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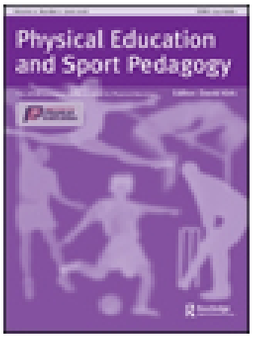

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Coaching player decision making in rugby union: exploring coaches espoused theories and theories in use as an indicator of effective coaching practice

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ABSTRACT

Introduction: Researchers exploring how coaches can best support the development of their players decision making within team invasion sports have often been conducted from a cognitive or ecological approach, which differ in their views regarding the presence and absence of memory representations. This difference has, in turn, resulted in practical implications that are theoretically different, but not pedagogically different. Research has categorised such approaches to coaching decision making into intentional decision making training or incidental decision making training that offer different suggestions for how coaching methods may be used within their practice. Sometimes, these categories of training have been offered as *the* way coaches should operate over the careful selection of coaching methods given their intentions for impact. Instead, within this study we aim to explore the pragmatic nature of coaching practice, rather than adherence only to theoretical principles or beliefs.

Materials and Methods: In this study five English Regional Academy Rugby Union Coaches participated in a semi-structured interview, three categorised systematic observations of their coaching practice and a self-confrontation interview to explore; (i) the espoused theories coaches believe they use in practice; (ii) the theories in use within their coaching practice and; (iii) the alignment and misalignment between their espoused theories and theories in use during their coaching practice.

Results & Discussion:: Our findings demonstrate that coaches employed a balance and blend of intentional and incidental coaching methods concurrently. Coaches proposed the use of non-linear pedagogy and the manipulation of constraints to promote learning activities which captured the representative nature of the competitive decision making environment. Yet also promoted the role and importance of shared mental models, tactical frameworks, off field video analysis and deliberate if–then rules of thumb when supporting the development of their players decision making. Thematic analysis extracted from interview data regarding coaches espoused theories, alongside the coaches theories in use, captured through categorised frequencies of coach behaviours and learning activities through systematic observations, present clear misalignments between proposed coaching methods and

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those used in practice. Misalignments were apparent for learning activities, where coaches espoused the need for representative practice but used more single-phase and huddle based scenarios, and coach behaviours, where coaches espoused the importance of setting problems for their participants through divergent questioning, yet used more instructional behaviours and convergent questions leading players toward a shared mental model of collective decision making behaviour. From our findings, we offer practical implications to coaches which suggest that when supporting player decision making, coaches should consider using their judgment to select the appropriate evidence-informed coaching method given their wider intentions for impact in the session and the context in which they operate. Furthermore, we offer a suggestion to coaches and researchers where we encourage the exploration of the chain and gap between what coaches they think they do, and what they actually do in practice as a means for critical reflection.

Introduction

Findings from academic research have presented coaches with conflicting practical implications regarding how to best support the development of player decision making (Ashford, Abraham, and Poolton 2021a, 2021b; Raab et al. 2019). These implications have largely, although not exclusively, been derived from two standpoints, the cognitive and ecological perspectives (Ashford, Abraham, and Poolton 2021b; 2021c). Drawing on the work of Bar-Eli, Plessner, and Raab (2011), such practical implications have been separated into two types; intentional decision making training and incidental decision making training. According to Bar-Eli, Plessner, and Raab (2011) intentional decision making training centres on planning and strategizing behaviour to outwit and defeat one's opponent, largely supported by a deeper understanding and knowledge-of the game (Collins, Collins, and Carson 2021; Ashford, Abraham, and Poolton 2021b; 2021c; Toner and Moran 2015). For instance, match strategy (Grehaigne, Godbout, and Bouthier 1999), shared mental models (Richards, Collins, and Mascarenhas 2012; 2017) and tactical frameworks (Tee, Ashford, and Piggott 2018) all encourage the weighting and execution of specific planned roles and responsibilities that guide players to behave in particular ways (Light, Harvey & Mouchet 2014).

Rather than employing methods which seek to deepen a players understanding, Bar-Eli et al.'s (2011) conception of incidental decision making training conforms to the principles of ecological dynamics (Stone et al. 2021; Chow 2013). This approach prioritises frequent exposure to the perception of game information to identify invariances between the information perceived and the action planned (Bar-Eli, Plessner, and Raab 2011). From this idea, coaches learning activities should be designed to represent real game situations which compel players to interact directly with game-specific information without access or need for memory representations (Passos et al. 2008; Dicks, Davids, and Button 2009). Here, exposure to 'real game' contexts attunes players' perception of information (Fajen, Riley, and Turvey 2008) and influences the emergence of action capabilities over time (Esteves, de Oliveira, and Araújo 2011; Wilson et al. 2018). Crucially, activities which constrain the practice space, rules, equipment and players, must contain the perception-action relationships available to recognise the shared (Silva et al. 2013) affordances offered by the game (Chow 2013; Otte et al. 2020; Correia et al. 2019).

Intentional and incidental coaching approaches should not be operationalised as a question of either-or, but one which depends on informed assessment of the needs of the players (Cushion, Ford, and Williams 2012; Williams and Hodges 2005). Furthermore, conceptual links between the intentional and incidental training approaches have been frequent, where tactics and strategy filter through to coaching methods within game-oriented activities (Light, Harvey, and Mouchet 2014; Pill 2021; Mouchet 2005). Such perspectives have built upon the pedagogical models for tactical decision making (PMDT cf., Grehaigne, Godbout, and Bouthier 1999; 2001), where decisions

are seen to be inseparable from technical execution, as with the ecological approach. However, socio-constructivist conceptions like these have also advocated for pauses during activities, where coaches may promote their players understanding of when and why decisions may be appropriate (Light et al. 2013). Thinking pragmatically, these methods are likely to be included in the coaching methods of coaches who advocate for the ecological dynamics perspectives and approaches. Furthermore, Mouchet et al. (2019) have employed a psychopenomenological approach to understanding in-match player decision making, which downplayed the importance of the dominant theoretical perspectives to draw closer links to real life experiences. Building on this work, recent empirical findings have suggested that coaches may balance and blend intentional and incidental methods within their practice. For instance, Morgan, Mouchet, and Thomas (2020) has suggested that decision making is best developed by rugby coaches through balancing activities between off-field tactics, strategy, and on-field representative training designs. Similarly, O'Connor, Larkin, and Williams (2017) has provided evidence that coaches employed training activities which represented true competitive scenarios alongside the use of guidance and instruction towards salient game information; and use of task and individual constraints (O'Connor, Larkin, and Williams 2017).

To date, empirical work in the area of developing athlete decision making has focussed exclusively on either *what* methods a coach believe they use (Morgan, Mouchet, and Thomas 2020), *how* coaching methods were employed (Larkin, O'Connor, and Williams 2016; O'Connor, Larkin, and Williams 2017), or *why* methods were adopted by acknowledging the theories that underpin their use (Richards, Collins, and Mascarenhas 2017; Passos et al. 2008). Additionally, findings have suggested that coaches possess low levels of awareness of how their intentions play out in practice (Hall et al. 2022; Hewitt, Edwards, and Pill 2016; Partington and Cushion 2013), which means how they think they coach rarely aligns to the methods they use. Presently, we suggest that research is this area is missing the mark, as limited attention is being given to the chain between a coaches understanding of underlining theory, logic, planning, methods and their coaching practice and the gaps that can be unearthed following (Collins, Collins, and Grecic 2015 Grecic and Collins 2013; Hewitt 2015). Thus, the concepts of espoused theories and theories-in use proposed by Argyris and Schön (1974) may be useful in helping to understand the potential misalignment between coaches' intentions for practice, what methods they believe they use, how they intend to use them and why (espoused theories), with what it is they do during practice (theories-in use), how and why. Partington and Cushion (2013) in their research with academy soccer coaches referred to this misalignment as the epistemological gap.

A critical exploration of a coach's epistemological gap can be initiated through the Coaching Planning, Practice and Reflective Framework (CPPRF; Muir et al. 2011) which encourages an exploration of the alignment between session objectives, the structure of learning activities, and the use of behavioural strategies used to shape the athlete experience. Whilst the CPPRF supports deeper investigation into *what* pedagogical methods are being employed, we feel that additional depth is needed to understand *why* such methods are being used (Collins and Collins 2021). Cushion et al.'s (2011) coach analysis and intervention system (CAIS) is the most up-to date validated method of systematically observing coaching methods, inclusive of categories of specific learning activities and coach behaviours. If the epistemological gap is to be explored, employing a systematic observational tool such as the CAIS alone, fails to explore the reasoning behind *why* coaching methods have been employed and why others haven't been (Downes and Collins 2022; Martindale and Collins 2010). It is also necessary to consider whether specific learning activities and coach behaviours, have rightly or wrongly, been aligned and/or misaligned to each theoretical approach. For the purpose of this study therefore, we must extend the methodological boundaries of the CPPRF and CAIS to critically explore a coaches epistemological gap with respect to developing their players decision making.

The recommendations made by authors for coaching player decision making are conflicting due to the reliance on perspective specific methodologies (Ashford, Abraham, and Poolton 2021b).

Instead, we see it as necessary to critically explore coaches espoused theories, theories-in use and the underpinning *why* behind the decisions being made within practice rather than an adherence to a particular theoretical approach (Collins, Collins, and Carson 2021; 2022; Morgan, Mouchet, and Thomas 2020). Thus, the purpose of this study was to explore how Premiership Regional Academy rugby union coaches in England support the development of their players decision making during training sessions. To meet this purpose, three research objectives were considered; (i) to explore coaches *espoused theories* regarding the methods they believe they use to support player development; (ii) to explore the coaches' *theories in use* within their coaching practice; and (iii) to explore the alignment and misalignment between coaches *espoused theories* and *theories in use* as a means for reflection.

Materials and methods

Participants

Before any data collection took place, ethical approval was granted by Leeds Beckett University. Then, coaches who worked full time within the Rugby Football Union (RFU) and English Premiership's Regional Academies were approached and invited to take part within the study. Informed consent was obtained from 5 coaches who decided to participate, who had a mean average of 10.2 years coaching experience. Table 1 presents key background information for each coach.

Data collection procedure's

Step 1: semi-structured interview – espoused theories

To explore coaches *espoused theories*, a semi-structured interview guide consisting of core open-ended questions was developed by the first and final authors, who carefully considered the line of questioning in respect to the studies aims and objectives. Additionally, the final author acted as a critical friend throughout the development and conduction of the data collection procedures. The questions were as follows: (1) What role does decision making play in elite rugby union?; (2) What characteristics do you believe expert decision makers have?; (3) How do you think players make decisions in rugby union?; (4) Do you believe decision making is something that can be developed in elite rugby union?; (5) What methods do you use to coach player decision making?; (6) Can you give me some practical examples?; (7) You mentioned earlier a number of characteristics of an 'expert' decision maker: how do you develop these? Follow-up probes and prompts were planned for and used to allow expansion on key points (Jiménez and Orozco 2021). Interviews (*m duration*

Table 1. Background information of Premiership Regional Academy rugby union coaches.

Coach	Playing level	Years coaching	Age group	System goals
1	International	3	Under 18 lead coach & senior academy backs coach	To progress at least 3 players into the senior academy.
2	Championship	13	Academy head coach	33% best in the world. 33% best in the country. 33% academy graduates.
3	Premiership	3	Senior academy lead coach & under 18 forwards coach	To progress at least 3 players onto first XV contracts. To support all players to meet their potential.
4	National League	18	Assistant academy Manager and lead under 16 coach	Progress two players per year from the Junior Academy into the senior Academy. To support all players to meet their potential.
5	Premiership	14	Under 18 lead coach & senior academy forwards coach	To get as many players from the Under 18's programme into the senior academy as possible. To develop every individual as a person.

= 38 min) took place in a mutually agreed quiet location and an information sheet and pre-briefing encouraged the coaches to reflect on their perceptions and opinions in anticipation of the interview.

Step 2: systematic observation of training – theories in use

Coaches' sessions were video recorded on three separate occasions over the phase of a season (cf., Cope, Partington, and Harvey 2017; total observations $n = 15$; *mean duration* = 70.88 min) using a video camera positioned at the side of the pitch and elevated where possible (Brewer and Jones 2002; Partington and Cushion 2012). Coaches wore a microphone and collar radio transmitter which captured audio and visual data concurrently. Then the first author, trained in the use of systematic observation tools (McKenzie and van der Mars 2015; Cope, Partington, and Harvey 2017) coded activities as *individual, paired, drill, small-sided activities, freeze in position, player huddles, larger-sided activities or transitions* (O'Connor, Larkin, and Williams 2017) and as *a phase of play, possession games or conditioned games* (Ford, Yates, and Williams 2010). Additionally, coach behaviours were coded using 17 primary and secondary behaviours taken from the validated Coach Analysis Intervention System (CAIS) (Cushion et al. 2011; 2012), namely: *positive* and *negative model, corrective, specific* and *general feedback, instruction, humour, praise, hustle, punishment, scold, response to question, confer with assistants, convergent* and *divergent questioning and silence on* and *off task*. For test-retest reliability of the post-observation coding, inter-rater reliability and intra-rater reliability measures were taken for >10% of the sessions observed ($n = 2$; Chronbach's Alpha; Inter = .88; Intra = .91). Considering the limitations of systematic observation tools, the behaviours and learning activities within the CAIS (Cushion et al. 2011) have been aligned to the categories of intentional and incidental training approaches (See Table 2; Cushion et al. 2011; Bar-Eli, Plessner, and Raab 2011). Where they aligned to both approaches, they were labelled unclassified. The process of categorisation was shaped by recent literature published by authors in this research area (cf., Araújo et al. 2019; Raab et al. 2019) which will form critical discussion later within the study.

Step 3: self-confrontation interview – espoused theories vs theories in use

To investigate coaches *espoused theories* and *theories in use*, self-confrontation interviews (Von Cranach and Harré 1982; Gleeson and Kelly 2020; Feigean et al. 2018) were employed as a means of reflection to elicit a justification for their practice within 48 h of the final coaching session. Interviews took place in a mutually agreed location and lasted between 75 and 90 min. Before each observed session coaches stated their intentions for impact. Within the semi-structured interview's, coaches' *espoused theories* were identified, which guided the first author to deduce from the audio/

Table 2. Categorisation of learning activities and coach behaviours as intentional, incidental and unclassified training approaches to develop player decision making.

Intentional Behaviours	Incidental Behaviours	Unclassified Behaviours
Positive model	Divergent questioning	General feedback
Negative model	Silence on task	Humour
Corrective feedback		Praise
Specific feedback		Hustle
Instruction		Punishment
Convergent Questioning		Scold
		Response to question
		Confer with assistant coaches
		Silence off task
Learning Activities	**Learning Activities**	**Learning Activities**
Individual	Small sided activities	Transitions
Paired	Larger sided activities	
Drill	Possession games	
Phase of play	Conditioned games	

video capture the key learning activities and/or coach behaviours employed to develop players decision making. With this, coaches' espoused theories and theories-in use were cross referenced. Key coaching events were clipped and collated into a chronological account of each of the three sessions, with the clipped footage played to the coach (Partington et al. 2015). After each clip the video was paused and the re-enactment of the coaches' lived experiences during the training session was encouraged via prompts, such as 'what are you thinking?'; 'why a question there?'; or 'talk me through what happened?'. In this way, the systematic observation data capturing coaching methods, served as a prompt by which coaches' rationales could be explored. Prior to data collection, participants were informed about the three stages of the data collection procedure which were offered as an opportunity to engage in critical reflection on action (Schon 1991). The prebriefing process built high levels of trust and rapport before the first interview took place, resulting in interviews which captured critical discussion regarding espoused theories and theories-in use.

Data analysis

The triangulation of the three stages of data collection followed a consistent process. First, the semi-structured interviews were audio recorded and transcribed verbatim. Each transcript was read numerous times to ensure familiarity and understanding (Taylor and Collins 2019). Deductive thematic analysis procedures commonly used in sport coaching research were employed for the semi-structured interviews (Bean, Kramers, and Harlow 2022; Braun, Clarke, and Weate 2016; Miles, Huberman, and Saldaña 2020; North et al. 2020). Given the theoretical approaches, use of the CAIS, framing of the CPPRF and the alignment of coaching methods to different theoretical approaches (see Table 2), deductive themes derived from theory and existing knowledge were produced. In turn, qualitative analysis software (QSR NVIVO 11) was used to build thematic hierarchies by creating lower-order themes which were then grouped into higher-order themes under the umbrella of key deductive themes (Johnston and Morrison 2016; Kyngäs, Mikkonen, and Kääriäinen 2020). Second, the coach's *espoused theories* regarding learning activities, coach behaviours and player engagement extracted from the semi-structured interviews, were then cross-referenced to the analysis of those adopted during systematic observations and the categories associated (Table 2). Systematic observation data was analysed by the first author, using post-facto performance analysis software (Sportscode elite, V11, Hudl, Lincoln, Nebraska, United States of America) where frequencies of the specific type of learning activities and coach behaviours used by coaches were collated. Third, all coaching sessions were watched numerous times and clipped where links between espoused theories and theories in use were evident in the data. Clips were then collated for the self-confrontation interview within a single video. Finally, analysis of the self-confrontation interviews followed the same process of deductive thematic analysis as the initial semi-structured interview.

Results & discussion

To meet the intended research objectives, deductive thematic analysis of the coaches espoused theories (see Table 3), categorised systematic observation data capturing theories in use (see Tables 4 and 5), and deductive thematic analysis of self-confrontation interviews (see Table 6) have been tabulated. Findings and points of discussion have been triangulated to explore the relationship between intentions for impact, espoused theories and theories in use.

Reflexive thematic analysis of coaches espoused theories presented two higher order themes, *incidental coaching methods* and *intentional coaching methods*. Seven lower order themes underpinned the incidental coaching methods which were espoused, including *representativeness*, *exaggeration of game information*, the *manipulation of constraints*, *player ownership* and *problem setting*. Whilst eight themes underpinned intentional coaching methods; including the use of *specific*

Table 3. Deductive Thematic analysis of Premiership Regional Academy rugby union coaches' proposed espoused theories regarding the incidental and intentional strategies they use to support the development of player decision-making.

Prescribed theme	Higher order theme	Lower order theme	Example from raw data	CPPRF
Espoused theories	Incidental (33)	Representativeness (10)	'I think that they need to be, well the training environment needs to be as specific as it can be because we're trying to make sure that they're actions are always in conjunction with their perception.' Coach 2	Learning activity
		Exaggeration of game information (5)	'Exaggerate the cues for players and guide them to game information.' Coach 1	Learning activity
		Manipulation of constraints (7)	'You can change how the attacking player receives the ball and where. Are you just starting with it, do you choose where you want to start. Which I would generally guide them to a starting position based on their most favoured side to step off. Little things like that. Changing the boundaries, where the ball starts, how it comes to you, don't limit their range of options. So you'll hear a lot 'don't kick in this game', every option that is available to them in a game should be available to them then. 1 vs 1 there may be times where we build that into 2 vs 1, 3 vs 2 and it becomes 15 vs 15 and it resembles a full game. Don't limit options and make it realistic.' Coach 4	Learning activity
		Player ownership (5)	'Also giving them ownership, to help them make effective decisions you've got to allow them to make those decisions themselves.' Coach 3	Player engagement
		Problem setting (6)	'A lot of self-discovery, so yeah I know it's a bit of a cliché, ah right questioning again. But in terms of learning it's so much more powerful. It's probably something that I didn't really realise as a player that my coaches were doing it. I used to think, why are they not just telling me?' Coach 3	Learning activity
	Intentional (106)	Specific feedback (37)	'Off field definitely tends to be more detailed, but I think to be a really great coach you have to be able to offer that detailed specific feedback then and there on the field, in the moment. Which I'm working towards, sometimes it's a confidence thing with me and I say it to them but try and prise that information from them.' Coach 3	Coach behaviour
		Guidance of perception (12)	'So, a big thing we'd identified was his ability to scan the defensive picture. Instead of just getting up and reload, it was right get up reload, look up, explore the opportunity and if it wasn't on go and look for work. The key middle ground was the scanning.' Coach 3	Coach behaviour
		Instruction (2)	'In other situations, I've been going with some direct instructions, like this is where you need to run.' Coach 2	Coach behaviour
		Questioning (10)	'You try and remove that, and create a safe environment to try things, you might then question them to justify why they make certain decisions' Coach 4	Coach behaviour
		Repetition (6)	'I think players learn from experience so the more you revisit that game information in those pressure environments and do things well and make mistakes, the more you put them in that scenario, and they develop an understanding and awareness of what's appropriate, the more they will make better decisions in future.' Coach 5	Learning activity

(*Continued*)

Table 3. Continued.

Prescribed theme	Higher order theme	Lower order theme	Example from raw data	CPPRF
		Shared mental model (25)	'I think that if a team has a shared mental model of what we're trying to do and achieve we're trying to engage players in team-based decision-making rather than individual based decision-making and I think that the shared 'common language' means that there's a clarity in what we're trying to do as a group and I think that supports team-based decision-making. Everyone needs to see and communicate what our intentions are – so listening is just as important' Coach 2	Player engagement
		Vicarious experiences (role models) (2)	'I think his own identification of some of the players he looked up too, so he saw **** as somebody he looked up too and wanted to play like as he believed he had a lot of similar characteristics' Coach 2	Player engagement
		Video analysis (18)	'But then in the season, it's a constant balance between out intentions, off – field video, on field practice and then review work in the classroom, which tends to be well did we make the appropriate decisions to get out of it what we wanted from those games. The time of year would definitely play a role in it, probably less significantly in terms of the time of year, we have to make some in the moment snap judgements on how we feel that particular tactic, strategy or decisions are going.' Coach 5	Learning activity

[Numbers in brackets denote the number of times this theme was referenced during interviews].

feedback, *guidance of perception, instruction, questioning*, *repetition, shared mental models*, use of *vicarious experiences* and *video analysis*.

Second, reflexive thematic analysis of the self-confrontation interview data has presented four higher order themes; a *common frame of reference*, *learning activities*, *coach behaviours* and *player engagement* (see Table 5). Three lower order themes underpinned a *common frame of reference*, including the development and use of a *common language*, a *tactical framework* and *If–then rules* of thumb. For learning activities, seven lower order themes have been presented, including the *exaggeration of game information*, *variability*, *manipulation of constraints*, *player huddles*, *representativeness*, *walk through's* and *video analysis methods*. For coach behaviours, eight lower order themes were presented, made up of *feedback*, *instruction, listening*, *praise*, *problem setting*, *problem solving*, *questioning* and *silence with observation*. Finally, for player engagement two lower order themes were identified, these included the *co-construction of tactics and strategy* and giving players *ownership*.

Coaches espoused the use of non-linear design principles as central when creating an effective learning environment (Passos et al. 2008; Correia et al. 2019). Specifically, coaches referenced the importance of designing learning activities that represent the random nature of the competitive environment (Correia et al. 2019; Williams and Hodges 2005), tasks that exaggerate specific game information to couple perception and action (Tan, Chow, and Davids 2012) and manipulate task constraints to increase the number of opportunities to make (goal-directed) decisions (Passos et al. 2008; Balagué et al. 2019). This was best captured by Coach 2, who suggested that;

> 'the training environment needs to be as specific as it can be because we're trying to make sure that they're actions are always in conjunction with their perception.' (Coach 2, espoused theories).

However, the observational data presented misalignments between coaches espoused theories and theories in use, as player huddles (46.88% of all activities) were the most frequent learning activity for all five coaches where coaches often checked the declarative understanding of players. Player

Table 4. Systematic observation of coaches theories in use – learning activities.

Learning activity	Coach 1	Coach 1%	Coach 2	Coach 2%	Coach 3	Coach 3%	Coach 4	Coach 4%	Coach 5	Coach 5%	Total (n)	Total (%)
Paired	0.00	0.00	0.00	0.00	4.00	5.56	3.00	4.62	7.00	7.61	14.00	4.38
Drill	2.00	4.55	0.00	0.00	0.00	0.00	0.00	0.00	7.00	7.61	9.00	2.81
Small-sided activities	4.00	9.09	8.00	17.02	8.00	11.11	16.00	24.62	0.00	0.00	36.00	11.25
Freeze in position	0.00	0.00	9.00	19.15	0.00	0.00	2.00	3.08	0.00	0.00	11.00	3.44
Player huddle	21.00	47.73	16.00	34.04	30.00	41.67	34.00	52.31	49.00	53.26	150.00	46.88
Larger activities	2.00	4.55	0.00	0.00	6.00	8.33	0.00	0.00	5.00	5.43	13.00	4.06
Transition	2.00	4.55	6.00	12.77	5.00	6.94	3.00	4.62	7.00	7.61	23.00	7.19
Phase of play	9.00	20.45	4.00	8.51	16.00	22.22	0.00	0.00	14.00	15.22	43.00	13.44
Possession game	0.00	0.00	0.00	0.00	3.00	4.17	0.00	0.00	0.00	0.00	3.00	0.94
Conditioned game	4.00	9.09	4.00	8.51	0.00	0.00	7.00	10.77	3.00	3.26	18.00	5.63
Total	44.00	100.00	47.00	100.00	72.00	100.00	65.00	100.00	92.00	100.00		

Table 5. Systematic observation of coaches theories in use – coach behaviour's.

Behaviour (n)	Coach 1	Coach 1 (%)	Coach 2	Coach 2 (%)	Coach 3	Coach 3 (%)	Coach 4	Coach 4 (%)	Coach 5	Coach 5 (%)	Total (n)	Total (%)
Positive model	21.00	5.24	5.00	1.36	10.00	1.74	5.00	0.73	16.00	2.13	57.00	2.05
Negative model	2.00	0.50	1.00	0.27	2.00	0.35	0.00	0.00	7.00	0.93	12.00	0.43
Corrective feedback	18.00	4.49	37.00	10.05	35.00	6.08	47.00	6.90	103.00	13.73	240.00	8.62
Specific feedback	34.00	8.48	26.00	7.07	80.00	13.89	49.00	7.20	36.00	4.80	225.00	8.08
General feedback	20.00	4.99	4.00	1.09	8.00	1.39	4.00	0.59	24.00	3.20	58.00	2.08
Instruction	71.00	17.71	96.00	26.09	127.00	22.05	240.00	35.24	214.00	28.53	748.00	26.87
Humour	9.00	2.24	0.00	0.00	12.00	2.08	19.00	2.79	1.00	0.13	41.00	1.47
Praise	85.00	21.20	21.00	5.71	130.00	22.57	43.00	6.31	46.00	6.13	325.00	11.67
Hustle	10.00	2.49	14.00	3.80	31.00	5.38	45.00	6.61	49.00	6.53	149.00	5.35
Punishment	1.00	0.25	0.00	0.00	1.00	0.17	5.00	0.73	2.00	0.27	9.00	0.32
Scold	0.00	0.00	0.00	0.00	4.00	0.69	1.00	0.15	23.00	3.07	28.00	1.01
Response to question	18.00	4.49	6.00	1.63	15.00	2.60	24.00	3.52	26.00	3.47	89.00	3.20
Confer with assistants	19.00	4.74	0.00	0.00	31.00	5.38	19.00	2.79	22.00	2.93	91.00	3.27
Convergent Questioning	29.00	7.23	113.00	30.71	48.00	8.33	82.00	12.04	139.00	18.53	421.00	15.12
Divergent Questioning	40.00	9.98	28.00	7.61	18.00	3.13	63.00	9.25	29.00	3.87	178.00	6.39
Silence – on task	24.00	5.99	17.00	4.62	22.00	3.82	34.00	4.99	13.00	1.73	110.00	3.95
Silence – off task	0.00	0.00	0.00	0.00	2.00	0.35	1.00	0.15	0.00	0.00	3.00	0.11
Total	401.00	100.00	368.00	100.00	576.00	100.00	681.00	100.00	750.00	100.00		

Table 6. Deductive Thematic analysis of Premiership Regional Academy rugby union coaches' theories in use when developing player decision making.

Prescribed theme	Higher order theme	Lower order theme	Example from raw data
Coaching methods	Common frame of reference (SMM) (86)	Common language (30)	So people can make effective decisions for other people. That's one of the best examples of it, a winger makes the decision to make the decision for their number 10, before he's even caught the ball, or even had the chance to look up and interpret what he's making a decision on, the wingers use of that terminology has already made the decision for him immediately. That terminology makes the process time much shorter, if the 10 chooses to listen and act as asked. Terminology increases the speed of processing information, as other players always have more time and opportunity to look. So, to have one clear call for one specific action, if everyone understands it, knows it and is on the same page with it then its like that (click of the fingers).If you don't have that language, then there could be multiple words or multiple things that you could say that makes that time bigger, and you may have different views on what those terms mean. Coach 3
		Tactical framework (29)	Obviously because we're playing 2's [*A framework of four pods of 2 forwards across the width of the pitch*], we always need an extra man to ruck if we take the ball into contact. When we play off ten, the man out of the back should look after the ruck, but when we play off 9, 2's off 9, we need one player to double ruck. So in this case it was the man out of the back, I think it was **** who didn't execute their role. So I asked who's missing here? To see if he knew if it was his responsibility. Coach 1
		IF-THEN rules (27)	So the information to attack in our own 22, so on a kick off we attack all the time unless the weather's poor. Then from scrum, same unless we are on our own 5 m line, then there's a decision to be made as there may be too much risk. They do have the freedom to play. Also, their decision should be made in reference to the score, the weather, so if we have wind in our face then we cannot kick, so instead we have to keep the ball and run it. If we haven't got decent momentum in three phases, then we kick. Coach 1
	Learning activities (140)	Exaggeration of game information (41)	Because, with players at this age and stage I've designed this to further exaggerate what they would see on the pitch. So it might not be immediately obvious where the defence are or the positions they're taking without that picture being exaggerated, so in this I told the defence that they have to be very wide or very narrow. Coach 2
		Variability (9)	I changed the pitch dimensions to add to task variability. So, by increasing the width of the pitch you're adding and changing the task variability, so if you take the action in the practice away from being very massed and similar to a little bit more variable. Coach 2
		Manipulation of constraints (21)	*So, you mentioned 'beat the game', where's that come from? What's the purpose?* It's come from listening to, well I know the origins are actually a **** thing. It's not the phrase that I would use a lot to be honest, but I think it frame this practice quite nicely for the lads. It gives them a, it terms of the context of the game, there is a deliberate plan to guide player's decision making behaviour, there's a rule that's running throughout them all which is consistent, bit of reward

(*Continued*)

Table 6. Continued.

Prescribed theme	Higher order theme	Lower order theme	Example from raw data
			based, if you make these decisions well in the right moment you'll get the ball back sort of thing. Coach 4
		Player huddles (43)	Yeah so I hadn't thought about it like that before, I guess it's reflection – how did it go? Diagnosis – the players break their decision-making down and if they miss it I would. Then set future goals for performance for the next game. So say if the player's bring in a new lineout, I'd probably make them walk through it first, for clarity and detail on roles and responsibilities, ask them how they think it went and then run through it against opposition and ask them how they think it went again. Coach 3.
		Representativeness (24)	Different widths for the attacking and defence, different spaces to play into. Here I'm trying to replicate here a one phase scenario they will be presented with in the game, if we start on the line this is not a game scenario, so the ruck needs to be positive or negative and the attackers and defenders need to fold round the corner. You keep the different start points, just make the ruck more variable. Coach 1
		Walk through's (3)	So like we spoke about earlier, he didn't need to go to big picture stuff because it was already established, but if you're going to bring in a new shape off 9, or a new framework in phase play, my first response is always to walk through it first. So on this clip, it's the first time they've done it, or considered what their role is so if we were doing a new shape off 9, I would coach it the same way. Coach 3.
		Video analysis (16)	We watched them before the game and analysed the way they set up on launch defence. We noticed that they were overfolding, so that's why we decided to come back down the shortside. Coach 1
	Coach behaviour's (134)	Feedback (16)	Put a bit of pressure on them. It's not necessarily gone to plan, as I wanted them to be more successful than that because they've got a big game at the weekend and I wanted them to go into it with confidence but, there's a reality here that they've had four unsuccessful line outs which in a game, would hand the opposition four possessions of the ball. So really I'm inexplicitly talking to the lineout caller almost saying 'I'm just reminding you, that you haven't made good decisions on the last four, so what is your go too decision to get us back on track and build some confidence again and break the momentum. Coach 3
		Instruction (19)	This player **** is one of our best and most developed players, he knows this through and through. So if I asked him where the space was or what the right decision was he'd just say what I was going to say. He knows so I tell him. His game intelligence and understanding is at a premiership level. Coach 1
		Listening (3)	It shows that as a coach you're listening to what they're saying, open to their collective solution to what you've asked them to do, check so that's what you've said now how have you actioned it or were you even actioning it? Coach 4.
		Praise (15)	Well I'm praising the specific process beforehand. What led to that outcome, it's also a serious work on for him. To be honest he's unfit and lazy. So I've purposefully tried to show him and his peers a clear example of when he's not being lazy, the decisions around that and a positive outcome. It's trying to get him to reflect on, well when I make the decision to

(*Continued*)

Table 6. Continued.

Prescribed theme	Higher order theme	Lower order theme	Example from raw data
			work hard this is how successful I can be. This is about building confidence in decision-making. Coach 3
		Problem setting (16)	When we get to this stage of the session there is a, we've built up enough of a shared mental model that I can step back and set problems for them to use it most effectively. They now have the shared reference points to work from. Coach 2.
		Problem solving (14)	*I'm really intrigued from where this launch has been born from in your mind before handing it over to the players?* Yeah it's a two phase pattern of play, I'll be honest there is not much player led decision-making in these two phases of play. Yeah it's been very successful as a play as we've scored loads of first phase tries this season off it and the lads have enjoyed it. I would never prescribe anything longer than two phases. Because after that, they need to make decisions, make errors, learn from that. Coach 1
		Questioning (39)	Oh no, the double question. I shouldn't close my own question. The intentions there, but I didn't even give him a chance did I. I asked quite an open question, then a really specific question immediately, I should have allowed for silence and given some time for them to consider an answer. I said, 'what would you have changed?' and then immediately said 'where would you have stood differently?' two massively different questions. Coach 3
		Silence (3)	One thing I'm learning is that I don't want to be scared when there's a silence, when I ask a question I need to be patient and they will eventually come to an answer. If they don't just give them the time. Coach 1
	Player engagement (39)	Co-construction of tactics & strategy (11)	Make them take ownership and see what they come up with. It's co-constructing the new launch rather than creating it myself. Coach 1
		Ownership (28)	The players themselves came up with the terms 'stacked' or 'spread' to identify what the defence were doing. Coach 2

[Numbers in brackets denote the number of times this theme was referenced during self-confrontation interviews].

huddles may capture periods of inactivity and time-off task (O'Connor, Larkin, and Williams 2017) which suggests that player's must be actively 'doing' to develop how to make better decisions (Correia et al. 2019). Whilst we agree that *doing* is essential, digesting knowledge and receiving feedback that supports players in understanding what they are doing and why is just as important (Hattie and Timperley 2007; Kirschner 2009; Race 2005). When confronted with these findings, coaches rationalised that huddles created opportunities for players to consider what decisions they're making, how they made them, and why they may/may not be appropriate (Anderson 1982). This highlighted a clear epistemological gap between the coaches espoused theories and theories in use regarding their intended coaching methods used to develop their players decision making. Despite the misalignment, self-confrontation interview data suggests that coaches use huddles to promote opportunities to communicate, receive feedback, sense make, peer-coach and co-construct relevant tactical ideas (Harvey and Light 2015; Cushion and Harvey 2016). Consequently, if framed correctly, player huddles can be a powerful learning tool if they're guided towards appropriate intentions for impact (Holland et al. 2010). If framed incorrectly however, they may create a breakdown in players understanding and promote individuals to focus on their personal preferences over relevant intentions.

Analysis of the CAIS data suggested that Coach 1 (20.45%), Coach 3 (22.22%), Coach 5 (15.22%) and Coach 2 (8.51%) made use of learning activities that tasked players with executing a single phase of play. Woods et al. (2020) has suggested that single-phased activities are sub-

optimal when supporting the development of players decision-making, as they remove too many contextual variables from an activity. Again, this demonstrated a misalignment between each coaches espoused theories regarding learning activities and their theories-in use. Within self-confrontation interviews, coaches rationales resorted back to the nature of the game whereby rugby union is characterised by its physical nature, where a contest for possession occurs every time a defensive player tackles an attacking player, a new phase of play begins (Tee, Ashford, and Piggott 2018). If single phases of play represent the demands of the sport, then they will present game specific information which players must attend too and in turn be a plausible coaching method to support the development of player decision making (Ashford, Abraham, and Poolton 2021b).

Themes extracted from self-confrontation interview data resemble the perceptions addressed during the initial semi-structured interview, where coaches promoted learning activities often claimed as theoretical origins of non-linear pedagogy (Chow 2013). These methods included purposefully coaching players to exaggerate game 'pictures' to promote a higher coupling of collective appropriate action (Johnston and Morrison 2016). Coaches also described increasing or reducing the variability of a task; or introducing or removing rules to manipulate task constraints towards desired intentions (Chow 2013; Correia et al. 2019). All coaches described that the constraints of a task should remove other rugby specific information to allow for the same perceptual information to be frequently available and to create frequent opportunities to couple perception with action (Balagué et al. 2019).

Whilst all coaches referred to the manipulation of task constraints as beneficial for the development of player decision making, they were also unanimous in stressing the importance of players understanding why constraints have influenced their decisions (Macquet and Kragba 2015; Levi and Jackson 2018). This blend of incidental and intentional training is perhaps reflected in the behavioural data where instruction (Total – 26.87%), corrective feedback (Total – 8.62%) and specific feedback (Total – 8.08%) were common across all activities. The observational data has highlighted that instruction was the most used behaviour for all coaches, except for coach 1, who employed the use of praise (21.20%) most often and coach 2 (30.71%) who employed convergent questioning. This presents a challenge to the constraints led approach and suggests that coaches can be directive in their coach behaviours when using more game like, constrained activities (Harvey et al. 2013).

Whilst coaches gave the impression that their design of training activities were embedded in an incidental approach, coaches also espoused intentional methods (Bar-Eli, Plessner, and Raab 2011). All coaches consistently revisited how players collectively coordinate their decision making based on a shared mental model of performance (Richards, Collins, and Mascarenhas 2017). For example, Coach 2 suggested the following;

> 'I think that if a team has a shared mental model of what we're trying to do and achieve, we're trying to engage players in team-based decision-making rather than individual' (Coach 2, espoused theories)

The observational data presents that coaches 2 (30.71%), 3 (8.33%), 4 (12.04%) and 5 (18.53%) used convergent questioning more frequently than the use of divergent questioning. Convergent questions were often asked when reviewing the team's collective knowledge-of the game and shared mental model (Kagan 2005; Harvey and Light 2015). These questions often challenged players to consider tactics, strategy and their common language, which aligned closely with their espoused theory regarding a common language as a connecting variable between game information and collective execution of their accepted tactical framework (Ashford, Abraham, and Poolton 2021c; Mckay and O'Connor 2018). For instance;

> 'a winger makes the decision to make the decision for their number 10, before he's even caught the ball, or even had the chance to look up and interpret what he's making a decision on, the wingers use of that terminology has already made the decision for him immediately. That terminology makes the process time much shorter' (Coach 3, self-confrontation interview).

Importantly, self-confrontation interview data suggested that the adoption of a shared mental model was not to prescribe solutions for players, but a means to scaffolding collective perception, decisions, communications and actions towards common intentions (Tee, Ashford, and Piggott 2018).

Within coaches espoused theories, problem setting was frequently described as a successful method through the design of an activity, where players take ownership of their decision making (Light, Harvey, and Mouchet 2014). For instance, Coach 3 proposed;

> 'A lot of self-discovery … It's probably something that I didn't really realise as a player that my coaches were doing it. I used to think, why are they not just telling me?' (Coach 3, espoused theories).

Triangulation of self-confrontation interview and observational data suggests that this was not evident in coaches' theories-in use as there was an imbalance between the use of problem setting, problem solving and lines of questioning (Mosston and Ashworth 2008). Only coach 2 espoused a more balanced approach identifying the need for convergent questioning and direct instruction, which was corroborated in their observational data (Convergent questioning – 30.71%; Instruction – 26.09%). Interestingly, it was clear that the tactical solutions players use to solve tasks within training were already given to, or co-created with, the coach as tactical frameworks, where explicit options were available to select from (Richards, Collins, and Mascarenhas 2017; Mckay and O'Connor 2018). For instance, during single phase of play activities, coaches employed attacking shapes to support players in identifying key cues and typical decisions through if–then rules, such as creating passing options around the ball carrier (Richards, Collins, and Mascarenhas 2017). However, observational data suggested that coaches did not dictate where to look and how to act, instead more game like activities were used to embed shapes in a representative setting (Tan, Chow, and Davids 2012).

Directive coach behaviours were frequent within observations, as instruction (Coach 2–26.09%; Coach 5–28.53%), corrective feedback (coach 2–10.05%; coach 5–13.73%) and specific feedback (coach 3–13.89%; coach 1–8.48%) were used to support the development of player decision making. Thematic analysis of self-confrontation interviews suggested that this was to guide players to perceptual cues, error corrections and optimal decisions (Carpentier and Mageau 2013; McPherson and Vickers 2004). These findings align with our view where direct instruction, corrective feedback and supporting game understanding are significant methods within a wider coaching toolbox (Cope and Cushion 2020; Williams and Hodges 2005; More and Franks 1996). Thus, the blending of task constraints being accompanied by intentional development of a players understanding of what they're aiming to achieve in the context of the shared mental model seems necessary (Richards, Collins, and Mascarenhas 2017). Subsequently, there may be value in a coaches practice informed espoused theory of developing player decision making where learning activities work in harmony with explicit coach behaviours under the umbrella of a shared mental model of performance (Richards and Collins 2020; Richards, Collins, and Mascarenhas 2017; Price et al. 2019).

Findings indicate that coaches used convergent questioning to lead players to their own mental model of rugby union (Cushion et al. 2011; Partington, Cushion, and Harvey 2014). When confronted with this, coaches were quick to highlight feelings of guilt and how they should have behaved differently suggesting they may play hostage to specific theoretical approaches when creating learning activities (Chow 2013; Passos et al. 2008). However, the delivery of learning activities and coach behaviours should be aligned to facilitate the engagement of players to meet the intentions for impact regarding decision making behaviour (Martindale and Collins 2005). Similarly, advocates of the non-linear approach suggest that coaches set goals for sessions, through an informed diagnosis of what specific characteristics players need to improve (cf., Correia et al. 2019; Renshaw et al. 2019). Therefore, it is not theory which supports the creation of effective learning activities, but a pragmatic awareness of what methods will best support players experience and why (Collins, Collins, and Carson 2022).

Coaches occasionally described increasing player's autonomy to co-construct or create tactical play's;

> 'Make them take ownership and see what they come up with. It's co-constructing the new launch rather than creating it myself.' (Coach 1, self-confrontation interviews)

All coaches seemed comfortable alleviating control and handing ownership to the players, however they erred on caution as many added that they knew the players had the pre-existing knowledge, confidence, and technical/tactical capability to satisfy the demands of task (Occhino et al. 2014). Interestingly, research in an education setting has suggested that perceived competence has a dominant effect on self-determined motivation, whereas autonomy and relatedness had little to no effect (Bureau et al. 2022). Furthermore, the challenge point framework (Guadagnoli and Lee 2004; Hodges and Lohse 2022) would suggest that coaches first explore the nominal and functional difficulty of a task before increasing player autonomy. Therefore, the level of difficulty of a learning activity should be set at a desirable level for the individual(s) targeted if autonomy is shared (Bjork and Linn 1999).

General discussion

Numerous misalignments were unearthed between coaches espoused theories and theories in use regarding the methods used to develop their players decision making (Argyris and Schön 1974). This highlights several key factors that require deeper discussion. First, coaches learning activities which are representative, exaggerate game information and manipulate task constraints have recently been claimed by advocates of the ecological perspective exclusively (cf., Dicks, Davids, and Button 2009; Serra-Olivares, Clemente, and González-Víllora 2016). However, these implications have also been central to the cognitive view, which precede its ecological counterpart (cf., Thorpe, Bunker, and Almond 1986; Williams and Hodges 2005; Guadagnoli and Lee 2004). For instance, the notion of manipulating levels of contextual interference and randomness within a task has long offered a similar argument made by advocates of ecological dynamics (cf., Lee and Magill 1983; Magill and Hall 1990). It is unclear then why the ecological perspective has been labelled as *contemporary*, whilst other theoretical approaches are labelled as *traditional* and *sub-optimal* when they advocate for similar coaching methods. In addition, social media (MacNamara and Collins 2015) has become a likely contributor for the espoused theories described by coaches who participated in this study and the consequential epistemological gap unearthed. Perhaps therefore, disagreement between perspectives regarding the use of representative practice, the manipulation of constraints and the exaggeration of task information is a straw man argument driven by theoretical critique, instead of finding accepted points of similarity (Pill 2021; SueSee, Pill, and Hewitt 2020).

Our findings suggest that methods advocated by both research approaches largely overlap and intertwine (Ashford, Abraham, and Poolton 2021b). For instance, Cope and Cushion (2020) have recently called for a reconceptualization of direct instruction in coaching following years of stigma and conflation being attached to its use. The use of instruction is a clear example of the straw man argument, where it has been dichotomised to a traditional form and a contemporary form as a constraint through the ecological approach (Otte et al. 2020). This is unhelpful and unneeded as pragmatically, knowing when, how and why to intervene with a direct instruction should be prioritised before abidance to any theoretical boundaries. Furthermore, coaching methods derived from the ecological approach have been categorised as incidental, but advocates of the constraints led (Renshaw et al. 2019) and non-linear approaches (Correia et al. 2019) have since suggested that methods should begin with a desired intention in mind. Therefore, the incidental label is contradictory, as both perspectives offer practical implications which begin with broader coaching intentions. Therefore, instead of the dichotomy of intentional vs incidental training proposed, methods used by coaches should not be separated to an either-or decision, but instead form a judgment and decision making process which employs coaching methods to best support the decision making experience of their players.

Analysis of coaches espoused theories have identified the central importance of tactical frameworks which scaffold player's decision-making, underpinned by a common language (Ashford, Abraham, and Poolton 2021c) which guides players collective perception and action (Richards, Collins, and Mascarenhas 2017). These findings suggest that shared mental models presented the closest alignment between coaches espoused theories and theories in use (Argyris and Schön 1974). Interestingly, this concept has been openly criticised within research for several reasons; players who are continuously told where to look may become blind to important information (Memmert and Furley 2007), player creativity may be restrained by overbearing tactics (Ribeiro et al. 2019; Araújo et al. 2015) and players may be developing roles within a single way of playing the game, rather a broad range of appropriate strategies (Pinder et al. 2011; Phillips et al. 2010). However, findings from the self-confrontation interviews suggest that shared mental models are not prescriptive or overly constraining for players, but instead guide players search for game information and formulate typical responses to it (Bar-Eli, Plessner, and Raab 2011; Macquet and Kragba 2015). Thus, the highly instructional coaching demonstrated within the observational data was not to control or make the decisions for players, as often argued, but to guide and scaffold players experiences (Cope and Cushion 2020; Pill 2014). Therefore, what is most important is coaches ensure that their way of playing encourages players to adapt, express creativity, react to unfamiliar game incidents and fit into other tactical frameworks as they progress into more serious performance-based contexts (Ashford, Abraham, and Poolton 2021c; Collins, Collins, and Carson 2021).

Coaching methods should capture the needs of players to facilitate an athlete experience which develops their decision making and supports their learning (Martindale and Collins 2005; Muir et al. 2011). However, without a coach engaging in critical reflection to truly explore whether their coaching methods are achieving this end, they are largely working through a set of assumptions which may be heavily influenced by bias (Lipshitz and Strauss 1997). Our findings mirror other studies which have explored the epistemological gap, as coaches were found to be unaware of the relationship between what they think they do and what they do (cf., Hall et al. 2022; Hewitt 2015). Consequently, coaches should be supported to explore the evidence which informs their own decision making on a classical basis (*planning*) and naturalistic basis (*delivery*) to assess whether their coaching methods were appropriate.

Conclusion

Methodologically, there are limitations to the process used within this study. For instance, we employed the use of the CPPRF and CAIS whilst offering the limitations of their use. To mitigate these limitations, we were required to extend the boundaries of their use in order to produce data that meets the purpose of this paper. Furthermore, more attention should have been given to the logic underpinning the coaches' espoused theories and theories in use throughout the protocol. Therefore, we strongly suggest that time and effort is given by researchers in an effort to shape tools which better capture the underpinning logic and cognitive reasoning behind coaching methods, learning activities and coach behaviours, rather than a simple indication of what methods are being used.

To conclude, we suggest that coaches move past a desire to hold true to specific theoretical boundaries and instead consider their coaching as an 'it-depends' selection of practical tools that work within an appropriate context (Abraham and Collins 2011a). We urge coaches consistently deepen their knowledge and understanding of coaching methods and engage in their own action research each time they coach (Schon 1991). However, we suggest that coaches be sceptical of and reflect on what is it that they do, what they're trying to achieve and why are they doing it (Abraham and Collins 2011b; Collins, Collins, and Carson 2022). Thus, coaches should be supported by coach developers to engage in a cognitive apprenticeship to understand theoretical concepts as tools available for hire within their coaching (Downes and Collins 2022). Coaches can then be better supported to make pragmatic judgments on what intentions for impact are appropriate and what

learning activities and coach behaviours are suitable to shape an effective learning environment for their players decision making (Cruickshank and Collins 2013; Abraham and Collins 2011b).

Disclosure statement

No potential conflict of interest was reported by the author(s).

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