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DEVELOPING DECISION-MAKING IN RUGBY

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ABSTRACT *The development of player decision-making involving an empowering approach to coaching has been advocated for "Small Blacks" through to All Blacks over the past decade (Kidman, 2001, 2005; Kidman & Hanrahan, 2004). This paper examines how rugby players, through facilitated structured self-reflection, perceive their ability to make decisions in game situations, after participating in a seven-week decision-based training intervention designed and facilitated by a coach of the Canterbury Rugby Football Union in New Zealand. The aim is for teachers and coaches to better understand how the players learn to make better decisions in game-based situations.*

Semi-structured interviews were conducted pre, during and post the intervention with six 15-year-old rugby players from an independent private boys' high school in Christchurch, New Zealand. Content analysis of the descriptive data involved coding, categorising and then identifying common themes using NVivo (N6), a qualitative software program. The findings showed that all six players perceived improved perception and motor skills and tactical sport-specific knowledge, and that better intra-communication (within the team) was critical in their ability to make informed decisions.

The implications for sports teachers and coaches' education suggest that purposeful decision-based training, involving facilitated structured self-reflection, better equips players to improve decision-making on the rugby field. However, further research is needed to track and monitor individual players and their ability to make effective decisions in game situations.

KEYWORDS

Decision-making, perception and motor skills, tactical knowledge, communication, team cohesion

INTRODUCTION

The importance of decision-making in sport has been well documented (Raab, 2007; Starkes, Ericsson, & Anders, 2003; Williams & Hodges, 2004). However, there is a need to investigate decision-based training and determine how to develop players' cognitive processing and ability to make better decisions. Dunn (2003) argues that too much emphasis has been placed on physical skills and too little on players' awareness of game strategies and their decision-making capacities. There

also appear to be few coaches who are actually facilitating or implementing decision-making strategies with players (McMorris, 1999).

Dewey (1938) suggests that education requires purposeful thinking and reflection guided by educators. Similar characteristics define the pedagogical approach to learning in sport coaching and player education (Kidman, 2001). In the coaching setting, players should be encouraged to "recapture their experience, think about it, mull it over and evaluate it" (Boud, Keogh, & Walker, 1985, p. 19). Structured reflection, facilitated by the coach, encourages players' "conscious reflective activity" (Roberts, 2002) related to connections between information, feelings and learning produced by the training experience (Gibbs, 1988). The quality of the learning is dependent on the depth of the process of reflection rather than the quality of the experience (Dewey, 1938).

The purpose of this current study is to assist teachers and coaches to understand how rugby players, through facilitated structured self-reflection, perceive their ability to make decisions in game situations after participating in a decision-based training intervention designed and facilitated by the Canterbury Rugby Football Union (CRFU) in New Zealand.

INTERVENTION

The decision-based intervention programme was additional to the players' normal technical and physical training rugby programme (two sessions, each of one hour, per week). It included seven sessions—one-hour per session each week—based around the run-catch-pass skill set, so players could then focus on decision-making skills (see Table 1). Two further review sessions followed six weeks later. Farrow and Abernethy (2002) recommend retention sessions and data collecting as post intervention to determine learning versus performance effect, or training may not be a consequence of learning and heightened results may dissipate or improve.

The CRFU programme used several instructional techniques, based on a three-step decision-making training process recommended by Vickers, Reeves, Chambers and Martell (2004) to facilitate the development of perceptual and decision-making skills. The first step frames practice events so that decision-making skills are at the fore. Highlighting a specific cognitive skill within variations found in game situations helps to develops the ability to retrieve from memory the correct solution, and solve a problem under time constraints. The second step requires the coach to design drills/sequences of drills that simulates decision-making in game conditions (Gréhaigne, Richard, & Griffin, 2005; Griffin, Mitchell, & Oslin, 1997). The third and final step requires the use of one or more of seven decision-training tools. According to Vickers et al. (2004) each decision-making tool outlined below is well supported by the literature in the development of cognitive, perceptual and decision-making skills:

- Variable practice: Specific skill(s) are trained, using variations found in game situations,
- Random practice: Different groups of skills are combined to simulate tactical game situations,

- Bandwidth feedback: Reduces or delays feedback or "bandwidth" feedback as skill develops,
- Questioning: Probes players' understanding of their physical skills and decision-making,
- Video feedback: Players review their own/teammates' performance, and engage in self-reflection,
- "Hard first" tactical instruction: Complex conceptual skills taught early in the season, and
- Modelling: Coach/elite player demonstrates analytical and cognitive sport-specific skills.

Table 1. Sessions & review plan outlines

Session One	
Objective:	Establish terminology and identify key factors in catching and passing
Warm-up:	Dominant and non-dominant hand, holding and gripping; Paired passing two balls left/right side of body; Game sideline touch spiral and non-spiral
Skills:	Large square–two balls continuous passing through centre player Static relays building to running relay 4–"Wild West Draw" strong arms/soft hands
Warm down:	Side line touch–no spiral passing
Review:	Types of pass, gripping and holding passing action
Skill development:	Juggling left/right hands; Catch–pass in pairs left/ right side of body; Blind reaction catch
Session Two	
Video:	Crusaders try versus Brumbies
Objective:	Perform functional roles of ball carrier and support player
Warm-up:	Game sideline touch–functional roles
Skills:	Large square–two balls continuous passing through centre player; Passing waves–fours in lanes; 3 vs. 2 pass to space start ball middle and sides
Warm down:	Side line touch
Review:	Functional roles of ball carrier and support player
Skill development:	Blind reaction catch; left/right side body–two balls in pairs; dropped ball over head; two ball juggling with alternative hands

Session Three	
Video:	Crusaders working the defence angles running lines hold/drag
Objective:	Identify options in defence to attack
Warm-up:	Two balls alternative juggle and call numbers; lateral passing in threes while calling numbers; Skill development; continuous attack 6 vs. 3 points for successful attack, rotate teams of 3; Extend drill to have two players attack from depth; 3 vs. 2 pass to space start ball middle and sides
Warm down:	Side line touch
Review:	Functional roles and running lines in attack situations
Skill development:	Two ball juggling; Kick-catch-attack in pairs; 5m x 5m attack defender
Session Four	
Video:	NZRU – Defence CD
Objective:	Understand defensive systems in order to make better decisions in attack
Warm-up:	Lateral passing in threes while calling numbers (middle catch/pass above post); Extend by moving receiver's short long pass; Extend by adding coloured cones to depth
Skills:	Piggy in middle; Backline attack – boot man, rock, guard dog and two defenders attack what you see
Warm down:	Mini game
Review:	Functional roles and head and eye movement on and off the ball Players' fill in notebook and complete skill sheets Divide into two groups practice 3 x attack and run against defence next session 7 vs. 4
Skill development:	Kick-catch-attack in pairs; 5m x 5m attack defender; 2 vs. 1 narrow channel
Session Five	
Video:	NZRU – Defence C
Objective:	Fulfil functional roles in attack by identifying space and cue recognition
Warm-up:	3 vs. 3 half pass to first receiver who must pass to gap, one defender not to move forward
Skills:	3s lateral passing call numbers and colours in depth; Right angled movement 3 x stages of drill; Run groups attack moves against defence 7 vs. 4 talk functional role in move

Warm down:	Mini game
Review:	All skills, concepts and principles of attack and defence covered to date
Skill development:	5m x 5m attack defender; 3 vs. 2 narrow channel attack; Explosive passing drill ball on hip left and right hands
Session Six	
Video:	Intervention U16 Team vs. Bumside Clip 1: Decision-making at breakdown tackle, clean out Clip 2: Ball watching see things early being stressed in defence Clip 3: Moving ball to space, clean out, functional roles in attack
Objective:	Functional roles unstructured attack – see option collectively and anticipate from cues identified early
Warm-up:	Spiral above head left and right, 2 x balls paired passing
Skills:	Right-angled movement 3 x stages; 2 x groups and run Henry Drill (NZRFU); Unstructured attack and defence
Warm down:	N/A
Review:	Need to look identify relevant cues early to select best option
Skill development:	Explosive passing off hip; Spiral above head; Kick-catch-attack 1 vs. 1 and 2 vs. 2
Session Seven	
Video:	Unstructured attack Crusaders and Chiefs
Objective:	Revise all learning and principles of attack and defence, head and eye movement, passing, catching and running angles
Warm-up:	Paired passing 2 x balls Spiral above head
Skills:	Classroom session – review of content knowledge/understanding – through questioning, problem-solving scenarios
Warm down:	N/A
Review:	All aspect and terminology and give out skill sheets
Skill development:	Right angled grid extend to numbers; Overhead reaction catch; blind reaction catch; Kick-catch-attack single and paired

Review Session 1	
Objective:	Revise functional roles and terminology in attack in order to create space
Warm-up:	Piggy in the middle one and two
Skill revision:	Left and right 1 Running drill utilise per observed feedback; Build to add in support from depth position
Warm down:	4 vs. 5 mini game
Review:	Functional roles and head and eye movement identify options and cues on and off the ball
Review Session 2	
Objective:	Identify cues/options in attack to beat defenders
Warm-up:	Target passing static and moving; Magic circle 1L – 2 – 3L – 4k – 5L and down; Introduce soccer ball inside circle
Skill revision:	Quick hands drill, add in flash cards; Quick hand and 4 vs. 3 attack; Left and right V Running
Warm down:	7 vs. 7 mini game
Review:	Look for options/cues off the ball

The facilitator of the intervention programme, a 45-year-old male with several years' rugby-playing experience at a senior representative level and who had worked for the CRFU as a Rugby Development Officer for the past five years, provided feedback for players throughout and was interviewed post intervention. Games were video recorded (early, mid and end of season) and converted onto Silicon COACH Computer software for ease of game and player performance analysis, as well as the ability to manipulate images and categorise video segments of play into video clips (Liebermann et al., 2002). The researcher and facilitator analysed the video and provided feedback for players to confirm (or not) what they said they were doing. One video camera was used each game and filming was positioned from behind the intervention team's attacking try line to enable more effective visual representation. The video analysis was used as a player feedback tool to encourage self-reflection, but was not included in the data, as it was felt that it provided anecdotal rather than systematic support for all the players' actions/decisions (e.g. limited due to the one camera, its distance from the action, and lack of audio to hear player's intra-communication). The main source of data was the players' perceptions of their decision-making on the rugby field at different times during and after the training intervention period.

METHODOLOGY

Decision-making has been studied extensively in the last two decades utilising a growing range of research methodologies (Lenzen, Theunissen, & Cloes, 2009; Tenenbaum, 2003). This current study of decision-making has focused on understanding players' perceptions of their decision-making on the rugby field using qualitative survey methodology involving semi-structured interviews (Denzin & Lincoln, 2000; Gratton & Jones, 2004). Lenzen et al. (2009) and Mouchet and Bouthier (2006) have also undertaken exploratory studies investigating decision-making in handball and rugby, respectively, using qualitative self-reflective interview. Self-reflection by the players encouraged development of their decision-making processes via ongoing self-discovery (Kidman, 2001).

Participants

Data were collected from interviews with six 15-year-old rugby players (three forwards and three backs) selected via stratified random sampling from the 14 players involved in the intervention. All respondents were informed of their participant rights and involvement before signing to confirm voluntary participation and data confidentiality. Williams and Ward (2003) suggest that the perceptual maturity and recall memory capacity of this age has the perceptual and cognitive ability to improve decision-making skills in a specific sporting context.

Semi-structured interview

Interviews were held at four time periods, as below. This structured approach to the reflection post intervention supports Leberman and Martin's (2004) findings in relation to Kolb's "Experiential Learning Cycle" (1984), which encourages critical reflection on action and more effective transfer of learning (Boud et al., 1985; Schön, 1983).

- T1 – pre (one week prior to the intervention commencing),
- T2 – midway (one day after week four of intervention),
- T3 – post (one week after intervention), and
- T4 – six weeks post intervention (near the end of the rugby season), after two review sessions (one week later).

Three baseline questions were consistently used in all four interview sessions with all six players to determine any shift in the players' responses during the period of the intervention and review sessions. The baseline questions were modelled from Ericcson and Simon (1993), who suggest using probes such as "what were you thinking?" This minimises front-loading questions or probes that lead participants to give the response the interviewer is wanting, and is important in eliminating researcher bias.

- When you have the ball–what are you thinking? (ball carrier),
- When your teammate has the ball–what are you thinking? (support player), and
- When the opposition has the ball–what are you thinking? (defender).

Content analysis

NVivo (N6), a qualitative research program, was used by the researcher to store, edit and organise the interview data as well as code, search and retrieve the data units from the interview transcriptions to provide structure and effective processing of the data (Crowley, Harre, & Tagg, 2002). Twenty-eight codes were identified by the lead researcher from the four sets of interview data for each of the six players. The coded data was then grouped into 10 themes that all players identified: peripheral vision; perceptual skills; attention; anticipation; spatial and tactical awareness; motor skills; functional roles; player organisation and structure; communication; and team cohesion. These themes were then categorised into three main themes: perception and motor skills, tactical knowledge, and communication and team cohesion.

The transferability is enhanced here by the provision of a "thick" description (i.e., a very detailed description, see Merriam, 1998), which details the educational context, methodology and data analysis procedure. This is concordant with the nature of qualitative research, which seeks to form a unique interpretation of events rather than produce generalisations (Merriam, 1998).

Limitations

It is acknowledged that there was no control group used in this current study, which is consistent with a qualitative approach and the study of personal growth related to a specific context "due to the problems of controlling variables in a social setting" (Remenyi, Williams, Money, & Swartz, 1998, p. 99). We also recognise that a 15-year-old player's performance does improve normally throughout the season. However, the players' change in verbalisation of their perceived ability to make decisions indicates the intervention effects related to the three main themes. There are potentially several reasons for individual differences in actual performance among the six players; for example, pre intervention experience, knowledge and motor skill competence; their ability to self-reflect, memory recall and retrieval capabilities; verbal communication skills, motivation levels and player genetic potential (Baker, Cote, & Abernethy, 2003a; Gréhaigne, Godbout, & Bouthier, 2001; McMorris, 1999). The small sample also prevented position differences being identified; for example, the spatial differences between the three backs and forwards would require different focuses on the nature of the decisions made in game situations.

RESULTS

Perception and motor skills

Pre intervention some of the players demonstrated a "wait and see" focus. The following statement shows how Player W perceived his anticipatory and spatial skills had developed at T2:

> Kind of more tactical, instead of at the start of the season some people just sort of go out there and make big hits, we're thinking more in

> depth than that and thinking how we can get at them and what situation we are in and where we should run it.

The findings suggest players perceived that their vision changed from ball gazing and tunnel vision to knowing what to look for. The following response at T3 from Player S indicates he perceived that he was starting to glance at more than one visual cue and improving attention strategies:

> Use the eyes and just identify–try and scan across–not just look in the middle first. You've got to look everywhere–scan. So I can see both the defence coming up and my support player … it helps me to assess what I should do and … helps me to decide to be in space, if I can see the space.

Player S commented further, at T3, about dividing his attention between visual and verbal cues to help make the decision on what to take. Pre-intervention data provided no indication, from the players' perceptions, that they divided their attention.

> First thing, look up, run straight … look for where the defence is positioned and listening to, say if someone's calling for it–listening to my support players and give it to someone who's in a better position than me … Looking at defence and support player, as well as listening.

Anticipation was only stated by Player L at T1, "Try and anticipate where they're going to move and which way I should pass it or whether I should take it and maul it or go down to a ruck", but by the end of the programme all players referred to the use of anticipation.

> You can get a picture of what move they're going to do, where the support players are and where the gaps are.
>
> You're sort of deciding and then ... that you've got support before the ball comes out.
>
> Anticipating where they're going to go and if they're going to run the gap or if they're going to take the tackle and go to ground, in which case just be first there.

A shift in all the players' spatial and tactical awareness had occurred. This was illustrated by Player W. At T1 his focus was on his own game "not be worrying about what the other team's always doing, but just focusing on your own thing". At T2 he indicated that

> Instead of just concentrating on your own team, watching what the other team's doing and how they're performing–[watching] their players especially being a back–watching their backs.

At T4, Player W's comments below were typical of all six players, and illustrated the players' awareness of their surroundings away from the ball, their thinking and positioning based on the space available, and their role as support player and/or ball carrier.

> Instead of just running beside him and calling, looking where the defence is positioned and seeing where the best place is for you to be

> around him–what the best option is, where the space is … and am I in the right position. Positioning yourself to help the ball carrier so you don't get them in trouble … to help them out and get in the right position.

All six players made comments relating to how cognitive and physical motor skills and strategies learnt from the intervention had started to come through in the later practices and games. For example, Player G provided an explanation of when he would use fast or slow feet, and fast or slow hands in the final interview session, T4, at the end of the rugby season.

> I would use slow feet/quick hands when the opposition are running up at me in a line quite fast and when they're not really running up, I'll use quick feet/slow hands. Because if I was running ... if we're running together … it wouldn't allow me … give me as much time to make a choice where I could put the ball.

Player R commented on the transfer of learning to the game in respect of "push/pressure pass", which was taught in the programme. This technique allows the ball to be moved on quickly and it enables the player who is passing the ball to keep their "head up" to see the opposition and playing environment and "stress the defence"–drawing the opposing defender in to create space for the receiver of the pass.

> I just keep trying to make sure of my pass–like I've been taught to pass and then I try and take what I've been told here and practice it and then into the game.

Tactical knowledge

The findings support a greater knowledge base and understanding of the game, as illustrated by Player H, who at T1 indicated, "I can't really think too much when I am on the field". Later at T2 he commented,

> It's changed everything I've done, I think–like stressing the defence, keeping my awareness up … just the small things, which I had never really thought about. I just keep thinking about now … handling the ball with two hands, keeping the head and ball up.

The findings show a significant shift, from pre to post intervention, in perceived tactical understanding and knowledge of players' "functional roles" and the importance of these roles. Pre intervention, a typical response as a ball carrier was about "looking for space/gaps", "take it straight up", "I kind of stay with my loosies", and "look for players around you". Similarly, as a support player, "try and get there as fast as I can", and "if he gets in trouble to take the ball and react to what I think he's going to do". There appeared to be no clear criteria or set of rules identified by all the players in the pre-intervention interview. However, once the intervention programme commenced, all six players commented about "stressing the defence", "holding the ball in two hands", "listening to support players", and executing a "push/pressure pass" to his outside support player. For example,

Players H, G and R commented about their roles as ball carrier and support players at T2, respectively:

> Keeping the ball up, keeping your head up, and just listening to where my support is or what's happening, like in calls, and just set up for a back move, for example, whether there's space out wide or any gaps.
>
> I think hold it in two hands. Shall I run, shall I pass or hold it until … see where the overlap is and I kind of look who's outside me and who's inside me? What's the best option here? And like shall I offload or shall I go for the gap?
>
> Listening and I'm thinking about passing and what I have to do to stress the defence–hold the ball in two hands and run at the player I want to stress, and I'm looking for any communication from support players.

The players perceived a changed approach to defending based on an increased understanding of their functional roles as defenders, and knowledge and understanding of patterns of defence. The following comment provides an example of what and how to respond in a defensive situation:

> When I'm going to tackle a player–don't get sucked in … don't go in too quickly.

The "what" (declarative knowledge) is not to get sucked or drawn in by the attacker when making a tackle as the defender. The "how" (procedural knowledge) is not to move in too quickly to make the tackle; therefore, hold position to force the attacker to move and reduce the attacker advantage.

After completing the intervention training programme, all six players have identified player organisation and understanding of defence patterns as important for decision-making on "what and how" to respond to defensive and attacking situations on the rugby field. The players are more aware that their position in a given situation helps not only the decision they make but assists in helping their teammates make a more informed decision, based on the positioning of surrounding players. Player G provided a commentary at T4 of his positional play:

> Whereabouts I should be in the line, who I've got, calling saying I've got this man, which channel I should be taking. If the half back's gone down in a maul and there's no one playing boot man [stands back and in between "rocks" on both sides of ruck or maul], then I would go into that position to cover for the line. Or if I'm there first, guard dog [2nd defender off ruck or maul] or rock [1st defender off ruck or maul].

The following comments provide typical examples of how the intervention has made the players think more and increased their game sense and understanding of player positioning:

> Player W: Concentrate on two things at once–learn to look at the defence and look out for our own players'–how everyone's positioned. [The intervention] taught us to be a lot more confident in what we're

> doing … that's changed our decision-making because we're looking and thinking a lot more rather than just sort of catching runners.
>
> Player S: Give it to the guy in space if he's in a better position. Not just pass 'cause I think I have to … pass because it's the best thing to do or run if it's the best thing to do … so identify more what's on.
>
> Player G: [The intervention] made me think a lot more when I'm out on the field. Made me a lot more aware of where the opposition are and what my role is as ball carrier or just in support play. It's helped a lot with the general sense of the game.

Communication and team cohesion

At T1, communication was identified by only two of the six players as important in making decisions on the rugby field; comments were "communicating … just talking"; "just listening to the players". All the players perceived that the quality of intra-communication (within the team) improved as per their understanding and reading of the game. By T2 of the intervention, all six players were familiar with the roles and principles of team play and provided content-specific information that enabled them to communicate more effectively as their ability to understand each others roles and adapt to game situations improved. These current findings exemplify the value of intra-communication in making informed decisions. Player R and G commented, respectively, at T4 about the increased amount of team communication: "... communication with teammates is the main thing; keep the same channel instead of crossing each other and getting confused"; "there's much more communication in the game". The following comments at T3 and T4, respectively, illustrated the change in Player G's functional role and how that was communicated and impacted on the back line in a game situation.

> I was calling the back line up quite a lot that game … they were paying a lot more attention to who was calling up. Like they were paying attention to where the ball was at. If someone else was guard dog and I was out in the back line, I'd usually be looking at or just listening for the player, if he was calling up or not.
>
> A key change in the backs relates to communication and watching the opposition more. The backs used to pay too much attention to our own men, rather than his opposite number. I think our backs talk more and have picked up on those sorts of things … like last week–they've been matching up numbers rather than looking to where the ball is. Everyone's responding as a team rather than individuals coming up at different times.

DISCUSSION

Perception and motor skills

The players' reflection between T1 and T4 has developed from "noticing", or "making sense" to "making meaning" from their experiences (Gibbs, 1988; Moon,

2000, 2004). Our findings suggest that players are starting to detect key sensory cues earlier, leading to faster and more accurate decisions (Gréhaigne et al., 2001). In this current study, following the training intervention, the players perceive greater awareness of their ability to know what to do in a given situation on attack or defence. The players are starting to adapt and develop their perception skills and knowledge, namely procedural (how to do it) and declarative knowledge (what to do), and their ability to encode and retrieve such information (Gréhaigne et al., 2001). We conclude that the intervention has enabled the players, at varying levels, to respond appropriately to stimuli presented based on recognition (Proteau, Levesque, Laurenelle, & Girouard, 1989).

Players are starting to think more about their role in relation to the other players in advance. This awareness indicates that players are starting to make decisions based on the support players and spatial and tactical awareness of the game situation, rather than just picking up the ball and then reacting to the situation. Williams and Grant (1999) and Baker, Cote and Abernethy (2003b) suggest that the shift from a "wait and see focus" to a more anticipatory approach is due to contextualising the information and situation more effectively. As with Nevett, Rovengo and Babiarz's (2001) findings, we feel the tactically focused intervention has enabled players to be more aware of the environment in helping them make better decisions. Players are now starting to "see the options" more clearly and organise themselves in advance to take advantage of their present situation. Player awareness is helping prepare player positioning in advance, compared to novices who react rather than anticipate (Gréhaigne et al., 2001).

We note that the intervention may not have benefited the players immediately, as their technical competence, ability to conceptualise and apply the perceptual and motor skills and strategies, as well as tactical knowledge learnt, may take time to process (Starkes et al., 2003; Baker et al., 2003b). However, we argue that the structured self-reflection post intervention has facilitated this time to process and encouraged the players' learning, as suggested by Leberman and Martin (2004). The facilitator made the following comment at the conclusion of this current intervention, which highlights individual differences among the six players as well as suggesting the players are still in a transitional phase of development, from declarative to procedural knowledge and application:

> I think within the group … there's some highly skilled and well-coordinated players. Some guys are seeing things, some guys aren't ... they've got an awareness and they understand within themselves, but they're not always picking up the right cues or able to execute the right actions in sync with the right cues.

Tactical knowledge

The intervention exposed players to complex structured and unstructured game and problem-solving situations. Ripoll and Benguigui (1999) suggest this type of practice environment will facilitate decision-making capabilities, particularly in those over the age of 15 years. A schema of play (Gréhaigne & Godbout, 1995) makes it possible to take the opposition by surprise to gain an initial advantage to

make the next pattern/phase of play (simply speeding up the game) even more advantageous. Our findings indicate that players perceived greater awareness of where the opposition players were standing in defence in relation to the ball and their position and functional role on the field. The players understood more about defence patterns and organisation, and therefore could think more about predicting and problem solving by improved game understanding.

These findings reinforce that "knowledge about the organisation of the game, sport specific knowledge, and knowledge about configurations of play provide the basis for understanding the game" (Gréhaigne & Godbout, 1995, p. 500). Furthermore, three key tactical knowledge areas are highlighted as being essential for effective decision-making in team sport (Gréhaigne & Godbout, 1995): action rules relating to defence and attack situations; rules for managing play organisation in relation to player positioning; and space and functional roles. The players in this current study perceived additional knowledge and understanding of the game as a result of the intervention, and developed workable strategies that increased cognitive effort within the training setting (Vickers et al., 2004). This training impact resulted in an increase in the number of tactical action concepts in games as well as better decision-making skills after the intervention implementation (Nevett et al., 2001).

Communication and team cohesion

We find the players' perceptions clearly highlight how intra-communication between players promotes their decision-making. If players have a greater understanding of the game collectively and know what their role is compared to other team members, decisions should improve as configurations are more likely to be coherent among the team, and the quality of communication should be enhanced as players will be thinking in the same manner (Gréhaigne et al., 2001). In this current study, the players perceive that the level of communication doesn't just increase, but the quality is more effective.

Holt and Sparkes (2001) and Beauchamp, Maclachlan and Lothian (2005) also argue that maintaining positive patterns of communication enhances cohesion in sports teams, enabling players to "adapt and connect" with other team members. This notion is supported by the results of the Holt and Sparkes (2001) study, which show that by the end of the season "valuing of individual roles" and "positive communication" by players improves cohesiveness, which may be lacking midway through the season. Gréhaigne et al. (2001) discuss how individual and collective aspects of decision-making in team sports are interwoven and contribute in combination to determine the final action response taken by a player. Eccles and Tenenbaum (2004) also believe "shared knowledge" is achieved by intra-communication between players.

In this current study, the facilitator of the intervention commented about how the players have learnt to understand the importance of knowing and being aware of the other 14 players on the team, and making sure communication is used to keep players "thinking" cohesively as a team unit:

> I think that's the big step that we've probably made with the individuals is their understanding of the role when they haven't got the ball. Let's look at the game of rugby at any one stage in attack–there's 14 of your teammates don't have the ball that are supporting you and that's valuable … we need those 14 to be in the game.

CONCLUSIONS

All six players have reflected with more game understanding and awareness since the commencement of the intervention. Players' perceived levels of understanding and content-specific information provided during the intervention were maintained through to the end of the season, nine weeks post intervention. Our findings, from this decision-based intervention, suggest perceived player development in cognitive, perception and perceptual motor skills and strategies, as well as tactical knowledge and communication. The study has provided a greater understanding for teachers and coaches of decision-based training from the players' perspective and supports the use by teachers and coaches of deliberate and purposeful training and self-reflection in developing decision-making on the rugby field, as the players' ability to think and act in advance has improved.

However, the current findings highlight the need for further investigation to determine transfer of skills from intervention to games (Gréhaigne et al., 2005) through, for example, systematic video analysis, as the season progresses. Facilitated and purposeful reflective practice involving the experiential component aims to provide opportunities to transfer the skills learnt in a practice environment to a game situation, particularly post decision-making training intervention. Teachers and coaches need to assist players to become more aware of their different stages of reflection and learning, as proposed by Gibbs (1988) and Moon (2000, 2004); for example, "noticing"–discussing feelings and emotions, then "making sense"–analysis and evaluation, and finally "making meaning" from their experiences, leading to an action plan for future development.

REFERENCES

Baker, J., Cote, J., & Abernethy, B. (2003a). Learning from the experts: Practice activities of expert decision makers in sport. *Research Quarterly for Exercise and Sport, 74*(3), 342–347.

Baker, J., Cote, J., & Abernethy, B. (2003b). Sport-specific practice and the development of expert decision-making in team ball sports. *Journal of Applied Sport Psychology, 15*(1), 12–25.

Beauchamp, M. R., Maclachlan, A., & Lothian, A. M. (2005). Communication within sport teams: Jungian preferences and group dynamics. *The Sport Psychologist, 19,* 203–220.

Boud, D., Keogh, R., & Walker, D. (1985). Promoting reflection in learning: A model. In D. Boud & R. Keogh & D. Walker (Eds.), *Reflection: Turning experience into learning* (pp. 18–40). London, England: Kogan Page.

Crowley, C., Harre, R., & Tagg, C. (2002). Qualitative research and computing: Methodological issues and practices in using QSR Nvivo and NUD-IST. *International Journal of Social Research Methodology, 5*(3), 193–197.

Denzin, N. K., & Lincoln, Y. S. (2000). *Handbook of qualitative research* (2nd ed.). Thousand Oaks, CA: Sage.

Dewey, J. (1938). *Experience and education*. New York, NY: Collier Books.

Dunn, J. (2003). *Coaching decision making in rugby*. Wellington, New Zealand: New Zealand Rugby Union.

Eccles, D. W., & Tenenbaum, G. (2004). Why an expert team is more than a team of experts: A social-cognitive conceptualization of team coordination and communication in sport. *Journal of Sport and Exercise Psychology, 26*(4), 542–560.

Ericsson, K. A., & Simon, H. A. (1993). *Protocol analysis: Verbal reports as data*. Cambridge, MA: The MIT Press.

Farrow, D., & Abernethy, B. (2002). Can anticipatory skills be learned through implicit video-based perceptual training? *Journal of Sports Sciences, 20,* 471–485.

Gibbs, G. (1988). *Learning by doing*: *A guide to teaching and learning methods*. Oxford, England: Oxford Further Education Unit.

Gratton, C., & Jones, I. (2004). *Research methods for sport studies*. New York, NY: Routledge.

Gréhaigne, J.-F. & Godbout, P. (1995). Tactical knowledge in team sports from a constructivist and cognitivist perspective. *Quest, 47*(1), 490–505.

Gréhaigne, J.-F., Godbout, P., & Bouthier, D. (2001). The teaching and learning of decision making in team sports. *Quest, 53*(1), 59–76.

Gréhaigne, J.-F., Richard, J.-F., & Griffin, L. L. (2005). *Teaching and learning team sports and games*. New York, NY: Routledge Falmer.

Griffin, L. L., Mitchell, S., & Oslin, J. L. (1997). *Teaching sport concepts and skills: A tactical games approach*. Champaign, IL: Human Kinetics.

Holt, N. L., & Sparkes, A. C. (2001). An ethnographic study of cohesiveness in a college soccer team over a season. *The Sport Psychologist, 15,* 237–259.

Kidman, L. (2001). *Developing decision makers: An empowering approach to coaching*. Christchurch, New Zealand: Innovative Print Communications.

Kidman, L. (2005). *Athlete centred coaching: Developing inspired and inspiring people*. Christchurch, New Zealand: Innovative Print Communications.

Kidman, L., & Hanrahan, S. (2004). *The coaching process: A practical guide to improving your effectiveness* (2nd ed.). Palmerston North, New Zealand: Dunmore Press.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, N.J: Prentice Hall.

Leberman, S. I., & Martin, A. J. (2004). Enhancing transfer of learning through post-course reflection. *Journal of Adventure Education and Outdoor Learning, 4*(2), 173–184.

Lenzen, B., Theunissen, C., & Cloes, M. (2009). Situated analysis of team handball players' decisions: An exploratory study. *Journal of Teaching in Physical Education, 28*(1), 54–74.

Liebermann, D. G., Katz, L., Hughes, M. D., Bartlett, R. M., McClements, J., & Franks, I. M. (2002). Advances in the application of information technology to sport performance. *Journal of Sports Science, 20*(10), 755–770.

McMorris, T. (1999). Cognitive development and the acquisition of decision-making skills. *International Journal of Sport Psychology, 30,* 151–172.

Merriam, S. B. (1998). *Qualitative research and case study applications in education*. San Francisco, CA: Jossey-Bass.

Moon, J. A. (2000). *Reflection in learning and professional development: Theory & practice*. London, England: Kogan Page.

Moon, J. A. (2004). *Learning from experience*. York, England: Higher Education Academy Network for Hospitality, Leisure, Sport and Tourism.

Mouchet, A., & Bouthier, D. (2006). Prendre en compte la subjectivité des joueurs de rugby pour optimiser l'intervention [Taking the subjectivity of rugby players into account for optimising intervention]. *STAPS, 72,* 93–106.

Nevett, M., Rovengo, I., & Babiarz, M. (2001). Fourth-grade children's knowledge of cutting, passing and tactics in invasion games after a 12-lesson unit of instruction. *Journal of Teaching in Physical Education, 20,* 389–401.

Proteau, L., Levesque, L., Laurenelle, L., & Girouard, Y. (1989). Decision making in sport: The effect of stimulus-response probability on the performance of a coincidence-anticipation task. *Research Quarterly for Exercise and Sport, 60*(1), 66–76.

Raab, M. (2007). Think smart, not hard: A review of teaching decision making in sport from an ecological rationality perspective. *Physical Education and Sport Pedagogy, 12*(1), 1–22.

Remenyi, D., Williams, B., Money, A., & Swartz, E. (1998). *Doing research in business and management.* London, England: Sage.

Ripoll, H., & Benguigui, N. (1999). Emergence of expertise in ball sports during child development. *International Journal of Sport Psychology, 30,* 235–245.

Roberts, B. (2002). Interaction, reflection and learning at a distance. *Open Learning, 17*(1), 39–55.

Schön, D. A. (1983). *The reflective practitioner*. New York, NY: Basic Books.

Starkes, J., & Ericsson, K. A. (2003). *Expert performance in sport: Advances in research on sport expertise*. Champaign, IL: Human Kinetics.

Tenenbaum, G. (2003). Expert athletes: An integrated approach to decision making. In J. Starkes & K. A. Ericsson (Eds.), *Experts performance in sports: Advances in research on sport expertise.* Champaign, IL: Human Kinetics.

Vickers, J. N., Reeves, M., Chambers, K. L., & Martell, S. (2004). Decision training: Cognitive strategies for enhancing motor performance. In A. M. Williams & N. J. Hodges (Eds.), *Skill acquisition in sport: Research, theory and practice* (pp. 103-120). London, England: Routledge.

Williams, A. M., & Grant, A. (1999). Training perceptual skill in sport. *International Journal of Sport Psychology, 30,* 194–220.

Williams, A. M., & Hodges, N. J. (Eds.) (2004). *Skill acquisition in sport: Research, theory and practice.* London, England: Routledge.

Williams, A. M., & Ward, P. (2003). Perceptual expertise: Development in sport. In J. Starkes, K. Ericcson & K. Anders (Eds.), *Expert performers in sport: Advances in research on sport expertise*. Champaign, IL: Human Kinetics.