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DEFINING COACHING EFFECTIVENESS

A focus on coaches' knowledge

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Introduction

Côté and Gilbert (2009) recently proposed an integrative definition of coaching effectiveness that focuses on coaches' knowledge, athletes' outcomes, and the different contexts that coaches typically work in. The definition, based on a thorough review of coaching, teaching, athlete development, and positive psychology literature, is:

> The consistent application of integrated professional, interpersonal, and intrapersonal knowledge to improve athletes' competence, confidence, connection, and character in specific coaching contexts.
>
> *(Côté and Gilbert 2009: 316)*

In-depth discussions about athletes' outcomes (Côté *et al.* 2010; Côté and Gilbert 2009) and coaching contexts (Lyle and Cushion 2010; Trudel and Gilbert 2006) are available in the literature. A similar discussion on the coaches' knowledge component has not been presented, thereby limiting the application of the integrated definition of coaching effectiveness and expertise. The purpose of this chapter is to define in more detail the three forms of coaches' knowledge that underpin coaching effectiveness and expertise. Various ways of classifying the type of knowledge required in coaching have been proposed (Abraham *et al.* 2006; Cassidy *et al.* 2009; Nash and Collins 2006). Although a major component of coaching expertise resides in one's ability to teach sport specific skills (professional knowledge; Jones 2007), coaching expertise also requires the ability to create and maintain relationships (interpersonal knowledge; Becker 2009; Jowett 2007) and the ability to learn from one's own practice (intrapersonal knowledge; Gilbert and Trudel 2001). For the purpose of our discussion specific to sport coaching, we view professional knowledge as content knowledge and how to teach it; hence, it also includes pedagogical content knowledge related to

teaching sport skills. Interpersonal knowledge in a sport coaching context might best be framed as emotional intelligence. It is knowledge of how to connect with others (players, coaches, media, administrators, officials, etc.). Lastly, we suggest that the third type of knowledge – intrapersonal knowledge – is most aligned with the concepts of self-awareness and reflection.

Coaches' professional knowledge

Abraham and colleagues (2006) proposed that expert knowledge for coaches includes declarative knowledge in the sport sciences (i.e. ologies), sport specific knowledge, and pedagogical knowledge with accompanying procedural knowledge. These different categories of knowledge can be regrouped under a more general 'professional knowledge' category that defines the large body of specialized knowledge required to coach. The conceptual foundation, then, for professional knowledge in sport coaching is declarative (what) and procedural (how) knowledge. We will avoid elaborating on declarative knowledge for sport coaching because although there is some overlap among sports and settings (e.g. principles of strength and conditioning), declarative knowledge will vary widely among sport settings. The second component of professional knowledge is procedural knowledge – the ability to transform and use declarative knowledge in specific sporting contexts. Although the study of procedural knowledge in sports coaching is limited, it appears that two dominant conceptual frameworks have guided this work – coaching skill and coach decision making.

Examination of procedural knowledge from a coaching skill perspective has been driven by the work of Schempp and colleagues (see Schempp and McCullick 2010 for a review of this line of work). Based on nearly two decades of research – influenced mostly by a series of studies with golf instructors – Schempp and colleagues have identified nine distinct coaching skills that appear to differentiate expert from novice sport coaches. These skills are planning, prediction, intuitive decision making, communication, automaticity, observational analysis, problem solving, self-monitoring and perception. From a skill perspective, then, these nine skills comprise the procedural knowledge for sports coaching. Although these nine skills provide an appealing organizational framework for the study and development of procedural knowledge in sports coaching, this framework does not appear to have been widely adopted in the literature. Clearly much more research is needed before a determination can be made on the efficacy of the coaching skill perspective for understanding procedural knowledge in sport coaching. However, at its core the coaching skill perspective clearly aligns with a more widely adopted perspective on procedural knowledge in sport coaching. The common theme across the nine coaching skills is that 'expert' coaching (transformation and application of declarative knowledge) rests on effective decision making. In fact, Schempp and colleagues refer to effective decision making as 'strategic knowledge' – under which all nine coaching skills may be subsumed.

Unlike the coaching skill perspective, approaching procedural knowledge from a decision-making perspective has been widely adopted in the sports coaching literature. Based on our review of the literature we hold the position that procedural knowledge is inextricably linked with decision making ability (Lyle 2010; Lyle and Vergeer, Chapter 10 in this volume). Isolated studies on coach decision making have been published since the early 1990s. In perhaps the first published research on this topic Duke and Corlett (1992) examined the factors university women's basketball coaches used when calling timeouts during games. The first published study of coach decision making during practice settings appears to be the

one on high school basketball coaches' practice planning decisions conducted by Jones *et al.* (1995). These two landmark studies collectively represent two divergent conceptual approaches to coach decision making. Whereas the Jones *et al.* study examined coaches' decision making in a contrived lab-based setting (coaches were instructed to plan and teach a 30-minute practice on a specific play), the Duke and Corlett study examined coaches' decision making in actual games. The Jones *et al.* study could be considered a Judgment/Decision Making (J/DM) approach as opposed to the Naturalistic Decision Making (NDM) approach used by Duke and Corlett. Since the time of these early studies, the NDM approach has become the dominant and advocated approach for research on coach decision making (Lyle 2010).

Comprehensive summaries of the NDM approach applied to sport coaching research are now available (Lyle 2010; Lyle and Vergeer, this volume). The central theme of NDM is that procedural knowledge rests on a coach's ability to 'make sense' of a situation and formulate a response (decision). These decisions are influenced not only by a reading of the situation, but also by the coach's experience and awareness of athlete profiles. For example, Gilbert and colleagues (1999) found that youth ice hockey coaches cited approximately three unique factors that influenced each interactive decision during games. Furthermore, 21 separate factors in all were identified by the coaches that were separated into two categories (Field Information and Coach Knowledge).

In a deeper analysis of the complexity of coach decision making, this time in the context of training sessions with elite sailing coaches, Saury and Durand (1998) found three constraints that heavily influenced coach decision making:

1 principles of training efficiency;
2 temporal situation of the actions; and
3 uncertainty inherent in athletes' actions and the weather conditions.

Within these constraints, coaches used what were referred to as 'operating modes' – which in our view is simply another way to describe procedural knowledge. Five operating modes were identified:

1 use of organizational routines;
2 cognitive anticipation based on flexible plans;
3 flexible adaptation of plans to unforeseen circumstances;
4 joint control of training; and
5 involvement in the training situation based on reference to past experiences.

Further support for the NDM as a conceptual framework for understanding coaches' procedural knowledge is evident in Debanne and Fontayne's (2009) case study of an elite handball coach's cognitive processes during competition. Whereas Saury and Durand use the term 'operating modes' to describe procedural knowledge, Debanne and Fontayne use 'adjustment routines'. Adjustment routines varied depending on the game conditions (offense or defense) and were influenced by the coach's deep knowledge of the game and athlete profiles. Regardless of the terminology used, both studies provide strong evidence for the validity of the NDM perspective.

Although there are relatively few published studies that could be considered examples of NDM in sports coaching, the evidence clearly shows support for NDM as a valid conceptual framework for understanding coach procedural knowledge. Furthermore, although

developing somewhat independently there is considerable thematic overlap both within studies conducted from the NDM perspective and between the decision making and coaching skill perspectives.

For example, from a decision making perspective expert coaches' procedural knowledge rests on their ability to 'forward reason' and anticipate potential outcomes of decision options (Lyle 2010). From a coaching skill perspective, expert coaches' procedural knowledge also rests on this same ability to 'predict outcomes' based on recognition of similarities across situations (Schempp and McCullick 2010). So although one common unifying conceptual framework remains elusive, the common themes for understanding coach procedural knowledge are clearly evident.

Coaches' behaviors in competition and training can be seen as the concrete manifestation of their knowledge base. Accordingly naturalistic behavior research (see Erickson and Côté, Chapter 9 in this volume) should continue to inform and be integral to our understanding of coaches' professional knowledge. The seminal work of Smith and Smoll (2007) is a prime example of behavioral research that has been used to shed light on aspects of coaches' professional knowledge, specifically youth sport coaches' procedural knowledge during teaching sessions. The practical significance, however, of a common framework for understanding coaches' knowledge is not a standardized set of effective coaching behaviors. Rather, the real value of a coaches' knowledge framework is that it increases our ability to help coaches and coach educators develop the knowledge 'competencies' required in order to effectively translate knowledge into action. One might consider the decision-making skills identified in our review of the literature as a starting point for creating a common list of coaches' knowledge 'competencies'. The challenge then is to design formal coach education systems that provide regular and systematic opportunities for coaches to develop these knowledge 'competencies'. Among the many suggestions found in the coaching literature, 'situated learning' coach education opportunities appears to be the most widely supported (Lyle 2010). Examples of 'situated learning' approaches include problem-based learning (Jones and Turner 2006), communities of practice (Culver and Trudel 2008), and learning communities (Gilbert *et al.* 2009). In closing this section, we believe fruitful courses of action at this point are to further refine definitions and terminology, and expand our database of naturalistic coaching behavioral research, to facilitate the generation of an evidenced-based conceptual framework for studying and developing coaches' professional knowledge.

Coaches' interpersonal knowledge

Coaches do not work in isolation; their effectiveness depends on individual and group interactions. To be successful, coaches have to interact regularly with their athletes, as well as assistant coaches, parents, and other professionals. Recent theoretical work (Bowes and Jones 2006; Cushion *et al.* 2006; Jones *et al.* 2010; Jones and Wallace 2006) advocates for a multidirectional conceptualization of coach-athlete interactions which suggests that coaching is a complex, reciprocally influential process based on systems of social interactions. The interpersonal and social skills involved in leading individuals can also be referred to as the 'human' aspect of coaching. Although this has been acknowledged as being a crucial element of effective leaders, teachers and coaches (Becker 2009; Jones *et al.* 2010; Rieke *et al.* 2008), this concept has not been operationalized enough to be measured and studied.

In an attempt to conceptualize the interpersonal aspect of coaching, Lorimer and Jowett in Chapter 26 of this volume highlight the notion of 'understanding' as a way to shed light on coach-athlete relationships. They advocate that understanding and communication are

the heart of the relationships between coaches and athletes. Because emotion plays a fundamental role in interpersonal relationships (Caruso *et al.* 2002; Greenockle 2010), the field of emotional intelligence provides us with a concrete model to frame the interpersonal knowledge of effective coaches and their ability to understand their athletes and communicate with others. Emotional intelligence can be seen as a subset of Lorimer and Jowett's concept of understanding and communication that focuses on the coaches' ability to recognize and use emotions to manage their relationships with others and regulate behaviors.

In a review of different emotional intelligence frameworks in sport research, Meyer and Fletcher (2007) reiterate the fact that two broad approaches exist in the general field of emotional intelligence research: a mixed approach and an ability approach. The mixed approach conceptualizes emotional intelligence as including emotional competencies and personality traits such as self-awareness and self-motivation. This approach has been widely popularized by authors such as Goleman (1998). However, the overlapping constructs of emotional intelligence and personality traits inherent in the mixed approach have led authors from a mixed approach perspective to define a field that has little scientific validity (Davies *et al.* 1998). Two drawbacks of the mixed model approach are the difficulty in measuring emotional intelligence traits with self-report inventories and the fact that the model does not appear to exist as a construct separable from other aspects of personality (Meyer and Fletcher 2007).

On the other hand, the ability approach (Mayer and Salovey 1997) conceives emotional intelligence as an ability that can be developed and measured using objective instruments such as the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT). Most importantly, the ability model has been useful in providing guidelines in areas such as group research (Latimer *et al.* 2007) and leadership (Caruso *et al.* 2002). Recently Chan and Mallett (2011) initiated a comprehensive discussion on the value of the emotional intelligence framework for high performance coaching effectiveness. Specifically, in their lead article they illustrated the importance of perceiving, using, understanding, and managing emotions as an important set of abilities for high performance coaches. For the purpose of this chapter and in line with Chan and Mallett's recent recommendations, the Mayer and Salovey (1997) ability approach to emotional intelligence will be used to offer insight into our understanding of how effective coaches interact with others. According to Mayer and Salovey emotional intelligence can be defined according to a four branch model of (1) identifying, (2) using, (3) understanding, and (4) managing emotions. These abilities are essential components of interpersonal skills and the capacity that a coach has for instance, to motivate athletes, plan and make decisions, and to interact with others and build a team.

The first branch is identifying emotions. This branch includes a number of skills, such as the ability to identify feelings in others and express emotions in a constructive manner. Coaches' ability to perceive their athletes' emotions accurately will facilitate communication, prevent conflict, and help deal with athletes who are anxious or lack confidence. Additionally, coaches' ability to perceive emotions in opponents may provide a performance advantage.

The second branch is using emotions. This includes the ability to use emotions to focus attention on relevant cues and to generate emotions that facilitate decision making and problem solving. Coaches' ability to use emotions such as enjoyment with young athletes will likely create a positive and nurturing sporting environment. Furthermore, coaches that are effective at using their own emotions can generate effort, enthusiasm, and concentration in their athletes and eventually develop more confident and competent athletes.

The third branch is understanding emotions. This relates to the ability to recognize the causes of emotions and to understand relationships among emotions. Coaches that are

effective at understanding emotions have a good sense of what makes their athletes react one way or another. Coaches' understanding of their athletes' emotions becomes essential for creating a cohesive group and connections with others. The ability to understand emotions provides a coach with the power to recognize other's point of view and ultimately influence behaviors or skills in others.

The fourth branch is managing emotions. This includes the ability to be aware of one's emotion, determine the nature of an emotion, and solve emotional situations effectively. Coaches play a critical role in teaching athletes strategies to achieve an emotional state that will lead to optimal performance. For example, coaches are known to manage emotions in order to arouse their athletes before a competition; conversely, coaches that are effective at managing emotions are also able to use calming emotional strategies to help certain athletes relax before an important competition. Furthermore, many sporting situations create an array of emotions that need to be managed by the athletes and the coaches. Effective coaches possess the ability to teach athletes to respond appropriately to emotionally charged situations in sport (i.e. character building) and will themselves regulate their own emotions when faced with adverse or frustrating situations.

The following hypothetical scenario illustrates how Mayer and Salovey's (1997) ability model provides a useful framework to operationalize the interpersonal knowledge of effective coaches.

Bob is a high school basketball coach in the United States. He has been coaching for ten years for the same school and won a State Championship in his second year of coaching. Bob started his high school career as a physical education teacher and was appointed as a coach when the job became available. He believes that sport offers adolescents opportunities to learn important life skills and develop character, but his main concern is to put a winning team on the floor. Bob is a performance coach for young adolescents.

As a coach, Bob is very effective at teaching skills to his players and designs practices that prepare his players effectively for games. Bob is capable of accurately identifying and expressing emotions, as he often makes insightful observations about his players. The recognition of his own emotions is sometimes inaccurate as, he often claims to be feeling calm when it is obvious to his assistant coaches and players that he is angry and upset at the performance of some of his players. Bob appears to be skilled in some areas of perceiving emotions in his players but sometimes fails to recognize his own emotional state.

Bob is very innovative and is able to use his own emotions to generate excitement in his players and coaching staff. He is able to think creatively and is always positive about his team and program with journalists, parents, and other school staff. Bob's ability to use his own emotion to harness certain moods in his players and the people around him is high.

Bob's ability to understand emotions is not as high as his ability to perceive or use emotions. Bob appears to sometimes not understand the true character of some teachers in the school who believe that the basketball program uses too many resources in the school and creates inequities. He sometimes gets impatient with parents who pull their sons from basketball practices so they have more time to prepare for important exams. Although Bob understands the basics of emotions, he often misunderstands other people's motives.

Bob is fairly effective at managing emotions. He is able to integrate his emotions into his actions and assist his players in responding constructively to upsetting situations such as a losing streak. Although Bob is effective at handling situations that are upsetting to his players, he sometimes avoids confrontations with his coaching staff when they don't agree on certain strategies. Similarly, Bob will try to avoid confrontations with parents who are not happy about their son's playing time or utilization on the team.

Table 12.1 was adapted from Caruso *et al.* (2002) and presents an analysis of how the four branches of the Mayer and Salovey (1997) model can be applied to coaching and more specifically defines the competencies of coaches' interpersonal knowledge. Columns 2 and 3 of the table summarize Bob's ability on four different levels of his relationships with others. An in-depth discussion of the Mayer and Salovey model as a determining factor of leadership and interpersonal qualities in coaching can be found in the recent article by Chan and Mallett (2011).*n*

: Application of emotional intelligence abilities to sport coaching

Ability	*Level*	*Analysis of Bob the Coach*
Perceiving: • Identify own emotions. • Identify emotions in others.	Average	Skilled at attending to his players' emotions but sometimes misreads his own emotions.
Using: • Use emotion to facilitate own effective thinking. • Generate emotions to assist own problem solving.	High	Effective at harnessing his own emotions to solve problems and think about creative solutions.
Understanding: • Understand relationships and transitions among emotions. • Understand complex feelings and contradictory states.	Average	Understands well the basic of emotions but often misunderstands other peoples' motives.
Managing: • Ability to manage emotions in oneself and in others.	High/ Average	Effective at managing his own and his players' emotions but avoids confrontations with certain people.

Coaches' intrapersonal knowledge

Intrapersonal knowledge is formally defined as 'the understanding of oneself and the ability for introspection and reflection' (Côté and Gilbert 2009: 311). Sport coaches, and those who have studied them, have long acknowledged the central role of self-awareness in becoming an effective coach. This recognition of self-awareness as the foundation for developing coaching effectiveness transcends time and coaching contexts (Vickers and

Hale 2010). However, there is much less clarity on the underlying conceptual framework that is used to inform our understanding of coaches' intrapersonal knowledge. Although it has been shown that effective coaches have a keen sense of self-awareness (e.g. Gallimore and Tharp 2004), being aware of one's strengths and limitations will not lead to coach development unless this awareness is accompanied by action – either to maintain strengths or address weaknesses (Schempp *et al.* 2007). The term most widely used to describe the act of using self-awareness to improve coaching effectiveness is reflection. In the remainder of this section we discuss coach reflection in order to provide a detailed description of intrapersonal knowledge and the role it plays in the development of coaching effectiveness and expertise.

Coach reflection

One of the earliest examinations of reflection with sport coaches is the multiple-case study of experiential learning with model youth sport coaches conducted by Gilbert and Trudel (2001, 2004, 2005). Since their original work, many others have studied and written about reflection in sport coaching. For example, reflection applied to sports coaching has since been described as a type of 'internal learning situation,' 'where there is a reconsideration of existing ideas in the coach's cognitive structure' (Werthner and Trudel 2006: 201). Others have framed coach reflection as a type of informal coach learning situation (Mallett *et al.* 2009; Nelson *et al.* 2006). Actual studies of coach reflection, however, are still somewhat rare (Irwin *et al.* 2004: Jones and Turner 2006; Knowles *et al.* 2006).

Schön's (1983, 1987) theory of reflection specific to the development of knowledge for professional practice in the context of professional activity underlies much of the literature on coach reflection. For Schön, knowledge creation through experience is accomplished by reflecting-in and -on practice dilemmas, referred to as a reflective conversation. These reflective conversations include repeating spirals of appreciation (problem setting), action (experimenting), and re-appreciation (problem setting). Problems of practice are the triggers for these reflective conversations. The problems themselves are bound by the way practitioners view their roles, referred to as a role frame. Role frames, then, are important to understanding reflection because they act as filters through which problems are constructed and strategies are developed.

Support has been found for all aspects of Schön's theory of reflection and evidence-based definitions for three different types of coach reflection are now available. The first type of reflection is referred to as reflection-in-action. When coaches consciously engage in all or some of the components of a reflective conversation while in the midst of the act of coaching (i.e. while an event is occurring during a competition or training session), we refer to this as reflection-in-action. Using the example of a basketball coach, a coach may observe during a competition that the opponent has changed their offensive strategy, and his team has not adjusted to this move resulting in several easy scores by the opponent. While the play continues on the floor, the coach quickly cycles through the reflective conversation experimenting virtually in his mind with one or more potential adjustments (solutions to a newly observed problem). The coach may even test his proposed solution with members of his coaching staff or players on the bench before moving forward in the reflective conversation to actual (real-world) experimentation. Once a strategy has been selected – and vetted through the reflective conversation – the coach calls out to his players on the court to make a defensive adjustment, or the coach may call a time-out to explain the adjustment in more detail. The reflective conversation then continues as the coach observes the results of

his experiment. During reflection-in-action the coach may quickly cycle through multiple rounds of this reflective conversation.

The second type of reflection – reflection-on-action – is defined as engaging in a reflective conversation after an event has occurred but while there still is an opportunity for applying potential solutions to resolve the event. Returning to our basketball example, the coach may decide to wait until the following competition to experiment with a different defensive strategy. Depending on a myriad of factors that influence each and every coaching decision (opponent, time left in the game, time of season, team attributes, score, etc.) the coach may postpone the reflective conversation until there is more time to formally engage in the reflective process.

Building off of Schön's work, we would refer to this as waiting until the 'direct action-present' has passed – that is, the time during which a strategy can be applied to resolve the current problem (this particular opponent scoring during this particular competition). However, if the basketball season has not been completed, the 'action-present' is still open because an adjustment to the defensive system made after the game can be applied (and tested) in subsequent games and therefore impact the team success in that present season. The key distinction, then, between reflection-in-action and reflection-on-action is the action-present in which the reflective conversation occurs. Reflection-in-action occurs in the direct action-present whereas reflection-on-action occurs in the indirect action-present.

Lastly, the third type of reflection found with sport coaches is labeled retrospective reflection-on-action. In this type of reflection a reflective conversation is still triggered by a coaching problem, but the conversation occurs long after the event has happened. Suppose our basketball coach does not make any formal adjustments to his defensive system during the season, or even pause to formally reflect on the need to make an adjustment (i.e. does not set the defensive system as a problem). However, in the off-season the coach engages in a post-season review and at that point it is determined that an adjustment is needed in the team's defensive system. The reflective conversation that occurs at this point – long after the direct and indirect action-present have passed – is an example of retrospective reflection-on-action.

Regardless of the outcome of the defensive adjustment (success or failure), and the time at which the reflective conversation occurs (inside or outside the action-present), changes to coaches' procedural knowledge are dependent upon a coach's ability to effectively engage in a reflective conversation. Clearly reflection-in-action will be constrained by time and attentional capacities, and in many situations may simply be impractical. Perhaps reflection-on-action and retrospective reflection-on-action are more practical means for teaching coaches how to develop and improve their intrapersonal knowledge competency. Regardless of the type of reflection, the more 'situated' (Lyle 2010) the reflective conversation is the more likely that the coaching knowledge that is generated will be meaningful for the coach. In other words, using reflection as a conceptual framework for coaches' intrapersonal knowledge reinforces the importance of using real (situated) coaching situations as the source for reflective conversations.

When studying coach reflection, it would be beneficial to clearly identify the type of reflection that is being investigated while also exploring direct links between this reflection and changes in coaches' procedural knowledge and behaviors. It should also be noted here that there is an emerging body of literature related to coaches' intrapersonal knowledge that is using self-monitoring – as opposed to reflection – as a conceptual framework (Cushion 2010; Schempp *et al.* 2007; Schempp *et al.* 2006). As this body of literature develops it will be important to consider how the two conceptual frameworks

may be integrated into a single coherent framework for understanding coaches' intrapersonal knowledge. In terms of application to coach education, efforts designed to stimulate growth in coaches' intrapersonal knowledge clearly would benefit from an emphasis on reflection-in- and on-action. Ongoing situated learning experiences (e.g. learning communities, communities of practice) currently being advocated in the coach education literature provide direction for creating a formal infrastructure to support coach reflection and the development of intrapersonal knowledge (Bertram and Gilbert 2011; Culver and Trudel 2008; Gilbert *et al.* 2009).

Summary and future directions

In this chapter we provided descriptions of the conceptual frameworks that underpin the three types of coaches' knowledge: professional knowledge, interpersonal knowledge, and intrapersonal knowledge (Côté and Gilbert 2009). Decision-making frameworks and coaching behaviors research are used to frame our understanding of coaches' professional knowledge. When examining interpersonal knowledge, emotional intelligence is offered as a guiding framework. Lastly, coach reflection – and its relation to growth in coaches' knowledge – is the conceptual framework used to examine intrapersonal knowledge. Although much progress has been made in the quest to understand coaching effectiveness and expertise, we close this chapter with some thoughts on our ability to measure coaches' knowledge, which may serve as productive areas for future research.

We have argued that professional knowledge is exemplified in coach decision-making competencies. Therefore, assessment of coaches' professional knowledge may best be accomplished by having coaches articulate – either in writing or orally – the rationale behind their decisions. These 'decision narratives' can then be used as a platform for self-reflection and/or peer mentoring (Jones *et al.* 2009). When combined with naturalistic behavior observation tools, these decision narratives will provide robust insight into the content and organization of coaches' professional knowledge. Another potential method for measuring coaches' professional knowledge is concept mapping (Novak and Cañas 2008). Although this method may provide accurate and comprehensive portraits of coaches' knowledge, we acknowledge that it may not be practical for widespread use in organizations and countries that oversee thousands of coaches annually.

Suggestions for measuring coaches' interpersonal knowledge include the Coach-Athlete Relationship Questionnaire (CART-Q; Jowett and Ntoumanis 2004), the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; Mayer *et al.* 2003) and the observation of coach-athlete interactions using state space grid method (Erickson *et al.* 2011). The CART-Q is a brief (11-item) questionnaire that measures the nature of the coach-athlete relationship from the perspectives of both the coach and athlete. The questionnaire is composed of three subscales that break down the coach-athlete relationship into closeness (emotions), commitment (cognitions), and complementarity (behaviors). The MSCEIT is a 141-item test that measures how well people perform tasks and solve emotional problems. The test is consistent with Mayer and Salovey's (1997) definition of emotional intelligence and measures individual abilities to (1) perceive emotions; (2) use emotions; (3) understand emotions; and (4) manage emotions. Finally, an observation method recently introduced into coaching research – the state space grid (SSG) – holds potential to further our understanding of coach-athlete interactions (Erickson *et al.* 2011). The SSG allows researchers to examine the structural, temporal, and sequential elements of coach-athlete interaction patterns and the influence of these interactions on various psychosocial outcomes.

Short of conducting individual interviews with coaches, there appear to be few practical and valid methods for assessing changes in coaches' intrapersonal knowledge. While some have experimented with having coaches keep reflective journals (Knowles *et al.* 2006), adherence to this procedure appears to be problematic once coaches are in the field. One instrument that seems promising and has been used at least once in coaching research (Bertram and Gilbert 2011) is the Self-Reflection and Insight Scale (SRIS; Grant *et al.* 2002). The SRIS is a 20-item self-reporting scale with two subscales: the self-reflection scale and the insight scale. Self-reflection is defined as 'the inspection and evaluation of one's thoughts, feelings, and behavior' (821) and insight is defined as 'the clarity of understanding of one's thoughts, feelings, and behavior' (821). These definitions align well with our conceptualization of coaches' intrapersonal knowledge.

In closing, our understanding of how coaching effectiveness is defined and developed continues to evolve, and the conceptual frameworks presented herein provide direct links from the literature on effectiveness and expertise across domains to sport coaching. Indeed the future of coaching as a legitimate profession, with a well-defined and coherent body of research-based knowledge, is dependent upon this very type of cross-discipline pollination (Duffy *et al.* 2011). We look forward to continued testing and refinement of the integrated definition of coaching effectiveness and its underlying conceptual frameworks.

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