Journal Article

Decision making and decision communications in elite rugby union referees: An inductive investigation

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1   Running Head: REFEREE DECISION MAKING AND COMMUNICATION

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10   Date of submission: July 2011

11   Date of re-submission: February 2012

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1   Abstract

2   The application of law, combined with contextual judgment and communication

3   have been shown to be essential skills of the elite sports official (Mascarenhas,

4   Collins & Mortimer, 2005). Further, the behaviours that officials demonstrate to

5   communicate decisions to sport participants have important implications on match

6   outcomes and perceptions of fairness (Mellick, Bull, Laugharne & Fleming, 2005;

7   Simmons, 2010). The purpose of the present study was to explore the higher-

8   order decision making and decision communication processes of three

9   international rugby union referees. Semi-structured interviews were conducted to

10   explore the routines, psychological strategies and processing skills they utilise to

11   meet the decision making demands of the game. Interview data were analysed by

12   means of thematic content analysis providing four core themes related to expert

13   decision making processes and decision communications: corporate theatre, pre-

14   game preparation and post-game analysis, refereeing philosophy and approach,

15   and within-game psychological skills. The results of this investigation will provide

16   practice-based information to inform training interventions as a pedagogic tool to

17   assist pre-elite sport officials in developing higher-order understandings of

18   decision making processes and communication patterns.

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23   Key words: referee, decision, communication, corporate theatre.

1   Decision making and decision communication in elite sport officiating have

2   been recognised to be critical characteristics to the maintenance of expert

3   performance (Catteeuw, Helsen, Gilis & Wagemans, 2009; Mascarenhas, Collins

4   & Mortimer, 2005; Mellick, Bull, Laugharne & Fleming, 2005; Mellick, Fleming &

5   Davies, 2007). In many sports, an elite official is subject to performance appraisal

6   by players, coaches and league management as well as stadia and television

7   audiences, media commentators/journalists and peers. Thus, these sport officials

8   are required to function to the expectations of a range of 'stakeholder' groups

9   particular to their professional practice community (Dickson, 2000; Mellick *et al.*).

10   In rugby union, with the advent of open-microphone communication systems

11   between referees, assistant referees and television match officials, much of what

12   referees verbalise between one another is also available for public consumption.

13   Managing an elite sport contest in a noisy stadium, whilst being broadcast by

14   multiple television cameras, creates conditions of high physiological and cognitive

15   workloads. In order to perform effectively, demonstrating accurate and acceptable

16   decisions and communicate them effectively, in this unique environment, referees

17   are required to filter voluminous amounts of information (Nevill, Balmer & Williams,

18   2002; Unkelback & Memmert, 2010). These types of match official performance

19   characteristics require skilled communication patterns, psychological strategies

20   and processing skills to cope effectively with such decision making demands

21   (Mascarenhas, O'Hare & Plessner, 2006; MacMahon & Plessner, 2008).

22   The performance demands inherent to elite refereeing have been identified

23   to involve a number of key areas that include fitness and positioning, law

knowledge and application, contextual judgement, personality and game management (Mascarenhas, Collins & Mortimer, 2005). These essential performance characteristics particular to elite refereeing, are overarched by psychological skill sets (e.g., distraction control, arousal regulation, imagery, performance planning) and as such contribute to the development and maintenance of refereeing expertise and performance effectiveness. Crucially, referee effectiveness is often evaluated by perceptions of fairness (Simmons, 2011). This heuristic, to be perceived as fair and professionally credible, involves both decision making and decision communication, where decision communication is defined as the causal account of the decision that is made (Mellick, 2005; Simmons, 2010). Given this scrutiny, there appears to be an inter-relationship between communication skills, fairness and perceived effective decision performance and practice (Mellick, 2005).

This process involves three stages; the *decision outcome* – for example, who the penalty was awarded to; the *reason* – the point of law (or rule) that has been infringed; and the *explanation* – the characteristics of the event that determines the prescribed sanction (Mascarenhas & Smith, 2011). Both decision making and decision communication are used at all three stages. However, the novelty and consequence of decisions act as mediators to this process. For example, if the decision is more novel (in terms of frequency of occurrence across games) there is likely to be an increased importance upon the communication (Folger & Cropanzano, 2001). Similarly, if a decision has major consequences

1   (e.g., a red card) this will require more emphasis on the account given, both

2   verbally and non-verbally.

3   Expert referee decisions are considered to be governed by advanced

4   organisation of task information into knowledge structures that, through critical

5   thinking skills, allow for a more rapid response to decision making conditions

6   (Mascarenhas, Collins, Mortimer & Morris, 2005). Due to the fast paced nature in

7   which referees make and communicate decisions, reasons to decide and act rely

8   on stored knowledge representations that serve decision making through

9   associations to patterns of environmental cues (Ericsson & Kintsch, 1995;

10 MacMahon & Ste-Marie, 2002; Plessner, Schweizer, Brand, & O'Hare, 2009).

11 Applied researchers outside sport who have examined expert decision making in

12 real-world settings characterised by time-pressured circumstances (e.g., fire-

13 fighting, airplane cock-pit crews) show that experts demonstrate superior context-

14 dependent, cognitive strategies and skills including pattern recall (Klein, 1993;

15 North, Ward, Ericsson & Ward, 2011) and situational assessment (Endsley &

16 Garland, 2001; Lipshitz, Klein, Orasanu & Salas, 2001). Naturalistic decision

17 making models would suggest that experts adapt to their real-world environments

18 by developing a greater comprehension for relevant decision cues (Rasmussen,

19 1993; Stokes, Kemper & Kite, 1993), use imagery skills to apply knowledge

20 structures and predict future events (Lipshitz, 1993), as well as demonstrate more

21 efficient working memory function through knowledge-based filtering of task-

22 irrelevant information (Klein, 1993; Simon & Chase, 1973). Ste-Marie (2003)

23 emphasises that to compensate for limitations in information processing capacity,

1 expert sport referees appear to use certain decision rules and elaborate

2 knowledge structures that allow them to cope with broad bands of perceptual

3 cues.

4   Three studies have investigated the interpersonal interactions between

5 referees and players that illustrate the relationship between decision making and

6 decision communications. First, Mellick and colleagues (2005) explored the verbal

7 and non-verbal communication practices that elite rugby union and football

8 referees use to increase players' acceptance of decisions. Seven interpersonal

9 actions were shown to be the most effective, comprising of (a) whistle, (b) gaze,

10 (c) posture, (d) hand/arm signals (non-verbal explanation through illustration of

11 offence), (e) verbal explanation (account giving), (f) control, (g) composure, and

12 (h) time management. In communicating decisions to players, Mellick, Fleming,

13 and Davies (2007) suggest that an elite official must first engage the offender's

14 attention following the infraction, project confidence concerning the decision being

15 presented, and foster the perception of a fair and just decision to the sport

16 participant though the verbal and non-verbal decision account provided. In another

17 investigation, Simmons (2006) concluded from interviews with highly-experienced

18 Australian football umpires that officials should be explicitly trained in effective

19 verbal and non-verbal communication strategies and how to deal with player

20 behaviours. Their findings further suggest that referees should understand how to

21 depersonalise abuse and criticism from players, recognise player, coach, and

22 spectator behaviour that creates uncertainty about their decisions, and develop

23 reflective learning strategies and resilience to mistakes in decision making. Finally,

1 communication patterns have been shown to be used by referees to manage the

2 tenor of player behaviours during competition in order to promote continuity of

3 game play (i.e., preventative communication; Mascarenhas, 2005).

4   Given such evidence supporting the importance of the relationship between

5 decision making and decision communication in elite refereeing (e.g.,

6 Mascarenhas, O'Hare & Plessner, 2006; Mascarenhas, Collins & Mortimer, 2005;

7 Mellick *et al.*, 2005; Mellick *et al.*, 2007), the purpose of the present study was to

8 explore the perceptions of elite referees in these topic areas. From a theoretical

9 perspective, we expect to contribute to existing frameworks of elite refereeing

10 performance (i.e., Mascarenhas, Collins & Mortimer, 2005) by exploring the

11 *interaction* between suggested performance factors (i.e., law application,

12 contextual judgement, and communications) not previously examined. From a

13 practical perspective, the results provided by this investigation will offer insight into

14 crucial higher-order knowledge to inform the design of deliberate training activities

15 as a pedagogic tool for pre-elite referees to develop their decision making and

16 decision communication practice (Ericsson, 2003; Mascarenhas, Collins, Mortimer,

17 & Morris, 2005; MacMahon, Helsen, Starkes & Weston, 2007, Mellick *et al.*).

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19   Method

20 *Participants*

1   Three elite rugby union referees[1] with experience of officiating full senior

2   international test matches were purposively selected to participate in the present

3   study. All research participants were current members of a national elite referee

4   unit and had been or were current members of the International Rugby Board's

5   International Referee Panel. Referees were deemed expert by the management

6   team within their national-level training group based on their national and

7   international performance experiences as elite rugby union referees.

8   *Semi-structured interviews*

9   Three independent semi-structured interviews were conducted with the

10   referees to explore their psychological strategies, processing skills, and

11   communication patterns used during their performance (see table 1). In addition,

12   question probes were used to help referees' elaborate on their answers within

13   these discussion themes. Using the guidelines recommended by Patton (2002),

14   three types of probes were used that included: *detail probes* (e.g., "Could you give

15   an example of one of those phrases that you are ready to use if necessary?"),

16   *elaboration probes* (e.g., "Can you just expand on that and talk through what that

17   sequence of events is?") and *clarification probes* (e.g., "So you're checking for

18   understanding by looking at the visual cues?"). Questions posed to referees were

19   designed to be sufficiently open-ended to allow a frame of reference for referees'

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[1] Given the high profile nature of the referees, detailed information on each

referee has been withheld in order to try and maintain their anonymity.

1   to base their answers. Interviewers' subsequent questions could then be

2   improvised in a critical and theorised manner (Kerlinger, 1970).

3   (Insert table 1 here)

4   *Procedures*

5   Referees were contacted and requested to participate in an exploratory

6   study examining elite referee decision making and decision communications.

7   Following participants' agreement, interviews were scheduled independently and

8   conducted jointly by a referee development professional who had extensive

9   experience as a Sport Psychologist working with match officials, and a highly

10   experienced interviewer and qualitative research scholar who was also a

11   practising rugby union match official. The interviews were conducted in November

12   2009; two in a quiet corner of the foyer of a city-centre hotel, and the other in the

13   empty bar of a sports club of which the participant was a member. Participants

14   were assured of anonymity and rapport had been established previously[2]. Each

15   interview took between 60 and 90 minutes and was recorded using a digital

16   dictaphone and later transcribed *verbatim*.

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18   *Data analysis*

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[2] As with the previous footnote, details of the ways in which rapport had been

developed would compromise the participants' anonymity.

1   Interview data was examined through a thematic content analysis. First, all

2   transcribed interviews were categorised into raw data points represented as

3   meaningful units (i.e., a part of the interviewee's response reflecting an idea,

4   wording, definition, or phrase that stand as a distinguishable moment within the

5   data set; Tesch, 1990) in relation to (a) decision making and (b) decision

6   communications. Those particular meaning units that showed subject similarity

7   were then clustered together and tagged as raw data themes and given a label to

8   represent their thematic content. Second, all raw data themes that provided a

9   common grouping were identified as higher order themes and each were further

10   divided into sub-themes. The higher-order themes and their sub-themes derived

11   from the raw data were then re-assessed by another member of the research team

12   for: (a) the representation of the interaction between decision making and decision

13   communications *within* each core theme and; (b) the interdependent relatedness

14   *between* core themes in relation to the investigated concepts. Themes provided by

15   the analysis were subsequently established and assessed through other members

16   of the research team. Finally, the research team sent the categorisation of themes

17   to the participants to confirm the trustworthiness of the analyst's interpretation of

18   the interview data.

19   *Trustworthiness*

20   Maxwell's (2002) guidelines for enhancing the trustworthiness of qualitative

21   research design were considered. The validity criteria proposed by Maxwell (2002)

22   include descriptive validity, interpretive validity, and theoretical validity. Descriptive

23   validity was supported through dictaphone audio recording to avoid missing data

1   and allow for later transcription. Interviews were reviewed prior to transcription,

2   translated verbatim, and subsequently hardcopy transcripts were compared to the

3   audio recording for accuracy. Interpretive validity, or attempting to understand the

4   concept under investigation from the vantage point of the participants, was

5   enhanced through an ongoing collaboration between research team members and

6   referee development professionals within the referee training group. Theoretical

7   validity was considered through *analytic generalization* (i.e., evaluating the

8   transferability of results to a theory of the phenomenon being studied; Yin, 2003)

9   to a scientifically-based conceptual framework of elite refereeing performance (i.e.,

10   Mascarenhas, Collins & Mortimer, 2005).

11   Results and Discussion

12   The aim of the present investigation was to explore higher-order decision

13   making and decision communications used by elite rugby union referees. A

14   thematic content analysis of semi-structured interviews with three elite rugby union

15   referees with international experience provided four core themes and 23 sub-

16   themes that included: (A) corporate theatre, (B) pre-game preparation and post-

17   game analysis, (C) refereeing philosophy and approach; and (D) within-game

18   psychological skills. Table 2 highlights the core and sub-themes established with

19   the referees that were interviewed.

20   (Insert table 2 here)

21   *Corporate theatre*

1   The core theme, corporate theatre, was identified by referees as an aspect

2   of the decision communication environment that requires behavioural strategies to

3   manage the perceived image of their refereeing performance to others inter-linked

4   with match proceedings. Sub-themes were shown to include: (a) impression

5   management; (b) punctuation; (c) shared decision making; and (d) role clarity. One

6   of the referees [R3] explains the process of corporate theatre and the effect on

7   decision communications:

8   [Corporate theatre] is about the delivery of the message so that it's clear to

9   all those audiences. And you haven't just got the players' audience, even the

10   conversation we're having as three officials is no longer, a private

11   conversation. So therefore you are making a decision that is clear and

12   obvious to everybody who's in those audiences. The audiences being the

13   players, the TV audience, the coaches who analyse the game, the members

14   of the officiating brotherhood who will then look at the game afterwards and it

15   has to be clear and it has to be reasoned decisions…people are watching it

16   because it's public, it's a piece of theatre.

17   Impression management (a type of *self-presentation*) was a sub-theme identified

18   by referees that involves deliberate efforts to self-monitor the display of their public

19   image to meet the expectations of players, spectators and the media. Impression

20   management is an aspect of high-performance refereeing that has been previously

21   shown to be a source of negative role stress (Thatcher, 2005). According to Leary

22   and Kowalski (1990), impression management is influenced by two contributing

23   processes that are *impression motivation* (i.e., the need to create particular

1 impressions to a real or imagined audience) and *impression construction* (i.e.,

2 selecting an impression to convey and then using certain tactics to express it).

3 Referees identified an understanding of the necessity to manage the impressions

4 they display during decision communication episodes with players and with other

5 game officials and how this required certain methods to 'sell' the accuracy and

6 fairness of a decision through positioning, presence, tone, non-verbal cues, and

7 clear, explanatory language in verbal phrasing. This was linked to the desire to

8 establish credibility as an official:

9 ... It's things like the tone that you use, it might be key words you use, it's

10 certainly about your facial pressures, you know, that you're under. It's like the

11 old swan effect isn't it, you're paddling like crazy underneath but you're nice

12 and calm and I think the best officials in the world regardless of what sport it

13 is that they've got the swan effect, they can sell their decision, they're cool,

14 they're calm under pressure and that's how we relate corporate theatre as

15 being able to sell the decision even if you're not quite in the right position or

16 you may have perhaps perceivably missed something happening previously.

17 That's how we address it... [R2]

18 How elite referees make decisions and communicate with players was identified

19 as requiring a preservation of judgment criteria throughout game events in order to

20 guide game activities. This was further associated with maintaining consistency in

21 one's refereeing approach. One referee explained how a narrative ultimately

22 unfolds in the interactions with players where decision episodes are punctuated

23 through certain communication patterns:

1 … It's about verbalising, communicating, when you've made your decision if

2 you don't want to have to make that decision again, the way you give the

3 decision, the way you apportion responsibility to whoever's broken it and the

4 way you then let everybody else around you know why, whether it's what

5 they agree with, but it's that you're then going to be consistent with that which

6 will help you in the story, if you like, of the game. [R3]

7 Other sub-themes of corporate theatre included clarifying the scope of one's

8 refereeing responsibilities and shared exchanges in decision making with other

9 game officials (i.e., assistant referees, television match officials). Previous

10 research has identified that referees and assistant referees demonstrate clear

11 differences in their role-specific decision making responsibilities in an elite football

12 setting (Catteeuw et al., 2009). Although referees and their assistants perform

13 varied primary duties in a rugby union environment, the decision making

14 requirements involved in certain match situations can overlap both roles such as in

15 identifying foul-play. How the theatrical nature of refereeing occurs in relation to

16 assistant referees' role functions was identified by one referee as involving a

17 common understanding concerning public displays and adaptive communications

18 such as in reporting foul play:

19 We didn't know what the words were going to be but we knew where we

20 stood. We knew when it was your cue, and at one point I spoke, and then I

21 spoke to the other touch judge and he came in with what he had seen and

22 then he actually went like this [respondent leaning forward in seat] to the

23 other touch judge and it was like "I've spoken and now it's your turn"… [R3]

1   *Pre-game preparation and post-game analysis*

2   A second core theme provided by the rugby union referees was pre-game

3   preparation and types of post-game analysis that referees undertake to further

4   develop and maintain their expertise. Sub-themes included: (a) template building;

5   (b) game review and self-analysis; and (c) mental rehearsal (visual and verbal).

6   Preparing for match day involved a range of practice activities for referees

7   including fitness training, DVD game review, assessor and referee coaching

8   sessions, peer learning groups, and pre-game briefings with assistant referees. All

9   referees supported the notion that game review is primarily a video-driven

10   process, emphasising reflection to help build higher-order refereeing knowledge.

11   Previous studies with elite football referees examining their deliberate training

12   activities has shown high self-ratings for the relevance of technical refereeing skill,

13   video training, and game-playing tactics (MacMahon *et al.*, 2007; Catteeuw *et al.*,

14   2009). However, referees in these studies identify a lack of available decision

15   making training resources to supplement their on-field learning. The rugby union

16   referees in the present study identified game review as an integral training activity

17   to help build familiarity between decision making practices and game outcomes as

18   well as to foster understanding of the philosophical and intuitive elements to their

19   refereeing approach. Psychological skills training was aimed at building mental

20   templates of anticipated scenarios and involved other awareness-raising

21   techniques such as routine planning, visualisation, and gathering information

22   about trends of previous matches and player tendencies. Pre-match briefings with

1 the referee's assistants were also recognized as a key period for discussing

2 procedures related to decision communications:

3   ... I do think pre-match is important to get everybody on the same

4   wavelength, even people you work with the whole time, that you would just

5   talk through, if we get foul play and in my briefing I will say if you get foul play

6   what I'd like you to do is to put your flag out. If it's foul play, tell me about the

7   foul play, I need to know as early as possible it's happened. So I will say

8   that, is it white, is it blue. If it's the side who've got the ball and it's blue then

9   tell me until you get some sort of acknowledgment from me. So that's the

10   first thing. Don't come on until I ask you to come on, when you ask to come

11   [gesturing towards him with arm and hand outstretched] so it's enter side,

12   entrance door, theatre, in you come...it's reinforcing the process. [R3]

13 Mental rehearsal was considered a customary aspect of pre-performance that

14 supported within-game decision making demands of elite refereeing. Prioritising

15 decision cues at phases of play, re-assessing one's decision criteria, increasing

16 awareness of scenarios that can take place between particular teams were all part

17 of referees preparation and review practices. Rehearsal of explanatory

18 verbalisations or 'stock' phrases for certain decision communication episodes were

19 also important factors related to how referees prepared. Referees identified

20 engaging in both first (internal) and third-person (external) perspectives as part of

21 visualization processing skills to engage in proper positional viewing angles and

22 elaborate their mental 'picture' of possible decision-making situations. One referee

1   described a simulation exercise they use to increase their awareness of visual and

2   verbal cues for an upcoming refereeing performance:

3   ... What I'm visualising is, I'm using the colours, the colours of the teams that

4   I'm refereeing that weekend, so it might be white and red and next week it

5   might be blue and black. So I'm using those specific terms I'm going through,

6   I'm rehearsing what I'm going to say and for us because we're obviously

7   micro-phoned up unlike other elite match officials, what we say is part of that

8   corporate theatre that sells the decision to people watching the game. [R2]

9   *Refereeing philosophy and approach*

10   The third theme provided by the referees was their philosophy and

11   approach to elite refereeing. Subthemes of this construct included (a) experience;

12   (b) laws of the game; (c) fairness; (d) decision making accuracy and style; (e)

13   personality and game management; (f) prioritising; and (g) instinct. Referees

14   discussed their philosophy as an attribute built on extensive experience and held

15   within a view of fairness and complex understanding of the framework of the law.

16   All referees shared the same underlying beliefs of 'fair contest' and rewarding

17   physical skills (team or player techniques/tactics). One referee commented:

18   … There's also a mental side where your head is clear as you approach that

19   situation, that you're expecting to see a certain number of things happen or in

20   a certain pattern, if you like. If you get that pattern right, then you start to be

21   consistent but as I said at the beginning, you have to believe in what you're

22   trying to do which I think comes down to almost a vision of the game that you

1   want to see happen. Now that vision to me is about something called fair

2   play, not maybe the fair play that people conceive when they're watching

3   sport in a big way, but there should be a fair contest going on where you're

4   trying to reward both sides, both teams in what they're trying to do. [R3]

5   Other sub-themes identified were decision making accuracy and style that

6   referees' applied including the dynamic ways that they manage game situations

7   through preventative communication and the application of personality attributes.

8   This was associated to prioritizing within-game decision criteria and establishing

9   expectations of how game events potentially unfold through fair contest. Conflict

10 management style (e.g., compromising, collaborating, avoiding) is an important

11 skilled communication displayed by the elite official that has been shown to vary in

12 preference of use by professional coaches for managing team conflicts (Laios &

13 Tzetzis, 2005). However, presently there is limited research available that explores

14 *when* or in which situations referees should express a particular communication

15 style for managing such conflict (MacMahon & Plessner, 2008; Mascarenhas *et*

16 *al.*, 2006). The various ways that referees identified managing a game involved a

17 personalised style that was informed by a weighting of particular decision cues, a

18 consistency in one's approach and the use of communication patterns to establish

19 and maintain rapport with players:

20   It's about seeing how players react, you know when you've penalized a prop

21   three times in a row and then you go and penalize him a fourth time, you've

22   lost him probably for the game whereas if the ball goes on the floor, the

23   scrum goes on the floor and you say come on scrum half get it away and you

1 don't penalize him and then you speak to him at the next stoppage, "Look I

2 know you're under trouble but you've got to do x, y and z." [R1]

3 Referees all shared the belief that *instinct* - a sub-conscious, intuitive feel - for

4 decision-making accuracy acted as a primary source of feedback that supported

5 the referee's philosophy and approach. This was believed by referees to be further

6 enhanced through game experience and on-going post-game feedback and review

7 processes.

8 It's back to the clear and obvious point isn't it? I want to see things which

9 are clear and obvious, if they're clear and obvious they should be right, and

10 that's belief in your ability and trusting your gut instinct. And that's by trial

11 and error. [R1]

12 The instinct comes from again watching a huge amount of games ... but by

13 being under the spotlight the whole time I think you sharpen your, your

14 instinct is sharpened, it has to be sharpened. [R3]

15 *Within-game psychological skills*

16 The final theme was the types of within-game psychological skills that

17 underlie refereeing performance. Contextual judgment (i.e., an awareness of game

18 tenor and ability to adjust one's referee approach to meet the nuances of the

19 game; Mascarenhas, Collins & Mortimer, 2005; Unkelback & Memmert, 2008) was

20 considered by all referees as an important factor to game understanding and

21 comprehension that informed decision making and decision communications. This

22 was developed through an appreciation for what players and teams are trying to

23 achieve, empathy for the verbal and non-verbal behaviours of players, establishing

1 rapport with players and accounting for the affects of decisions on the game. All

2 referees identified that at the elite-level, while accuracy in decision making is

3 crucial, a particular underlying decision motivation is to become increasingly

4 outcome-driven in applying the law (i.e., making perceived 'acceptable' versus

5 'unacceptable' decisions). How referees filter large amounts of perceptual

6 information as part of their decision making performance was recognized to

7 include decision heuristics such as satisficing (Simon, 1955), where rather than

8 comparing decision options, a solution is chosen that meets some minimum

9 criteria (i.e., 'take the first option') to fulfill a desired outcome goal:

10   ... It goes back to that making the decision on who's had the most material

11   impact on the game, from a negative point of view and I guess that's what

12   we're looking for isn't it, we're looking for players who aren't playing the game

13   as it should be in our opinion. So if two blue made a tackle from an off side

14   position and then four blue continued to carry on and then six blue comes

15   into the side, for me, the start of the process is two blue because he's made

16   the initial [infringement]. So I guess part of my mind, it is filtering the

17   lesser...my decisions based on who I think has had the most impact. [R3]

18 Anticipating certain orders of behavioural actions by players, recognising patterns

19 and templates of game play and expecting alternatives of what might occur

20 throughout game progress were identified as other key aspects of referees'

21 decision making processes. Pattern matching, or pattern recognition, has been

22 shown to be essential processing skill used by experts in real-world decision-

23 making environments characterised by high speed-accuracy trade-offs, multiple

1   goals, and acute stress (e.g., airplane pilots; Stokes *et al.*, 1997). These decision

2   processes identified by referees were linked to a range of psychological skills

3   including a self-belief in one's decision making ability as an elite referee that was

4   gained through experience as a player, assistant referee and referee. Other

5   psychological skills identified by referees included concentration and use of narrow

6   and broad attentional styles, visualization, and recall of earlier game incidents and

7   past game experiences. Coping with decision mistakes, player reactions, media

8   interpretations and self-appraisal of communication effectiveness was identified to

9   be managed through self-talk strategies that were also considered an asset to elite

10 refereeing. Referees further identified these within-game psychological skills as

11 being informed through priority check-lists, consistent application of their

12 philosophy, and further developed by game experiences, game analysis, and peer

13 and coaching advice.

14 Conclusion

15   The present inductive investigation explored the topics of decision making

16 and decision communications in elite refereeing. Elite rugby union referees in this

17 investigation identified four core themes related to their decision making and

18 decision communications that included: (a) corporate theatre, (b) pre-game

19 preparation and post-game analysis, (c) refereeing philosophy and approach, and

20 (d) within-game psychological skills. The implications of these findings inform the

21 development of training practices to assist pre-elite referees as a pedagogic

22 framework and elite referees in maintaining standards in their expertise.

1   Possible practical applications could consider types of communication skills

2   training (e.g., conflict management and resolution, language practice, role playing

3   decision account giving) coupled with decision making training tools and practices

4   aimed at enhancing meta-recognition skills (e.g., video-based infraction detection

5   tasks with immediate performance feedback; scenario building through video-

6   based discussion, reflective journals/diaries). A key advantage of incorporating

7   such psychological skills training into deliberate practice behaviours is to allow

8   referees to improve critical thinking skills and accumulate the necessary

9   experience in key performance areas to support their on-field skill development

10   (e.g., Brand, Plessner, & Schweizer, 2009; MacMahon, Starkes & Deakin, 2007;

11   Mascarenhas, Collins, Mortimer & Morris, 2005; Schweizer, Plessner, Kahlert &

12   Brand, 2011). Establishing meaningful terms such as 'corporate theatre' can be

13   helpful for referees to further understand how their performance may be perceived.

14   In a similar vein, terms and phrases such as 'contextual judgement', that are

15   labeled by participants from within the practice community can assist in the further

16   development of these skills and make them easier to understand and manage.

17   Future research should further examine the association between characteristics of

18   decision making and decision communications in other sport settings

19   characterised by varying referee role responsibilities and rule structures.

20   Longitudinal research designs with referee populations should be further employed

21   to increase our understanding of the interaction between decision making and

22   communications over time as many studies generally adopt a cross-sectional view

23   (i.e., comparing differences between expert and novices).

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2

1   Table 1: Interview schedule – Discussion themes

A. What constitutes a *successful/acceptable* refereeing decision and what role does communication play in the process?
B. How would you describe the concept of 'materiality' and can you describe its application using examples from your recent refereeing performance?
C. How would you describe the concept of 'contextual judgement' and can you describe its application using examples from your recent refereeing performance?
D. What strategies/techniques do you use in order to filter information that can both aid and interrupt your decision making processes?
E. How do you train/monitor and develop your decision making and decision communication skills (i.e., specific psychological skills training practices)?

2

3

1   Table 2: Summary of Core Themes and Sub-themes of Decision-Making and

2   Decision Communications in Elite Rugby Union Refereeing.

Themes	Sub-themes
Corporate theatre	Impression management
	Punctuation
	Shared decision-making
	Role clarity
Pre-game preparation and post-game analysis	Template building
	Game review and self-analysis
	Mental rehearsal (Visual and verbal)
Refereeing philosophy and approach	Experience
	Laws of the game
	Fairness
	Decision-making style and accuracy
	Personality and game management
	Prioritising
	Instinct
Within-game psychological skills	Contextual judgment
	Satisficing
	Pattern matching
	Anticipation
	Memory – recall

Visualization
Confidence in decision making
Concentration
Coping

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