Accepted author manuscript version reprinted, by permission, from I*nternational Sport Coaching Journal*, 2019, 6 (1): 74-87, https://doi.org/10.1123/iscj.2017-0091. © Human Kinetics, Inc.

An examination of the coach-created talent development motivational climate in Canoe Slalom in the United Kingdom.

Stephen Macdonald, British Canoeing, Scotland

Justine Allen, University of Stirling, Scotland

Date of submission: 1st November, 2017

Date of revision: 17th April, 2018

Date of 2nd revision: 20th September, 2018

Corresponding Author and contact details:

Justine Allen
Email: justine.allen@stir.ac.uk
Address:
Faculty of Health Sciences and Sport,
Pathfoot Building
University of Stirling,
Stirling,
FK9 4LA
United Kingdom

Abstract

This study examined the coach-created talent development motivational climate in Canoe Slalom in the United Kingdom using achievement goal theory, self-determination theory and transformational leadership. The participants were six (five male, one female) full-time Canoe Slalom talent development coaches and twenty-four athletes (13 male, 11 female). A multidimensional, mixed methods approach examined participants' perceptions of the motivational climate, transformational leadership behaviours, coaching practices, and coaching philosophies. Data were collected through questionnaires, interviews, and systematic observation. A summary of the coaching climate, practices, and philosophy was developed for each coach based on the perspectives of the athletes, coach, and observer. These were then compared and commonalities and differences amongst the coach-created climates were identified. The coaches created a motivationally adaptive (structured, relatedness supportive, individually-focused, task-involved) talent development motivational climate. However, the coaches varied in the extent to which the climate was autonomy supportive and intellectually stimulating. Analysis of the coaching climates using Nelson and Colquhoun's (2013) learning continuums revealed two distinct forms of climate: behaviourist/structure and humanistic/agency. The implications for talent development and key stakeholders are discussed.

Key words: talent development environment, interpersonal coaching behaviours, learning theory

Introduction

In sport, many factors need to come together in the life of an aspiring athlete to facilitate successful transition to elite levels of performance (Côté, Lidor & Hackfort 2009). These factors are wide ranging (e.g., innate, behavioural, psychological, sport culture) (Coutinho, Mesquita & Fonseca, 2016; Mills, Butt, Maynard, & Harwood, 2012), however, the importance of the talent development environment (TDE) and the coach's central influence within it, have been consistently documented (e.g., Henriksen, Stambulova, & Roessler, 2011; International Council for Coaching Excellence (ICCE), 2013; Mills, Butt, Maynard, & Harwood, 2014a; Martindale, Collins, & Daubney, 2005). To date, examinations of the characteristics of TDEs have been holistic and largely descriptive (Henriksen, Stambulova, & Roessler, 2010a). An approach with potential to provide a theoretically based in-depth exploration of, at least the central feature of TDEs (i.e., coach-athlete interactions), is the coach-created motivational climate. In addition, some researchers (e.g., Allen & Hodge, 2006; Duda 2013; Mallett & Hanrahan, 2004; Morgan, 2017; Vella & Perlman, 2014) have brought together multiple theories to understand the coach-created environment. Therefore, the purpose of this study was to adopt a multidimensional view to examine the coach-created talent development motivational climate in Canoe Slalom in the United Kingdom (UK).

A wide range of potential factors that affect talent development have been identified through research and demonstrate the complex and multidimensional nature of the TDEs (e.g., Coutinho, et al., 2016; Henriksen, et al., 2010a; 2010b; 2011; Martindale, Collins, & Abraham, 2007; Mills et al., 2014a). Factors include a long-term vision, coherent messages, clear expectations, winning in perspective relative to development, encouraging self-responsibility and autonomy, and an individualised approach to development and support (Martindale et al., 2007; Martindale, Collins, Douglas, & Whike, 2012). They can also include preconditions (e.g., coaching resources, financial, material), processes (e.g., training,

social events), individual developments and achievements (e.g., physical, psychological skills), and organisational culture (e.g., cultural stories, espoused values, basic assumptions). These factors can affect talent development at the macro level (e.g., wider culture, media, education systems, sports federations) and micro level (e.g., immediate coaching environment) (Henriksen et al., 2010a).

An example of research in this area is two separate studies in which Mills et al. (2014a; 2014b) explored athletes' and coaches' perspectives of the TDE of football academies. Their findings were largely consistent with existing research on factors important to the TDE. Unfortunately, a direct comparison between the coaches' and athletes' perspectives is limited because it is not clear whether the two studies were reporting on the same TDEs. Therefore, to provide an in-depth understanding of the TDE it will be useful to examine multiple perspectives (e.g., athletes, coaches) of the same TDE (Coutinho, et al., 2016). In addition, existing research does not indicate which specific factors are responsible for success or how they are implemented (Henriksen, et al., 2010a). The central position given to communication and interactions between coach and athlete, suggests that examining what coaches do and why and how this is perceived by athletes will enhance understanding of this critical micro layer of the TDE (Coutinho, et al., 2016).

The concept of the motivational climate has much to offer examinations of TDEs, in particular, with regard to the interactions between coaches and athletes at the micro level. Through their actions, and non-actions, coaches convey information about what athletes should consider as important in that particular context, thereby creating the motivational climate (Ames, 1992). Furthermore, this coach-created social context influences participants' experiences of sport (Mageau & Vallerand, 2003). The motivational climate has been examined in youth (e.g., Smith, Smoll, & Cumming, 2007) and elite sport contexts (e.g., Pensgaard & Roberts, 2002; Lara-Bercial & Mallett, 2016), however, little is known about

the coach-created talent development motivational climate. During the development phase in athletes' careers tension may arise between performance development (long term self-referenced 'successes') and performance outcomes (immediate 'normative successes' for selection purposes) and the 'messages' about what is important and valued (motivational climate) may become confused or even conflicted. Therefore, an examination of the coach-created motivational climate and behaviours that shape it in TDEs can provide valuable insight into the features of 'productive' climates for athletes at this stage in their careers.

Two theories have been prominent in conceptualizing the motivational climate, achievement goal theory (AGT) (Nicholls, 1989) and self-determination theory (SDT) (Ryan & Deci, 2000) (for reviews see Gilchrist & Mallett, 2017; Harwood, Keegan, Smith, & Raine, 2015; Occhino, Mallett, Rynne, & Carlisle, 2014). AGT focuses on how ability is understood in a given context. According to AGT, a coach that emphasizes a self-referenced concept of ability through a focus on effort, learning, and individual improvement, is deemed to create a task-involving motivational climate. A coach that emphasizes judging one's ability by comparison to others and suggests that effort and mistakes are a sign of low ability, is deemed to create an ego-involving motivational climate. SDT, in particular the mini theories of cognitive evaluation theory, basic needs theory, and organismic integration theory, focuses on how the social context influences behavioural regulation (self-determined and non-self-determined motivation) through facilitating or thwarting the satisfaction of three basic psychological needs: autonomy, competence, and relatedness. According to SDT, a social context that supports need satisfaction is characterized by individuals in a position of authority (e.g., coaches) providing autonomy support, structure, and involvement, whereas a social context that thwarts need satisfaction is characterised by controlling actions and a lack of connection with participants (Mageau & Vallerand, 2003).

Mallett and Hanrahan (2004) employed multiple social cognitive theories of motivation, including AGT and SDT, to examine the motivational forces behind elite athletes' performance. They argued that future research should examine multiple theories of motivation to provide a comprehensive investigation of motivation and potential for conceptual convergence across models of motivation. Consistent with this multi-theories perspective, Allen and Hodge (2006) proposed the integration of AGT and SDT when considering how coaches create an optimal learning environment for athletes. Subsequently, Duda (2013) proposed a multidimensional, empowering and disempowering, view of the coach-created motivational climate. An empowering motivational climate is task involving, autonomy supportive, and supports relatedness. In contrast, a disempowering motivational climate is controlling, ego-involving, and thwarts relatedness.

Research from AGT and SDT perspectives separately, and the integrated perspective, generally demonstrates that the empowering dimensions are associated with desirable outcomes for participants such as superior performance, positive perceptions of competence and self-worth, self-determined motivation, adaptive practice and competition strategies, and positive affective states. In contrast, disempowering dimensions are associated with more motivationally maladaptive outcomes for participants such as attrition, extrinsic motivation, amotivation, maladaptive strategies, negative affect, and feelings of lower positive affect and autonomy (for reviews see Gilchrist & Mallett, 2017; Harwood, Keegan, Smith, & Raine, 2015; Occhino, Mallett, Rynne, & Carlisle, 2014). Research has typically employed large scale, self-report questionnaire-based methods with youth sport participants or tertiary education participant and more recently systematic observation in youth sports (e.g., Smith et al., 2016). One notable exception to this focus on youth sports and large-scale quantitative research is Mallett's (2005) qualitative case study of autonomy supportive coaching with elite performance athletes. Much less, however, is known about the motivational climate in TDEs,

147 including what coaches do that creates the motivational climate and why they behave as they
148 do. A closer examination of the motivational climate in TDEs is warranted because it is at
149 this time in athletes' development when competing agendas may arise (e.g., development vs.
150 performance), which could affect the motivational climate and ultimately the development of
151 athletes' talent.

152 Transformational leadership (TL) (Bass & Riggio, 2006), although not a theory, also
153 has potential to further our understanding of TDEs at the micro level. It has been connected
154 with the motivational climate (Stenling & Tafvelin, 2014; Vella & Perlman, 2014) and has
155 also been employed as the guiding framework for a continuing professional development
156 workshop for coaches with the aim of promoting positive youth development in sport
157 (Turnnidge & Côté, 2017). TL occurs when coaches influence athletes by focusing on their
158 goals and providing them with the confidence to extend their performance. In other words,
159 the coach engages in behaviours designed to empower, inspire and challenge athletes
160 (Callow, Smith, Hardy, Arthur, Hardy, 2009). TL behaviours emphasise a growth-oriented
161 process and promote autonomous action, which is similar to the support for autonomy and
162 structured development of competence in an empowering motivational climate (Stenling &
163 Tafvelin, 2014). The growth-oriented focus is also consistent with a mastery motivational
164 climate.

165 There are four main TL behaviours: idealized influence, inspirational motivation,
166 intellectual stimulation, individualized consideration. In addition, two further TL behaviours
167 have been identified as relevant to sport: high performance expectations, fostering group goal
168 acceptance; as well as one transactional behaviour: contingent reward (Callow et al, 2009).
169 TL behaviours have been associated with a range of desirable outcomes for participants
170 including improved performance but also basic needs satisfaction, well-being, life skills
171 development, group cohesion (Kirkpatrick & Locke 1996; Callow et al., 2009; Stenling &

Tafvelin, 2014). There are similarities among some TL behaviours and empowering/ disemepowering behaviours. For example, intellectual stimulation with its emphasis on encouraging athletes' cognitive engagement and decision making has clear parallels with autonomy supportive behaviours such as providing choice and opportunities to show initiative. However, other TL behaviours such as high expectation and role modelling are not as clearly part of the empowering/disempowering motivational climate dimensions. Furthermore, little is known about the extent to which coaches in TDEs engage in TL behaviours and how these behaviours contribute to the motivational climate. Therefore, examination of these behaviours as well as empowering/disempowering behaviours allows for a more complete examination of the coaching behaviours shaping the motivational climate in TDEs.

One other topic central to coaching and relevant to TDEs is athletes' learning. As Nelson and Colquhoun (2013) noted "the facilitation of athlete learning is arguably one of the few outcomes that all coaching practitioners desire, irrespective of the context in which they work" (p. 284). They argued, as have others (e.g., Cushion, 2010), that coaches' view of learning will influence how they go about their practice and, we argue, coach-athlete interactions and motivational climate. To better understand how coaches view learning, Nelson and Colquhoun suggested researchers consider perspectives of learning from psychology (i.e., behaviourism and humanism) and sociology (i.e., structure and agency).

Humanism assumes that an individual has unlimited potential for change and growth and as such is an optimistic philosophy. With a humanistic approach to athletes' learning coaches will facilitate athletes' commitment to the process of learning, support them to make responsible choices and encourage them to engage in an ongoing process of self-understanding (Nelson & Colquhoun, 2013). In a similar manner, empowering and transformational behaviours such as emphasizing self-referenced competence, acknowledging

athletes' perspectives, providing opportunities to make meaningful choices, complete individual tasks and intellectual stimulation also seek to facilitate participants' engagement rather than control it. Nelson and Colquhoun position a behaviourist approach at the opposite end to humanistic on a psychological view of learning continuum. A behaviourist view sees the athlete as being "like a complex machine, whose behaviour needs to be controlled and shaped by the coach" (p. 286). A coach with this view of learning is likely to seek to control athletes' learning, perhaps being overtly controlling and critical through feedback that emphasizes 'the correct' way to do things and reinforcing 'correct' performance through tangible rewards such as praise, reminiscent of a disempowering, transactional climate.

From sociology, are the structure and agency perspectives of learning. Structure draws from a functionalist position where individuals are programmed into the norms of the system. In this system, society (e.g., sport or TDE) has a defined framework of expectations that shape an individual's relations and governs their actions. This perspective leaves little room for individual control over one's own actions (Nelson & Colquhoun, 2013). The coach may be the architect of this structure in the TDE, setting expectations and defining goals, which shape the athletes' actions. The resulting climate is likely to be experienced as structured and controlling. In contrast, although influenced by the context in which we exist, we do make choices. Therefore, there is an element of agency in our actions (Nelson & Colquhoun, 2013). A coach who recognizes athletes' agency is likely to involve athletes more in the learning process, even encouraging them to 'take the lead' in the process. In this case the climate would be experienced more autonomy supportive and transformational.

In summary, the TDE is multidimensional and complex (Henriksen, et al., 2010a; 2010b, 2011). Not ignoring or discounting this complexity, we sought to provide greater depth to our understanding of the micro layer by adopting a multidimensional view of the motivational climate and consideration of coaches' perspectives on learning. Therefore, the

purpose of this study was to examine the coach-created talent development motivational climate in Canoe Slalom in the UK. Specifically, we examined what coaches convey about what is important in their talent development context (empowering/disempowering climate), what coaches do (coach-athlete interactions and leadership behaviours), and why they act as they do (intentions, philosophy, and perspectives on learning).

Method

Participants

Six coaches aged 28 to 59 years (M=40.7, SD=12.8) participated in this study. Each coach was employed in a full time role at one of the seven talent development centres in the UK. There were five different centres represented in the sample geographically they covered South Wales, England, and Scotland. This was a significant sample, representing two thirds of the full-time employed coaches working with talent development canoe slalom athletes in the UK at the time of the study (Trollope, 2015). In Canoe Slalom 'talent development' involves working with the junior athletes (under 18 years of age) who are progressing along a managed Home Nation or Regional pathway aiming to achieve selection to Great Britain Junior programmes. Five of the coaches were male and one was female. This is representative of the gender split of coaches in the sport as a whole (Trollope, 2015). To preserve the anonymity of all coaches they will be referred to as 'he' and each coach was given a male pseudonym. All the coaches were experienced coaches, coaching for 7 to 35 years, (M=14.3) and had spent a similar amount of time in the TDE in their current roles, 1 to 7 years, (M=3.5). All were former national age group or senior canoe slalom athletes. All six coaches had delivered 'results' within the talent development pathway and were considered 'productive', even successful, coaches within talent development in the sport. That is, they worked with athletes who had achieved the race results needed to graduate to the next stage(s) of the British Canoeing slalom athlete performance pathway.

Twenty four athletes participated in the study (11 female and 13 male). Athletes were in the age category J14-20 (14 to 20 years of age, M=16.2). The athletes were regularly coached by the participating coaches, between 2 and 10 sessions per week. Therefore, they knew the coaches well and were in a position to make comment on the coaching they received. With regard to the key stages in athlete development (e.g., sampling, specialising, investment, maintenance) (Côté, et al., 2009) these athletes were in late specialisation and early investment years. They were part of a structured British Canoeing development pathway in which there is a finite window of opportunity for athletes to progress to elite national squads (e.g., J18, U23, GB podium potential and GB podium).

Procedure

Ethical approval was granted by the authors' institution. The coaches were then contacted by email or phone using the first author's contacts within the sport. The purpose of the study and what was involved was explained. Each of the coaches approached agreed to take part in the study. The athletes of these coaches were then invited to participate in the study. All athletes agreed to take part in the study.

Data were collected during and after a training session 2 or 3 days before a significant competition (e.g., J18 (under 18 years of age) selection race or an important national race leading to promotion to Premier Division). This was deemed a critical time for the athletes because of the potential for performance and development outcomes to conflict and affect the TDE. Data collection was conducted by the first author, who was suitably experienced to understand the coaching interactions in a canoe slalom coaching session. He has spent the previous seven years coaching canoe slalom in a talent development context and holds the British Canoeing UKCC Level 4 coaching award. Additionally, he has 30 years coaching experience in paddlesports and 22 years as a coach educator within the sport. Due to his prolonged engagement in the context the first author was known informally to the coaches

and athletes who participated in the study, however, he did not work with or coach any of the participants. Immediately after the observed session, athletes completed the questionnaire. At a time convenient to the coach (within 24 hours of the observed session) the semi structured interview was conducted.

Data Collection

To provide a comprehensive understanding of the motivational climate created by the coach, data were collected from multiple sources (questionnaire, interview, observation) and from three perspectives (athlete, coach, observer) (Smith, 2010). A summary of the methods employed, their purpose, and data generated is presented in Table 1.

Systematic observation of coaching (observer's perspective):

The interactive and leadership behaviours the coaches employed and the motivational climate created during the training session were captured through video and audio recordings and field notes. The video was positioned on the bank (river or course) near the coach so that his/her actions were visible but so as to avoid impinging on the coach's or athletes' performance. The coach also wore a lapel microphone during the session.

Coaching interactions. Based on a review of the coaching behaviour literature (e.g., Cushion, 2010), a template of eight behaviours was created to record the time spent engaged in coaching interactions. Our focus was on the nature of the information exchange between the coach and athlete, in particular, the extent to which the coach was 'telling' the athlete what to do, how much discussion was taking place between coach and athlete, and the way in which questioning was being used by the coach (if at all). Rather than focus on the number of behaviours exhibited, which is common practice in systematic observations (e.g., Cushion, 2010), we calculated the percentage of time the coach devoted to each of the behaviours. This is useful because a conversation between coach and athlete that lasts a few minutes might only be recorded as one instance of a behaviour, if only the number of behaviours is recorded.

297 However, the conversation maybe critical to the athlete's understanding of what they need to
298 do or why. The eight behaviours recorded were: (a) course description (i.e., coach explaining
299 the sequence of gates to be negotiated); (b) coach feedback (i.e., feedback provided about the
300 performance not in response to athlete input); (c) coach-initiated tactical input (i.e., coach's
301 input provided without any initiation from athlete); (d) tactical input response (coach's
302 response to athlete's question/comment); (e) coach question to open the conversation; (f)
303 coach question to develop athlete understanding; (g) athlete input (all input into the
304 interaction such as asking/answering questions, checking their understanding); and (h)
305 interactive (a 'catch all' category covering non-performance-related discussions).
306 *Empowering/disempowering motivational climate*. To determine the extent to which
307 the coach–created an empowering or disempowering motivational climate, the video and
308 audio recording of the session was analysed using the Multidimensional Motivational
309 Climate Observation System (MMCOS) (Smith, et al., 2015). The MMCOS contains 32
310 behaviours organised into seven strategies. The empowering climate dimensions are:
311 autonomy-supportive; task-involving; relatedness supportive; and structure. The
312 disempowering dimensions are: controlling; ego-involving; and relatedness thwarting. For
313 each coach observation, the strength (potency) of each dimension was scored on a four-point
314 scale: 0 (not at all), 1 (weak), 2 (moderate), 3 (strong) (Smith, et al., 2015). Empowering and
315 disempowering climate potency scores were calculated by averaging the dimension scores.
316 *Transformational leadership behaviours*. There is no existing observation tool
317 available to systematically observe transformational leadership behaviours, therefore, we
318 used the definitions of the four transformational behaviours: idealised influence; inspirational
319 motivation; intellectual stimulation; and individual consideration plus the 3 additional
320 behaviours (high performance expectations, fostering group goal acceptance, contingent
321 reward) from the DLTI (Callow, et al., 2009) as the framework. We followed a process

similar to that employed with MMCOS (Smith, et al., 2015), recording the strength of each TL behaviour on a four-point scale: 0 (not at all), 1 (weak), 2 (moderate), 3 (strong).

Coaching behaviours and practice (athletes' perspectives).

Athletes completed the Differentiated Transformational Leadership Inventory (DTLI) (Callow, et al., 2009). Participants responded to each of the 27 items assessing 7 leadership behaviours on a 5 point Likert scale anchored by 1 (not at all) to 5 (all of the time). The internal reliability (Cronbach's alpha coefficient) for the subscales were: (a) individual consideration (0.66); (b) inspirational motivation (0.59); (c) intellectual stimulation (0.67); (d) idealized influence (0.78); (e) high performance expectations (0.73); (f) fostering group goal acceptance (0.68); and (g) contingent reward (0.83). In addition, athletes provided written answers to a series of short open-ended questions exploring their perceptions of the coach's practices and how the coach helped them to prepare them (e.g., "how similar was this session to previous sessions this year?" and "in what ways does your coach encourage you to understand why certain techniques work best?"). Questions are available from the authors.

Coaching practice and philosophy (coaches' perspectives):

The coaches' perspectives were captured by a semi-structured interview following the observed coaching session. In keeping with guidelines for semi-structured interviews (Patton, 2002), a set of general questions were developed covering coaching background (e.g., experience, qualifications) and approach to coaching, common practices, and why they coach as they do. The questions were not specifically about the motivational climate or TL behaviours, rather they were kept broad and open to encourage the coach to describe his/her approach to coaching without being constrained by particular theoretical concepts. The interview questions are available from the authors on request. The general questions were supplemented by follow-up questions and probes to further explore the coaches' perspectives

(Patton, 2002). To keep the interviews to a reasonable length whilst still gaining in-depth information, the coaches provided their coaching philosophy, via email, after the interview.

Preliminary data analysis

Each author watched the video recorded sessions separately and scored the strength of the empowering/disempowering climate and TL behaviours. To check for reliability of scoring, the scores generated were compared and any discrepancies were discussed. If necessary the video recording was reviewed to assist the discussion and achieve consensus on the score for each dimension/behaviour for each coach (Morgan, Muir, & Abraham, 2014). For one coach, the video recording failed, in this case field notes were used to contribute to the preliminary analysis of the coach's motivational climate and TL behaviours. From the athletes' responses to the DTLI, the means were calculated for each of the seven TL behaviours for each coach. The athletes' responses to the open-ended questions and the coach's interview and coaching philosophy data were content analysed (Patton, 2002). This process involved each author reading and re-reading the responses to become familiar with the data, the first author identified the initial meaning units, followed by review of the meaning units and organised them into lower and then higher order themes. These were then discussed with the second author who took on the role of critical evaluator (Patton, 2002) and between the authors the final higher order themes were established.

Main analysis

To describe the multidimensional nature of the coach-created talent development motivational climate in Canoe Slalom in the UK and how it was created two further stages of analysis were conducted similar to the process employed by Gould, Guinan, Greenleaf, Medbury, and Peterson (1999): 1) development of summary profiles of the talent development motivational climate; 2) comparison of climate profiles.

Stage 1: Summary profiles of the talent development motivational climate

Using the multiple data sources, the authors separately developed a summary profile for each coach. The summaries were shared and discussed with the intention to explore any discrepancies between researchers' interpretations (Gould, et al., 1999). Few discrepancies occurred and consensus was reached on the talent development motivational climate created.

Stage 2: Comparison of climate profiles

The profiles of the six coaches were then compared to identify common and unique features of the talent development coaching climate created by these coaches. At this stage the coach's espoused and enacted perspective on learning were examined using Nelson and Colquhoun's (2013) behaviourist/humanistic and structure/agency continuums framework.

Trustworthiness of the data and interpretation

There is no one way to ensure the trustworthiness of the research (Cresswell & Miller, 2000). The 'measures' taken to for this purpose included the first author's prolonged engagement with the talent development context; rigorous systematic data collection processes; cross-checking and triangulation of information and interpretations; discussion and consensus amongst researchers about the interpretation and meaning of the data. The first author's background ensured familiarity with the context, the participants (and participants with the researcher), the way things are done, and knowledge and language specific to that context (Cresswell & Miller, 2000). Such engagement with the context was useful in constructing the meaning of coaches' and athletes' comments and behaviours during analysis. The established rapport with participants helped create an environment where they could feel comfortable and supported to provide 'true' accounts of their experiences (Cresswell & Miller, 2000). Furthermore, we employed measures with established validity and reliability. The multiple sources and perspectives enabled us to cross-check the information gathered. The authors independently analysed the data and discussed interpretations, returning to the data if needed to re-examine it, and enable a consensus to be reached on what the data were

telling us about the nature of the talent development motivational climates. This cross-checking provided triangulation of data and interpretations, which is useful to establish the credibility of the research and its findings (Patton, 2002).

Results

Stage 1: Talent development motivational climate profiles.

Summary descriptive findings of the time spent in the eight interaction behaviours, observed multidimensional motivational climate, observed TL behaviours, and athletes' perceptions of TL behaviours are presented in Tables 2-4. The profiles developed for each coach are described below and include illustrative quotes from athletes and coaches. All athletes indicated that the session observed was typical of pre-competition sessions.

Coach 1: James

James had an established relationship with the athletes with plenty of 'social chat' evident (e.g., 12.0% of interaction time). He provided a structured training environment (e.g., 28.8% of interaction time on course description) that was neither obviously empowering nor disempowering. Interactions demonstrated consideration for individuals' needs, however, there was limited observed evidence of other TL behaviours. Exchanges with athletes were individualised, coach driven, and focused on providing tactical input. Of the interaction time, 44.5% was coach-initiated tactical input and 5.5% was tactical input in response to athletes' comments or questions. An example of this was the process whereby after a performance effort the athlete paddled to James and waited for input from him. On the few occasions questions were asked (1.9% of interaction time) any conversation was quickly closed down by the delivery of tactical input before the athletes had an opportunity to respond. The athletes (N=3) perceived James to engage in transformational behaviours 'fairly often' (M=3.96, range: inspirational motivation, M=4.33, to role model, M=3.33). Somewhat contrary to the evidence from the observation, the athletes stated that James used questioning

to make them think before providing input (e.g., "asked how I felt before giving me his feedback"). More consistent with the observation findings, however, was the athletes' perception that their role during training sessions was to "concentrate on feedback and apply [it] on [the] next run." James' perspective on coaching reflected a culture of high performance, conveying high expectations for performance, it is "something they are all committed to doing," and fostering agreement of goals. He indicated a desire to understand the athlete's perspective, "I don't know what they think or feel so asking questions [gives me that perspective]." However, his philosophy centered on 'making a difference' and what he, as the coach, would do. In practice this translated into a direct instructional style of coaching, which allowed for little interaction.

Coach 2: Iain

The nature of the session (progressive session with 'walk backs' where the athletes negotiate a short sequence of gates as they progress down the course) limited Iain's opportunity for input (30.1% of coaching session). The input provided focused on tactical information (51.9% of interaction time) and was delivered through an interactive process, which involved asking a question, listening to the athletes' responses (20.1% of interaction time), before providing his view. Iain demonstrated individual consideration through this process, conveyed high expectations, and moderate inspirational motivation. He also praised good performances (contingent reward behaviour). The motivational climate was moderately empowering and weakly disempowering, with the stronger dimensions being structure and relatedness support. There was some, albeit weak, evidence of fostering athletes' autonomy and creating a task-involved environment, however, there was also evidence of controlling and ego-involving dimensions.

The athletes (N=4) indicated that Iain engaged in TL behaviours 'fairly often' (M=4.08, range: contingent reward, M=4.38 to fostering group goals, M=3.75). They

recognised his high expectations (M=4.25) for their performances and approach to training (e.g., "try your hardest" and "stay focused"). However, according to Iain, they didn't always adequately meet his expectations, "what they commit is very spasmodic". The athletes valued Iain's "to the point", "precise" and "technical feedback" and noted that it was positive and encouraging. There appeared to be a reliance on Iain (or another coach) for support (e.g., Iain or a substitute coach is "always there" at competitions). For Iain, the control of the coaching process resided with the coach. For example, he frequently used terms such as 'make them' (e.g., "it's making him realise what he's doing"). Furthermore, Iain decided the goals for the observed session and shared these with the athletes. Iain indicated a desire for interaction between coach and athlete to enhance their learning, however, he felt constrained by the time available for sessions and reverted to a more direct style of coaching: "…with time pressure, [its] 'do this' and 'do that'… in that situation I do a lot of telling."

Coach 3: Andrew

Andrew created an empowering, transformative, not disempowering, motivational climate. There was strong evidence of all four empowering dimensions and several transformational behaviours (i.e., intellectual stimulation and individual consideration). Andrew used the time available for interaction with athletes to engage them cognitively, seeking their input and assessment. He frequently used questions to do this (10.2% of interaction time). There was a clear process in place whereby the athletes expected to have input and solve problems themselves rather than be told. This was evident in the comment of one athlete who, during the session, joked with Andrew saying "you just told me the answer!" The percentage of time athletes were providing input was similar to that of Andrew (30% cf. 29%). Furthermore, two thirds of the time when Andrew provided tactical input it was in response to the athletes' comments or questions. The coaching climate was a clear

translation into practice of Andrew's coaching philosophy, which was illustrated in his comments:

> "My role is to facilitate the learning process and manipulate the environment to ensure that learning is unavoidable, addictive, fun and long term … it's identifying those teachable moments… I won't just give them an answer but expect them to go away and come back to me… I want them to learn about themselves a little bit."

Andrew's approach was corroborated by the comments of the athletes (N=5). They recognized the importance of a mastery focus and self-analysis (e.g., "I would feedback to the coach, say what I could improve, then [Andrew] would give me some more points if there were any"), and to be able to support themselves in competition (e.g., "[gives] one of the parents a video camera [and] tells us to review our run, just like as if he were there"), and appreciated his individualized coaching (e.g., "coaches you as an individual"). This was also reflected in their perceptions that Andrew engaged in transformational behaviours 'fairly often' (M=4.14) with individual consideration (M=4.85) and intellectual stimulation (M= 4.45) displayed almost 'all the time'.

Coach 4: Stewart

Stewart created an empowering, not disempowering, motivational climate. There was strong evidence for all four empowering dimensions. TL behaviours were also evident, in particular, individual consideration and intellectual stimulation. For example, even in a large group of six athletes, Stewart spoke to athletes individually throughout the session and used insightful questioning to support their learning. This interaction encouraged athletes to think and give their views (55.7% of interaction time). This empowering, transformative climate was corroborated by the athletes (N=6) who indicated that Stewart engaged in TL behaviours almost 'all the time' (M=4.81, range= intellectual stimulation, M=4.92, and individual consideration, M=4.85 to role model, M=3.70). Furthermore, they were clear about

performance expectations such as being on time and prepared and also being task-involved (e.g., "try my best", give "100% effort", and "push myself out of my comfort zone") during sessions. Supporting this task-involved climate the athletes commented that Stewart was "constructive", "helps me achieve", and "helps me with confidence." They felt he also supported their learning and autonomy, (e.g., he "wants me to improve", "lets me get on with it", and "allows me to give things a go").

Stewart's coaching practices were deliberate and consistent with his philosophy, "I want them to learn for themselves… creating longer-term learning and independent athletes." He sought to actively engage the athletes in the learning process, commenting that he likes "to get them to do the thinking… figure things out for themselves." This was achieved through questioning, encouraging autonomous exploration (e.g., "open to experimenting") and shaping tasks so that they were 'the teacher' (e.g., "setting up the environment is so much more important than actually telling them technical things… I set up the gates in a way they know, even before they speak to me how they are doing").

Coach 5: Cameron

The motivational climate Cameron created was both empowering (i.e., moderate relatedness support and structure) and disempowering (i.e., moderate controlling). Structure was evident in the proportion of time Cameron spent providing course descriptions (24.2%). He considered the individual (TL behaviour, relatedness support) through 1 to 1 feedback following a performance effort, spending more than a third of his time (36.7%) providing coach-initiated tactical input. There was limited athlete input (13.1%). The established process appeared to be that an athlete would complete a performance effort, come to Cameron, and immediately be provided with feedback from him. The athletes' corroborated this process commenting that Cameron "watches the run and then gives feedback."

The athletes (N=3) indicated that Cameron engaged in TL behaviours 'fairly often' (M=4.13), they also perceived that contingent reward, a transactional behaviour, occurred almost 'all the time' (M=4.92). The athletes were clear that in sessions they should be task-involved (e.g., "try my best", be "open minded when practicing") and "take on board advice given". They recognised and valued Cameron's expertise commenting that he was "thorough" and had a "good understanding of what I needed to do or change [which] was passed on to me with room for my innovations as well." There did, however, appear to be a dependence on Cameron to "support my choices" and provide "mental support in order for me to be relaxed and confident."

The individualised approach was confirmed by Cameron who commented that "every paddler is a different person…. [I] need to speak [in] different ways with every paddler." He also suggested he adopted a positive approach with athletes by emphasising "what they did well, rather than what they did not do very well" and recognising the importance of a holistic approach to sport commenting (e.g., "what they learn here in this kind of sport can be [useful] in personal life"). Cameron was also clear that his role was "to lead the athletes to the best way… the coach is one person from many who teaches them [athletes] what to do, how to do it, why to do it – the coach has the biggest impact." In practice, the process was coach-led.

Coach 6: Simon

Simon created a strong empowering, not disempowering, motivational climate. There was strong evidence of all four empowering dimensions (i.e., autonomy supportive, task-involving, relatedness supportive, and structured). Simon also engaged in several TL behaviours, in particular, individual consideration and intellectual stimulation. An example of how the climate was created was evident in the process Simon had established (structure) whereby after a performance effort athletes came to the him with their thoughts already considered (autonomy support – encouraging input from athletes, intellectual stimulation), a

544 discussion ensued in which the athletes gave their analysis and areas for improvement (task-
545 involved focus, autonomy supportive), Simon asked questions to facilitate learning
546 (intellectual stimulation), provided supportive, positive feedback (relatedness supportive,
547 task-involving) and competition performance-related advice (task-involving). The athlete
548 then engaged in another performance effort. This process was conducted on a one-to one
549 basis (task-involving – individual improvement, individual consideration). Simon's
550 comments indicated that facilitating this empowering transformative motivational climate
551 was intentional, "I'm trying to get them to lead what is going on… I think it's all about
552 autonomy, guided autonomy."

553 Furthermore, and perhaps most importantly, the athletes (N= 3) corroborated the
554 empowering transformational nature of Simon's coaching climate. They indicated that Simon
555 worked with them and listened to their views (e.g., "hear his views as well as mine to ensure
556 the best race plan"), provided supportive, positive feedback and advice (competition
557 performance-related) with the aim of developing their ability to perform independently (of
558 the coach – if needed) at competitions (e.g., "so that I can work in a group without a coach").
559 They also felt the coach understood them as individuals considering their well-being and at
560 times a need to build their confidence. These perceptions of the coaching climate were also
561 supported by their perception that Simon 'almost all the time' engaged in TL behaviours
562 (M=4.65, range= individual consideration, M=4.83, to intellectual stimulation, M=4.33).

563 Stage 2: Comparison of talent development coaching climate profiles

564 All the coaches were recognised by the national governing body as effective coaches
565 in producing athletes who were capable of moving up the performance pathway (and had). It
566 was evident, however, from the analysis of the talent development coaching climates that the
567 way the coaches worked with athletes was not uniform. There were a number of common
568 features amongst the coach-created climates. First, their coaching had clear organisation and

structure, a feature of a task-involving motivational climate. Goals for sessions were shared and athletes understood the coach's expectations and the processes used within the session (e.g., briefing, performance effort, interaction with coach, subsequent performance effort). Second, they all adopted an individualised, task-involved approach by considering the individual's needs (at the very least the technical/tactical needs) and focusing on assisting each individual to improve his or her performance. Third, all the coaches also connected with the athletes through their performance and non-performance related conversations, which fostered relatedness support and a generally positive social psychological environment. There were, however, also differences in how the coaches worked with athletes. In particular, the coaches differed in the extent to which they created a climate that supported athletes' autonomy and fostered intellectual stimulation.

Using the framework proposed by Nelson and Colquhoun (2013), we analysed the talent development coaching climates these coaches created, and why, to further explore the differences in their coaching approaches. Specifically, we examined the data and summary profiles for evidence of behaviourist, humanistic, structure, and agency perspectives on learning and coaching. Each coach-created TD coaching climate was then 'mapped' in relation to these perspectives to provide a visual representation (Figure 1). This process revealed two relatively distinct clusters of coaching climates: 1) Predominantly coach-driven approaches characterized by a more behaviourist and structured view of learning and coaching; 2) Approaches to coaching characterized by an emphasis on humanistic and agency views of learning and coaching.

The climates created by James, Iain, and Cameron emphasized a more behaviouristic view of learning. These coaches spent a greater proportion of their interaction time with athletes providing tactical input. James and Cameron, in particular, provided feedback with only limited engagement with, or input from the athletes. Cameron's athletes also reported

that he engaged in contingent reward behaviour (a transactional behaviour) almost 'all the time'. Observations of these three coaches demonstrated weak evidence of an empowering motivational climate, with structure and relatedness support dimensions being the main components of the climate. There was also some evidence of a weak disempowering climate through controlling and ego-involving dimensions.

There were, however, differences amongst the three coaches with regard to the structure-agency view of learning. James' desire to 'make a difference', focusing on what he will do, along with high expectations positioned James more towards structure than agency. There was some suggestion that he at least recognized the importance of agency (e.g., he indicated a desire to understand the athletes' perspective), however, this was not evident in his practice or the athletes' perceptions. Iain demonstrated a balance between structure of the coaching episode and an individual's agency. This was seen in his practice where he used a questioning style to promote athlete learning but with an exacting technical model that he wanted the athletes to achieve. Cameron's observed and perceived coaching climate was also clearly positioned towards a behaviourist view of learning, however, his philosophy and discussion positioned him towards an agency rather than structured view. This revealed a potential mismatch for Cameron between what he believed was effective and what he was able to put into practice. This may be in part a result of pressure due to the limited time available 'on the water' as a result of coaching at an artificial course.

In contrast, the climates created by Simon, Andrew, and Stewart portrayed clear humanistic and agency views of learning and coaching. Similar to James, Iain, and Cameron, they fostered elements of an empowering climate through structure and relatedness support. It was, however, the facilitation of task-involvement, autonomy support, intellectual stimulation and a lack of disempowering dimensions that set them apart from the other 3 coaches and positioned them as more humanistic in their approach. A translation of this approach into

practice was the deliberate effort to cognitively engage the athletes. This was achieved through the use of questioning and also task design to supportively challenge athletes to 'figure things out for themselves'. The coaches also sought to assist athletes to become independent, autonomous performers, a central feature of a humanistic approach. Simon's climate was intentionally empowering. His support for autonomy and freedom for athletes to express themselves aligned Simon with an agency view of learning. Stewart, like Simon, fostered athletes' agency from a strongly humanistic stance (relatedness support, task-involved, autonomy support), which was consistent with his philosophy and practice. Andrew's use of a questioning style, emphasising athletes' autonomy over their performance, was a translation of his philosophy into practice. In comparison to Simon and Stewart, whilst Andrew still allowed for elements of athlete agency, his climate was more structured.

Discussion

The purpose of this study was to extend our understanding of the TDE, in particular the athlete-coach micro level, by adopting a theoretically-based multidimensional view of the coach-created motivational climate. Employing multiple perspectives and methods enabled an in depth examination of what coaches do, why, and how athletes' perceive the climate and coaching behaviours in canoe slalom TDEs in the UK. Our findings contribute to TDE and coaching knowledge in several ways. First, the commonalities amongst coaches' practices are consistent with TDE research but also demonstrate that the coaches created motivationally adaptive climates. Second, despite commonalities there were also differences in the motivational climates created. Analysis of what the coaches did and why, from a learning perspective, provided an explanation for these differences. Third, adopting multiple perspectives and methods proved useful in identifying both congruence and disparity within the motivational climates. Fourth, the findings demonstrate the complementary nature of the

three approaches (AGT, SDT, TL) employed to analyse the motivational climate and the additional insight that can be gained.

To date, the exploration and analysis of the TDE has been holistic and largely descriptive with the identification of a wide range of factors that affect talent development (Coutinho, et al., 2016). By employing a theoretically-based motivational climate approach we were able to provide a more detailed analysis of the interactions between coaches and athletes. This analysis demonstrated common practices amongst the coaches that were not only consistent with TDE research (Henriksen, et al., 2011; Martindale et al., 2007; Mills et al., 2012), research of successful high performance coaches (Lara-Bercial & Mallett, 2016) but also consistent with motivationally adaptive climates. The coaches all created a more empowering and less disempowering climate, which is consistent with the International Sport Coaching Framework (ICCE, 2013), findings from Smith et al.'s (2016) large scale study of youth sport coaches, and associated with motivationally adaptive outcomes for participants (e.g., Gilchrist & Mallett, 2017; Harwood, et al., 2015; Occhino et al., 2014). In addition, respondents in the current study indicated that coaches exhibited transformational leadership behaviours which have also been associated with desired outcomes for participants (e.g., Callow et al., 2009). As such, theory and research suggest that an empowering and transformational climate, similar to those exhibited by the coaches in this study, would be expected to satisfy basic psychological needs and in turn lead to self-determined behavioural regulation and even superior performance in TDEs.

It would be inappropriate to claim that a causal relationship exists between the coach-created climates in the current study and the success these coaches have had in developing athletes that progress along the talent pathway, however, there are many similarities between these coaches' behaviours and those of serial winning high performance coaches (Lara-Bercial & Mallett, 2016). For example, the coaches had a clear philosophy that provided

purpose and direction to their coaching. Detailed planning resulted in structured sessions and individualised their approach. They conveyed high expectations (TL), considered individual needs (AGT/SDT/TL), and to varying extents the coaches focused on process over results (fostered a task-involved focus - AGT/SDT). All but one of the coaches built strong relationships with athletes (supported relatedness - SDT) and three of the coaches shared decision making and fostered self-awareness and self-reliance (supported autonomy – SDT, fostered intellectual stimulation - TL). Therefore, this study does suggest practices that other coaches and key stakeholders may wish to consider when working in TDEs.

An example of how this 'productive' motivational climate was achieved by several coaches was through well-developed performance-analysis-discussion-performance 'routines' established with their athletes that encouraged athletes to consider their own performance and how they might improve it before discussing this with the coach. If needed, the coach would provide feedback or, more often, ask a question to help athletes to 'discover' or decide what they could do to improve and then encourage them to 'try it and see'. All the while encouraging individually-referenced performance. By listening to the athletes' analysis of their performance, encouraging them to work through a 'problem' or task, providing input only when needed, they built a training environment in which athletes felt 'supported and safe' to challenge themselves. The structure and emphasis on task-involvement helps athletes to develop their actual and perceived competence. Furthermore, acknowledging their perspectives and encouraging initiative tasking supports athletes' autonomy and provides intellectual stimulation. This individualised approach and listening to athletes fosters a sense of relatedness and individual consideration. Although structure may seem at odds with providing support for autonomy, research in education has demonstrated that when clear objectives are combined with autonomy supportive behaviours, structure can lead to adaptive

692 outcomes for participants (Jang, Reeve, & Deci, 2010; Vansteenkiste et al., 2012; Reeve,
693 2002).

694 During the coaching sessions, all athletes gained insight into how to improve their
695 performance, however, how this insight was gained was notably different amongst the
696 coaches and influenced the climate created. Several coaches were more overt and direct in
697 their provision of input to assist athletes to improve (e.g., James, Iain), whilst others used
698 practices such as questions, conversations, and manipulation of the tasks to guide and
699 encourage athletes to analyse their performance and 'discover' feedback to improve their
700 performance (e.g., Simon, Stewart, Andrew). These practices resulted in the coaches differing
701 in their support for autonomy (SDT) and intellectual stimulation (TL). This finding is
702 somewhat in contrast to TDE research which generally suggests that coaches consider
703 athletes' ownership and self-responsibility (autonomy) as critical to successful talent
704 development (e.g., Martindale, et al., 2007; Mills et al., 2014a; 2014b).

705 An explanation for the difference in how athletes gained insight about their
706 performance was evident in the clear connection between the coaches espoused and enacted
707 view of athletes' learning and their coaching practice. For all but one of the coaches,
708 differences in their coaching practice could be explained by their espoused philosophy of
709 coaching. Others have also recognized this link between philosophy and practice (e.g.,
710 Barnson, 2014; ICCE, 2013; Lara-Bercial & Mallett, 2016). For example, Barnson concluded
711 that "coaching is defined as the process of utilising an intentional philosophic approach"
712 (2014, p. 73). Coaches' philosophies have been subject to research attention (e.g., Bennie &
713 O'Connor, 2010; Nash, Sproule, & Horton, 2008), however, to our knowledge this is the first
714 study to examine the congruency between philosophy and practice in relation to the climate.

715 Using Nelson and Colquhoun's (2013) framework we were able to analyse the
716 coaches' perspectives on athletes' learning along behaviourist/humanistic and

717 structure/agency continuums. In doing so, we were able to gain understanding of why they
718 coached as they did. Those coaches positioned towards the humanistic and agency ends of the
719 continuums emphasised knowledge production, rather than knowledge transmission. Such
720 views of coaching are consistent with Kirk's (2010) contemporary educational practice view
721 of coaching. Developing this understanding not only helps to explain the practices of these
722 coaches but also provides avenues for development of coaches. When reflecting on how to
723 develop TDEs, coaches and other key stakeholders (sport organisations, coach developers,
724 athletes, parents) might consider why certain practices and climates are being promoted
725 (perhaps over others) and consider what perspective on learning is being privileged.
726 Understanding these underlying beliefs and values can raise awareness and provide
727 opportunities to 'check and challenge' practices and structures. For example, the International
728 Sport Coaching Framework (ICCE, 2013) and a recent US Olympic Committee coach
729 development programme (Ferrar, et al., 2018) both emphasise the importance of developing
730 coaches' intrapersonal knowledge.
731 It has been argued elsewhere (Coutinho, et al., 2016) that there may be differences
732 between what coaches' *say* is critical for talent development (e.g., Martindale, et al., 2007;
733 Mills et al., 2014b), what they actually *do* (Henriksen, et al., 2010a), and what is perceived by
734 athletes (Mills, et al., 2014a). Therefore, we employed multiple perspectives and methods to
735 provide an in-depth understanding of the same TDE. Our findings are somewhat in contrast
736 to this argument, suggesting congruence rather than disparity amongst perspectives. An
737 exception for this, however, was the disparity identified between one coach's (Cameron)
738 espoused philosophy and actual practice. This disparity may have arisen for several reasons.
739 Cameron was the youngest of the coaches, had the least amount of coaching experience, and
740 time coaching in the TDE. Although, we are not suggesting he is a novice coach, research has
741 demonstrated differences between expert and novice coaches in their ability to express their

742 coaching philosophy (Nash et al., 2008). Cameron was also observed during a session on
743 artificial water which has time constraints that are not evident when coaching on a natural
744 river. The added pressure of limited time may have contributed to his more coach-led
745 approach (Mageau & Vallerand, 2003).

746 This study was the first, to our knowledge, to empirically examine the coach-created
747 talent development motivational climate using a theoretically-based multidimensional
748 approach. Others have integrated AGT and SDT (Allen & Hodge, 2006; Duda, 2013; Mallett
749 & Hanrahan, 2004) or SDT and TL (Stenling & Tafvelin, 2014) and Vella and Perlman
750 (2014) have proposed commonalities amongst all three at the behaviour level. This is the first
751 study, however, to use all three approaches to develop a detailed understanding of the
752 motivational climate. Although AGT, SDT, and TL have differences conceptually, all three
753 promote essentially a growth-oriented process focused on inspiring and empowering others to
754 excel. Each provide a focus on the situational factors (i.e., specific coaching behaviours) that
755 influence athletes' experiences in sport (Ames, 1992; Mageau & Vallerand, 2003; Callow et
756 al., 2009). By employing all three approaches, we were able to provide a more complete
757 examination of the coaching interactions that shape the motivational climate in TDEs within
758 Canoe Slalom in the UK.

759 Limitations and future directions

760 No study is without limitations and the current study is no exception. We explored the
761 perspectives of only a small number of coaches and athletes in one sport, Canoe Slalom, in
762 one country, the UK. Even though our sample comprised two-thirds of the coaches who are
763 employed full-time within the talent development pathway for this sport, caution should be
764 taken in applying these findings to other TDEs, sports, and countries. Researchers should
765 continue to explore, in detail, the factors of successful and less successful TDEs, including
766 the coach-created climate, to further our understanding of how coaches and other key

stakeholders might facilitate talent development. Our study included only one female coach. Where researchers have provided the gender of coaches working in TDEs very few have been women. For example, Martindale et al. (2007) had 2 women coaches out of the 16 coaches in their study. Mills et al. (2014b) did not give the gender of the coaches in their study, however, given that the focus was male academy football one might assume that all the coaches were men. Despite recognition of the benefits of women as coaches (UK Coaching, 2015), they are underrepresented in performance sport (Norman, 2017). Further research should seek to examine the climate created by female coaches as well as male coaches. Adopting multiple methods and perspectives to capture the motivational climate was a strength of this study, however, we only observed the coaches during one training session. The context of a particular training session (e.g., session goals, events in previous sessions, stage of the training cycle) may, and arguably should, influence the coach's behaviours. Therefore, this may raise a question regarding how representative the observed session was of the coaches' 'normal' coaching behaviours and motivational climate. The sessions were all at the same point in the training cycle (i.e., 2-3 days prior to an important competition), athletes were asked directly, and indicated that the session was reflective of a 'normal' session. Future research, however, should consider how many observations are necessary to provide accurate and representative data for their intended purpose. Furthermore, we did not measure perceptions of the empowering/disempowering climate through quantitative means as others have done (e.g., Smith et al, 2016), rather we assessed this through open-ended questions, the coaches' interviews, and observations. Both methods provide useful insight into participants' perceptions of the motivational climate, therefore future research should consider the application of both methods, along with recognition of the strengths and limitations of each, to further develop our understanding of the motivational climate in TDEs.

Conclusion

Adopting a theoretically-based multidimensional approach we examined the central feature of TDEs at the micro level – the interactions between coaches and athletes and the motivational climate created. The coaches all created a more empowering and less disempowering talent development motivational climate, however, the extent to which the coaches' fostered autonomy support and intellectual stimulation differed. This notable difference in coaching practice could be explained by the coaches' philosophy of coaching, in particular their views on athletes' learning. Therefore, those working with or responsible for athletes in TDEs may benefit from examination of, not only, coaches' interactions with athletes but also concepts such as the motivational climate and coaches' beliefs about how learning happens. The workshop of Turnnidge & Côté (2017) may provide a useful starting point for development this area. This could involve exploring and reflecting on coaches' philosophies of coaching, understanding of the motivational climate, and how (and perhaps under what conditions) they do or do not translate knowledge and beliefs into actual coaching practice.

References

Allen, J. B., & Hodge, K. (2006). Fostering a learning environment: Coaches and the motivational climate. *International Journal of Sports Science & Coaching*, 1, 261-277.

Ames, C. (1992). Achievement goals, motivational climate, and motivational processes. In G.C. Roberts (Ed.) *Advances in Motivation in Sport and Exercise* (pp. 161-176). Champaign, IL: Human Kinetics.

Barnson, S.C. (2014). *The authentic coaching model: A grounded theory of coaching*. *International Sport Coaching Journal*, *1*, 61-74.

Bass, M. B. & Riggio, E. G. (2006). *Transformational Leadership* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Bennie, A. and O'Connor, D. (2010). Coaching philosophies: Perceptions from professional cricket, rugby league and rugby union players and coaches in Australia. *International Journal of Sports Science and Coaching, 6* (2), 309-320.

Callow, N., Smith, M.J., Hardy, L., Arthur, C.A., & Hardy, J. (2009). Measurement of transformational leadership and it's relationship with team cohesion and performance level. *Journal of Applied Sport Psychology, 21*, 395–412.

Côté, J., Lidor, R., & Hackfort, D. (2009). To sample or to specialize? Seven postulates about youth sport activities that lead to continued participation and elite performance. *International Journal of Sport and Exercise Psychology*, 7, 7-17.

Coutinho, P., Mesquita, I. & Fonseca, A. (2016). Talent development in sport: A critical review of pathways to expert performance. *International Journal of Sports Science & Coaching, 11*(2), 279–293.

Cresswell, J. W. & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory in Practice, 39* (3), 124-130.

Cushion, C. (2010). Coach behaviour. In J. Lyle and C. Cushion (Eds.), *Sports coaching: Professionalisation and practice* (pp. 43-61). London: Elsevier.

Duda, J.L. (2013). The conceptual and empirical foundations of Empowering Coaching™: Setting the stage for the PAPA project'. *International Journal of Sport and Exercise Psychology*, 11, 311-318. DOI: 10.1080/1612197X.2013.839414

Ferrar, P., Hosea, L., Henson, M., Dubina, N., Krueger, G., Staff, J., & Gilbert, W. (2018). Building high performing coach-athlete relationships: The USOC's National Team Coach Leadership Education Program (NTCLEP). *International Sport Coaching Journal, 5*, 60-70 https://doi.org/10.1123/iscj.2017-0102

Gilchrist, M. & Mallett, C. J. (2017). The theory (SDT) behind effective coaching. In R. Thelwell, C. Harwood, I. Greenless (Eds.) *The Psychology of Coaching*. London: Routledge.

Gould, D., Guinan, D., Greenleaf, C., Medbery, R., & Peterson, K. (1999). Factors affecting Olympic performance: Perceptions of athletes and coaches from more and less successful teams. *The Sport Psychologist, 13,* 371-394.

Harwood, C. G., Keegan, R. J., Smith, J. M. J., & Raine, A. S. (2015). A systematic review of the intrapersonal correlates of motivational climate perceptions in sport and physical activity. *Psychology of Sport & Exercise, 18*, 9-28.

Henriksen, K., Stambulova, N., & Roessler, K.K. (2010a). A holistic approach to athletic talent development environments: A successful sailing milieu. *Psychology of Sport and Exercise*, *11*, 212–222.

Henriksen, K., Stambulova, N., & Roessler, K.K. (2010b). Successful talent development in track and field: Considering the role of environment. *Scandinavian Journal of Medicine & Science in Sports*, *20*, 122–132.

Henriksen, K., Stambulova, N., & Roessler, K. K. (2011). Riding the wave of an expert: A successful talent development environment in kayaking. *The Sport Psychologist*, 25(3), 342-362.

International Council for Coaching Excellence. (2013). International Sport Coaching Framework. Champaign, IL: Human Kinetics

Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It is not autonomy support or structure but autonomy support and structure. *Journal of Educational Psychology, 102*, 588-600.

Kirk, D. (2010). Towards a socio-pedagogy of sports coaching. In J. Lyle and C. Cushion (Eds.), *Sports coaching: Professionalisation and practice* (pp.165-176). London: Elsevier.

Kirkpatrick, S., & Locke, E. (1996). Direct and indirect effects of three core charismatic leadership components on performance and attitudes. *Journal of Applied Psychology, 81*, 36-51.

Lara-Bercial, S. & Mallett, C. J. (2016). The practices and developmental pathways of professional and Olympic serial winning coaches. *International Sport Coaching Journal, 3,* 221 -239 http://dx.doi.org/10.1123/iscj.2016-0083

Mallett, C. J. & Hanrahan, S. J. (2004). Elite athletes: why does the 'fire' burn so brightly? *Psychology of Sport and Exercise, 5*, 183–200.

Mallett, C. J. (2005). Self-determination theory: a case study of evidence-based coaching. *The Sport Psychologist, 19,* 417-429.

Martindale, R., Collins, D., & Daubney, J. (2005). Talent development: A guide for practice and research within sport. *Quest, 57*, 353-375.

Martindale, R., Collins, D., & Abraham, A. (2007). Effective talent development: The elite coach perspective in UK sport. *Journal of Applied Sport Psychology, 19*, 187–206.

Martindale, R., Collins, D., Douglas, C. & Whike, A. (2012). Examining the ecological validity of the Talent Development Environment Questionnaire, *Journal of Sports Sciences, 31*, 41–47.

Mills, A., Butt, J., Maynard, I., & Harwood, C. (2012). Identifying factors perceived to influence the development of elite football academy players in England. *Journal of Sports Sciences, 30,* 1593–1604. doi:10.1080/02640414.2012.710753

885 Mills, A., Butt, J., Maynard, I., & Harwood, C. (2014a). Examining the development
886 environments of elite English football academies: The players' perspective.
887 *International Journal of Sports Science & Coaching, 9*, 1457-1472.
888 Mills, A., Butt, J., Maynard, I., & Harwood, C. (2014b). Toward an understanding of optimal
889 development environments within elite English soccer academies. *The Sport*
890 *Psychologist, 28*, 137-150.
891 Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational
892 model. *Journal of Sports Sciences, 21*, 883–904.
893 Morgan, G., Muir, B., & Abraham, A. (2014). Systematic Observation. In L. Nelson, R.
894 Groom, & P. Potrac (Eds.) *Research Methods in Sports Coaching*, (pp. 126-133).
895 London: Routledge.
896 Morgan, K. (2017). Reconceptualising motivational climate in physical education and sport
897 coaching: An interdisciplinary perspective, *Quest, 69*(1), 95-112.
898 Nash, C., Sproule, J., & Horton, P. (2008). Sport coaches' perceived role frames and
899 philosophies. *International Journal of Sports Science & Coaching, 3*(4), 539-554.
900 Nelson, L. & Colquhoun, D. (2013). Athlete (non) learning. In P. Potrac, W. Gilbert, & J.
901 Denison, (Eds.) *Routledge Handbook of Sports Coaching* (pp. 284-295). London:
902 Routledge.
903 Nicholls, J. G. (1989). *The competitive ethos and democratic education.* Cambridge, MA:
904 Harvard University Press.
905 Norman, L. (2017). *Presenting the 2016 Rio Olympics gender and coaching report card:*
906 *What's changed since London?* ICCE Global Coaching Conference, July 31 - August
907 2, 2017, Liverpool**.**

908 Occhino, J. L., Mallett, C. J., Rynne, S. B., & Carlisle, K. N. (2014). Autonomy-supportive
909 pedagogical approach to sports coaching: Research, challenges and opportunities.
910 *International Journal of Sports Science & Coaching, 9* (2), 401-417.
911 Patton, M.Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks,
912 CA: Sage.
913 Pensgaard, A-M., & Roberts, G.C. (2002). Elite athletes' experiences of the motivational
914 climate: The coach matters. *Scandinavian Journal of Medicine & Science in Sports*, 12,
915 54–59.
916 Ryan, R.M., & Deci, E. L. (2000). Self–Determination theory and the facilitation of intrinsic
917 motivation. *American Psychologist, 55*, 68–78.
918 Smith, B., (2010). Narrative inquiry: ongoing conversations and questions for sport and
919 exercise psychology research, *International Review of Sport and Exercise Psychology*,
920 *3* (1), 87-107.
921 Smith, N., Tessier, D., Tzioumakis, Y., Fabra, P., Quested, E., Appleton, P., Sarrazin, P.,
922 Papaioannou, A., Balaguer, I., & Duda, J. L. (2016). The relationship between observed
923 and perceived assessments of the coach-created motivational environment and links to
924 athlete motivation. *Psychology of Sport and Exercise 23*, 51-63.
925 Smith, N., Tessier, D., Tzioumakis, Y., Quested, E., Appleton, P., Sarrazin, P., Papaioannou,
926 A. & Duda, J.L. (2015). Development and validation of the Multidimensional
927 Motivational Climate Observation System. *Journal of Sport & Exercise Psychology*,
928 *37,* 4-22.
929 Smith, R.E., Smoll, F.L., & Cumming, S.P. (2007). Effects of a motivational climate
930 intervention for coaches on young athletes' sport performance anxiety. *Journal of Sport*
931 *and Exercise Psychology*, *29*, 39-59.

Stenling, A., & Tafvelin, S. (2014). Transformational leadership and well-being in sports: The mediating role of need satisfaction, *Journal of Applied Sport Psychology*, *26*(2), 182-196.

Trollope, K. (2015). *British Canoeing Slalom Yearbook 2015*. British Canoeing Slalom Committee.

Turnnidge, J. & Côté, J. (2017). Transformational coaching workshop: applying a person-centred approach to coach development programs. *International Sport Coaching Journal, 4*, 314-325. https://doi.org/10.1123/iscj.2017-0046

UK Coaching (2015). Briefing note - The case for gender equality in coaching. Available at http://www.ukcoaching.org/resource/gender-equality-coaching-briefing-note

Vansteenkiste, M., Sierens, E., Goossens, L., Soenens, B., Dochy, F., Mouratidis, A., Aelterman, N., Haerens, L., & Beyers, W. (2012). Identifying configurations of perceived teacher autonomy support and structure: Associations with self-regulated learning, motivation and problem behavior. *Learning and Instruction*, *22*(6), 431–439.

Vella, S. A. & Perlman, D. J. (2014). Mastery, autonomy and transformational approaches to coaching: Common features and applications. *International Sport Coaching Journal, 1* (3), 173-179.

949 Table 1. Overview of data collection methods, purpose, and data generated.

Method	Purpose	How data were collected	Data generated
Athletes' Perspectives			
Questionnaire Part A: Differentiated Transformational Leadership Inventory (DTLI) (Callow, et al., 2009)	To assess athletes' perceptions of the coach's TL behaviours	Athletes were asked to complete the DTLI within 1 hour of their session and to make their reflections with reference to that specific session	N=24 Completed questionnaires
Questionnaire Part B: Open-ended questions	To assess athletes' perceptions of the session and the coach's empowerment and TL behaviours, including how representative the session of 'normal' coaching.		
Coaches' Perspectives			
Semi-structured interview	To gain the coaches' perceptions of the session, their coaching practices, and underlying philosophy	Coaches were interviewed within 24 hours of the session. Interviews were recorded and then transcribed	N= 70 minutes of recording N=33 pages of transcription Average transcription length was 5.5 pages.
Coach philosophy question: 'what is your primary aim when coaching junior athletes? (in other	To understand the coaches' individual coaching philosophy	After the observed coaching session and interview, coaches were contacted and asked to provide a written response to the	N=6 short paragraphs Philosophy length range was 10 to 110 words Average length was 54 words

words, what is your philosophy as expressed in your coaching role?)'		emailed question about their coaching philosophy	
Observers' Perspectives			
Systematic observation Part A: Coaching interactions	To examine the proportion of the session involving athlete-coach interaction and the type of interactions	Video analysis of session utilising a bespoke observation tool	
Systematic observation Part B: Multidimensional Motivational Climate Observation System (MMCOS) (Smith, et al., 2015)	To examine the empowering and disempowering motivational climate in the coaching session	Video analysis of session using the MMCOS	N=6 observed and recorded sessions N=380 minutes of observation Session length range 50 to 108 minutes Each session was analysed 3 times
Systematic observation Part C: Transformational leadership behaviours	To examine the transformational leadership behaviours in the coaching session	Video analysis of session using a bespoke TL behavior observation tool based on DTLI behaviours (Callow, et al., 2009)	

951 Table 2. Proportion of time and type of coach-athlete interactions

	James	**Iain**	**Andrew**	**Stewart**	**Cameron**
Observing / recording time (mins)	49.5	95.3	64.0	108.0	62.8
Athletes in session	3	4	5	6	3
Percentage of coach interaction time by session					
Coach-athlete interaction time	44.3	30.1	42.5	34.2	28.0
Coaching interaction time per athlete*	14.8	7.5	8.5	5.7	9.3
Percentage of coach interaction time by type					
Coach extrinsic feedback (KP)	5.9	6.0	5.7	0.8	6.5
Interactive (e.g., discussion, social chat)	12.0	9.6	17.0	10.8	13.2
Extrinsic tactical input	44.5	13.7	9.3	4.8	36.7
Tactical input in response	5.5	38.2	19.6	9.1	2.8
Coach question to open conversation	1.1	1.3	4.9	3.4	0.7
Coach question to develop understanding	0.8	1.5	4.3	7.5	2.7
Athlete input	4.9	20.1	30.0	55.7	13.1
Course description	25.4	9.5	9.2	7.8	24.2

952 * Calculated by total coach-interaction time divided by number of athletes in the session

953 Note. Specific figures are not available for Simon due to video recording failure

954

955

Table 3. Observed strength of multidimensional motivational climate.

Climate Dimension	**James**	**Iain**	**Andrew**	**Stewart**	**Cameron**	**Simon**
Autonomy supportive	0	1	3	3	1	3
Task involving	1	1	3	3	1	3
Relatedness supportive	1	2	3	3	2	3
Structured	2	2	3	3	2	3
Empowering mean	***1***	***1.5***	***3***	***3***	***1.5***	***3***
Controlling	1	1	1	0	2	0
Ego involving	1	1	0	0	1	0
Relatedness thwarting	0	0	0	0	1	0
Disempowering mean	***0.7***	***0.7***	***0.3***	***0.0***	***1.3***	***0.0***

Note. Potency rating scale is 0 (not at all), 1 (weak), 2 (moderate), 3 (strong).

Table 4. Athletes' and observers' perceptions of transformational leadership behaviours

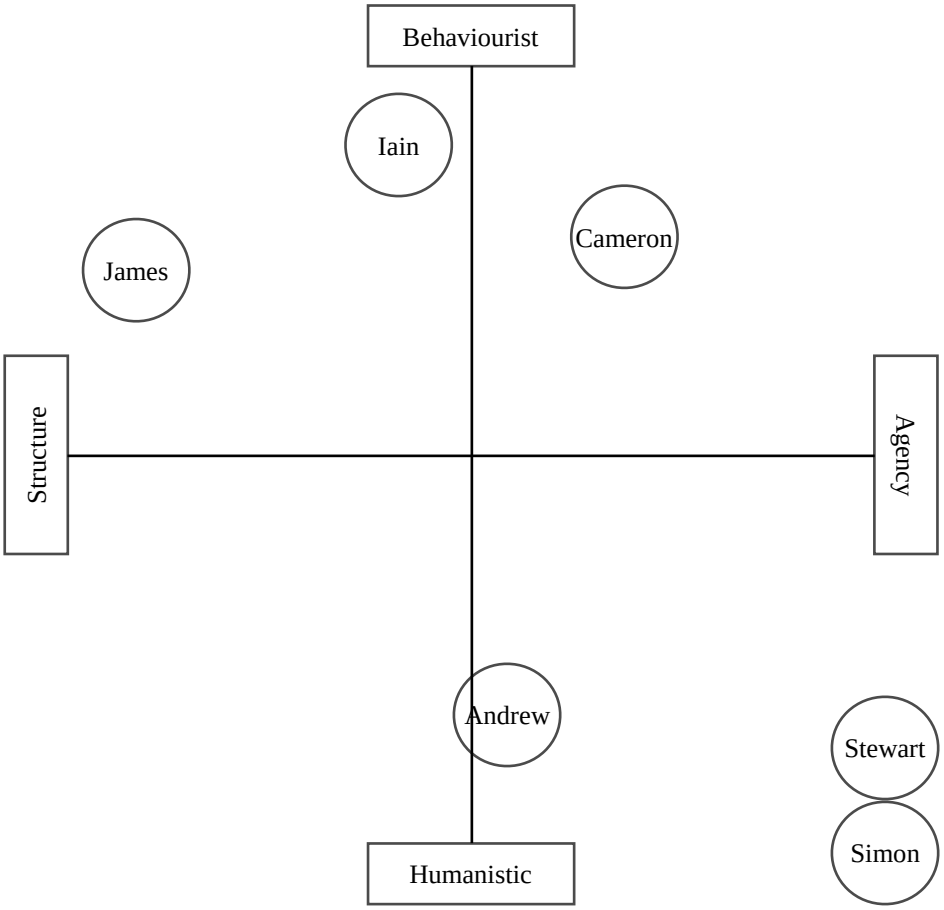
	James	Iain	Andrew	Stewart	Cameron	Simon
Individual consideration	4.33 / 3	3.94 / 3	4.85 / 3	4.75 / 3	4.50 / 3	4.83 / 3
Inspirational motivation	4.33 / 0	4.38 / 1	4.25 / 3	4.83 / 2	3.92 / 0	4.67 / 3
Intellectual stimulation	4.08 / 0	4.06 / 2	4.45 / 3	4.92 / 3	4.08 /1	4.33 / 3
Role model	3.33 / 1	3.81 / 1.5	3.70 / 2	4.71 / 2	3.67 / 1.5	4.83 / 2
High performance expectations	3.75 / 1	4.25 / 2	4.20 / 2	4.83 / 1	3.75 / 1	4.58 / 2
Contingent reward	3.75 / 2	4.38 / 3	4.00 / 2	4.83 / 2	4.92 / 1	4.75 / 2
Group goal acceptance	4.11 / 1	3.75 / 0	3.53 /1	4.78 / 1.5	4.11 /1	4.56 / 1
Mean	3.96 / 1.1	4.08 / 1.8	4.14 / 2.3	4.81 / 2.1	4.13 /1.2	4.65 / 2.3

Scores are presented athlete's perceptions / observers' rating. Athletes' perceptions are scored on a 5 point scale (1 = not at all, 5 = all the time). Observers' ratings are scored on the potency rating scale 0 (not at all), 1 (weak), 2 (moderate), 3 (strong).

965 Figure 1. Coaches' TD motivational climate mapped onto perspectives of learning

966

967



968

Appendix A. Coaches' interview questions

Did the session run as anticipated?

What were your aims for the session?

How well were those aims achieved?

How do you encourage interest and enquiry on the part of your athletes?

Do you, if so how and why, provide rationale to athletes for the tasks you set?

How important is providing structure to the environment you create?

How do you encourage athletes taking initiative?

How do you provide reward for your athletes and what do you reward?

How would you describe your communication style and how is this manifest to your athletes (ie what would they see / hear)?

How does this last session fit with your overall plan for these athletes?

Appendix B. Athletes' questionnaire open-ended questions

How similar or different was this session to previous sessions you have had this year?

How would you describe the way your coach coached you on this session?

Does your coach explain why they are asking you to do certain drills / exercises? If yes, do you think this is important and why?

How does your coach encourage or reward you?

In what ways does your coach encourage you to understand why certain techniques work?

What do you need from your coach in the run up to a competition?

How does your coach prepare you for times when he/she can't be with you at an event?