyre and Miller (2005)	**	✓ ✓		-- ✓ ✓ --		50%		Social (peer relationships)
Holt and Mitchell (2006)	***	✓ ✓	✓ ✓ ✓ --			75%		Psychological (Delaying gratification, determination, coping skills), social (social support) and behavioural (volitional behaviours)
MacBeth and Magee (2006)	**	✓ ✓	✓ -- ✓ --			50%		Social (Educational institution and football opportunities)
Ullrich-French and Smith (2006)	**	✓ ✓		-- ✓ ✓ --		50%		Social (Parent relationships, peer relationships)
Moran and Weiss (2006)	*	✓ ✓		-- -- ✓ --		25%	Lacks details of number of participants initially sampled or response rates	Social (Peer experiences and coach perceptions)
Ward, Hodges, Starkes & Williams (2007)	**	✓ ✓		✓ -- ✓ --		50%		Behavioural (Practice and play activities)
Hill, Hall, Appleton and Kozub (2008)	**	✓ ✓		✓ -- ✓ --		50%	Unclear how many participants were initially sampled and what the response rate was	Psychological (Perfectionism, unconditional self-acceptance)
Weiss, Amorose and Wilko (2008)	*	✓ ✓		-- -- ✓ --		25%		Social (Coach behaviours, motivational climate)
Christensen and Sørenson (2009)	***	✓ ✓	✓ ✓ ✓ --			75%	Reflexive techniques discussed but not linked to how this impacted on research process or findings	Social (Dual career challenges)

[2] 'Rating' refers to the star-rating awarded based on number of MMAT criteria achieved

[3] 'Final quality score' refers to the numerical value attributed to a study based on its start rating, so that risk of bias and inter-rater reliability analyses could be completed

[4] Notes are included to indicate key discussion points or to show where there was initial disagreement between authors in blind MMAT rating and – in these instances – to demonstrate the justification for the final decision.

Ford, Ward, Hodges and Williams (2009)	**	✓	✓					✓	--	✓	--				50%			Behavioural (Practice and play activities)
Toering, Elferink-Gemser, Jordet and Visscher (2009)	**	✓	✓					--	✓	✓	--				50%			Psychological (Self-regulation)
Ullrich-French and Smith (2009)	**	✓	✓					--	✓	✓	--				50%			Psychological (perceived competence), social (peer relationships, parental relationships), Behavioural (social support seeking, problem-focused coping)
Van Yperen (2009)	*	✓	✓					--	✓	--	--				25%	Unclear sampling strategy and lack of clarity over inventories used		Psychological (goal commitment) and social (family structure)
Elliot and Weedon (2010)	*	✓	✓	--	--	✓	--								25%			Social (Socioeconomic status)
Ford, Yates and Williams (2010)	**	✓	✓					--	✓	--	✓				25%			Social (Coach behaviours)
Konter (2010)	*	✓	✓					--	--	✓	--				25%			Psychological (Non-verbal intelligence)
Sagar, Busch and Jowett (2010)	*	✓	✓	✓	✓	✓	--	--	--	✓	--	✓	✓	✓	25%	No details provided about the level of football academy		Psychological (Fear of failure)
Christensen, Laursen and Sørenson (2011)	***	✓	✓	✓	✓	✓	--								75%			Social (Talent development environment)
Kavassanu, White, Jowett and England (2011)	*	✓	✓					--	--	✓	--				25%	Sampling strategy and response rate unclear		Psychological (task orientation) and social (parenting climate)
Sapieja, Dunn and Holt (2011)	*	✓	✓					--	--	✓	--				25%			Psychological (healthy perfectionism) and social (parenting climate)
Toering et al. (2011)	***	✓	✓	✓	✓	✓	--	--	✓	✓	✓	✓	✓	✓	75%			Psychological (Self-regulation)
Taylor and Bruner (2012)	*	✓	✓					--	--	✓	--				25%			Social (Perceptions of team cohesion, coach-player relationships)
Ford et al. (2012)	*	✓	✓					--	--	✓	--				25%			Behavioural (Practice and play activities)
Ford and Williams (2012)	**	✓	✓					✓	--	✓	--				50%			Behavioural (Practice and play activities)
Larsen, Alfermann and Christensen	***	✓	✓	✓	✓	✓	--								75%			Psychological (motivation, self-awareness) and social

(2012)													(ability to use social skills)
Mills, Butt, Maynard and Harwood (2012)	***	✓	✓	✓	✓	✓	--	✓	✓	✓	--	75%	Psychological (self-awareness, goal commitment, sport-specific attributes) and social (significant others, football culture)
Roca, Williams and Ford (2012)	**	✓	✓					✓	--	✓	--	50%	Behavioural (Practice and play activities)
Curran, Hill, & Niemiec (2013)	*	✓	✓					--	--	✓	--	25%	Social (Autonomy supportive coaching)
Larsen, Alfermann, Henriksen and Christensen (2013)	***	✓	✓	✓	✓	✓	--	✓	✓	✓	--	75%	Social (Talent development environment)
Quested et al (2013)	*	✓	✓					--	--	✓	--	25%	Psychological (enjoyment) and social (Autonomy supportive coaching)
Zibung and Conzelman (2013)	***	✓	✓					✓	✓	✓	--	75%	Behavioural (Practice and play activities)
Gledhill and Harwood (2014)	***	✓	✓	✓	✓	✓	--	✓	✓	✓	--	75%	Researchers reported roles within female football but did not discuss how this influenced the research process	Behavioural (Adaptive lifestyle choices, practice and play behaviours), psychological (self-regulation) and social (player-parent relationships, player-sibling relationship, social support)
Haugassen, Toering & Jordet (2014)	*	✓	✓					--	--	✓	--	25%	Gender of participants not reported	Behavioural (Practice and play activities)
Morley, Morgan, McKenna and Nicholls (2014)	**	✓	✓					--	✓	✓	--	50%		Behavioural (adaptive lifestyle choices), psychological (Discipline, motivation, determination) and social (parental support)
Mills, Butt, Maynard and Harwood (2014a)	***	✓	✓	✓	✓	✓	--	✓	✓	✓	--	75%	Reflexivity in data collection but not in data analysis or drawing conclusions	Social
Mills, Butt, Maynard and Harwood (2014b)	**	✓	✓					✓	--	✓	--	50%		Social
Gledhill and Harwood (2015)	***	✓	✓	✓	✓	✓	--	✓	✓	✓	--	75%	Reflexive techniques discussed in the methodology but not related to	Behavioural, psychological and social

											findings or conclusions	
Larkin, O'Connor and Williams (2015a)	***	✓	✓			✓	✓	✓	--	75%		Psychological
Larkin, O'Connor and Williams (2015b)	***	✓	✓			✓	✓	✓	--	75%		Psychological
Toering and Jordet (2015)	****	✓	✓			✓	✓	✓	✓	100%		Psychological
Zuber, Zibung and Conzelmann (2015)	***	✓	✓			--	✓	✓	✓	75%	Sampling procedure not discussed	Psychological
Hornig, Aust and Güllich (2016)	***	✓	✓			✓	✓	✓	--	75%	Untraced snowball sampling adopted so not possible to calculate response rate	Behavioural

✓ = denotes criterion met; --denotes criterion not met or insufficient information provided so MMAT option of 'can't tell' adopted.

Qualitative criteria: (1) Are the sources of qualitative data relevant to address the research question? (2) Is the process for analyzing qualitative data relevant to address the research questions? (3) Is appropriate consideration given to how findings relate to the context? (4) Is appropriate consideration given to how findings relate to the researcher's influence?

Quantitative descriptive criteria: (1) Is the sampling strategy relevant to address the quantitative research questions? (2) Is the sample representative of the population under study? (3) Are measurements appropriate? (4) Is there and acceptable response rate?

Mixed-methods criteria: (1) Is the mixed-methods research design relevant to address the qualitative and quantitative research questions, or the qualitative and quantitative aspects of the mixed-methods question? (2) Is the integration of qualitative and quantitative data relevant to address the research questions? (3) Is appropriate consideration given to the limitations associated with this integration, in a triangulation design?

Table 3.

Demographic analysis

Participants	n	% of total participants (N=14977)	Mean age (SD)	Level
Male players	12327	82.3	15.90 (4.09)	Amateur to senior international
Female players	1903	12.71	14.9 (2.75)	Competitive high school to elite youth
Gender not specified players	639	4.27	15.6 (3.54)	Competitive high school to senior elite
Male coaches	61	0.41	Insufficient reporting of data to determine	Working towards UEFA 'B' license to attained UEFA Pro license
Female coaches	3	0.02	Insufficient reporting of data to determine	Insufficient reporting of data to determine
Gender not specified coaches	17	0.11	Insufficient reporting of data to determine	UEFA 'A' and UEFA Pro license
Other	27	0.18	Insufficient reporting of data to determine	N/A

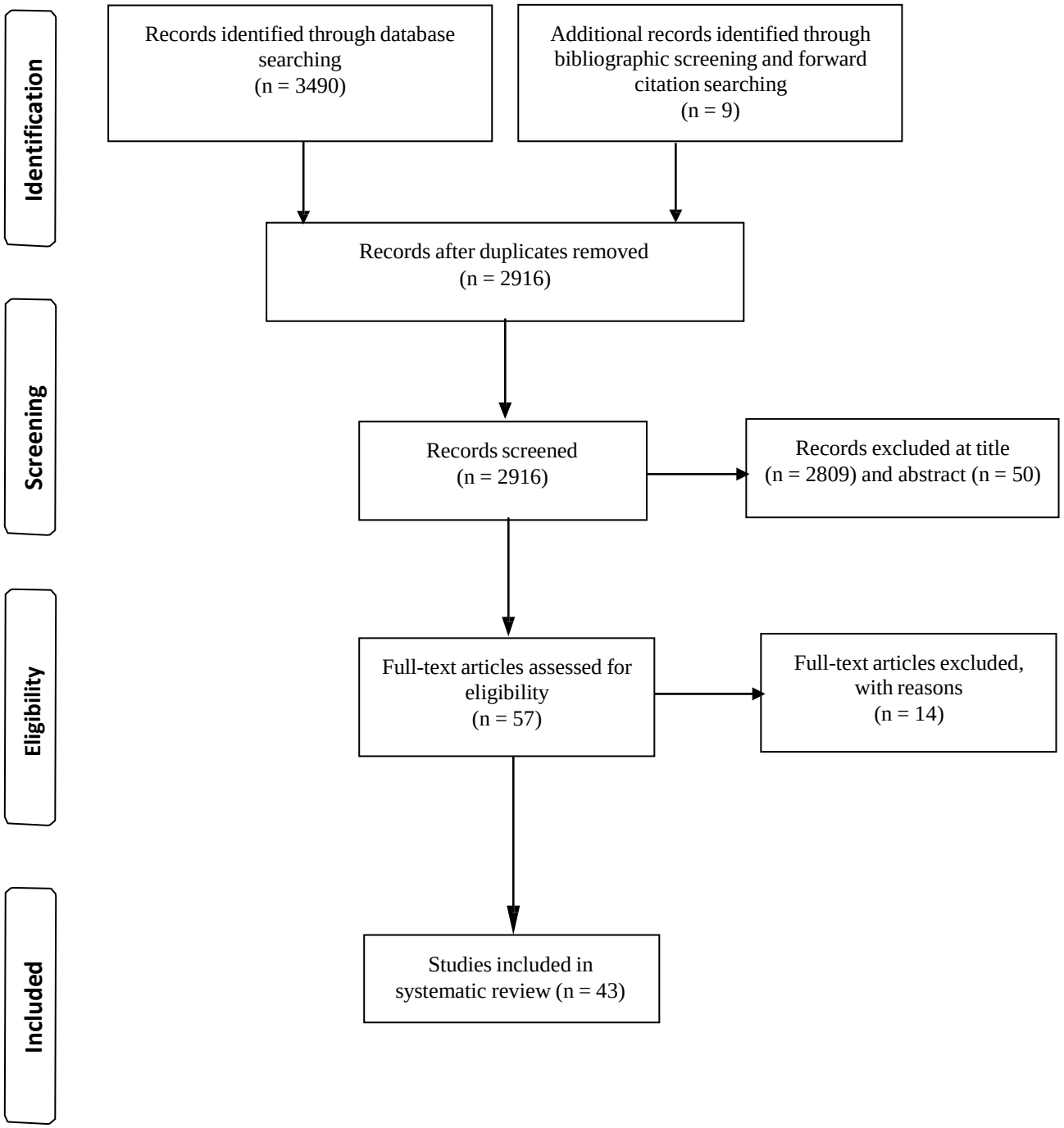


Figure 1. PRISMA flow diagram

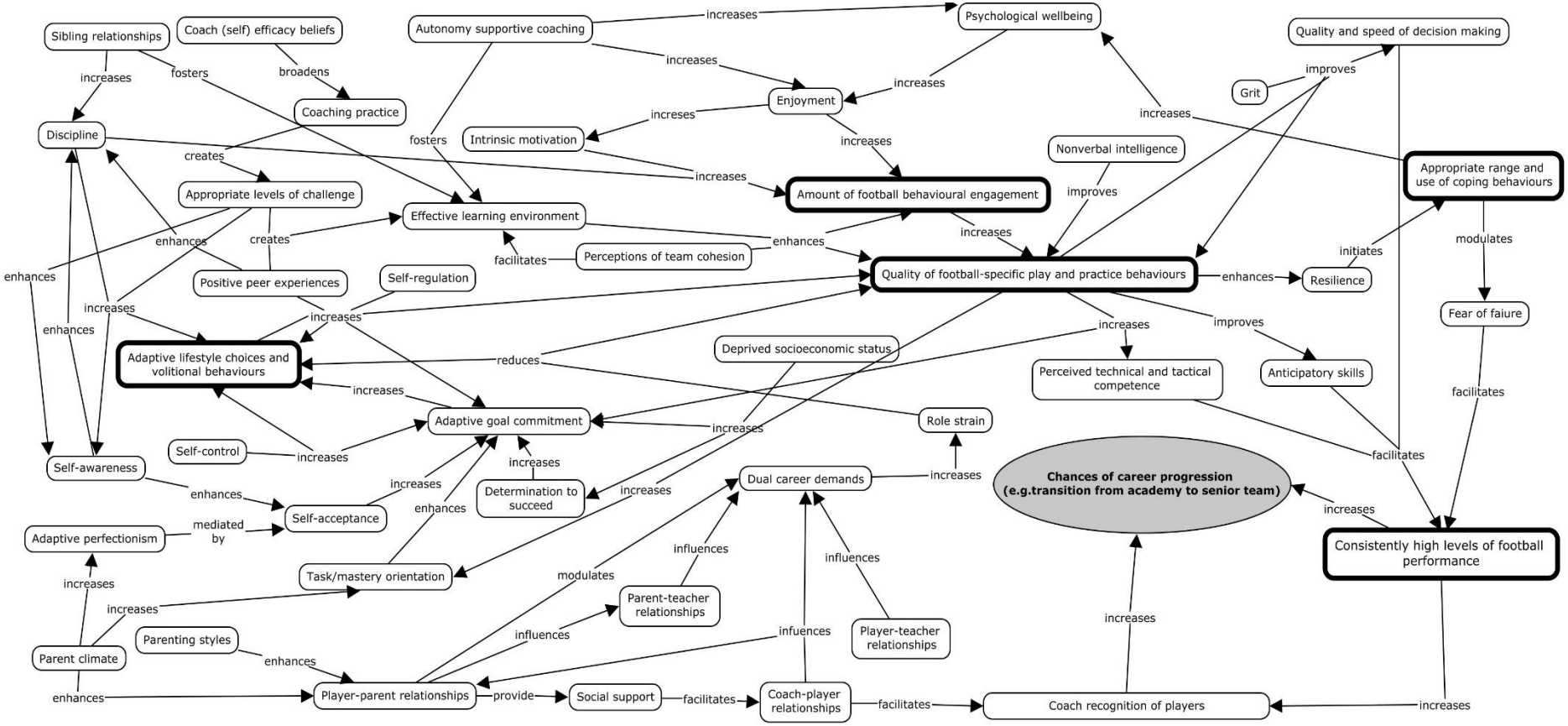


Figure 2
Concept map of psychosocial factors associated with talent development in football and their hypothesized interrelationships