

A review of competitive sport motivation research



Rachel B. Clancy^a, Matthew P. Herring^{a, b}, Tadhg Eoghan MacIntyre^{a, b},
Mark J. Campbell^{a, *}

^a Department of Physical Education and Sport Sciences, University of Limerick, Ireland

^b Health Research Institute, University of Limerick, Ireland

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ABSTRACT

Objectives: The purpose of this review was to synthesise contemporary research on competitive sport motivation (1995–2016) with a view to identifying trends and gaps in sample characteristics, research designs and analytical strategies, and classifying associated topics.

Design: Narrative review.

Method: Four databases were searched using a focused search strategy, leading to 63 studies that met the inclusion criteria. These were then evaluated in five sections: *Theoretical Frameworks, Sample Characteristics, Research Designs, Analytical Strategies and Topics*.

Results: A total of 63 studies comprising 12,440 participants were appraised. The average sample size and participant age were 197 and 22.6 years, respectively. Just over half of the studies described their sample as *high-level*. The majority of studies were quantitative and employed a cross-sectional design. A range of innovative statistical analyses were used, with structural equation modelling being increasingly adopted. In addition to studies focusing on motivation as a stand-alone topic, researchers in the area also investigated its relationship with motivational climate, burnout, doping, perfectionism, injury, and several other related variables.

Conclusions: After reviewing the body of research on this specific topic area, promising directions for future research are presented. The focused approach particularly seeks to encourage researchers to employ different methodologies, and prioritise underused topics in future research on competitive athlete groups. Furthermore, the review points to several practical implications for competitive sport stakeholders.

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* Corresponding author.

E-mail addresses: rachel.clancy@ul.ie (R.B. Clancy), matthew.herring@ul.ie (M.P. Herring), tadhg.macintyre@ul.ie (T.E. MacIntyre), mark.campbell@ul.ie (M.J. Campbell).

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1. Introduction

Understanding the *why* of behaviour has been a consistent goal of psychology research. As Roberts, Treasure, and Conroy (2007, p. 3) commented, motivation “is defined so broadly by some that it incorporates the whole field of psychology, so narrowly by others that it is almost useless as an organising construct”. Despite its apparent intricacy, there is utility in studying motivation, as it proffers the theoretical and practical knowledge to understand *why* we do what we do. It illuminates the cause of behaviour, thereby providing an insight into why one person pursues a world record on the track while another drops out at mile 22 of a marathon. The diverse applicability of motivational research is reflected in the many domains it pervades, from education (Dweck, 1986; Guay, Ratelle, & Chantal, 2008) to organisational settings (Gagné & Deci, 2005; Gagné & Forest, 2008) to health and healthcare (Carter & Kulbok, 2002; Miquelon & Vallerand, 2008) to exercise and physical activity (Buckworth, Lee, Regan, Schneider, & DiClemente, 2007; Kilpatrick, Hebert, & Bartholomew, 2005; Standage, Gillison, Ntoumanis, & Treasure, 2012), to name but a few. In the area of sport psychology, there is similar interest in the psychological processes that initiate and sustain behaviour.

Motivation can be defined as “the investigation of the energisation and direction of behaviour” (Roberts & Treasure, 2001, p. 6). Thus, it comprises the reasons or forces that influence behaviour. Motivation is a complex *construct* (or latent variable), rather than an observable entity, which contributes to the difficulty in accurately conceptualising and measuring it (Lavalley, Kremer, Moran, & Williams, 2003). An athlete who performs extra repetitions in the gym is often perceived by observers as highly motivated, though no measure of motivation has actually taken place. Despite these conceptualisation and measurement challenges, motivation continues to be an “ever-present and robust topic” in sport research (Lindahl, Stenling, Lindwall, & Colliander, 2015, p. 77). However, motivation and its links to sport behaviour remain less well understood than some other psychological constructs for several reasons. First, motivation results from the interaction of many diverse factors. For example, internal motives (e.g., need for companionship) and/or external events (e.g., prize money) can move people to act (Mallett & Hanrahan, 2004). Second, motivation can act as an antecedent or outcome. To illustrate, self-determined motivation predicts higher levels of performance (Gillet, Vallerand, & Paty, 2013), and rewards decrease intrinsic motivation (Deci, Koestner, & Ryan, 1999). Additionally, motivation can act as a mediator; for example, motivation plays a role in the interplay between perfectionism and burnout (Appleton & Hill, 2012), and between coach/parent autonomy support and well-being (Gagné, Ryan, & Bargmann, 2003). Third, there is a plethora of theories on this topic, ranging from the early “grand” theories that sought to unify all actions within a single framework (e.g., Drive Theory, Hull,

1943) to the more contemporary accounts that focus on particular behavioural phenomena (e.g., achievement goal theory and self-determination theory, Ntoumanis, 2001).

The widespread interest in and applicability of motivation research has resulted in a vast body of literature being reviewed from numerous different perspectives (e.g., various psychology sub disciplines, education, employee work relations, health and well-being, and so on). Notably, however, and the principal rationale for this work is the fact that, there is no contemporary peer-reviewed publication that provides a comprehensive review of what *drives* adult athletes engaged in competitive sport (e.g., situations in which people are trying to win a contest or be more successful than others). With this in mind, the two main aims of this review on competitive sport motivation were: (1) to identify trends and gaps in sample characteristics, research designs, and analytical strategies; (2) to identify what topics are studied alongside competitive sport motivation. This focused approach sought to assist researchers in making best practice or effective decisions around the selection of different methodologies and underused topics in future research on competitive athlete groups.

2. Method

In seeking to succinctly review a specific body of research on this multidimensional construct, four sections and numerous subsections are presented. Firstly, the present section, *Method*, outlines the search strategy, inclusion criteria and procedure, including aims. Next, *Results* is divided into six subsections. After a brief overview of *General Findings*, significant details are provided on *Theoretical Frameworks*, *Sample Characteristics*, *Research Designs*, *Analytical Strategies* and *Topics*. The *Topics* subsection is further structured according to seven specific topics. Thirdly, *Discussion* synthesises and evaluates the results, identifying limitations, presenting avenues for future research and suggesting practical implications. Lastly, the brief *Conclusions* section reiterates the core findings of the review.

2.1. Literature search

Four databases were searched via EbscoHost: Academic Search Complete; PsycARTICLES; PsycINFO; SPORTDiscus. The search was conducted using the following terms:

TI motiv* (title) AND TI (sport* OR athlete* OR player* OR performer* OR team*) (title) AND (elit* OR competit* OR “high perform*” OR “organi?ed sport” OR “colleg* athlete*” OR “intercolleg* athlete*” OR professional OR amateur OR club* OR experienced) (abstract).

2.2. Eligibility criteria

Inclusion criteria were as follows: (1) electronically-accessible English language publication between 1995 and 2016; (2) publication in an ISI-indexed journal; (3) original studies, rather than reviews, theses, books, conference proceedings, *et cetera*; (4) publications with motivation as a central component of the research; (5) publications involving populations that participate in competitive sport, not physical activity, physical education, or other domains; (6) publications that did not address youth or special populations (under 18; people with disabilities); and/or, (7) publications that did not deal primarily with assessing/validating measurement tools.

2.3. Procedure

The initial search produced 994 records published up to January 30th 2016, which reduced to 844 studies between 1995 and 2016. This timeframe was selected because publications in this area have proliferated in the contemporary research environment, with approximately 85% of relevant publications captured in that 21-year period and 79% of those reviewed emerging since 2005. Once duplicates were removed, 585 records remained. Electronic copies of these studies were then assessed against the inclusion criteria. Sixty-three studies were selected and classified according to theoretical frameworks, sample characteristics, research designs, analytical strategies, and topic(s). Furthermore, the search strategy and inclusion criteria were designed to generate findings that are applicable to competitive sport practitioners. Samples were distinguished by size, gender, age, sport, competitive level, and nationality of participants. Research designs, data collection methods, and analytical strategies were also specified. A brief overview of topics was presented as well. A flow diagram is presented to display the process of inclusion/exclusion of papers (Fig. 1). All findings are summarised in [Supplementary Tables 1–8](#), and the excluded papers are outlined in [Supplementary Table 9](#).

3. Results

3.1. General findings

Sixty-three studies were synthesised in the review. The most studies (26) were published between 2010 and 2014 ([Table 1](#)) and in *Psychology of Sport and Exercise* (12).

3.2. Theoretical frameworks

Self-Determination Theory (SDT) and Achievement Goal Theory (AGT) were the dominant motivational theories adopted by the reviewed studies. Thirty-two studies used SDT to guide their research, 13 used AGT, and six used a mix of SDT and AGT. Of those studies that relied on SDT, eight provided further detail by specifying the sub-theory that they focused on (e.g., cognitive evaluation theory). One study encompassed SDT, AGT and a range of “traditional” (unnamed) theories. The 11 remaining studies did not explicitly mention the motivational theory that had guided their research. The full list of theoretical frameworks can be found in [Supplementary Tables 1–7](#).

3.3. Sample characteristics

The total number of participants was 12,440, and the range of sample sizes was between one and 1040. In some cases, the full sample was not included in the review, as a portion may not have met certain inclusion criteria (e.g., competitive athletes). Seven

studies had 10 or fewer participants, and 14 studies had between 11 and 100 participants. Twenty-five had between 101 and 250 participants, while 10 studies had between 251 and 400 participants. Seven studies had over 400 participants, with only one study reaching over 1000 participants. Three hundred and thirty-three participants (across four studies) were coaches, and the remainder were athletes.

The sample composition was 56.7% males and 43.3% females, with an average age of 22.6 years. Forty-eight studies contained both genders, 10 studies contained males only, and five studies contained females only. In three of the four studies that had coaches as participants, their ages were unspecified; rather, they were described as “adult”. Athletes' ages were unspecified in a further three studies. 18.3 years and 63.3 years were the youngest and oldest average participant age, respectively. Sixteen studies contained participants from the USA, nine studies contained participants from the UK, and seven studies contained participants from New Zealand. The remaining studies contained participants from Norway (five), France (four), Canada (three), Australia (three), Sweden (two), Greece (two), Germany (two), and China (two). A mix of nationalities was investigated in three studies, while participants from Bulgaria, Croatia, Iceland, Scotland, and Spain were each represented in one study.

Thirty-two studies described their sample (or part of it) as *high-level*, using words such as “elite, Olympian, international, professional, expert, world class”. All of the studies containing participants from the USA were at the collegiate level. Although several studies had student samples, they all participated in competitive sport in some form. Fifteen studies included mixed-level participants (e.g., club to national; national to Olympic), whereas the remainder contained samples at a single competitive level (e.g., they had all competed at the World Championships). The criteria for classifying competitive level varied. Some studies cited years in sport, whereas others noted the league/competition that athletes participated in. Performance rankings and recent competitive results were also used to classify participants. In some cases, the criteria for classifying participants were ambiguous, with descriptive words such as “elite” being used but not fully explained.

3.4. Research designs

Fifty-two of the 63 reviewed studies (82.5%) were quantitative, nine were qualitative (14.3%), and two were mixed-methods (3.2%). Fifty-one studies used questionnaires, two of which were supplemented with interviews. Additionally, four supplemented their inventories with physiological parameters: three accounted for objective performance, and one incorporated a training log. Although all 51 studies used at least one previously validated questionnaire, 20 studies also administered questionnaires based on adapted or modified prior versions (e.g., tailored to a particular sport, items removed). The Sport Motivation Scale (original or adapted) and Perceived Motivational Climate in Sport Questionnaire (versions I, II and/or adapted) were used in 17 (27.0%) and 10 (15.9%) studies, respectively. The full list of included questionnaires is in [Supplementary Tables 1–7](#) and readers are directed to [Mayer, Faber, and Xu \(2007\)](#) for a descriptive analysis of motivation measures. In addition to the two aforementioned mixed-methods studies, nine studies conducted interviews, one of which also included focus groups. Three studies that contained coaches as participants were qualitative; the other coach-based study was quantitative. Three studies were intervention-based: the first involved investigated the effects of a video-based motivational intervention on key performance indicators ([Cook & Crewther, 2012](#)); the second examined the relationship between resistance training, testosterone/cortisol concentrations and subsequent

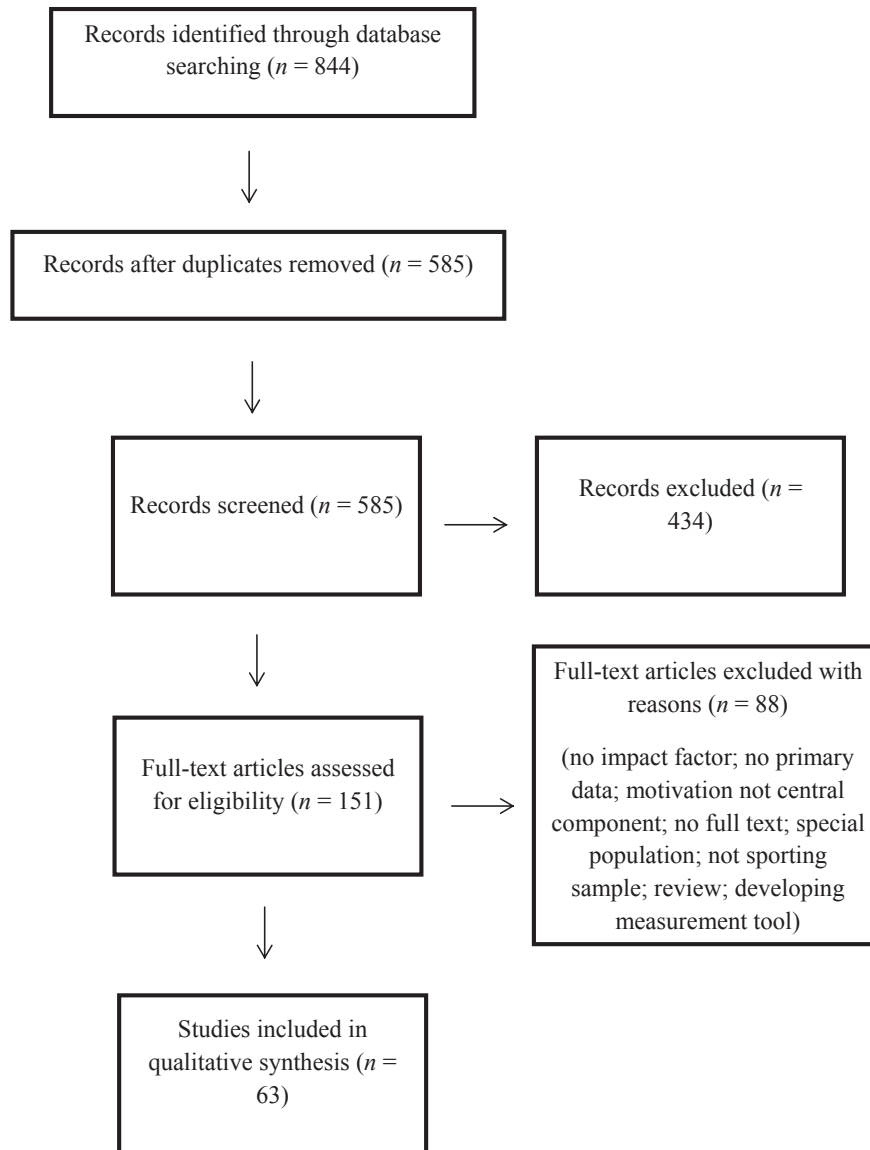


Fig. 1. Flow diagram representing process of inclusion and exclusion of papers.

Table 1
Number of included studies per five-year range.

Years	Number of studies
1995–1999	7
2000–2004	6
2005–2009	16
2010–2014	26
2015	8

motivation (Cook, Crewther, & Kilduff, 2013); the third explored the effects of an imagery training programme on pre-performance symptoms (Mellalieu, Hanton, & Thomas, 2009).

Fifty-one studies (81.0%) used a cross-sectional design. The remaining 12 (19.0%) were longitudinal. The three intervention-based studies were longitudinal and ranged from 25 days to 20 weeks. One qualitative study was longitudinal, as it involved the participant completing three interviews, though the time between each was unspecified. Six of the quantitative studies that were longitudinal used two measurement time points, the shortest

across a single week and the longest across an unspecified athletic season. Cresswell and Eklund (2005a) administered their questionnaires three times over 12 weeks. Lemyre, Treasure, and Roberts (2006) ran their investigation over 20–28 weeks, with affect measured weekly, motivation assessed every three weeks, and burnout quantified at the end of the study period.

3.5. Analytical strategies

The diverse research questions of the 63 studies make it difficult to summarise analytical strategies in particular groups. As such and similar to the brief mention of questionnaires in *Research Designs*, readers are directed to [Supplementary Tables 1–7](#) for a full list of analytical strategies used in the reviewed studies. The nine qualitative studies used different approaches for data analysis. Five studies explicitly labelled their approach (e.g., collaborative thematic content analysis, hierarchical content analysis), while the other four described their approach. In terms of the qualitative component of the two mixed-methods studies, one used principal component analysis and the other simply described their approach.

Descriptive analyses were provided for each of the 52 quantitative studies, and all but one of these (the imagery-training intervention) provided further analyses. Of the two mixed-methods studies, one relied only on descriptive analyses for the quantitative component. Twelve studies used structural equation modelling (SEM; one of which was variance-based), accounting for 23.1% of the quantitative studies. All but one of these studies was conducted between 2005 and 2015. One also used mediation analysis to test whether certain variables mediated the relationship between motivation and rehabilitation intentions. Hierarchical (multilevel/mixed) linear modelling was used in three studies, and multiple mediation modelling and linear mixed modelling were used in two other studies. Four studies employed cluster analysis, which is considered a person-centred approach as it groups participants based on similarities. Each of these studies also conducted (multivariate) analyses of variance, while one incorporated discriminant analysis as well. Discriminant analysis was used in relation to motivational type, scholarship status, and gender in another study. Nineteen studies used some form of regression analysis (e.g., multiple, multivariate), 15 studies incorporated correlation analysis, and four used canonical correlation analysis. Other statistical tests that were employed include MANOVA (13), ANOVA (6), MANCOVA (1), and ANCOVA (1). Lastly, seven studies used t-tests, two used chi-square analyses, three calculated effect sizes, and one used relative risk.

3.6. Topics

The current section serves to briefly overview the topics that are studied alongside motivation when competitive adult athletes are the population under investigation. Motivation can be the central component of a piece of research or it can be examined relative to other factors. Consideration of the motivational climate has become more widespread in recent years, as there is a greater appreciation of the influence of social agents on behaviour (Keegan, Harwood, Spray, & Lavallee, 2014). Likewise, studies on burnout have emerged because motivational theory has been recognised as a useful approach for studying this maladaptive response (Cresswell & Eklund, 2005a). Doping, perfectionism, injury, and several other factors have also appeared in the motivation literature. This section is structured into seven themes, depending on what was the central component of the study in question, and is presented as an overview, rather than an exhaustive account of each topic. Readers are directed to Lindahl (2012, p. 1) for the “intellectual structure” of motivation research in sport and exercise psychology.

3.7. Motivation

Eighteen studies (28.6%; 3049 participants) had motivation as their central component (see Table 2 for a brief methodological summary, and Supplementary Table 1 for full details).

Although there were motivational differences according to competitive level, the findings were somewhat mixed. Intercollegiate athletes report higher levels of self-determined motivation compared to intramural athletes (Fortier, Vallerand, Briere, & Provencher, 1995), and elite athletes report higher motivation and commitment than non-elites (Halldorsson, Helgason, &

Thorlindsson, 2012). Similarly, Mallett and Hanrahan (2004) reported that Olympic and World Championship level athletes exhibit self-determined forms of motivation, and are achievement oriented, highly driven, and self-believing. Conversely, many successful elite athletes are characterised by non-self-determined forms of motivation and ego orientations, which are related to performance decrements (Gillet et al., 2013) and unhealthy competitive/training/eating behaviours (Krane, Greenleaf, & Snow, 1997). Other evidence suggests that championship teams display both higher intrinsic and extrinsic motivation than less successful teams, regardless of academic year or starter status (Blegen, Stenson, Micek, & Matthews, 2012). For example, winning affords an opportunity to accomplish something new and earn a trophy, satisfying intrinsic and extrinsic motives, respectively (Blegen et al., 2012).

In addition to competitive level being associated with motivation, differences exist based on gender, sport type, context, age, and scholarship status. For example, though mixed findings have been reported regarding sex-related differences (Amorose & Horn, 2000), women tend to report more intrinsic motivation than men (Chantal, Guay, Dobrev-Martinova, & Vallerand, 1996; Fortier et al., 1995; Kingston, Horrocks, & Hanton, 2006). Sport type is also an important consideration. The interplay between motivational responses (effort, enjoyment and anxiety) and autonomy support differs in team and individual sports, with, for example, interest in input being positively associated with anxiety in individual sports (van de Pol, Kavussanu, & Kompier, 2015). Kerr and Mackenzie (2012) found that adventure sport enthusiasts cite a range of motives for participation, including goal achievement, risk taking, escape from boredom, overcoming fear, and connecting with nature. Moreover, pleasure/fun, challenge/competition, and improvement of health can be motivational factors, particularly for older athletes (de Franco Tobar, Meurer, & Benedetti, 2013). In terms of context, perceived praise is positively associated with enjoyment in training but not competition (van de Pol et al., 2015). Scholarship status was a discriminating factor in studies that considered the motivation of intercollegiate athletes in the United States. Again, however, the findings were mixed: some have reported that scholarship athletes have less self-determined motivational profiles than non-scholarship athletes (Kingston et al., 2006), others have claimed the opposite (Amorose & Horn, 2000), and a third group has reported no difference (Amorose & Horn, 2001).

Six studies evaluated the coach's association with motivation, but motivational climate was not the central component of the study (see *Motivational Climate* below). Athletes' intrinsic motivation is associated with the perception that their coaches emphasise training and instruction, provide positive and information-based feedback, and limit autocratic behaviour and social support (Amorose & Horn, 2000, 2001). Coach autonomy support positively relates to athletes' contextual motivation, which promotes interest and undermines dropout intentions (Gillet, Berjot, Vallerand, & Amoura, 2012), while also being related to situational motivation and performance (Gillet, Vallerand, Amoura, & Baldes, 2010). Certain coaching actions (e.g., providing clear instruction and being supportive of decisions) is related to athletes' self-determined motivation by satisfying their basic needs, which reinforces

Table 2
Brief methodological summary of studies on motivation.

Average sample size	Research designs				Most common analytical strategies
	Cross-sectional	Longitudinal	Quantitative	Qualitative	
169	15	3	13	5	MANOVA (3), SEM (3)

adaptive behaviours (Hollembeak & Amorose, 2005; Pope & Wilson, 2012). Similarly, Buning and Thompson (2015) found an association between direct coach-to-athlete communication and athlete motivation.

3.8. Motivational climate

Motivational climate was the focus of eight studies (12.7%; see Table 3 for a brief methodological summary, and Supplementary Table 2 for full details), accounting for 764 participants (762 athletes and two coaches) across a range of sports and ability levels (recreational to Olympian).

In brief, the motivational climate can be characterised as task involving or ego involving (Keegan et al., 2014). A task involving (mastery) climate is generally viewed as advantageous: it fosters adaptive learning strategies; self-referenced criteria are used to determine satisfaction; sport is seen as a means of developing lifetime skills (Ommundsen, Roberts, & Kavussanu, 1998). A task involving climate is also associated with the development of task and social cohesion (Boyd, Kim, Ensari, & Yin, 2014), and positively relates to basic need satisfaction (Reinboth & Duda, 2006). Although an ego oriented (performance) climate is associated with avoidance of challenging tasks, use of normative-based standards, and seeking achievement with little effort (Ames, 1992), it may not be maladaptive when accompanied by mastery oriented situational cues (Ommundsen & Roberts, 1999). In isolation, Heuzé, Sarrazin, Masiero, Raimbault, and Thomas (2006) found that ego involving climates are negatively associated with task and social cohesion within teams. Coaches (instruction, leadership, motivation), peers (support, collaboration/competition, motivation) and parents are key social agents that influence elite athletes, though parents are somewhat limited to emotional and moral supporters (Keegan et al., 2014). The coach is seen as the primary architect of the motivational climate (Pensgaard & Roberts, 2002), and engages in autonomy supportive and emotionally intelligent coaching, and transformational leadership at World Championship level (Hodge, Henry, & Smith, 2014). Readers are directed to Harwood, Keegan, Smith, and Raine (2015) for extensive detail regarding the intrapersonal correlates of motivational climate perceptions.

3.9. Burnout

Of the eight studies that focused on burnout (12.7%; 1830 participants), one accounted for athletes' training load (Lemyre et al., 2006), and the majority of participants were high performing athletes (see Table 4 for a brief methodological summary, and Supplementary Table 3 for full details).

Prolonged physiological and/or psychological exertion with inadequate recovery can lead to burnout and its associated symptoms: chronic fatigue; disturbed sleep patterns; depression; helplessness; reduced sense of accomplishment; and/or, devaluation of sport (Cresswell & Eklund, 2005a; Gould & Dieffenbach, 2002; Lemyre et al., 2006). Evidence supports a relationship between athlete motivation and burnout (Cresswell & Eklund, 2005a, 2005b, 2005c; Holmberg & Sheridan, 2013), with positive and negative associations between burnout, and amotivation and intrinsic motivation, respectively (Cresswell & Eklund, 2005a, 2005b, 2005c; Holmberg & Sheridan, 2013; Lemyre, Roberts, & Stray-Gundersen, 2007; Lemyre et al., 2006; Lonsdale & Hodge, 2011). Affect (Lemyre et al., 2006) and overtraining (Lemyre et al., 2007) are also linked to burnout in elite athletes. According to DeFreese and Smith (2013), perceived teammate support is an important correlate of self-determined motivation and, therefore, burnout. Other factors related to burnout include team membership, number of injuries, and win/loss history (Cresswell & Eklund, 2005a). The above evidence indicates that burnout is a maladaptive response to training that is often associated with motivation.

3.10. Doping/substance use

Doping/substance use was addressed in six studies (9.5%), accounting for 2552 participants (see Table 5 for a brief methodological summary, and Supplementary Table 4 for full details).

A task involving motivational climate is related to anti-doping attitudes among elite athletes (Allen, Taylor, Dimeo, Dixon, & Robinson, 2015). Similarly, intrinsically motivated and mastery oriented athletes report lower scores for both past drug use and future intentions to use drugs (Barkoukis, Lazuras, Tsozbatzoudis, & Rodafinos, 2011). Following from this, a controlling coach created climate, controlled motivation, and moral disengagement are

Table 3
Brief methodological summary of studies on motivational climate.

Average sample size	Research designs				Most common analytical strategies
	Cross-sectional	Longitudinal	Quantitative	Qualitative	
96	6	2	5 (+1 mixed method)	2 (+1 mixed method)	Correlational analysis (2), regression analysis (2), content analysis (2)

Table 4
Brief methodological summary of studies on burnout.

Average sample size	Research designs				Most common analytical strategies
	Cross-sectional	Longitudinal	Quantitative	Qualitative	
229	5	3	8	0	Correlational analysis (4), regression analysis (4)

Table 5
Brief methodological summary of studies on doping/substance use.

Average sample size	Research designs				Most common analytical strategies
	Cross-sectional	Longitudinal	Quantitative	Qualitative	
425	6	0	6	0	Regression analysis (3), ANOVA (2)

positively associated with doping attitudes and susceptibility (Hodge, Hargreaves, Gerrard, & Lonsdale, 2013). Barkoukis, Lazuras, Tsorbatzoudis, and Rodafinos (2013) found that attitudes, norms, and self-efficacy can mediate the relationship between achievement goal and moral orientations, and doping intentions. Two additional studies dealt with alcohol consumption among collegiate athletes in the USA, revealing that competitiveness, win orientation, and goal orientation are significantly associated with alcohol use (Weaver et al., 2013), and that extrinsically motivated athletes report greater alcohol use than their intrinsically motivated counterparts (Rockafellow & Saules, 2006). These results are consistent with previous findings that extrinsic motivation may promote maladaptive behaviours.

3.11. Perfectionism

Four studies (6.3%; 941 participants) focused on perfectionism (see Table 6 for a brief methodological summary, and Supplementary Table 5 for full details).

There are two facets to perfectionism, namely perfectionistic strivings and negative reactions to imperfection (Stoeber & Becker, 2008). Perfectionistic strivings, which are fostered by a task involving motivational climate (Greblo, Barić, & Erpić, 2015), are associated with adaptive motivational orientations and self-serving attributions, which may lead to improved performance (Stoeber & Becker, 2008). Motivation can also act as a mediator between perfectionism and coping (Gaudreau & Antl, 2008). Negative reactions to imperfection, however, can also be adaptive if such reactions are controlled. At the elite level, Gaudreau and Antl (2008) identified three categories of athletes: adaptive perfectionists; maladaptive perfectionists; and, non-perfectionists. Adaptive perfectionists score higher on mastery approach goals and lower on fear of failure than others (Gucciardi, Mahoney, Jalleh, Donovan, & Parkes, 2012). These findings suggest that perfectionism and motivation are linked, with motivation being an outcome and/or occupying a mediating role with another variable.

3.12. Injury

Injury was central to three studies in the review (4.8%; 715 participants; see Table 7 for a brief methodological summary, and

Supplementary Table 6 for full details).

Injured athletes who exhibit self-determined forms of motivation are more autonomously motivated to engage in their rehabilitation programmes (Chan & Hagger, 2012; Chan, Hagger, & Spray, 2011). Those who are intrinsically motivated to return to sport have a renewed perspective on participation, whereas those with extrinsic motives experience worry and concern (Podlog & Eklund, 2005). It is evident that self-determined motivation is associated with adaptive rehabilitation behaviours.

3.13. Other

The 16 remaining studies (see Table 8 for a brief methodological summary, and Supplementary Table 7 for full details) investigated some aspect of motivation in relation to stress/distress and well-being (Lundqvist & Raglin, 2014; Pensgaard & Roberts, 2000), self-handicapping (Kuczka & Treasure, 2005), an intervention (Cook & Crewther, 2012; Mellalieu et al., 2009), antisocial/prosocial behaviour (Hodge & Gucciardi, 2015), narcissism (Roberts, Woodman, Lofthouse, & Williams, 2015), music (Laukka & Quick, 2013), hormonal concentrations (Cook et al., 2013), exercise dependence (Hamer & Vlachopoulos, 2002), coping (Ntoumanis, Biddle, & Haddock, 1999), gambling (Curry & Jiobu, 1995), and social behaviour (Hodge & Gucciardi, 2015). Furthermore, three studies examined the motivation of coaches (Alcaraz, Viladrich, Torregrosa, Ramis, & Gillham, 2015; Leidl, 2009; McLean & Mallett, 2012). In total, 2704 participants were assessed across a range of sports and abilities. This section underscores the diverse topics studied alongside motivation, reinforcing that this construct is important for behaviours beyond training and performance.

4. Discussion

This review set out to analyse trends in theoretical frameworks, sample characteristics, research designs, and analytical strategies, and identify topics in research on competitive sport motivation. By executing a specific search and adhering to focused inclusion criteria, 63 studies were assembled and synthesised to meet these aims. The results indicated that the study area has grown steadily. Men and women in various sports and at different competitive levels have been investigated. Quantitative and qualitative methods

Table 6
Brief methodological summary of studies on perfectionism.

Average sample size	Research designs				Most common analytical strategy
	Cross-sectional	Longitudinal	Quantitative	Qualitative	
235	4	0	4	0	Correlational analysis (2)

Table 7
Brief methodological summary of studies on injury.

Average sample size	Research designs				Most common analytical strategy
	Cross-sectional	Longitudinal	Quantitative	Qualitative	
200	3	0	3	0	SEM (2)

Table 8
Brief methodological summary of studies on other topics.

Average sample size	Research designs				Most common analytical strategies
	Cross-sectional	Longitudinal	Quantitative	Qualitative	
169	12	4	13 (+1 mixed method)	2 (+1 mixed method)	Correlational analysis (6), regression analysis (6), T-test (4)

have been employed, as well as a mix of cross-sectional and longitudinal designs. There has also been a wide range of topics studied alongside motivation.

Regarding sample characteristics, there appeared to be *gender imbalance* in the reviewed studies. Men outnumbered women by 1,660, and there were twice as many men-only studies as women-only studies. As there are reported motivational differences between men and women (Amorose & Horn, 2000; Chantal et al., 1996; Fortier et al., 1995; Kingston et al., 2006), more equal gender representation would be informative. The review also indicated that most research on competitive sport motivation is conducted on participants from Europe, North America, and Australasia. Two studies contained Asian participants, while South America and Asia were represented by 11 participants and one participant, respectively, in one of the studies with a multi-national sample. Selecting samples from non-Western countries would reveal if and how sport systems, structures, and societal cultures impact the motivation of competitive athletes.

Specifying competitive level in the search terms produced a range of levels in the results. Lower *competitive levels* were under-represented, with 50.8% of studies classifying participants as high-level. Expert performers pursue their physical and psychological limits in an effort to excel in ever-changing, stressful environments (Williams & Ericsson, 2005). Therefore, knowledge of the development of expertise can enrich understanding by indicating what factors are important for effective practice, learning, and growth. It is this “strength-based approach” that MacIntyre, Moran, Collet, and Guillot (2013, p. 1) advocate. In many of the reviewed studies, however, the description of the athletes' performance level was vague, meaning there may have been a degree of misrepresentation. Swann, Moran, and Piggott (2015) highlighted the importance of standardising performance levels when conducting sport research. In the future, researchers could consider adopting the model of Swann et al. (2015) to classify expert samples, which would decrease the ambiguity that sometimes surrounds sample characteristics. As an additional note on high-level athletes, they are usually more vulnerable to the maladaptive behaviours that manifest in extreme athletic environments. Specifically, this review has shown that burnout (Cresswell & Eklund, 2005a), disordered eating (Krane et al., 1997), and distress (Pensgaard & Roberts, 2000), among other outcomes, often accompany elite performance. This, coupled with elite athletes' need to regulate motivation so they can optimally perform, makes them ideal participants for research on competitive sport motivation.

In terms of methodology and research design, the majority of researchers have employed *quantitative, cross-sectional methods*. Questionnaires are the predominant data collection method, possibly due to ease of administration. This is consistent with a 10-year review by Culver, Gilbert, and Sparkes (2012), which found that 71% of studies in three North American sport psychology journals used quantitative data collection techniques, with psychometric tests and surveys being most prevalent. In the current review, the majority of investigators used well-established questionnaires (e.g., Sport Motivation Scale) but a few developed their own measurement tools. As such, there is a need for these to be validated among other samples. Interviews can provide depth and comprehensiveness of information but were infrequently conducted by researchers. Similarly, the 63 studies contained only two case studies. Case studies, which examine a particular person/group in a real-life context, can provide even greater depth than interviews through their use of multiple perspectives and sources. The scarcity of qualitative methods indicates that employing such an approach could fill a gap in the literature and potentially provide further insights into sport motivation. Innovative methodologies that could further illuminate the construct of motivation could

employ behavioural or physiological data. As an example, Cook et al. (2013) used athlete's freely chosen workload as a proxy for their training motivation, which they found to be correlated with salivary free testosterone concentration. Rather than relying on traditional questionnaires or interviews, elements of behaviour and physiology were measured in this case. The potential role of hormones such as dopamine (Roelands, Koning, Foster, Hettinga, & Meeusen, 2013) and thyroid hormone (Puthucherry et al., 2011) in motivated behaviour could be another avenue for researchers to explore in this area.

Almost 20 years ago, Ntoumanis and Biddle (1999) claimed that there was a *paucity of longitudinal research* on sport and exercise motivation. This review reveals that little has changed in the last two decades, as approximately one-fifth of the included studies adopted such a design. As Gagné et al. (2003) pointed out, athletes' ongoing sporting experiences change daily. Likewise, motivational processes are dynamic and, thus, unfold differently over time (Stenling, Lindwall, & Hassmén, 2015). Clearly, a cross-sectional design is, therefore, restricted in what it can reveal. To illustrate, although one motivational climate usually exists within a team, there may be variations that dominate at particular times during the year (Ntoumanis & Biddle, 1999), perhaps due to the competitive calendar and/or training periodisation. As is the case with psychological factors, physiological variables can act as antecedents to motivational changes (Lemyre et al., 2006) and shift over time. The literature shows that the opposite pathway also exists, resulting in positive outcomes (e.g., improved performance, Gillet et al., 2013) or negative outcomes (e.g., burnout, Lemyre et al., 2006). In each case, time is required for the outcome to become apparent, necessitating the use of a longitudinal research design. Another limitation of cross-sectional designs is that they cannot address causality because they do not allow temporal relationships to be determined, and merely provide a snapshot of a given population at a particular moment in time. Notably, the extent to which researchers collect data during longitudinal studies varies, as does the total length of such studies. This review produced six studies that took measurements at two time points and two studies that included additional measures. Those that include only baseline and follow-up measures are less informative than those that also collect intermediate data. Including more time points and extending the length of the research would allow the shape of trajectories to be examined (Stenling et al., 2015), which is particularly important for a dynamic construct such as motivation.

The *diversity of analytical strategies* in the current review underscores that different approaches are needed depending on the research question. Most studies outlined and justified their data analyses by discussing them in a designated section (e.g., Data Analysis, Procedure). Given the multidimensional and unobservable nature of motivation, structural equation modelling was adopted by almost one-quarter of the quantitative studies, predominantly between 2005 and 2015. In brief, structural equation modelling allows a researcher to specify and test numerous competing models that illustrate the relationships between observed and latent variables (e.g., training load and motivation). This finding regarding structural equation modelling reflects its increasing popularity among motivation research in sport and exercise psychology (Lindahl et al., 2015). Multilevel modelling is another strategy recommended for sport research (Ntoumanis, 2014; Peugh, 2010), in that it allows person-level variables (e.g., intrinsic motivation, injury status) to be examined within higher levels (e.g., team, league, national governing body). That is, it accommodates hierarchically-structured data (e.g., Elferink-Gemser, Visscher, Van Duijn, & Lemmink, 2006), which is common and informative among athletic populations, and affords numerous advantages to the researcher, such as the separation of within- and

between-level variance, and the inclusion of unequal measurements (or unequal spacing of measurements) between athletes. Overall, modelling analyses are useful for research on multidimensional constructs such as motivation, as they can account for numerous contributing variables.

The multidimensional nature of motivation necessitates that researchers view it through a *holistic lens* and at *multiple levels*. As such, most studies on competitive sport motivation investigate motivation in relation to other factors (e.g., motivation, scholarship status and gender). The current study demonstrates that motivational climate, burnout, doping/substance use, perfectionism, injury, and a small number of other topics have been studied alongside competitive sport motivation in the last 20 years, usually at the person-level. Still, there are likely other relevant topics to be investigated. For example, more self-determined forms of motivation are associated with positive affect and better mental health (Deci & Ryan, 2000), suggesting that mental health measures could be a useful addition to research on competitive sport motivation. Likewise, consideration of physiological measures could be informative in sport psychology studies in general. For example, Smith, Marcora, and Coutts (2015) incorporated physiological and psychological (e.g., motivation) measures in their study on mental fatigue and endurance performance. Motivation-based studies, however, do not often include physiological measures (as mentioned above). The current review only produced four studies (6.9%) that account for physical training and/or performance. The work of Lemyre et al. (2006) stands alone in its inclusion of training load, with the remaining three studies providing a score for objective performance. Considering the high number of training sessions relative to competitive events for athletes, training load measurement could contribute to studies on competitive sport motivation, particularly considering its influence on certain maladaptive behaviours that are linked to motivation (Lemyre et al., 2006). According to Lemyre et al. (2006) training load can enhance motivation at one point and undermine it at another point by influencing an athlete's affect state, again reinforcing the utility of a longitudinal research design. Investigating more *types* of variables at more levels (e.g., team) that potentially contribute to an athlete's motivation could certainly be a promising avenue for future research, and could be facilitated by the analytical strategies mentioned above.

Several *practical implications* emerged from the present review, though they are not supported with empirical evidence. The findings indicate that self-determined forms of motivation are usually typical of successful athletes, and are associated with adaptive behaviours. Practitioners could, therefore, educate athletes regarding the dynamic nature of motivation so that they better understand the forces that drive them. For athletes who prioritise extrinsic motives, practitioners may need to provide coaches, parents, and other stakeholders with knowledge of the motivational climate, with the intention of fostering a task involving climate. As coaches can strongly influence athletes' motivation, programmes that train coaches to engage in autonomy-supportive and instructional behaviours with an emphasis on direct communication could benefit athletes. Two coach-based interventions have reported promising findings in this regard among youth Gaelic football players (Langan, Lonsdale, Blake, & Toner, 2015) and Paralympic athletes (Cheon, Reeve, Lee, & Lee, 2015). In addition to targeting coaches, early-season meetings or information packets for relevant stakeholders or service-providers (e.g., nutritionist) could also increase their awareness of their role in fostering adaptive motivational patterns for athletes. As there is a relationship between motivation and burnout, those who oversee athletes may need to pay special attention to amotivated and/or isolated individuals. The findings of the current review suggest that such steps could have a

positive influence on motivation and, consequently, many factors beyond actual performance, such as doping intentions, perfectionistic behaviour, and attitude towards injury.

The lack of empirical evidence in the area of adult competitive sport motivation may be attributable to the fact that stakeholders may not be as open-minded or holistic as such an approach assumes, and may prefer interventions that directly impact performance, rather than an unobservable variable that precedes performance. With that said, a recent meta-analysis found that psychological and psychosocial interventions have a positive moderate effect on sport performance (Brown & Fletcher, 2016), though there is currently little evidence for motivation-based interventions. For many, perhaps the time it could take to educate an athlete regarding their motives would be better spent engaging in mental skills training, which has been shown to have a quick and positive influence on athletic performance (e.g., Thelwell & Greenlees, 2003). Another consideration is that many of the implications above rely on parents and coaches and, therefore, cannot be independently executed by the athlete. Thus, they may require more time and resources than deemed necessary. Overall, the practical suggestions have a foundation in the literature but could be markedly strengthened by much-needed empirical studies.

5. Conclusions

Although there has been a plethora of studies over the last 20 years, this review stresses the importance of furthering competitive sport motivation research. The 63 reviewed studies have revealed trends in theoretical frameworks, sample characteristics, research designs, analytical strategies, and topics, which have also indicated several future research directions. Studying high-level performers may provide insights for other athletes, but detail and transparency is needed when classifying their competitive level. Quantitative data collection techniques are widespread, suggesting that qualitative methods (e.g., interviews, focus groups) could provide unique insights in the area. The use of behavioural or physiological data could be informative as well. Reliance on cross-sectional designs has somewhat limited findings to date, perhaps paving the way for longitudinal investigations. The evidence further suggests that there is a need to prioritise interventions in order to get a better understanding of causal relationships. The increased adoption of structural equation modelling reinforces its utility for studying a latent variable such as motivation. Multilevel modelling is another analytical strategy that is currently underused but promising. It is clear that motivation is not a fixed trait but rather a dynamic construct that influences and is influenced by numerous factors. In addition to studying psychological variables, future researchers could account for other person-level variables (e.g., affect, training load), and higher-level variables (e.g., support from national governing body) in an effort to better elucidate motivation, and potentially provide practical guidance for promoting athlete well-being. Similar to the way in which research in sport psychology has been informed by other disciplines, new insights into motivation obtained from athletes may be valuable beyond the playing field. For example, a comprehensive understanding of motivational inputs (such as the peer created motivational climate) could be transferable to the health sector, perhaps in improving adherence to a particular medical regimen. Motivational research is broadly applicable and can serve two important functions regardless of domain: to advance academic knowledge and provide practical implications.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.psychsport.2016.09.003>.

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