The roles of coaches, peers, and parents in athletes' basic psychological needs: A mixed-studies review

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Abstract:

The purposes of this mixed-studies review were to summarize (a) the social environments created by coaches, peers, and parents concurrently, (b) the relative influence of social agents in youth athletes' psychological needs, and (c) the emerging research gaps for future research in and practical implications for youth sport. Literature was searched in six databases, resulting in 20 final studies with 2851 participants. These studies were reviewed and synthesized based on the theoretical frameworks, research design, participants and sports, associations between social environments and psychological needs, data analyses, results, and limitations. Results suggest that coaches, peers, and parents serve different roles in athletes' psychological needs. Coaches are the most important social agent in influencing autonomy, while peers are the most important social agent in influencing competence and relatedness. Parental influence is the least influential but also least studied in current literature. More research, particularly studies that use mixed methods or longitudinal design across developmental periods, is needed to examine the relative influence of all three social agents in youth sport contexts.

Keywords: autonomy support | motivational climate | self-determination theory | youth sport

Article:

Youth sport participation rates in the USA increased to more than 60 million who play on at least one organized sport team.1 Given that youth sport is one of the most popular leisure activities in which school-age children and adolescents engage,2 athletes' sport experience is important for their physical and psychosocial development. Moreover, organized youth sport serves as a significant vehicle for children and adolescents to be physically active and maintain healthy weight.3 Unfortunately, sport participation decreases4 and sport dropout increases5 across the lifespan of athletes, particularly during adolescence. Youth athletes who drop out of a sport frequently report that they lack quality friendships and relationships with coaches,5 and that they

perceive more pressure and less support than those who continue to participate.[6,7] Therefore, interpersonal relationships and social environments created by social agents (i.e. coaches, peers, and parents) in youth sport can influence athletes' sport motivation and associated outcomes, which warrant research attention.

Theoretical framework

Contemporary theories of motivation, particularly self-determination theory (SDT),[8–10] explain sport motivation in relation to the environments created by social agents.[11] At the core of SDT, autonomy, competence, and relatedness are three basic psychological needs that must be satisfied in order to help individuals achieve intrinsic motivation and psychosocial well-being.[12] Autonomy refers to the experience of volition and having control; competence refers to a sense of effectiveness in an environment; and relatedness refers to a sense of belonging and connection with others in a given social context.[8] One way to satisfy these three psychological needs in youth sport is to foster positive social environments created by coaches, peers, and parents, which are essential to facilitating self-determined motivation and adaptive motivational outcomes. For instance, perceived autonomy support from coaches and good friendship quality promote athletes' psychological need satisfaction, and in turn, positive affect and less burnout symptoms.[13,14] On the other hand, basic psychological needs can be frustrated, particularly in negative social environments, which often lead to maladaptive motivational outcomes and ill-being.[15,16] For example, controlling behavior of coaches contributes to athletes' psychological need frustration, and in turn, depressive symptoms, ill-being, and disordered eating.[13,17] Therefore, satisfaction and frustration of psychological needs are important mechanisms, as a primary focus of this study, that result in different types of motivational outcomes.

Grounded in SDT, Vallerand[18] proposed a hierarchical model of intrinsic and extrinsic motivation that illustrates the motivational sequence of "social factors → psychological mediators → types of motivation → consequences." Within the context of youth sport, coaches, peers, and parents are three most significant social agents influencing the environments and subsequent motivational processes.[19,20] Because "athletes may experience the motivational 'pull and push' from varying social agents,"[21] it is imperative to examine the concurrent motivational influence from these three social agents, who may create different types of supportive and thwarting environments that respectively satisfy and frustrate athletes' autonomy, competence, and relatedness. This notion is supported by empirical evidence that the roles of coaches, peers, and parents differ across various types of social environments and developmental stages.[11]

In an effort to study motivational influence from the social agents, Harwood et al.[21] systematically reviewed social environments in terms of motivational climates, based on achievement goal theory (AGT),[22] in sport and physical activity contexts. They concluded that most youth sport studies only focused on the environments created by coaches, and that only five and three published articles examined parent-created environments and peer-created environments, respectively. It is worth noting that the most widely studied SDT-based social factors, representing high-quality correlates of sport participation and dropout,[5] were not included in their review. Evidenced by cross-cultural youth sport research across multiple countries that validate the universality and predictive utility of psychological needs,[23] reviewing the associations between psychological needs and social environments created by multiple social agents in sport is needed. Therefore, this study sought to systematically review the concurrent motivational influence (i.e. at least two social agents) of coaches, peers, and parents on each basic psychological

need of athletes grounded in SDT, as well as social factors grounded in SDT and other theories including AGT.

Research has shown that while coaches are a consistent, key social agent in sport, the relative influence of coaches, peers, and parents may change across the lifespan of athletes. Keegan et al.'s11 qualitative synthesis and meta-interpretation of motivational influence on athletes indicates that the roles of social agents change across three developmental stages—initiation–sampling (aged 4–12 years), specialization (aged 11–18 years), and investment–mastery (aged 15–30 years)—in which coaches and peers gradually become more influential while parental influence diminishes. The researchers further noted that, however, most literature in this line of research used quantitative surveys for data collection. To provide corroboration and comprehensive evidence based on different research methods, this review examined the roles and relative influence of the three social agents (based on different social environments) by synthesizing both quantitative and qualitative evidence.24 Guided by Vallerand's hierarchical model of intrinsic and extrinsic motivation and the critical role of basic psychological needs in the model, relative influence of the social agents was investigated specifically in reference to satisfaction and frustration of each psychological need.

Taken together, the purpose of this systematic mixed-studies review was threefold: (a) to examine all types of concurrent coach-created, peer-created, and parent-created social environments that are related to youth athletes' basic psychological needs; (b) to study the relative influence of the social agents on youth athletes' psychological need satisfaction and frustration; and (c) to synthesize both the quantitative and qualitative literature and offer recommendations for future research in and practical implications for youth sport.

Method

Following the systematic review guidelines of the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA),25 across the methods, results, and discussion sections, this review addressed the eligibility criteria, information sources, search strategy, study records, data items, data synthesis, meta-biases, and confidence in cumulative evidence of sport motivation studies. Risk of bias in individual studies was not assessed systematically, because the majority of the literature in this line of research was non-experimental in nature.25 Throughout the data extraction and analysis process, however, selective reporting and publication bias in overall quantitative evidence were assessed in reference to the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system,26,27 while the methodological limitations, relevance, coherence, and adequacy of data in overall qualitative evidence were evaluated using the Confidence in the Evidence from Reviews of Qualitative research (CERQual).28

Search strategies

A systematic search of literature was completed through six electronic databases (Academic Search Complete, ERIC, PsycINFO, SportDiscus, Web of Science, and ProQuest Dissertations & Theses Global) from 1985 (i.e. the inception of SDT) to August 2018. The keywords used in the search were "(sport*) AND (psychological need* OR autonomy OR competence OR relatedness) AND (coach* OR peer* OR teammate* OR parent* OR father* OR mother*)." This search included published peer-reviewed journal articles and doctoral dissertations with available full texts and English abstracts. Published doctoral dissertations were included because limited studies

have examined social environments created by more than one social agent,11,21 and publication bias could be slightly reduced.29 Citations in the eligible articles and dissertations were also examined to identify potential studies that were not included in the initial database search. This search strategy resulted in a total of 414 articles and 183 dissertations (see Figure 1).
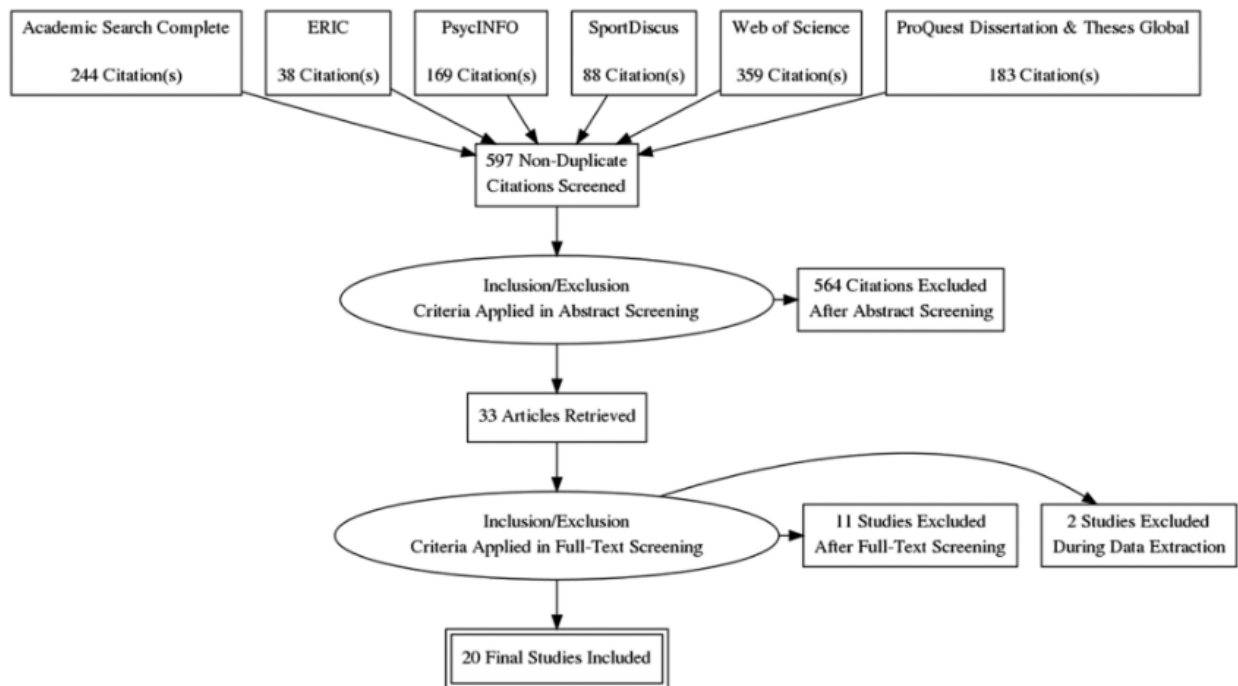
Figure 1. The PRISMA flow diagram showing the literature search and selection process.

Selection criteria

The study selection process used the following inclusion criteria: (a) provided empirical evidence as original studies (i.e. not a review) that related their framework and/or findings to SDT; (b) included participants who were current or former athletes who had competitive sport experience; (c) excluded participants who were special populations (e.g. physical or mental illness); (d) examined social environments created by more than one social agent in sport contexts; and (e) provided quantitative (e.g. correlations) and/or qualitative (e.g. categories) findings for the influence of social agents on at least one of the three basic psychological needs. Although the coach–athlete–parent triad exists mostly in youth sport contexts, athletes from children to young adults (<30 years) were included in this review to show potential differences and progression in the roles of the three social agents across developmental stages.11

The first author implemented a screening procedure (see Figure 1) to retain relevant and exclude irrelevant studies using a two-stage systematic approach30: (a) read all abstracts and excluded those not meeting one or more selection criteria; (b) retrieved the relevant abstracts after checking for appropriateness of the study participants and constructs. The abstract screening resulted in extraction of 33 full-text studies, including 27 peer-reviewed articles and six doctoral dissertations. Upon further screening of the full texts, seven peer-reviewed articles and four dissertations were excluded, due to either not including basic psychological needs in their investigation or having an overlap between the original dissertations and final published articles.31,32 In the data extraction process, two more peer-reviewed articles were excluded due

to the absence of evidence for the relationships between social environments and psychological needs. This screening procedure resulted in 20 studies (18 peer-reviewed articles and two dissertations), which were further examined by the second author regarding their appropriateness for inclusion. Meanwhile, the second author performed another literature search to confirm no additional studies were excluded in the first round of search by the first author. The two authors reached complete agreement for including the 20 final studies for data extraction and analysis in this systematic review.

Data extraction and analysis

The data of the 20 studies were extracted and analyzed in four steps: (a) read the abstract to familiarize with the content; (b) summarized the article information concerning the author names, theoretical frameworks, research design, participant characteristics and related sport background, assessment period, social environments studied, data analyses and results regarding satisfaction and frustration of psychological needs, and study limitations (see Tables 1 to 3); (c) examined the method, results, and discussion sections to determine the relative influence of coaches, peers, and parents on psychological need satisfaction and frustration; and (d) made note of the specific methodologies (e.g. whether they were consistent with the epistemology) and findings of each study for examining potential biases. Epistemology—the construction of knowledge—should guide each research study's methodological choices, and a lack thereof would lead to inconsistent, unjustified, and/or poorly reported research designs and results.[33] For instance, quantitative studies should adopt a positivist epistemology, whereas qualitative studies should adopt a nonpositivist epistemology, such as constructivism, critical theories, and postmodern epistemology (see Koro-Ljungberg et al.[33] for a review).

This systematic review implemented a mixed-methods approach in integrating different data and methods of analysis,[34] which consisted of a predominantly aggregative (quantitative) sub-review and a configuring (qualitative) sub-review. More specifically, a parallel-results convergent design was used to synthesize the quantitative and qualitative evidence.[24] Quantitative findings were synthesized using content analysis, which is typically used for systematic reviews, to examine the relative influence of coach-created, peer-created, and parent-created social environments on each basic psychological need.[35] More specifically, the findings regarding the relative influence of the social agents on psychological needs were investigated and compared using bivariate correlations and beta weights from regression analyses or structural equation modeling (SEM), as well as related effect sizes, if they were available. On the other hand, qualitative findings were synthesized using qualitative comparative analysis,[36] in which the goal is to investigate the causal pathways to particular outcomes, such as autonomy, competence, and relatedness in this review. In this review, qualitative comparative analysis was performed to identify the "active ingredients" in different positive and negative social environments and how athletes perceived their relative influence on satisfying and frustrating basic psychological needs. Specifically, findings regarding the relative influence of the social agents on psychological needs were compared by assessing the frequency of themes and categories related to coaches, peers, and parents across studies, as well as the researchers' interpretation of the themes and categories that contributed to autonomy, competence, and relatedness within studies. Using qualitative comparative analysis has additional advantages over other synthesis approaches in that it is systematic, transparent, appropriate for integrating qualitative and quantitative findings, and suitable for exploring multiple pathways to outcomes.[37] Following the parallel-results convergent

Table 1. Summary of the design and participants of the extracted studies (N = 20).

ID	Author(s)	Purpose	Theories	Design	Participants	Sports and levels	Country
1	Almagro et al.[43]	To examine how athletes perceived autonomy support from coaches, basic psychological need satisfaction, and sport motivation	SDT and 2 × 2 AGT	Cross-sectional; individual interview	15 sport participants aged 13–16 years (M = 14.67) from sport clubs; 9 males, 6 females	Soccer, basketball, volleyball, tennis, handball, athletics, and swimming; provincial, state, and national levels	Spain
2	Blanchard et al.[49]	To test the impact of cohesiveness and coaches' controlling interpersonal style on athletes' perceptions of autonomy, competence, and relatedness	SDT	Cross-sectional; quantitative survey	197 athletes aged 16–22 years (M = 18) playing in an inter-cegep (i.e. Grade 12) league; 59% males, 37% females, 4% unreported	Basketball; 3 months to 12 years on a team	Canada
3	Felton and Jowett[32]	To explore the mediating role of social factors on the associations between attachment styles and basic psychological needs satisfaction within two relational contexts	SDT and attachment theory	Cross-sectional; quantitative survey	215 athletes aged 15–35 years, mostly of university age (M = 20.56); 41% males, 59% females	A range of individual (40%) and team (60%) sports; from club through university to national and international levels	UK
4	Fraina[40]	To develop a stronger comprehension of the factors that motivate adolescents, especially those from vulnerable circumstances, to participate in sport	SDT	Cross-sectional; quantitative survey	136 athletes from 8 urban high schools; 102 males, 34 females	Football, lacrosse, soccer, basketball, baseball, softball, volleyball, hockey, track and field, and cheerleading; junior varsity and varsity teams	USA
5	Gagné et al.[52]	To examine the effects of young athletes' perceptions of support from coaches and parents on their need satisfaction, motivation, and well-being	SDT	Cross-sectional; quantitative survey and diary	45 athletes aged 7–18 years (M = 13) from a competition team; all females	Gymnastics; 1–11 years (median = 6) of practice	USA
6	Gledhill and Harwood[31]	To examine career experiences of UK-based female youth soccer players from a holistic perspective with a view to producing a grounded theory of factors contributing to talent development and career transitions in UK youth female soccer	Talent development and career transitions	Cross-sectional; individual interviews	13 former players (M = 19.61 years) who had withdrawn from competitive soccer; all females. Sequential sample of 4 former coaches (3 males), 13 female best friends, and 8 former teachers (6 males) of the players	Soccer; joined player development center programs, but not progressed into leagues or international teams	UK

Table 1. *(continued)*

ID	Author(s)	Purpose	Theories	Design	Participants	Sports and levels	Country
7	Hodge and Gucciardi[39]	To examine whether the relationships between contextual factors and basic psychological needs were related to antisocial and prosocial behavior in sport	SDT	Cross-sectional; quantitative survey	272 university athletes (M = 19.49 years); 40% males, 60% females	Team sports; from club through provincial to national levels (M = 9.90 years of participation)	New Zealand
8	Khalaf[41]	To assess the motivational sequence posited by SDT in the context of sports	SDT	Cross-sectional; quantitative survey	310 athletes aged 14–31 years (M = 19.19); all females	Track and field; from club through university to national and international levels (M = 5.77 years of participation)	Egypt
9	Keegan et al.[20]	To re-examine the concept of 'motivational climate' based on recent developments studied the influences of coaches, parents, and peers on sport motivation of young athletes	SDT and AGT	Cross-sectional; focus-group interviews	40 sport participants aged 7–11 years (M = 9.58), who played sport in spare time; 21 males, 19 males	17 sports; < 3 years of participation	UK
10	Keegan et al.[19]	To examine the motivationally relevant behaviors of coaches, parents, and peers in specializing sport participants	SDT and AGT	Cross-sectional; focus-group interviews	79 specializing sport participants aged 9–18 years (M = 12.93), who played sport in spare time; 43 males, 36 females	26 sports; 2–6 years of sport experience	UK
11	Keegan et al.[42]	To examine the construction of the motivational climate surrounding elite athletes in relation to the behaviors of coaches, peers, and parents	SDT and AGT	Cross-sectional; individual and focus-group interviews	28 sport participants aged 15–29 years (M = 20.25) with; 23 males, 5 females	8 sports; national and international levels (>8 years of participation)	UK
12	Kimball[53]	To assess collegiate student-athletes' perceptions of autonomy	SDT	Cross-sectional; individual interviews	12 NCAA Division I student-athletes from freshman to senior; 7 males, 5 females	Basketball, football, track, and golf; all participants on athletic scholarship	USA
13	Kipp and Weiss[45]	To examine relationships among coach and teammate behaviors, psychological need satisfaction, and well-being among female adolescent gymnasts	SDT	Cross-sectional; quantitative survey	303 athletes aged 10–17 years (M = 13) who competed in US Gymnastics-sanctioned meets; all females	Gymnastics; varying skill level (M = 15.5 hours of training per week)	USA

Table 1. *(continued)*

ID	Author(s)	Purpose	Theories	Design	Participants	Sports and levels	Country
14	Kipp and Weiss[14]	To examine longitudinal relationships among perceived social influences, psychological need satisfaction, and well-being among female adolescent gymnasts	SDT	Longitudinal; quantitative survey	174 athletes aged 10–18 years (M = 13.5) who competed in US Gymnastics-sanctioned meets; all females	Gymnastics; varying skill level (M = 15.2 hours of training per week)	USA
15	Raabe and Readdy[46]	To explore motivational profiles and basic psychological need satisfaction across different contexts and situations that comprise the collegiate cheerleading environment	SDT	Longitudinal; individual interviews	12 NCAA Division I student-athletes aged 18–22 years (M = 19.3) from one university; 2 males, 10 females	Cheerleading; 11 participants on athletic scholarship	USA
16	Raabe and Zakrajsek[50]	To assess (a) if there were differences between coaches' and teammates' influence on psychological need satisfaction; (b) potential differences regarding the impact of coaches and teammates between interactive and coactive sports; (c) whether coaches' and teammates' influence affected perception of, and satisfaction with, individual and team performance	SDT	Cross-sectional; quantitative online survey	362 NCAA Division I student-athletes aged 18–24 years (M = 19.36); 136 males, 226 females	Track and field, cross country, soccer, basketball, and tennis; 235 participants on athletic scholarship	USA
17	Riley and Smith[48]	To examine the association of perceived coach–athlete and peer relationships with self-determined motivation for sport in young athletes	SDT	Cross-sectional; quantitative survey	211 middle and high school players aged 12–15 years (M = 13.5) from 29 teams; 90 males, 121 females	Basketball; M = 7.6 years of participation	US
18	Sánchez-Oliva et al.[38]	To examine the importance of significant others on motivational aspects, and how these variables might influence involvement in basketball	SDT and AGT	Cross-sectional; quantitative survey	284 players aged 11–16 years (M = 12.47); 149 males, 135 females	Basketball; community team	Spain
19	Taylor and Bruner[51]	To examine social-contextual correlates of players' developmental experiences in an elite youth soccer context	SDT	Cross-sectional; quantitative survey	133 players aged 11–18 years (M = 14.23) from four youth academies; all males	Soccer; three academies from the second tier and one academy from the fourth tier of professional soccer	UK
20	Williams et al.[47]	To examine the putative role of relatedness support for retention in golf among young females	SDT	Cross-sectional; individual interviews	10 players aged 16–26 years (M = 21.4), including active (n = 5) and inactive (n = 5) participants; all females	Golf; played competitively at club and regional tournaments	Australia

AGT: Achievement goal theory; SDT: self-determination theory; NCAA: National Collegiate Athletic Association.

design, quantitative and qualitative studies were reviewed and synthesized separately, while the characteristics of the two syntheses are summarized and compared in the Discussion section.[24]

Results

Theoretical background and research design

Table 1 provides a summary of the study background and participants of the 20 extracted studies. Among these studies, 19 were published in English and one was published in Spanish with an English abstract.[38] Information from the Spanish articles was retrieved through translation to English using an online tool (https://www.onlinedoctranslator.com). Of the 18 peer-reviewed articles, 17 conducted a single study and one conducted two studies[39] published in journals related to the field of sport and exercise psychology and sport sciences. Only Study 2 of Hodge and Gucciardi's[39] article was extracted for the purpose of this review. The two doctoral dissertations achieved a high level of scholarship and appropriateness for review: one included a single study[40] and the other included three studies,[41] though only Study 2 was extracted. All studies except one[31] mentioned SDT as a theoretical framework of the study; Gledhill and Harwood[31] applied a theory of talent development and career transitions instead of SDT in their study. Alongside SDT, five studies[19,20,38,42,43] integrated AGT, and one study[32] included attachment theory.[44]

      Of the 20 studies, 12 employed a quantitative and eight employed a qualitative research design. No mixed-methods studies were found. Among the quantitative studies, 11 used a cross-sectional design and only one used a longitudinal design,[14] which was an extension of a previous study by the same researchers.[45] Among the qualitative studies, seven used a cross-sectional design and only one used a longitudinal design[46]; five reported their epistemological and/or ontological stances as critical realism,[19,42] interpretivism,[31,46] and social constructivism,[47] whereas the other three did not report them.

Participant characteristics

Quantitative studies. The number of participants in each of the 12 studies ranged from 45 to 362 (M = 220.17; 35.2% males, 64.8% females), resulting in a total of 2642 athletes. Most studies recruited participants from a wide range of ages from youth to young adults, whereas one sampled only adolescents aged 12–15,[48] two sampled only high school-aged athletes,[40,49] and two sampled only college-aged athletes.[39,50] Most of them were White/Caucasian. One study included only males[51] and two included only females [14,41,45,52] as participants. Eight of the 12 studies investigated single-sport contexts, including basketball,[38,48,49] gymnastics,[14,45,52] soccer,[51] and track and field,[41] whereas the other four examined multiple-sport contexts varying from individual sports (e.g. cross country, tennis) to team sports (e.g. American football, baseball, field hockey, softball). The competitive level of the athletes varied both within and between studies, including professional and international levels.[14,32,39,41,45] Most studies were conducted in the USA (n = 6), followed by the UK (n = 2) and Canada/New Zealand/Spain/Egypt (n = 1).

Qualitative studies. The number of participants in each of the eight studies ranged from 10 to 79 (M = 26.13; 50.2% males, 49.8% females), resulting in a total of 209 athletes. All athletes were in the age between 7 and 29; most studies recruited a wide range of ages, whereas one sampled only

children below 12 years of age,[20] one sampled only adolescents aged between 13 and 16,[43] and two sampled only college-aged athletes.[46,53] The majority of the participants were White/Caucasian. Although most studies recruited only current athletes of both genders, two studies included dropout athletes who were females: Gledhill and Harwood[31] studied only former female soccer players while including their coaches, teachers, and female best friends as participants for triangulation of data sources, and Williams et al.[47] studied both active (n = 5) and inactive (n = 5) female golfers.

Three of the eight qualitative studies investigated single-sport contexts, including soccer,[31] golf,[47] and competitive cheerleading,[46] while the other five examined multiple-sport contexts varying from individual sports (e.g. swimming, tennis) to team sports (e.g. American football, volleyball, handball). Keegan et al.[19] included participants from the greatest variety of sports (n = 26). The competitive level of athletes varied within and between studies, most of which included regional and national levels, while Keegan et al.[42] included professional and international levels. Half of the studies (n = 4) were conducted in the UK, two in the USA, one in Australia, and one in Spain.

Assessment of social environments and psychological needs

Quantitative studies. Table 2 provides a summary of the data collection and analysis of the quantitative studies. Five of the 12 studies reported the data collection period, including pre-season,[14,45] the beginning of a season,[48,49] mid-season,[52] and the end of a season or off-season.[14] All 12 studies used validated survey measures to assess social environments and psychological need satisfaction in the sport contexts, while Gagné et al.[52] also included a diary to assess psychological need satisfaction perceived by gymnasts "at the moment" after each of the 15 practices over a course of four weeks. Of the 12 studies, 10 examined social environments created by two social agents, that is, coach and peers (n = 9) or coach and parents[52]; only two studies examined those created by all three social agents.[38,41] The most frequently studied social environments were autonomy support from coaches (n = 7), followed by controlling behavior of coaches (n = 5), autonomy support from peers (n = 4), and friendship quality (n = 3). When measuring basic psychological needs, nine studies used a single measure, including three using the Basic Need Satisfaction in Sport Scale (BNSSS),[55] and three studies used separate measures to assess autonomy, competence, and relatedness satisfaction. Most studies assessed general need satisfaction in sport, whereas four studies included need satisfaction with respect to specific social agents—coach and peers,[14,45,50] and coach and parents.[32] None of the studies assessed psychological need frustration

Table 2. Summary of methods and results in quantitative studies (N = 12).

ID	Author(s)	Assessment period	Coach Influence	Peer Influence	Parental Influence	Measures for BPN	Analysis	Autonomy	Competence	Relatedness	Limitations
2	Blanchard et al.[49]	First month of the season	Control (−)	Cohesiveness (+)	N/A	Adapted need satisfaction scale by Gagné et al.'s[52]	SEM	Coach ~ Peers (r = −.14 and .15*; β = −.30* and .29*)	Peers > Coach (r = .13 > .04; β = .22* > .01)	Peers > Coach (r = .48* > −.01; β = .58* > −.06)	Low reliability for autonomy and control scales
3	Felton and Jowett[32]	Unreported	Autonomy support (+); social support (+); control (−); conflict (−)	Autonomy support (+); social support (+); control (−); conflict (−)	N/A	BPNRS (La Guardia et al.[54])	Multiple regression (mediation)	Coach > Parents (autonomy support: b = .44* > .33*; control: b = −.22* ~ .−20*)	N/A	Parents > Coach (social support: b = .52* > .43*; conflict: b = −.18* > .04)	Attachment styles were measured at the global level rather than to specific agents
4	Fraina[40]	Unreported	Autonomy support (+); competence support (+); relatedness support (+)	Autonomy support (+); competence support (+); relatedness support (+)	N/A	BNSPP (Ng et al.[55])	Multiple regression (hierarchical)	Coach > Peers (autonomy support: r = .66* > .40*; b = .50* > .10)			
5	Gagné et al.[52]	15 practices over 4 weeks during the non-competing period of the season	Autonomy support (+); involvement (+)	N/A	Autonomy support (+); involvement (+)	Created a need satisfaction scale	Correlation	Coach > Parents (autonomy support: r = .54* > .23; involvement: r = .60* > .37*)	Coach > Parents (autonomy support: r = .33* > .06; involvement: r = .37* > .04)	Coach > Parents (autonomy support: r = .42* > .37*; involvement: r = .50* > .35*)	Measure of need satisfaction led to problems of multicollinearity
7	Hodge and Gucciardi[39]	Unreported	Autonomy support (+); control (−)	Autonomy support (+); control (−)	N/A	BNSSS (Ng et al.[55])	Bayesian path analysis	Coach > Peers (autonomy support: r = .43* > .39*; β = .36* > .23*; control: r = −.23* ~ −.20*; β = ns)	Coach > Peers (autonomy support: r = .31* > .25*; β = .31* > .15*; control: r = −.15* ~ −.13*; β = ns)	Peers > Coach (autonomy support: r = .57* > .44*; β = .45* > .28*; control: r = −.03 ~ −.02; β = ns)	Some data were collected in off-season that athletes had to recall experiences retrospectively
8	Khalaf[41]	Unreported	Autonomy support (+); involvement (+); structure (+)	Autonomy support (+); involvement (+); structure (+)	Autonomy support (+); involvement (+); structure (+)	BNSSS (Ng et al.[55])	SEM	Coach > Parents > Peers (r = .59* > .57* > .41*; β = .43* > .19* > .13*)	Coach > Parents > Peers (r = .55* > .47* > .42*; β = .36* > .21* > −16)	Peers > Coach ~ Parents (r = .49* ~ .48* > .45*; β = .30* > .21* ~ .22*)	Self-presentation biases might have led to report of great need satisfaction

Table 2. *(continued)*

ID	Author(s)	Assessment period	Coach Influence	Peer Influence	Parental Influence	Measures for BPN	Analysis	Autonomy	Competence	Relatedness	Limitation
13	Kipp and Weiss[45]	Pre-season (trained for at least 3 months with their current coach)	Autonomy support (+); control (−)	Mastery (+); performance (−); friendship quality (+)	N/A	Autonomy scale by Hollembeak and Amorose[56]; Athletic competence subscale of SPPA (Harter[57]); Relatedness subscale by Gagné et al.[52]	SEM	Coach > Peers (mastery/autonomy support: β = .61*; control: β = −.18*)	Peers > Coach (friendship quality: β = .16*)	Coach ~ Peers (mastery/autonomy support for relatedness with coach: β = .76*; friendship quality for relatedness with teammates: β = .53*)	Low reliability for performance climate subscale validated in team sports, so some items might be problematic in individual sports
14	Kipp and Weiss[14]	In season or just completed the season	Autonomy support (+); control (−)	Mastery (+); performance (−); friendship quality (+)	N/A	Autonomy scale by Hollembeak and Amorose[56]; Competence subscale of SPPA (Harter[57]); Relatedness subscale by Gagné et al.[52]	SEM	ns in SEM paths	Peers > Coach (mastery/ autonomy support: β = .17*; performance: β = .18*)	ns in SEM paths	Relatively low levels of performance climate; controlling behaviors showed a poor fit in the model
16	Raabe and Zakrajsek[50]	Unreported	Coaches' influence (+)	Teammates' influence (+)	N/A	Adapted BPNS (Deci et al.[58])	MANOVA	Peers > Coach (M = 5.40 > 4.39*)	Peers > Coach (M = 5.38 > 5.20*)	Peers > Coach (M = 5.87 > 5.30*)	Differences between starters and non-starters were not assessed
17	Riley and Smith[48]	Approximately 10 games in the current season	Coach-athlete relationships (+)	Friendship quality (+); peer acceptance (+)	N/A	Autonomy scale by Standage et al.[59]; Competence subscale of IMI (McAuley et al.[60]); NRS (Richer and Vallerand[61])	Multiple regression	Coach > Peers (coach-athlete relationship: b = .56*; friendship quality: b = −.29; peer acceptance: b = .44*)	Peers > Coach (coach-athlete relationship: b = .24*; friendship quality: b = .23*; peer acceptance: b = .31*)	Coach ~ Peers (coach-athlete relationship: b = .53*; friendship quality: b = .22; peer acceptance: b = .77*)	Selective attention to the social agents of the coach and peers
18	Sánchez-Oliva et al.[38]	Unreported	Task-involving (+)	Task-involving (+)	Parental support (+)	EMM (García-Calvo et al.[62])	SEM	Coach > Parents > Peers (r = .60* > .47* > .41*; β = .77* > .41* > −.10)	Parents > Coach > Peers (r = .45* > .35* > .18*; β = .51* > .50* > −.25*)	Coach > Peers > Parents (r = .54* > .52* > .36*; β = .41* > .32* > .09)	Only the positive social environments and need satisfaction were assessed
19	Taylor and Bruner[51]	Unreported	Coach rapport (+)	Task cohesion (+)	N/A	Adapted BPNRS (La Guardia et al.[54])	SEM	Coach > Peers (r = .44* > .31*; β = .46* > .26*)	Coach > Peers (r = .44* > .31*; β = .46* > .26*)	Coach > Peers (r = .44* > .31*; β = .46* > .26*)	Relationship in soccer did not represent experiences in family and school domains

BNSSS: Basic Need Satisfaction in Sport Scale; BPN: basic psychological needs; BPNRS: Basic Psychological Need in Relationships Scale; BPNS: Basic Psychological Needs Scale; EMM: Escala de Mediadores Motivacionales; IMI: Intrinsic Motivation Inventory; MANOVA: multivariate analysis of variance; NRS: Need for Relatedness Scale; SEM: structural equation modeling; SPPA: Self-Perception Profile for Adolescents; r: Pearson correlation coefficient; b: unstandardized regression coefficient; β: standardized regression/path coefficient; (+): positive social factor; (−): negative social factor. *p < . 05

Table 3. Summary of methods and results in qualitative studies (N = 8).

| ID	Author(s)	Assessment period	Coach Influence	Peer Influence	Parental Influence	Assessment for BPN	Analysis	Autonomy	Competence	Relatedness	Limitation
1	Almagro et al.[43]	Unreported	A climate of autonomy support, self-improvement, and teamwork	Support, collaboration, or help from teammates	N/A	Semi-structured, open-ended questions	Deductive and inductive content analysis; frequency analysis	Coach plays an important role in autonomy support	Coach played an important role in task design and motivational climate through feedback	Peers played an important role, both positive and negative influences	Each athlete completed one interview at different points of the season
6	Gledhill and Harwood[31]	Unreported	Thwarting autonomy, competence, and relatedness	Negative social interactions	Emphasis on academics and discouragement toward sport participation	Semi-structured, open-ended questions	Grounded theory; negative case analysis	Negative role: Coach (e.g. told players not to attend games)	Negative role: Coach (e.g. told 'low performers' that they could not develop through training or games any more	Negative role: Coach (e.g. asked players to remove themselves from the group) > Peers (e.g. 'low performers' distanced from 'high performers')	Reliance on player views about their parent interactions; retrospective interviews were subject to recall error or bias
9	Keegan et al.[20]	Unreported	Instructional and pedagogic considerations	Peer relationships, social interaction, altruistic behaviors, and collaboration	Parent support and facilitation; Parent play-and-teach behaviors	Semi-structured, open-ended questions	Inductive content analysis	Coach and Parents (collaborative vs. autocratic leadership styles) > Peers	Coach and Parents (positive vs. negative evaluations) > Peers	Peers (formation of friendships and group identity) > Coach and Parents	Impossible to establish the relative impact of social agents
10	Keegan et al.[19]	Unreported	Instruction, selection, and management (collaboratively, positively, tolerantly)	Friendship, cooperation, and reinforcement of rules/values	Support and facilitation (unconditionally, positively, collaboratively)	Semi-structured, open-ended questions	Inductive content analysis; constant comparison; critical reflection	Coach and Parents (autonomy supportive vs. controlling styles)	Peers (discriminatory vs. inclusive style, conflictive vs. positive rivalries); Parents (play-and-teach behaviors)	Peers (peer relationships and social interactions)	Complex interplay between autonomy, competence, and relatedness could not be examined

Table 3. *(continued)*

ID	Author(s)	Assessment period	Coach Influence	Peer Influence	Parental Influence	Assessment for BPN	Analysis	Autonomy	Competence	Relatedness	Limitation
11	Keegan et al.[42]	Unreported	Instruction, leadership, and coach-athlete relationships	Emotional support, collaborative/ competitive behaviors, and peer relationships	Emotional and moral support; diminished role	Semi-structured, open-ended questions	Inductive content analysis; constant comparison; critical reflection	Coach (autonomy supportive vs. controlling styles)	Peers (social recognition and status)	Coach (relatedness and team support); Peers (friendship and affiliation, group membership and belonging)	Mostly White male participants; focus groups might have led to social desirability, preventing criticism of social agents;
12	Kimball[53]	Unreported	Coach-athlete relationships and control	Peer relationships	N/A	Semi-structured, open-ended questions	Inductive content analysis	Peers > Coach ('Teammates are more influential in altering individuals' behaviors than are their coaches')	N/A	N/A	Demographic factors that might affect perceived autonomy were not examined
15	Raabe and Readdy (2016)[46]	Three time points: the beginning, middle, and end of the fall semester	Positive competence feedback and offer for choices and input	Positive competence feedback and peer relationships	N/A	Semi-structured, open-ended questions; field notes; observations	Deductive and inductive content analysis; frequency analysis	Coach > Peers ('the coaching staff gave more choice and opportunities for input to cheerleaders who had been on the team the previous year')	Coach ~ Peers ('cheerleaders obtained their competence feedback from a multitude of situational sources, including comments from teammates, coaches')	Peers > Coach ('cheer squad as their main peer group. This allowed for a good working relationship')	The majority of the participants were 1st-year collegiate athletes
20	Williams et al.[47]	Unreported	Relationships with coaches	Meaningful relationships within sport	Parental support	Semi-structured, open-ended questions	Inductive content analysis; frequency analysis	N/A	N/A	Parents (especially mothers) > Coach > Peers	Participants were interviewed at various stages of their golf experience (various levels of active golfers; different dropout ages of inactive golfers

BPN: basic psychological needs; N/A: Not applicable, due to the research emphasis on only one psychological need.

Qualitative studies. Table 3 provides a summary of data collection and analysis of the qualitative studies. All eight studies used semi-structured interviews, of which six included face-to-face individual interviews and three included focus groups to collect qualitative data using open-ended questions. Only Raabe and Readdy[46] reported the data collection period; they conducted individual interviews with each of the 12 competitive cheerleaders at the beginning, middle, and end of the fall semester. These researchers further included field notes and observations beyond interviews in data collection. Of the eight studies, five examined social environments created by all three social agents and three examined environments created by coach and peers. Six studies included all three basic psychological needs, but the other two focused exclusively on autonomy[53] or relatedness.[47] Although the majority of the studies assessed both positive and the negative social environments and psychological need satisfaction and frustration (i.e. brighter and darker sides of human existence),[16] only one focused on the "brighter side"[46] and one on the "darker side."[31]

Data analysis and study findings

Quantitative studies. Of the 12 studies using quantitative analysis, seven employed SEM techniques, three employed multiple regression, one employed correlation analysis, and one employed MANOVA to investigate the relationships between social environments and psychological need satisfaction. These studies found expected positive or negative associations between most social environments and satisfaction of autonomy, competence, and relatedness, except for a few occasions mostly observed in Kipp and Weiss'[14,45] research that included the largest number of social environments in their SEM model (see Table 2). Social environments were the most strongly related to autonomy and/or relatedness with typically medium-to-large effect sizes, but weakly (i.e. small effect sizes) or not significantly related to competence (see Figure 2). Nonsignificant associations existed, mostly between the opposite sides of SDT—particularly between negative social environments and need satisfaction—in which competence was the main contributor among the three psychological needs.
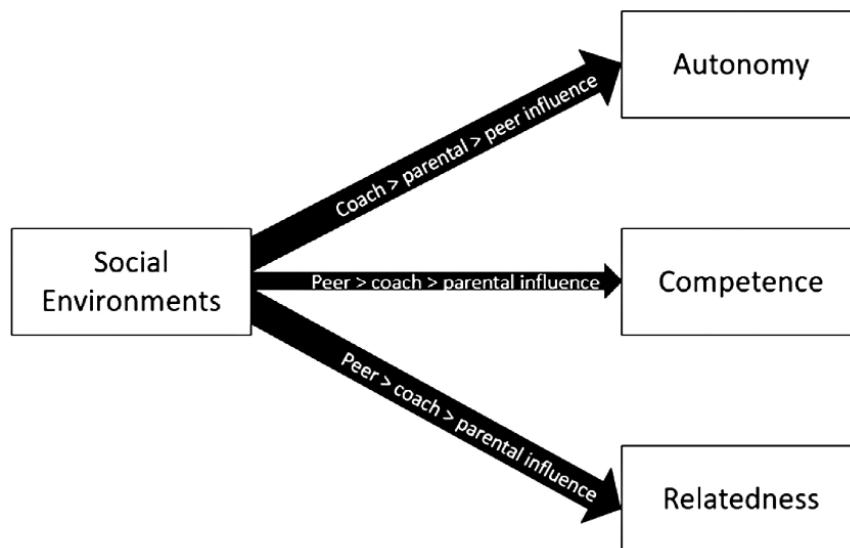
Figure 2. The relative influence of social environments created by coaches, peers, and parents and on autonomy, competence, and relatedness. Thicker arrows mean greater influence.

To determine the relative influence of the social agents, when predicting need satisfaction from social environments, SEM and regression analyses showed similar results to the aforementioned patterns (see Table 2). Fraina[40] was the only study examining the interactive effects of social environments, revealing that support of relatedness, but not autonomy and competence, from coaches and peers produced interactive effects over and above their independent (i.e. main) effects in predicting relatedness satisfaction. Only one study[50] compared group differences and indicated that coaches had more positive influence on all three need satisfaction in coactive sports (e.g. track and field, and table tennis) than interactive sports (e.g. soccer, volleyball), while peers had more positive influence on relatedness satisfaction in interactive sports than coactive sports. Only Kipp and Weiss investigated the role of developmental stages in data analysis, in which physical maturity of female gymnasts negatively predicted only competence in their cross-sectional study,[45] but not over time in their longitudinal study.[14]

Qualitative studies. In all eight studies, interviews were recorded and transcribed verbatim into texts for researchers to read and reread before data analysis. All studies underwent a coding process for researchers to find meanings from the data; seven applied content analysis while Gledhill and Harwood[31] used a grounded theory approach to conduct open coding, axial coding, and theoretical integration. In order to create categories and themes from the data, five studies used an inductive approach,[19,20,31,42,53] one study used a deductive approach,[47] and two studies used a combination of inductive and deductive approaches.[43,46] Inductive analysis uses participant quotes to create new themes and categories, whereas deductive analysis uses pre-determined themes and categories to organize the quotes. A combination of these techniques has been suggested as the most pragmatic way of conducting content analysis, because there are always underlying theories and assumptions in research.[63] All studies except Kimball[53] included more than one researcher in the analysis process to enhance confirmability of the coding results.

In addition to coding, several studies also employed other analysis strategies within content analysis. Specifically, Keegan et al.[19,20,42] implemented constant comparison[64,65] and critical reflection/questioning,[66] and three studies implemented frequency analysis.[43,46,47] Worthy of note is that frequency analysis in qualitative research provides a guidance on the general instead of definite importance of categories and codes.[67] Moreover, four studies used qualitative software—MAXQDA[43] and NVivo[19,20,42]—to perform content analysis.

All studies reported meaning units and themes related to the social environments created by coaches, peers, and/or parents and satisfaction or frustration of psychological needs. The majority of the studies organized the results specific to each social agent with quotes, which provided more detailed information about their corresponding motivational influence.[19,20,31,42,47] The eight studies presented different findings and categories based on their specific research purposes and interview questions. In general, the three social agents differentially contribute to the social environments: (a) coaches play an important (positive or negative) role in autonomy support/control, instruction and feedback, management, leadership, relationships with athletes; (b) peers influence mostly relatedness needs (satisfaction or frustration) through friendship, social interactions, cooperation/collaboration, and feedback; and (c) parents serve not only the role of support and facilitation but also discouragement and pressure.

Three studies performed additional analysis after the coding process. Kimball[53] compared the profiles of the collegiate athletes by gender, race, sport, and year in school to examine similarities and differences, while Williams et al.[47] compared the data from two groups of female golfers (active or inactive) to investigate differences in their relatedness support and associated

involvement in sport. Further, Gledhill and Harwood31 built a model using diagrams and completed a post-theoretical literature review68 based on their qualitative findings.

Relative influence of social agents

Quantitative studies. The quantitative findings provided empirical evidence to compare the relative influence of social agents in satisfying athletes' psychology needs, as shown in Figure 2. First, studies in this review universally showed greater influence of coaches than peers and parents on autonomy satisfaction, except for Raabe and Zakrajsek50 who studied collegiate athletes using a different analysis strategy multivariate analysis of variance (MANOVA) than other studies. The two studies that investigated social environments created by all three social agents revealed greater influence of parents than peers on autonomy satisfaction. In other words, the social environments created by peers generally contributed the least to autonomy satisfaction. Second, there was mixed evidence regarding the role of social agents in satisfying athletes' competence. Over half of the studies supported peers as the most influential agent in competence satisfaction through good friendship quality and supportive motivational climates.14,45,48 In contrast to the AGT assumptions, a peer-created task-involving climate was a negative predictor38 while an ego-involving climate was a positive predictor14 of competence. Two studies41,52 showed greater influence from coaches than parents on competence satisfaction when studying the same SDT-based social factors (i.e. autonomy support, involvement, and structure). Third, the majority of the studies suggested that peers played the most critical role in relatedness satisfaction. Nevertheless, two studies revealed that coaches could have stronger influence than peers when measuring non-SDT-based social factors, such as comparing coach rapport with task cohesion51 or a task-involving climate created by coaches versus peers.38 Whereas three studies showed stronger influence from coaches than parents based on need support and motivational climates in satisfying athletes' relatedness, one study showed an opposite pattern of relative influence when investigating social support from and conflict with coaches and parents.32

Unfortunately, the influence of social agents across developmental stages could not have been assessed, because the majority of the reviewed studies sampled athletes across both early and late adolescence without considering their developmental differences. Yet, the studies examining athletes in late adolescence and young adulthood39,49,50 indicated that peers played a more important role in athletes' psychological need satisfaction as compared to the studies investigating athletes in early to middle adolescence.38,48

Qualitative studies. Although the results of qualitative studies do not contain statistics for comparing the relative influence of social agents directly, qualitative comparative analysis of the findings indicated that coaches played the most important role in autonomy satisfaction and frustration. Styles of coaching and parenting (autonomy supportive vs. controlling) were the most frequently mentioned categories that influenced perceptions of autonomy. Two studies found that collegiate athletes might perceive greater influence from teammates than coaches,46,53 as "teammates are more influential in altering individuals' behaviors than are their coaches" (p. 833).53 With regard to competence, all three social agents seemed to be similarly influential, though in different ways. In satisfying athletes' perceived competence, coaches might play a more important role in designing tasks and giving feedback20,43; peers might be more influential in social interactions, recognition, and status19,42; and parents might play a more critical role in evaluations of athletes.20,42 For example, "cheerleaders obtained their competence feedback from

a multitude of situational sources, including comments from teammates, coaches" (p. 83).46 Concerning relatedness, qualitative research consistently demonstrated the most influential role of peers for both positive and negative relationships. While friendship and group identity were important contributors to relatedness, coach–athlete relationships and team support from coaches were also deemed vital.20,42 Moreover, parental support was crucial in promoting relatedness. Support from mother was indeed more influential than support from coaches or peers in satisfying relatedness of female golfers.47 Only one study focused on the negative social environments and found that coaches played the most influential role in thwarting all three basic psychological needs.69 Therefore, the relative influence of social agents in the "brighter" and the "darker" sides of sport experience could be different.

Meta-Biases and confidence in cumulative evidence

Quantitative studies. In terms of meta-biases, all of the quantitative studies were non-experimental, used a positivist research paradigm, and used a nonrandom, convenient sample that might not be representative of the population. However, these studies were able to define appropriate eligibility criteria for inclusion of participants (i.e. competitive athletes). Although each study included all three psychological needs in examining the influence of social agents, the measurement of autonomy, competence, and relatedness varied across studies, which limited the direct comparison of the study findings. Furthermore, the measurement of social environments had psychometric issues, such as low validity and reliability in measuring controlling coaching behaviors.14,49 Due to a positivist epistemology, the social environments assessed were limited to the ones in which the researchers were interested, potentially impacting the relative influence of the social agents. Most of the studies were cross-sectional and did not report when the data collection occurred in terms of the sport season, which could influence the relationships between social environments and basic psychological needs, and thus produced biased results as indicated in previous longitudinal research.70

With regard to potential problems of selective reporting, the reviewed studies appeared to have reported all of the results, both significant and nonsignificant, in the overall sample. Yet, none of the seven studies using SEM examined group variables (e.g. gender, sport type) through invariance testing. Because there are well-established links between motivation and, gender, competitive level, and sport type,71 it is plausible that these studies did not report invariance tests due to undesired results. In addition, less than half of the studies examined the bivariate relationships between sociodemographic variables and psychological needs to control for the significant confounding variables in their analyses.14,40,45,51,52 Therefore, the overall influence of social agents might have been overestimated. On the other hand, publication biases were undetected within the reviewed studies, since they had similar and appropriate number of participants and contained nonsignificant findings.27 Overall, the confidence in the cumulative quantitative evidence could be classified as low to moderate.72

Qualitative studies. Half of the qualitative studies contained minor methodological limitations, including, but not limited to, (a) varied data collection times/stages that were not in the same period of the season,31,43,47 (b) data collection formats that differed across studies,42 and (c) participants drawn from different demographics (e.g. racial/ethnic composition). With regard to the relevance of the evidence, it could be considered partial for two reasons: (a) all participants were from Europe or the USA; and (b) consistent with the purpose of this review, half of the studies

explicitly compared the roles of different social agents.[19,20,42,47] Moreover, the reviewed studies were generally coherent, although minor concerns existed due to different epistemological and ontological stances. While all of the studies adopted a nonpositivist research paradigm, Keegan et al.[19,42] specifically implemented a critical-realist approach, which used an unique research methodology and analysis technique without a guiding theory or paradigm, for determining the relative influence of the social agents.

For the adequacy of data component, substantial concerns existed due to two drawbacks: (a) only eight studies were extracted in this review, and three of them were conducted by the same researchers with the same procedures[19,20,42]; and (b) the richness of the data was negatively influenced by how the researchers established rigor and trustworthiness. Specifically, all studies included some type of traditional qualitative approach of member checks, peer debriefs, and/or intercoder consistency for "confirming" their findings, whereas only two of them[31,46] mentioned the quality and methodological rigor of the research by applying the more recent and acceptable criteria developed by Tracy.[73] These two studies, for instance, performed member reflections through a process of elaboration and collaboration with participants in replace of traditional member checking, as well as consulted other researchers for bracketing to reduce their personal biases in analyzing and presenting their data. Considering all four components of the CERQual critieria, the confidence in the cumulative quantitative evidence could be classified as moderate.[28]

Discussion

The main purpose of this convergent mixed-studies review was to summarize the research evidence of the roles of social agents in satisfaction and frustration of athletes' basic psychological needs, as well as to provide practical implications and suggestions for future research. A total of 20 studies, including both quantitative and qualitative research, were reviewed. The results suggest that coaches, peers, and parents serve different roles in supporting and thwarting athletes' basic psychological needs, which contribute to different degrees of satisfaction and frustration of autonomy, competence, and relatedness in youth sport contexts.

Consistent with SDT, the quantitative findings indicated that positive social environments created by coaches, peers, and parents were all positively associated with greater satisfaction of autonomy, competence, and/or relatedness in athletes. However, nonsignificant associations also existed, mostly between social environments and competence, maybe because most of the positive social factors studied pertained to autonomy support from and relationships with social agents. In sport contexts, however, positive feedback and optimal challenge should be more closely related to competence satisfaction.[10] On the other hand, negative social environments (e.g. controlling behavior) created by these social agents were not always associated with satisfaction of psychological needs.[14,45,49] This finding is in line with the "darker side" of SDT that negative social environments, such as need-thwarting contexts, contribute more directly to need frustration and ill-being rather than need satisfaction and well-being.[13,15]

In congruence with the literature,[11,74] this review shows that both coaches and peers are important social agents in shaping social environments in youth sport, which in turn produce positive and negative influences on athletes' psychological needs and motivational outcomes. Most of the participants were older adolescents and young adults who were in the specialization and/or the investment–mastery stages of their athletic career. Their more advanced developmental stage could partially explain the mixed findings regarding the relative influence of social agents on psychological needs, as well as why parental influence is shown less critical in satisfying athletes'

psychological need based on this review.11,75 Both quantitative and qualitative evidence reveals that, in general, coaches are more influential in both supporting and thwarting autonomy, peers are particularly important in supporting competence and relatedness, and parents contribute more strongly to supporting autonomy than competence and relatedness but to a lesser extent than coaches and peers (see Figure 2). These findings are congruent with Keegan et al.'s11 qualitative research synthesis of motivational influences on youth athletes and extend their work by (a) triangulating quantitative with qualitative methods for data extraction and analysis; (b) examining relative influence of social agents on psychological needs, in place of motivational climates, that are key mechanisms for sport motivation and participation; and (c) using a theoretical approach that can be directly translated into evidenced-based sport psychology and coaching practices.

To explain the influential role of coaches in autonomy, coaches take charge of training, instruction, and evaluation, so they exert a passionate and energizing influence that can also be intimidating, especially at the elite level that most reviewed studies investigated.11 On the other hand, the important peer influence on competence and relatedness stems from athletes' desires to be popular among their peers, to belong to a meaningful peer group, and to have quality friendships.11 With respect to the role of parents in sport, it changes from instrumental and social support in childhood to financial and emotional support in adolescence and young adults.11 Therefore, they exert less influence on need satisfaction and frustration over time as compared to coaches and peers. Although these developmental trajectories could not be assessed in this review, the relatively consistent roles of social agents across quantitative and qualitative studies added triangulation and thus confidence in cumulative evidence of their influence on athletes' psychological needs.

Suggestions for future research

Although study findings are mostly consistent with the SDT assumptions, a few issues concerning research design, data analysis, and research gaps are noteworthy. First, the majority of the reviewed studies used a cross-sectional design, with an exception of only one quantitative and one qualitative longitudinal study. Further experimental and longitudinal research is needed to examine the causal relationships between social environments and psychological needs, although researchers should think critically about the time and resources needed, as well as potential attrition of participants, in order to balance the cost-effectiveness. Researchers should also consider using a mixed-methods design to overcome the corresponding limitations of quantitative and qualitative research, promote triangulation and rigor, and enhance comprehensiveness and generalizability of the findings.76 At the same time, mixed-methods research is emerging and pose pedagogical challenges to which researchers should pay attention before implementing this methodology.76 Since only one qualitative study analyzed field notes from observation, future research may incorporate specific observational tools to analyze different social environments based on SDT and AGT, such as the Multidimensional Motivational Climate Observation System,77 the Behavior Evaluation Strategies and Taxonomies,78 and the Parent Observation Instrument for Sport Events,79 as a means to enhance credibility and transferability of the findings.

In regard to participants, only one study recruited athletes from a non-White/Caucasian dominant country.41 Future investigations should sample athletes of different races/ethnicities and from different countries, especially in continents beyond North America and Europe, in order to further our understanding of how social environments contribute to psychological needs across cultures. Although most of the studies sampled athletes across gender, various age groups, and

different sport contexts, no group comparisons (e.g. invariance tests) were made regarding the relative influence of social agents. Therefore, future research should examine whether the roles of social agents vary across gender, sport type, and competitive level using, multigroup and/or multilevel analyses for quantitative studies, and group comparisons for qualitative studies. In addition, both quantitative and qualitative research should recruit coaches and peers as participants in order to obtain a comprehensive view of the social environments from different perspectives.

With respect to data collection, the assessment period should be specified in future studies in order for researchers and practitioners to gain insights into whether the relationships between social environments and psychological needs differ across pre-season, in-season, and off-season. Research on athletes in adolescence80 and young adulthood81 indicated that over the course of a season, the social environments tended to become more positive, psychological need satisfaction generally increased, and the associations between the two constructs became stronger.

When investigating social factors, autonomy support and controlling behaviors were the most studied predictors with more consistent evidence, yet examining other positive and negative social environments is needed. For instance, Duda82 integrated SDT and AGT to conceptualize two types of coach-created motivational climates—empowering and disempowering climates—which have been shown to predict satisfaction and frustration of psychological needs, respectively.77,83 Furthermore, there is little research on the relationships between peer-created motivational climates and psychological needs, and parental influence on psychological need satisfaction and frustration received the least attention in the literature, which warranted attention in further studies. Future research may explore various parent-created social environments, such as motivational climates, parental involvement, and parental pressure that are critical in youth sport participation.84,85 Studying social environments created by coaches, peers, and parents concurrently is needed in order to better understand the relative influence of these important social agents in sport.

Since Weigand et al.'s75 call for more research on the relative influence of coaches, peers, and parents in sport, surprisingly, there had been only two quantitative studies examining this influence on basic psychological needs.38,41 The scarce quantitative investigations may be attributed to unique statistical and practical challenges in collecting and analyzing large data concerning multiple sources of social environments. Future quantitative studies are encouraged to apply advanced statistical techniques such as invariance testing and latent growth modeling when studying different social environments and psychological needs simultaneously. As it was more common for qualitative studies to include findings and discussions regarding social environments created by all three social agents, future qualitative investigations may extend current knowledge by comparing various groups of athletes (e.g. male vs. female, varsity vs. non-varsity, starters vs. non-starters, autonomously motivated vs. controlled motivated) within a study.

Practical implications

This review sheds light on structuring educational programs, with support from coaches, parents, and administrators, to facilitate positive sport experience and sustained participation among children and adolescents. The International Olympic Committee consensus statement on youth athletic development describes that positive psychological experiences and competencies should be the central components of youth sport participation.86 These components, based on the review findings, ought to include optimal social environments created not only by coaches but also peers and parents who can maximize satisfaction and minimize frustration of basic psychological needs

in athletes. Due to their critical role in autonomy and competence satisfaction of athletes, coaches are encouraged to adopt the empowering coaching framework82 and focus on five aspects of positive coaching: (a) promoting task involvement such as offering encouragement when athletes improve; (b) increasing autonomy support such as providing rationales for athletes to learn skills and strategies; (c) demonstrating social support such as caring for athletes as people; (d) reducing ego-involving behaviors such as praising only the best athletes on a team; and (e) avoiding controlling behavior such as threatening to punish athletes to keep them on task.

Peers (i.e. teammates) are a particularly important social agent in promoting athletes' competence and relatedness satisfaction. Depending on the age of the athletes, coaches and sport program coordinators can work independently or with the captain to facilitate positive peer-created social environments by emphasizing five types of athlete behaviors87: (a) encouraging improvement to help teammates develop new skills; (b) offering social support by caring about every teammate's opinions; (c) promoting effort by praising teammates' effort even in unsuccessful performance; (d) minimizing intra-team competition by not focusing on outperforming teammates; and (e) avoiding intra-team conflicts that stem from negative comments or jokes that upset teammates.

"Before we place all the responsibility for athletes' sport motivation on the coaches, we should consider that every young athlete typically faces another motivational climate at home" (p. 494).10 Although parents do not seem to have as much influence as coaches and peers do based on the review findings, they deserve attention as the most significant social agent who influences the overall development of children and adolescents.90 On the one hand, parents can engage in supportive behaviors by asking and listening to athletes' feeling before, during, and after practice/competition, encouraging athletes to express any worries and problems in sport, and volunteering for athletes' sport team or at competition. On the other hand, parents should avoid demonstrating directive behavior or pressure on athletes by limiting conversations about what the athletes should do to improve performance, how they should practice and train harder, and why they perform poorly in competition.85 Understanding and taking youth athletes' perspective is paramount.

Limitations and conclusions

Despite the attempt to comprehensively review the roles of social agents in athletes' psychological needs, several limitations should be addressed. First, only journal articles and dissertations with an English abstract were included, thus representing mostly a Western perspective dominated by English-speaking countries. However, this is a common concern for review studies due to much effort in literature search and translation from a different language. Second, this review focused only on the relationships between social environments and psychological needs in sport contexts, which limited the roles of social agents to the SDT literature as the current paradigm. Future reviews may focus on other important variables influenced by social agents in sport such as achievement goal orientation, well-being, and burnout, as well as other contexts such as physical education and other forms of organized physical activities. As Kuhn suggested,89 the most significant advances in scientific progress are achieved through the development of new explanatory theories that offer new hypotheses for testing, so more theories and variables should be tested regarding the social agents' influence on athletes. Third, it was somewhat challenging to summarize the relative influence of social agents from qualitative studies, because their aims, epistemologies, and methodologies were not consistent across studies. Future reviews may include

a greater number of quantitative articles for meta-analyses, as well as a wider range of qualitative studies drawn on different epistemologies, to examine whether the findings are consistent with this review. Furthermore, using qualitative comparative analysis to convert qualitative evidence into more quantitative form in this review might create problems in mixing ontological and epistemological assumptions for qualitative research. However, as this review sought to examine the relative influence of social agents on basic psychological needs as causal pathways rather than the meanings of athletes' experiences, using qualitative comparative analysis was deemed the most appropriate.37 Researchers who wish to further review the deeper qualitative findings can implement other qualitative analysis strategies, such as qualitative content analysis,90 to synthesize the literature with themes or categories.

This mixed-studies review serves as the first attempt to summarize the growing body of both quantitative and qualitative literature on the roles of the three social agents in predicting athletes' psychological need satisfaction and frustration in sport contexts. It is clear that coaches, peers, and parents have unique roles in satisfaction and frustration of psychological needs of athletes. More research studying the concurrent social environments created by these social agents, both intrapersonal and interpersonal, will further our understanding of what social factors support or thwart autonomy, competence, and relatedness more than the other ones. Moreover, the "darker side" of sport participation and experience, including negative social environments, psychological need frustration, amotivation, and maladaptive outcomes, should be another research emphasis in the future. Finally, it is recommended that youth sport programs be supported with positive social environments created by all coaches, peers, and parents with an aim to satisfy athletes' autonomy, competence, and relatedness and to support their long-term sport participation and well-being.

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