Optimising the learning environment through autonomy supportive coaching

By

Neil Yeates (24956294)

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Abstract

The main purpose of this paper is to investigate the drivers behind positive learning and performance outcomes in athletes through the influence of coach behaviours. The impact of coach behaviour on athletes has been found to influence athlete learning through the promotion of intrinsically motivated behaviours and satisfaction of the three main basic psychological needs: competence, relatedness and autonomy. The literature supports that autonomy supportive coach behaviours, satisfy the three basic psychological needs and in turn, promotes more intrinsically motivated learners and performers. Additionally, the use of augmented feedback in an autonomy supportive way, provides important opportunities for implicit feedback and decision making by the athlete, which has been found beneficial for learning. Coaches can promote learning by consistency giving positive feedback, re framing athlete mistakes as learning opportunities, delaying feedback to allow for implicit learning opportunities and allowing athletes to control when they receive feedback to promote autonomy through choice. In summary, although the implementation of autonomy supportive coach behaviours may seem a more challenging task than adopting controlled behaviours, in some cases, it plays an important role in developing self-determined behaviours in athletes and learners which can translate into improved learning environments which may positively affect performance.

Introduction

Although participating in sport has been found to promote positive health benefits (Sothern, Loftin, Suskind, Udall, & Blecker, 1999), and psychological and social benefits, (Eime, Young, Harvey, Charity, & Payne, 2013), there lacks clear evidence that solely participating in activities related to skill development (i.e., training), can facilitate the learning of new skills and motor behaviours to improve sports performance (Brunelle, Danish, & Forneris, 2007). In youth participants, sport can provide an important setting to promote positive development across life skills (e.g., goal setting, teamwork and motivation). Coaches have the opportunity to provide a platform to help develop these skills (Santos, Camiré, & Campos, 2018). Additionally, coaches are able to impart knowledge upon their athletes to facilitate and guide the improvement of motor skills, and how a coach or practitioner goes about this process may lead to positive, negative, or no changes in an athlete's skill development or performance (Schempp, McCullick, and Mason, 2006). In order to help develop athlete skills, (i.e., participant learning), coaches require technical knowledge (i.e., subject and pedagogical), and interpersonal knowledge (i.e., the coach-athlete relationship), both of which can influence athlete learning and development that can ultimately lead to success (Horton & Deakin, 2008). Furthermore, within the coach-athlete relationship, the preferred behaviours and leadership style adopted by a coach to interact with their athletes can influence learning through the impact of participant motivation (Ryan & Deci, 2000). How a coach interacts with participants may indicate a preferred coaching style. For example, coaches who adopt a more autocratic style of coaching (e.g., followers are not involved in decision making or offered opportunities for personal input), can destabilise groups or teams if individuals do not feel valued in their thoughts, feelings and ability to make decisions, which may negatively affect learning (Hooyman, Wulf, & Lewthwaite, 2014). Although in some cases

an autocratic style may improve results by forcing group or team members to invest in their group toward the common goal, an increase in discontent and hostility, and a decrease in task adherence was found in followers through autocratic coaching as opposed to democratic coaching (Van Vugt, Jepson, Hart, & De Cremer, 2004). Conversely, coach behaviours that support athlete involvement (i.e., democratic style), where followers are included in decision making that contribute to team goals, along with encouragement towards improving one's own personal goals can help increase athlete motivation (Ryan & Deci, 2000), wellbeing (Gonzalez, Garcia-Merita, Castillo, & Balaguer, 2016) and retention (Isoard-gautheur et al., 2012). The effect upon performance by increasing learner motivation can drive engagement towards the desire to learn, acquire and retain motor skills (Hooyman et al., 2014), developing higher competencies across physical movements and control (i.e., *physical literacy*). Physical literacy has been defined as; the ability of an individual to understand, apply and analyse different forms of movement (Margaret Whitehead, 2010; Giblin, Collins, & Button, 2014) Those who are physically literate are implied to have developed motor skill in the locomotor, non-locomotor and manipulative (object control) qualities. In other words, they have acquired skill to voluntarily perform movement tasks in certain environments (Whitehead et al., 2010). Skill acquisition refers to the learning and retention of these motor tasks that require voluntary control of one's body in order to achieve an outcome (i.e., motor learning and control). Skill acquisition has been viewed as an adaptive behaviour through the relationship outcomes of decision making and action and the functional relationship between the individual organism and their environment (Davids, Button, Araújo, Renshaw, & Hristovski, 2006)

From a physical activity standpoint, those who are *physically literate,* have voluntary control of body segments and joints in varying orders to create movement in loco motor (e.g.,

running, jumping, hopping, skipping, crawling, rolling, climbing, cycling, swimming), manipulative (object control, e.g., throw, bowl, pitch, catch, kick, hit, shoot, dribble), and stability actions, (e.g., balancing). These qualities have been used to describe fundamental movement skills (Barnett et al., 2016; Duncan, Hames, & Eyre, 2019). Additionally, non-locomotor movements (i.e., movements where one or more parts of the body are in contact with the ground, performed from a stable position, (e.g., squat, push, hinge, lunge, rotation, bend, sway, pull, press, reach), help form the basis of many specialised sports and games (e.g., tackling in rugby using reaching and pulling, and lunging and rotating to return a shot in squash), that contribute to the performance of many activities and forming the foundation to achieve greater movement complexities within these qualities. (Kirchner & Fishburne,1998). Therefore, the learning and retention of fundamental movement skills can help improve sport performance by underpinning technical skills related to the characteristics and physical requirements of the sport (Jukic et al., 2019).

For athletes to improve their physical competencies, they are required to adopt new motor behaviour and learn new motor skills, acquiring control over these skills for retention and reproduction. In essence, motor skills are learnt, are defined by their voluntary nature and are modifiable by practice, thus there exists an ability to make movement more effective to increase performance, (Utley, 2018). To change motor skill, changes in motor *behaviour* need to occur. Motor behaviour can be defined as producing a movement outcome through the uncertainly of sensory, motor and task variables, using prior knowledge to formulate a movement plan and making decisions based on ones interpretations of the environment and potential margins for error. (Wolpert & Landy, 2012). Furthermore, by adopting improved control of movement an athlete can unlock better biomechanical degrees of freedom (i.e., decoupling), gaining a deeper

connection between perception and performance by distinguishing between movement possibilities and movement selection. (Rosenbaum, 2005).

If athletes can produce higher levels of movement competency across a variety of scenarios and challenges, then they are primed for greater success due the variability and unpredictability of sport competition (Jukic et al., 2019). Furthermore, alongside higher physical ability, other benefits of accomplished movement skills and physical literacy have been found in youth, including improved mental health (Tomporowski, Lambourne and Okumura, 2011), enhanced academic performance and thinking skills (Kamijo et al., 2011), and influencing positive physical health (i.e., weight management), with these positive outcomes being carried into adulthood. (Castelli, Centeio, Beighle, Carson, & Nicksic, 2014).

The purpose of this paper is to highlight specific coach behaviours, that have been found effective in supporting a positive learning environment by encouraging positive actions that lead to improved motivation, positive self-esteem and learner engagement, (e.g., problem solving, decision making, thinking skills, managing emotions and admitting mistakes) that support learner empowerment, competence and peer socialisation (Brydon-Miller, 2018). Variables such as the coach-athlete relationship, uses of language and communication (i.e., feedback), and levels of freedom (i.e., autonomy), given by the coach to their athletes all influence the coach-learner environment, and are identified as impactful upon motor learning. Furthermore, how these specific coach behaviours can support or interrupt the learning process, and how coach behaviour may influence the learning outcome. Additionally, how coach behaviours facilitate the development of intrinsic motivation in learners to positively influence their own motor behaviours and retention of these behaviours, to help improve performance across physical

competencies. Stages of learning will be discussed in order to identify how and when specific coach behaviour can positively influence the motivation to learn.

Stages of Learning

Although learning may be observed in some to be a relatively quick process, or one that is more time consuming in others, there exists identifiable behavioural stages all learners experience on their way toward the acquisition of motor skills (Edwards, 2010). Researchers have proposed skill acquisition involves learning that occurs across *stages*. Fitts and Posner (1967), introduced a three-stage model of learning; *Cognitive* stage (e.g., learner focusses on what to do and how to do it), *associative stage* (e.g., after unspecified practice time, the learner associates specific cues with solving a motor problem), and the *autonomous* stage (e.g., learner needs little or no conscious thought to produce motor skill).

During the cognitive stage, learners may receive high levels of feedback from a coach, paying close attention to the feedback (Edwards, 2010). Typically, this process involves a large amount of errors, but also large gains resulting in higher levels of inconsistency in outcome. The associative stage sees the learner establish the fundamentals of the skill resulting in a higher rate of consistency in the outcome, decreasing the variability in performance through less errors. Attention is primarily given to body movements by the learner with a reduction in coaching feedback. The autonomous stage involves large elements of self-learning through performers understanding of error recognition and adjustment. As the stage suggests, a higher level of automation is present in this stage where performers can produce the motor skill whilst performing other tasks due to a knowledge framework of the skill being established in the associative stage. Additionally, less conscious effort is required due to a deeper understanding of the skill, resulting in more consistent performance of the skill in different environmental contexts

(e.g., training and competition variables) (Fitts & Posner, 1967). The autonomous stage is not always achieved due to the demand for a high and frequent level of deliberate practice required, typically only achieved by elite performers (Taylor & Ivry, 2012). To reach the autonomous stage requires coaching and instruction that will challenge task complexity, and deliberate, quality practice. (Ward, Hodges, Starkes, & Williams, 2007).

A two-stage model proposed by Gentile (1972), took a goal-relevant view on motor learning. Stage one, termed the *initial* stage is comprised of two goals. The first goal is to acquire the movement pattern by adapting to regulatory conditions within the environment that must be confirmed to so that the goal of completing a specific task can be accomplished, and secondly to discriminate between regulatory and non-regulatory (e.g., the colour of the surrounding walls), conditions within the immediate learning environment. To master these two goals, learners are required to display a variety of movement possibilities and find appropriate solutions through trial and error. To enable action goal achievement (i.e., task completion), the learner develops a movement coordination pattern appropriate to solve the task (i.e., movement) problem. For example, in volleyball, if a setter is using a setter's ball as opposed to a regulation ball, the movement characteristics of the arm and hand need to match the object (i.e., indented force production), due to a setter's ball being heavier than a regulation ball. The *later* stages of learning (i.e., stage two), involves learners now showing capabilities in adapting movement patterns and increasing their consistency of execution. Furthermore, effort along with the level of movement intent increases and movement economy improves (i.e., less conscious energy expended), where action tasks are accomplished with less conscious effort and diversifications are seen in the modifications made by the learner/performer across different environmental contextual in which the task can be performed.

Bernstein (1996), presents a six-stage model of learning and begins with solving a motor problem by identifying relationships or connections with previously learned motor behaviours that have been accumulated from earlier stages of life (i.e., the first stage; e.g., playing with a toy, reaching for an object), then developing a strategy to approach the problem (i.e., second stage). This second stage shares similarities from Fitts and Posner's (1967), *cognitive* stage, where learners attempt to figure out a way of accomplishing the task (e.g., what muscles need to be recruited and how much contractile force needs to be applied in order to perform the action required to complete the task). The third stage involves the learner identifying appropriate sensory connections, engaging these connections without conscious awareness (e.g., how does the skill 'feel' to the performer across different contexts. These first three stages represent 'planning' stages in where the building of boundaries and framework by which these actions will take place. In the later stages (i.e., standardisation and stabilisation), learners can counteract external influences that may de-automize the performance of a skill by performing a skill across a variety of contexts and modifications.

Although each of the three models categorizes the stages of learning differently, the same characteristics of learning are described within each models' respective stages. Of the three models outlined, the first model by Fitts & Posner (1967), has been found to be the most widely accepted, becoming the standardized model for describing the process of learning motor skills Belka, (2002), and is used across teaching and learning fields related to motor learning (Edwards, 2010).

Throughout the three interpretations of motor learning, some commonality exists when focussing upon the early stages of learning. During the cognitive stage of the learning model outlined by Fitts and Posner (1967), the involvement of a coach might be significant in relation

to the quantity and modalities of feedback given to the learner (Taylor & Ivry, 2012). Additionally, in the model proposed by Gentile (1972), the initial stage of learning requires decision making by the learner in order to find solutions to accomplish the movement task through trail and error, which seems to share similarities to the model presented by Bernstein (1996), in particular the second stage of learning (i.e., developing a strategy to solve the motor problem). Therefore, the role of a coach or teacher in supporting or interrupting the learning process could play a role in the learning outcome, (i.e., communication style, interactions between coach and learner and coach feedback). In other words, within the realm of motor learning, how does skill acquisition relate to the coaching environment the learner is in.

The learning environment

In order to optimize learning to facilitate skill acquisition, identifying and elements that can influence the learning environment (e.g., organisation of practice, feedback frequency and modality, and physical guidance), may be critical in providing a successful learning outcome. However, motor behaviour and the subsequent performance of a movement can also be influenced by social, cognitive and affective variables (Lohse, Wulf, & Lewthwaite, 2012). Affective states (e.g., irritation, frustration, anger and rage), highlight a relationship between emotion and cognitive states and how they may interfere with learning by causing cognitive disequilibrium. Cognitive disequilibrium occurs as a result of a learner experiencing obstacles to goals through unexpected feedback, deviations from norms, system breakdowns, errors or novelty. This can interfere with learning by causing confusion to the learner, leaving uncertainty as to what to do next and by remaining in cognitive disequilibrium, boredom and disengagement may occur (D'Mello & Graesser, 2012). In order to rectify the learner's failure within skill learning and performance, and move beyond an impasse to learning (i.e., cognitive equilibrium),

performers, coaches and teachers can ask questions to drive inquiry as to the potential faults to the breakdown of the movement, promoting more collaboration between coach and learner, with more opportunities for choice and decision making by the learner. Researchers found that those individuals with a deeper comprehension of faults will ask better diagnostic questions and will have a better understanding of where to fixate their attention as opposed to those with a lower knowledge base and comprehension of faults (Graesser, Lu, Olde, Cooper-Pye, & Whitten, 2005). For example, if when performing a serve in badminton, the outcome of the action results in the birdie repeatedly hitting the net, coaches can ask learners to identify an area of the skill they think could be improved (i.e., body position, racquet angle when striking the birdie, hand position on the racquet), in order to encourage learner engagement to the task. This collaboration can help develop a more productive 'working relationship' and provide the learner with opportunities to think deeper about their movement selections, as opposed to a coach identifying multiple faults after every action or trail. If this happens, learners become less involved in their own process of learning and can lose engagement, developing a reliance upon coach feedback and not relying on their own implicit feedback (Winstein, Pohl, & Lewthwaite, 1994).

Coach behaviour and the learning environment

Learning can be influenced by an individual's motivation but also by the coach or teacher's behaviour (Côté & Gilbert, 2009). To investigate the effects of coaching and leadership behaviours on the motivation of followers, Self-Determination Theory (SDT; Ryan & Deci, 2000), represents a board framework for the study of human motivation and within SDT lies six min theories, each of which addresses a facet of motivation or personality functioning (Deci & Ryan, 2000). SDT outlines a motivational continuum ranging from internal, self-determined motivation, to external non-self determined motivation, focussing on the social and

environmental influences that either support or oppose people's desire to take initiative and voluntarily make decisions. In the absence of motivation (i.e., amotivation), feelings of incompetence, a lack of control and a devaluation of a task or situation can occur whereas, those who show self-determined intrinsic motivation are more interested, gain enjoyment and inherent satisfaction with an internal locus of causality. However, in order to foster and develop motivation, environmental support is required through the absence of automatic tendencies to pursue personal growth (intrinsic motivation), in some cases (Ryan & Deci, 2000).

SDT highlights four types of extrinsic motivation, within the micro theory of Organismic Integration Theory (Deci et al.,1996). Extrinsic motivation is divided into 4 subtypes of behavioural regulation that result from the process of internalization functioning to a greater or lesser degree, related to the regulation of a specific behavior. These four types of extrinsic regulations (external, introjected, identified, integrated), are organised along a continuum from being relatively controlled (i.e., *external*; e.g., activities controlled by external demands such as punishment or reward, to relatively determined (i.e., integrated; e.g., activities experienced freely through being integrated with the persons sense of self). Activities controlled by internal demands such as guilt or embarrassment (i.e., *introjection*), are likely to be maintained to a greater degree than externally regulated behaviours but are still unstable in terms of maintaining these behaviours. *Identified regulation* (e.g., behaviours performed through recognising the importance of them related to one's personal goals). Identified regulation is associated with increased levels of commitment, performance and maintenance compared to external and introjected behaviours (Ryan & Deci, 2000). The more fully a regulation has been internalized, the more it represents integration and thus provides the basis for volitional behaving (Deci et al., 1996).

Cognitive evaluation theory, is another micro theory of SDT and refers to personal and/or environmental circumstances that can lead to either intrinsic or extrinsically motivated behaviour (Deci et al., 1996). Intrinsically motivated behaviours (i.e., those performed out of interest, enjoyment and/or satisfaction), refers to the activity being performed purely for the aforementioned reasons, without threats or consequences of either external or internal origin. Alternatively, extrinsically motivated behaviours (i.e., obtaining approval, gaining reward, avoiding guilt or punishment), are exhibited intending to satisfy these personally held values or beliefs. If motor skills are to be developed to higher levels, practice and training is required. Some coaches may design a type of externally defined deliberate practice to enhance performance that requires effort but is not inherently enjoyable. This extrinsically motivated behavior may be understood by learners to potentially help improve performance but in the absence of any enjoyment (Sanli, Patterson, Bray, & Lee, 2013).

To delve deeper into the theory of SDT is to investigate the six micro theories that contribute to the overarching theory. Of importance to this paper, is the basic psychological needs (BPN) theory, which identifies competence, relatedness and autonomy as essential needs in promoting personal growth, well-being and social development (Ryan & Deci, 2000). The extent to which these basic psychological needs are fulfilled enhances an individual's self-determined motivation. *Competence* refers to the extent to which an individual believes they can successfully achieve an outcome (Ryan & Deci, 2000). In the context of sport, competence may refer to one's ability to perform a skill (and confidence to perform said skill), taking initiative in problem solving or adopt coping strategies in order to effectively deal with specific challenges relative to a situation (Deci, 1975). *Relatedness*, refers to a sense of belonging or connection to a group, individual(s) or an environment, (such as a positive coach-athlete relationship), has been

found to link strongly to positive cognitive processes and pervasive motivation (Baumeister & Leary, 1995). Lastly, *autonomy* relates to having the freedom to make choices and decisions within and environment that one operates (e.g., learners having control over how to approach a movement problem) (Ryan, Vallerand, & Deci, 1985). In sport, autonomy could be demonstrated when an athlete is given a chance to provide input and feedback by a coach or leader. For optimal psychological functioning, humans need to feel competent, create and maintain strong social connections, and have a sense of volition over their decisions and actions (Mageau & Vallerand, 2003).

Furthermore, understanding environmental contexts in which the three basic needs can flourish and identifying social scenarios and environments that may contribute to the fulfillment of such needs is the goal of SDT. For example, positive learning and training environments would see individual athletes and members of a team exhibit respect for one another, treat each other as equal and see value in social relationships, helping to create trust and healthy relationships (i.e., relatedness). Within such an environment, if mistakes are viewed as learning opportunities and part of the *process* of learning and development, whilst also celebrating everyone's skill set, this may lead to feelings of personal competence (i.e., competency). In addition, when team members are encouraged to help make decisions and to direct the team's development, members may feel a greater sense of value and personal choice within the team environment (i.e., autonomy). However, environments that do not consider team members' individuality or environments that show favouritism, are overtly critical, or do not involve team members in any part of the goal process could hinder the fulfillment of the three BPN's, which may subsequently have a negative influence on team member motivation (Lewthwaite & Wulf, 2012).

In order to support volitional behaviour, commitment and persistence to a task (i.e., learning), and intrinsic motivation (via the three BPN's), a coach must adopt their own behaviours within their coaching style in order to create a platform to encourage and facilitate these desired behaviours in their own athletes. To do this, coaches can seek to encourage athlete involvement by supporting two-way dialogue and allowing the space to provide their own input, offering meaningful choices to the athlete (Matosic et al., 2017). By supporting athlete input, they are conveyed as a capable decision maker and contributor towards the situation, whilst positive encouragement is consistently given to the athlete to satisfy feelings of competency during performance (Erickson & Côté, 2016).

Accommodating the significance and impact of practice conditions on learning, and how these conditions may affect the processing of task related information towards learning resulted researchers to propose the OPTIMAL (optimising performance through intrinsic motivation and attention for learning) theory (Wulf & Lewthwaite, 2016). Wulf & Lewthwaite (2016), suggest motivational and attentional factors contribute to learning by strengthening the relationship between goals and actions in a learner through the association of positive experiences from skill practice. Attentional focus (i.e., where the coach aims to direct a learner's attention, or where the learner themselves direct their own attentional focus, can impact upon skill learning and performance). In other words, attention refers to what an individual is observing (Zeplin, Galli, Visek, Durham, & Staples, 2014). The attentional field involves internal (e.g., thoughts, emotions and physical responses) and external (e.g., the outside environment, sights and sounds), by which the learner or athlete can attend to. In the context of motor learning, reduced motivation may result in cognitive disequilibrium through feelings of low competency, lack of autonomy, or relatedness to the task and it has been found that emotional stimuli can modulate

the influence of attracting and holding of attention, with evidence of previous experiences overriding or augmenting attentional selection based upon task relevance (Raymond, 2009). In other words, the environment a coach creates may regulate the emotional state of a learner and therefore impact upon their level of attention or direction of attention. When positive emotional states in learners promote motivation, the direction of attention may be shifted toward key elements of the task and therefore, a more conducive environment to learning can occur. A study on Olympic medal winning athletes found that the nurturing of a learning environment was key to success. This was implemented by coaches creating an environment where enjoyment is viewed as important for athlete engagement, progress is celebrated, reflection is valued, and mistakes are seen as learning opportunities that form part of the learning process. Coaches created a fair and stable environment that emphasised learning at the forefront of practice and this was entrenched within the culture of the wider organisation (Din, Paskevich, Gabriele, & Werthner, 2015).

The OPTIMAL theory builds upon the idea that there exists a social-cognitive and affective (i.e., motivational), influence to learning, where the satisfaction of BPN's and intrinsic motivation affects performance and learning across different environments aside from movement based activities (Ryan & Deci, 2000; Wulf & Lewthwaite, 2016; Mageau & Vallerand, 2003). Within the context of motor behaviour, social-cognitive-affective influences play a role in the display of movement through actions typically being performed publicly. The presence of others as one performs motor skills may provide support (i.e., encouragement), or pressure to the performer. A learner or performers emotional state (i.e., their mindset), poses questions around individual levels of confidence influencing learning, where confidence enhancing measures may facilitate learning in beginners as opposed to concerns, worries and nervousness detrimental to

learning (Wulf & Lewthwaite, 2016). Within the theory of intrinsic motivation, feelings of competence (i.e., experiencing oneself as capable), are related to a deeper interest in a task, (Deci, 1975), and help to create circumstances that contribute to optimizing learning and performance (Hooyman et al., 2014). A learner's individual perceptions and feelings of their own abilities can affect their motivation to practice, perform and learn (Dweck, 1999). Individuals who feel a lack of competence in relation to the performance of a task may feel a lack of self-worth, and subsequently a decrease in motivation to persist in practice and learning, whereas those who have the BPN's of competence and autonomy satisfied, supports active participation in learning through feeling capable to perform the task (i.e., motor skill) (Hooyman et al., 2014).

Promoting autonomy in learners relates to athletes' basic need for control over their environment and ability to determine their own behaviours. By promoting more self-controlled (i.e., autonomy controlled) environments, learners have more autonomy over practice conditions and this has been shown to enhance learning through the positive motivational consequences of perceived control (Sanli et al., 2013). Additionally, the support of learner autonomy may create a sense of trust in learners, also satisfying the BPN's of competency and relatedness whilst reducing levels of stress in learners by creating a less controlling environment in which to operate (Sanli et al., 2013). As a coach, this could be implemented by using less controlling language with athletes and more positive reinforcement across tasks. Furthermore, showing belief in athletes can promote individual competency in their ability to make volitional decisions that can positively influence performance. Allowing athlete autonomy over practice conditions such as elements of the warm up, choices on how to solve a motor problem, or asking input on tactical elements of game play may show the athlete that a coach places trust in their abilities.

Autonomy supportive coaching

One prominent coaching style known to assist in enhancing self-determined motivation and learning is autonomy supportive coaching. *Autonomy supportive coaching* derives from SDT and refers to an individual in a position of authority (such as a physical education teacher or sport coach), whom considers the perspectives of their athletes, acknowledges their feelings, and provides pertinent information to them in order to provide opportunities for choice (Ryan et al., 1985). Autonomy supportive coaching fosters self-initiation, which can lead to participation in problem solving and decision making (Black & Deci, 2000), and the impact of coaches and teachers supporting autonomy in learners has been found to help promote intrinsic motivation, which has been positively related to intentions to persist towards a goal (Lewthwaite & Wulf, 2012).

Operational behaviours associated with an autonomy supportive coaching style include: nurturing motivational sources towards intrinsic motivation, (e.g., enhancing BPNs), providing rationales (e.g., coaches help learners understand the *why* they are doing something), using non-controlling and informational language with (e.g., coaches providing information related to a task and use language that promotes choice to the athletes and allows them freedom to make decisions), and displaying patience and acknowledging and accepting expressions of negative affect (e.g., coaches accept all emotions as natural and part of the challenge of growth (Amoura, Berjot, Gillet, Caruana, Cohen & Finez, 2015). By adopting behaviours associated with autonomy supportive coaching, the three BPN's can be fulfilled, further leading to self-determined motivation. The assumption is that athletes are encouraged to make choices and take initiative (further promoting autonomy), while coaches minimize controlling behaviour, criticisms, and pressure (Deci & Ryan, 1987).

Positive effects of autonomy supportive coaching

It has been found that when coaches adopt autonomy supportive behaviours they support their athletes in four key ways; satisfying psychological needs (competence relatedness and autonomy), sustaining intrinsic motivation (athletes value what they are doing), promoting engagement in sport (a sense of fulfillment though involvement) and enhancing athletic performance (Occhino, Mallett, Rynne, & Carlisle, 2014). Additionally, satisfaction of these basic psychological needs (BPN's), helps to foster more intrinsically motivated behaviour providing a shift towards more identified regulation and even integration, where behaviours are expressed through an appreciation of their importance or an identifiable trait of oneself (Deci et al., 1996).

In youth, autonomy supportive coaching has been applied in a variety of sport contexts. For example, Coatsworth & Conroy (2009), found that using autonomy supportive coaching with young swimmers was a predictor of needs satisfaction. The use of a coach autonomy supportive questionnaire (ASCQ; Conroy & Coatsworth, 2007), was used to assess two forms of autonomy support: (1) sincere interest in athletes' input (asking and seeking athlete opinions), and (2) praising autonomous behaviour (praising decision making). The researchers found that when coaches praised athlete's demonstration of autonomy (i.e., used autonomy-supportive coaching behaviours), athlete's experienced increases in relatedness and competence. Similar the aforementioned study, Almagro, Saenz-Lopez, & Moreno (2010), found both praise of autonomous behavior and showing interest in athlete's input were important coaching behaviours. As demonstrated by a structural equation modelling path analysis, the researchers found that autonomy supportive coach behaviours were predictive of athlete autonomy in Spanish multi-sport athletes (Almagro et al., 2010). Furthermore, when an athlete's basic need

for autonomy was met, this led to greater intrinsic motivation, which positively influenced their intent to be physically active (Almagro et al., 2010). As a result of autonomy supportive coaching, improvements were noted in individual emotional, interpersonal and social skills across teamwork, goal setting, time management, leadership and decision-making domains, all of which were positively related to athlete well-being and task engagement (Cronin & Allen, 2018).

Furthermore, positive learning outcomes have been seen through autonomy supportive environments across different factors that the learner has control over, regardless of whether or not the factor is related to the task, compared to situations where learner autonomy was not supported (Lemos, Wulf, Lewthwaite, & Chiviacowsky, 2017). Additionally, when teachers or coaches allow autonomy on decisions incidental to the task, motor skill learning can be enhanced. Lewthwaite, Chiviacowsky, Drews, & Wulf, (2015), looked at the motor skill task of putting a golf ball and gave participants a choice as to what colour ball they would like to use, opposed to a control group having no choice. The authors found that the group who had choice, albeit incidental to the task, enhanced their learning relative to the group who had no choice. In a second experiment the where participants were asked to balance on a moveable platform (stabilometer), the choice group were able to decide on which secondary task they would perform the next day between a coincident- timing task or a hand dynamometry task. On reflection from the first experiment, researchers felt it was possible that associations may be made between certain golf ball colours "working" better than other colours and so decided on choosing secondary tasks further unrelated to the main task of balancing on a moveable platform. Findings from the second experiment saw the choice groups 'learning' (i.e., increasing balance time), increase at a faster pace than the control group, also demonstrating longer balance times on a retention test 1 day post the initial experiment (Lewthwaite et al., 2015). By having the

opportunity to exercise control via choice, participants can find intrinsic reward as a consequence of their perceived control over a variable related to a task. Furthermore, having control over choice, or the anticipation of the opportunity of having a choice (however minor), is linked to increased activity in brain regions associated with reward processing through the value individuals place on making certain choices (Fujiwara et al., 2013). Therefore, exercising choice and the need for control could be deemed critical in order for humans to thrive by reducing the negative effects of stressful situations (i.e., learning and performing new skills), through perceived control (Leotti, Iyengar, & Ochsner, 2010). These findings suggest autonomy and non-controlling language have benefits to learning aside from information processing (i.e., error estimation), via coach feedback.

Feedback & Learning

Feedback refers to the acquisition of information not always available to the learner and is provided by an external source (i.e., the coach). A coach can provide the learner with knowledge of results (KR), on actions related to motor skills and behaviours as well as the learner receiving implicit feedback through the execution of an intended behaviour and the outcome that follows it (Carter, Carlsen, & Ste-Marie, 2014). Verbal augmented feedback provided by a coach is thought to have guiding properties that may enhance or degrade learning where the goal is to provide the learner with guidance by which to accomplish a specific task. Beneficial effects of verbal feedback are thought to be based around the information and knowledge it gives learners about their performance outcome which can be drawn on to correct errors and improve subsequent performance. However, augmented feedback is thought to be detrimental if it is solely focussed on error identification, or interferes with critical processing

time (i.e., encoding, storage and retrieval) of information between trails, due implicit feedback and problem solving being seen as important for learning. (Winstein et al., 1994)

The learning and performance of a movement skills typically occurs within the presence of others, and through these environments' learners can gain formal and informal feedback in relation to their individual performance, along with social comparisons that provide prompt implicit feedback by highlighting ones level of competency compared to another (i.e., level of individual competence) (Lewthwaite & Wulf, 2012). Therefore, the nature of feedback given by a coach can influence the speed of the learning process and enhance performance by creating an environment that enhances the learner's feelings of competence. Historically, the functional role of feedback has been viewed as informational in nature (e.g., the coach provides technical feedback and information on corrections to a motor skill) and can still serve as a useful tool for skill learning. However, the influence of controlling language and modes of corrective feedback that could thwart satisfaction of BPN's (i.e., feedback on how to improve performance delivered in a threatening way), has been found to have a negative influence on learner motivation (Mouratidis, Lens, & Vansteenkiste, 2010). Conversely, if feedback was perceived as autonomy-supportive way, this had positive links to intrinsic motivation in athletes and learners which positively influenced individual wellbeing and intentions to persist towards the learning and/or completion of a task (Lewthwaite & Wulf, 2012).

To further support the process of learning, researchers found that *when* coaches gave feedback, impacted upon learner motivation, and can also promote learning effectiveness. Providing learners with feedback following a good 'trial' (e.g., when a learner demonstrates competency or success), as opposed to feedback following poor trials, resulted in more effective learning (Chiviacowsky, Wulf, Wally, & Borges, 2007). This is supported through the role of the

neurotransmitter dopamine in motivating one to act through the receipt of a reward (i.e., a good trial), and reinforcement of 'good' motor behaviours helps to solidify the stimulus associations and response habits that follow receipt of a reward, thus increasing ones motivation to repeat good motor behaviour (Wise, 2004). In the absence of feedback related to performance errors from a set of coach instructions, performers may struggle to understand how to understand and implement prior instruction after each trial (Hodges & Franks, 2001), and this could have a negative affect on learning and motivation through learners feeling an impasse to improvement exists (i.e., cognitive disequilibrium) (D'Mello & Graesser, 2012), further affecting learners BPN's (i.e., feelings of competency). Although implicit feedback is available to the learner through the action of performance, the role of augmented feedback by the coach to provide knowledge of results (KR), can be the only form of meaningful outcome information available to learners, especially in the early stages of learning (Edwards, 2010). This could be because the learner does not understand what optimal movement might look like at this stage, and even if they do understand (i.e., declarative knowledge), the learner does not yet possess the ability to perform the movement task sufficiently (i.e., procedural knowledge) (Edwards, 2010). KR can be defined as a set of observable operations not necessarily based solely on error identification in performers, although this has been seen to act as a guidance function to inform future performance. KR can also act as a motivator, for when KR is present, learners have shown a deeper interest in the task (Salmoni, Schmidt, & Walter, 1984). The use of KR can also be influential to the learning process through the type of KR delivered. For example, if the learner was performing a dive from a board into water, KR could relate to the score from a judge (i.e., "you scored 4.5"), or an element of the dive 'action' (i.e., "you untucked too late"). Each KR

may cause the performer to learn something different about the dive by what it directs their attention towards (Salmoni et al., 1984).

The nature of feedback that coaches give has been seen to affect motor learning, where positive feedback has been seen to enhance intrinsic motivation (Ryan, 1982). Feedback refers to information not always available to the learner and can be provided extrinsically (i.e., by the coach), or received in a more implicit nature via the learner acquiring internal feedback through the performance of a motor skill (Carter et al., 2014). In the context of a coach learner environment, the goal of feedback is to improve sub optimal performance or results and therefore needs to be *corrective* in nature. Corrective feedback is distinguished from negative (i.e., failure) feedback by focussing on the process of the previous performance (e.g., aspects of the skill that require attention), opposed to negative feedback that focusses on the end result and provides little in the way of usable information that the learner can utilize in order to improve (Mouratidis et al., 2010). Within autonomy supportive coaching, coach behaviours (i.e., use of non controlling language, acceptance of negative emotions, use of informative language), support the use of corrective feedback over negative feedback (Abbas & North, 2018). Researchers investigated the difference between task feedback to a group that was solely positive, compared to a group who received only negative feedback and a group who received no feedback. Findings demonstrate more effective performance or greater improvement in those who received only positive feedback compared to the groups who only received negative feedback or no feedback. Additionally, the positive feedback group demonstrated more effective learning on a delayed retention test without feedback compared to the groups who received negative feedback or no feedback respectively in the initial task. Interestingly, the feedback provided to the positive group was falsely positive feedback, highlighting the influence of the coach in providing

feedback to learners. Positive language seems to promote learning and performance (i.e., competency), whereas negative feedback (or no feedback), by a coach can initiate a lack of competency in learners which can degrade the learning process (Lewthwaite & Wulf, 2010). In a study on the effects of feedback on running efficiency in experienced runners, those who received favourable feedback enhanced their running performance whilst also decreasing their perceptions of task effort (Stoate, Wulf & Lewthwaite, 2012). It seems that even when coaches manipulate feedback to enhance learner competency, the perception of competency is enough to promote self-efficacy and enhanced performance, persistence and effort. A study on undergraduate physical education students who were asked to tolerate sustained effort in a continuous force production (hand dynamometer), task saw those who received positive normative feedback display higher self-efficacy and lower perceived exertion than those who received negative or no feedback (Hutchinson, Sherman, Martinovic, & Tenenbaum, 2008). The role of positive feedback can also increase the perception of competence in performers, reduce levels of performance anxiety or doubts over one's ability to perform. Furthermore, the effects of anxiety on attentional control can negatively impact upon learning and performance and can be mitigated or removed by positive coach feedback (Ávila, Chiviacowsky, Wulf, & Lewthwaite, 2012).

Learners who receive positive feedback show a preference for positive feedback, implicitly understanding the beneficial impacts upon their own motivation, performance and learning (Wulf & Lewthwaite, 2016). However, as previously mentioned, the timing of feedback plays a role in allowing or disrupting important intrinsic processing mechanisms by the learner, causing learners to become reliant upon the external source of coach feedback. Feedback offered too frequently removes opportunities for learners to adjust to small response errors in the motor

system that occur through variability of each movement trial. As a result, learners are not given the opportunity to recognise stable behaviour and retention of behaviours (Abbas & North, 2018).

If coaches, wish to support autonomy in learners, then allowing the learner themselves to decide when feedback is received (i.e., self-controlled feedback), has resulted in superior performance in delayed retention tests compared to controlled groups (Chiviacowsky & Wulf, 2002). Studies have shown that when learners are given the autonomy to choose when to receive feedback, they prefer feedback after relatively successful (i.e., good) trials as opposed to poorer trials, supporting self-controlled feedback as being effective if based on the learners performance (Carter et al., 2014; Patterson & Azizieh, 2012).

Interventions to promote autonomy supportive coaching

All coaches wish to have motivated, engaged learners and athletes and therefore, high self determined motivation (through autonomy) are required to help support higher quality engagement and motivation toward a task (Podlog et al., 2015). To become a more autonomy supportive coach, there exists conditions that are most effective in facilitating this process. Researchers have discovered several variables which play a role in the effectiveness of autonomy supportive training, including modalities of training material, duration of training intervention and contact time, interpersonal orientation, personal experience, athletic experience, and use of a trained instructor (Langdon, Harris, Burdette, & Rothberger, 2015; Su & Reeve, 2011). Each construct is thought to have a unique impact on the learning and developmental outcomes in teachers and coaches adopting autonomy supportive behaviours (Langdon, Harris, et al., 2015; Su & Reeve, 2011). A 4-phase coach training plan used with youth baseball coaches proved successful in developing autonomy supportive coach behaviours (Langdon, Harris, et al., 2015).

The first phase took baseline data of coach behaviours via an audio recording of a training session led by the coach and was assessed on the use of autonomy supportive behaviours by two independent raters. This was followed by a 1.5 hour in person workshop with informal discussion and instruction on autonomy supportive behaviours. During phase three, coaches used an online resource that provided study materials on autonomy supportive coaching, focussing on six areas of instruction through the acronym, TARGET (tasks, authority, recognition, grouping, evaluation and time) (Boyce, 2013). This included providing challenges to all athletes, supporting athletes in having choice and taking on leadership opportunities, recognition of improvement in skills, supporting athlete cooperation and allowing athletes more time to work on skill development. Coaches were expected to implement their learned knowledge into future practice plans. The fourth and final phase acted as a follow up and a second round of observations of coach behaviour via audio recording, with a focus group comprised of all program attendees used to understand the effectiveness of the training program. Coaches noted areas of success from the training program revolved around the value of both face to face workshops and online material through the course and the user-friendly nature of the online modules. Areas of improvement were identified by coaches to be a lack of multimedia examples of coaching, especially examples of controlling coaching along with autonomy supportive examples (Langdon, Schlote, Harris, & Burdette, 2015). Evidence exists for coach training to promote autonomy supportive behaviours should contain a combination of knowledge resource and skill-based activities delivered by a trained instructor over medium to longer durations (from 12 weeks up to 1 year), which been found to be very effective in developing behaviours associated with autonomy supportive coaching (Langdon, Schlote, et al., 2015; Reynders et al., 2019). Furthermore, the experience levels of coaches have been found to influence the ease in

which autonomy supportive behaviors were exhibited, those who were less experienced coaches were found to employ a variety of autonomy supportive behaviours meaning autonomy supportive training programs may be more effective for inexperienced coaches (Su & Reeve, 2011). However, although allowing athletes to have more control over their learning and sport experiences, coaches still need to be mindful of the athletes need for guidance and structure within their sport environment and should be mindful of slipping into a coaching style that is too open and may create a more chaotic environment by becoming less demanding towards their athletes and reducing the active monitoring of guidelines and expectations (Mageau & Vallerand, 2003).

Potential challenges to Autonomy Supportive Coaching

Although autonomy supportive coaching has been successful in promoting motivation and learning, some limitations have arisen from the literature which for coaches, present avenues for discussion and future directions for research.

Challenges to autonomy supportive coaching can occur through an under representation of coach control. In a learning environment that is too comfortable, confusion and uncertainty in task learning may result in low states of arousal through the absence of challenges and therefore not yield deeper learning (D'Mello & Graesser, 2012). Furthermore, occasional risks to rewards (i.e., challenges), may dampen initial motivations to perform tasks which gives rise to the importance of positive communication by the coach at this time in order to promote competency in performers to strengthen the learning effect. Challenges can also provide a platform for learners to display deeper levels of thinking to challenge problem solving (D'Mello & Graesser, 2012). Additionally, the potency effects of success through challenge over challenge alone, may

support beneficial learning and retention effects attributed to challenges via difficult tasks (Lewthwaite & Wulf, 2017).

As coaches, the support of autonomy in learners may aim to satisfy the 3 BPN's but may degrade learning if no boundaries are established resulting in an absence of structure and support by the coach (Amorose & Anderson-Butcher, 2007). There is still a need for coaches to establish a structure without leaning towards a laissez faire style when too much autonomy and a lack of structure may impede the intended direction of the athletes learning and performance and it has been found that youth coaches perceived their athletes to need structure and boundaries to guide them through their sport development (Gould, Nalepa, & Mignano, 2019). Environmentally, youth coaches have noted a greater need for athletes to be led to an answer as opposed to have time to problem solve and therefore may support elements of controlling coach behaviours as opposed to exclusively promoting autonomy support (Gould et al., 2019). Additionally, if coach support and structure is in place, coaches should aim to understand the effects of autonomy supportive coaching on each of the three BPNs individually. If autonomy supportive coaching influences one need more than another in athletes, can coaches identify which need is more impactful upon learning in their athletes (Mageau & Vallerand, 2003). For example, if competency is supported though positive feedback but there is less autonomy of choice, different affects on motivation and learning in the athletes under the coach's guidance may occur.

Furthermore, some coaches found difficulty in adopting autonomy supportive behaviours, particularly during game play Occhino, Mallett, Rynne, & Carlisle (2014) suggest that a coach's personal orientation toward winning or losing may influence the behaviours they are likely to emit. For example, if coaches are ultimately concerned with winning or are under intense pressure to win, they are likely to adopt a more coach-centred approach as opposed to a more

athlete-centred approach. Interestingly, one study found that coaches who were more autonomous-oriented and had less coaching experience tended to benefit more from the training by adopting greater and more effective autonomy supportive behaviours compared to coaches who were more experienced (Langdon, Schlote, et al., 2015). Even if training variables are optimised, the effectiveness in delivering autonomy-supportive behaviours rely largely on the psychological characteristics of the coach themselves to favour the appropriate beliefs that direct their coaching practice, whereby supporting a coaches BPN's encourages a more adaptive interpersonal environment for learners and athletes (Stebbings, Taylor, & Spray, 2015).

Limitations may exist across sports that are highly structured such as Football, Ballet, floor gymnastics and synchronized swimming. Limitations via a potential disconnect between an autonomous environment in training and learning compared to one that is highly controlled by a pre-learned routine or specific 'plays' during performance. Although the performance of motor behaviours and skills has been seen to benefit from autonomy supportive coaching in training and practice (Abdollahipour, Palomo Nieto, Psotta, & Wulf, 2017; Chiviacowsky, Wulf, & Lewthwaite, 2012; Rebecca Lewthwaite et al., 2015), it would be interesting to understand if sports that mainly operate on pre planned actions see limitations to performance from autonomy support compared to more controlling environments, especially through the perspectives of the athletes and how they are used to being coached. Additionally, examining how coaches provide more autonomy to athletes performing in sports that historically have high levels of instant correction feedback may indicate limitations to autonomy support and allowing time for implicit feedback to assist athlete learning. If coaches delay their feedback to athletes in this instance, does this help or hinder learning? It was found in generation Z athletes (i.e., those born after 1996), through growing up in a fully technological world and having instant access to knowledge

and information, these athletes needed more instant feedback, had difficulty keeping attention and therefore, may lose focus if given too much time for their own implicit feedback opposed to instant coach feedback (Nichols, 2018).

From a participant safety standpoint, it could be argued that more controlling coach behaviours are in place to ensure participant safety such as; activities in the weight room or actions that require complex movements (i.e., tumbling in gymnastics), and therefore are more effective that autonomy support in these environments until a level of physical literacy is established that allows the coach to dial back controlling behaviours and implement more autonomy supportive behaviours.

Conclusion & Practical Recommendations

Although some athlete and coach orientations may manifest toward extrinsically motivated and controlling behaviours respectively, there exists an abundance of literature encouraging coaches to adopt behaviours that satisfy athletes needs for competence, autonomy and relatedness to help promote more self determined motivation in the athletes under their care (Amorose & Anderson-Butcher, 2007; Mouratidis et al., 2010; Podlog et al., 2015; Reynders et al., 2019; Wulf & Lewthwaite, 2016).

The level to which a coach adopts this type of behaviour may depend on their own initial orientation (i.e., coaching beliefs) and therefore may take practice and time. These beliefs may have been influenced by how they were coached as learners and athletes (Lyle, 2002). Outlining a coaching philosophy that includes the importance of autonomy supportive behaviours may help in supporting these behaviours to be habitual and act as a rationale for the coach to explain their actions to their athletes (Gonzalez et al., 2016). Additionally, outlining these important

behaviours at the start of a training year or season may make them easier to implement than an immediate change somewhere into a training year. The compatibility between performance (i.e., winning) and athlete development may influence the nature of coach orientation and so coaches that are solely involved in developing athletes may find an easier route to implementing autonomy supportive coach behaviours compared to coaches that are focussed mainly on performance (Vella & Perlman, 2014). These behaviours may require time to implement and coaches will need to be patient in their approach. This can be more challenging to do, especially if coaches are under pressure to produce results. The temptation toward adopting a more controlling style is to be resisted.

Need supportive coach behaviours have also shown positive effects when the situation allows, in elite volleyball (De Backer, Reynders, Boen, Van Puyenbroeck, & Broek, 2018). Although a more controlling style may not always be considered overly negative (e.g., when games are in quick succession or tactical feedback needs to be implemented immediately), autonomy supportive behaviours may buffer the potential negative affects effects of poor performance (i.e., competency). Allowing only limited opportunities for choice and freedom may not be enough, coaches need to be highly involved in being needs supportive, meaning positive feedback, allowing self controlled feedback and providing choice all need to be consistent but delivered at the right time (De Backer et al., 2018). However, in a practical setting, coaches should understand when and where to exercise more control over decision making for the benefit of the team or athlete. For example, during a timeout in basketball, a coach may need to control the tactical element of the game and so may be required to use a more directive approach (i.e., controlling language) to help players understand the play that needs to be executed to win the game. Although other elements of the game (e.g., warm up and in game

possessions) can be athlete led, coaches will benefit from understanding how to balance an autonomy supportive coaching style with elements of structure and control to their coaching (De Backer et al., 2018).

To be highly involved in this type of behaviour requires energy and for the coach to have adequate recovery time between athlete interactions (i.e., training and games), therefore it can be harder to deliver positive feedback in an autonomy supportive manner if coaches' own well being is not met (Balk, de Jonge, Geurts, & Oerlemans, 2019). Therefore, satisfying one's own BPN's should be prioritised in order to be effective in this capacity.

Working on supporting competence reinforcement, helps to develop persistence in youth athletes (Fransen, Vansteenkiste, Broek, & Boen, 2018). Within the context of learning, persistence may prove the difference between positive learning outcomes and successful performance and retention of motor behaviors, therefore the importance of positive feedback and delivering feedback to learners following successful trials can help to cement persistence to learn in youth athletes.

Motivational characteristics in generation Z athletes found athletes were more extrinsically motivated by results and social comparison and these extrinsic sources drove athletes motivation (Gould et al., 2019). In order to shift motivation to more introjected and internalised along the continuum towards intrinsic motivation, habitually focussing on supporting competency in these athletes will support their own beliefs in their ability to problem solve by maintaining the persistence to do so, without the dependence upon coach feedback. Although instant feedback is craved, coaches may not be able to provide such feedback through environmental constraints, such as a coach that is working with multiple athletes at once or environmental influences such as distance between athlete and coach (i.e., athletes are

performing on the opposite side of the side of field or court). Coaches should appreciate that proximity does not always equal learning and learning can only occur when both parities (i.e., coach and athlete) are motivated for learning to occur, supporting the importance of facilitating learning through delayed feedback or self controlled feedback so even when not in the coaches immediate view, athletes still have the desire to explore movement possibilities in order to learn and gain their own implicit feedback (Carter et al., 2014).

In summary, although the implementation of autonomy supportive coach behaviours may seem a more challenging task than adopting controlled behaviours in some cases, it plays an important role in developing self determined behaviours in athletes and learners which in turn supports coaches in facilitating intrinsic motivation across athletes and teams by supporting the three BPN's. Key areas to focus on as coaches are to habitually promote athlete competency by consistency giving positive feedback and re framing athlete mistakes as learning opportunities. Delaying feedback to allow for implicit learning opportunities and allowing athletes to control when they receive feedback to promote autonomy through choice. Furthermore, establishing a clear coaching philosophy in order to protect these coach behaviours regardless of external pressures or demands can aid consistency in coach behaviour and subsequently reduce athlete anxiety if they are reminded that collaboration between coach and athlete is an important part of the learning process. Lastly, displaying patience in implementing autonomy supportive coaching and understanding when to be needs supportive and when to exercise more control may be contingent entirely on the environment one operates in, and therefore taking time in knowing who you are working with will assist in understanding this balance.

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