

## **DECISION MAKING AND PERFORMANCE OF MALAYSIAN RUGBY SEVENS REFEREES**

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### **Abstract**

This study aims to examine the decision making by rugby sevens referees, and its relationship with the referees' performance. The instruments used in this study are the Rugby Referee Decision Making Test ( $\alpha=.74$ ) and the Referee Sevens Field Performance Evaluation ( $\alpha=.94$ ). It was administered to 132 rugby sevens referees (mean age  $33.4 \pm 1.5$  years; 132 males) from the Malaysian Rugby Union (MRU), which have been refereeing in 10 rugby sevens tournaments in Malaysia. Descriptive and Inferential statistics (one way ANOVA and Pearson's Correlation) were employed to analyse the data. Decision Making ( $\bar{X}= 24.13$ ,  $SD= 5.24$ ) and performance ( $\bar{X}= 136.45$ ,  $SD = 4.47$ ) were identified at a moderate level. The findings indicated no significant differences [ $F= (3, 128) =.246$ ,  $p>0.05$ ] in the decision making across age level, but there were significant differences [ $F= (3, 128) =63.159$ ,  $p<0.05$ ] across experience level. Highly experienced referees scored significantly higher in all decision making constructs compared to less experienced referees. The research findings have revealed a positive and significant relationship between decision making ( $r= .61$ ,  $p<.05$ ) and referee performance. In conclusion, the decision making can help rugby sevens referees' performance, and it is recommended that referees should increase the use of decision making in future training and assessment. Future research should investigate the effectiveness of decision making interventions in enhancing referees' performance in the future.

*Keywords:* Decision making, performance, sport officiating, rugby

## **Introduction**

The announcement that rugby sevens has been included as one of the events at the Olympic Games in 2016 and 2020 has further increased the popularity of this sport at the international level (IRB, 2010). Rugby sevens has attracted many new fans, mainly due to its game speed, shorter game time and appealing style of play, compared to the fifteen rugby game (Cain & Growden, 2006). Conducting a rugby game requires an experienced referee. The referee is responsible for maintaining the continuity and control of the match (FIBA, 2004), and ensuring a fair game according to the rules and the spirit of resistance (IRB, 2010). The referee is also known as “the sole judge of fact and law” (IRB, 2010), and is expected to apply the laws of the game consistently and without variation. His decision is accepted as final, and the coach or athlete involved in a given situation must face the given penalty for not complying with the law (Daniel, 2008). A referee’s mistake can lead to the loss of economic and social perspectives for the team players, as well as its fans (Guillen, 2003). It is clear that there is a heavy burden borne by the referee to refereeing the match, and also that the performance of the referee will affect the game. It is worthy to note that referees are not born, but are trained, to be arbiter of good, and there are several factors that can predict the performance of the referee in a rugby match (Greensted, 2000). A point that has come into greater prominence is the need for more accountability on behalf of the referees for their decisions during (particularly stressful) games (Mascarenhas, Collins, & Mortimer, 2002; Nazarudin et al., 2014). This study aims to examine the decision making by rugby sevens referees, and its relationship with referees’ performance.

## **Problem Statement**

The goal of improving the performance of rugby sevens referees in Malaysia to world-class levels rests upon the achievement of a delicate balance between the expectations and challenges that must be shouldered by these referees, in line with the aspirations of the Malaysian Rugby Union (MRU). Malaysian rugby sevens referees must possess qualities that meet the criteria set by the International Rugby Board (IRB), in order to be part of the elite group of referees. Despite the efforts of the MRU, disappointingly, the number of Malaysian rugby referees selected by the IRB sevens tournament has declined, and since 2010, no referees have been selected as match officials in the IRB’s Sevens circuit (Malaysia Rugby Union, 2010; Nazarudin, 2012).

Efforts to identify the factors that can influence the performance of rugby sevens referees should be the first logical step taken towards improving the performance of MRU’s referees. The results of this study can be used to develop courses, training programs, assessments and grading systems for rugby sevens referees. As studies have shown, elite athletes possess the ability to identify cues earlier than novice athletes (Abdullah, 2012). The earlier identification of cues in the dynamic setting of sports enables elite athletes to make accurate decisions. Decision making is the cognitive process in reaching a decision and opinion or valuation made after taking into account a number of factors (Shaw, 2005).

Refereeing a rugby match is a task that requires speed and accuracy in decision-making skills. Currently, the focus on decision making studies have been on athletes and coaches, and thus sidelining an important segment of the sporting environment: the match officials (Mascharenhas et al., 2002). According to Greensted (2000), refereeing in rugby is all about the ability to handle one's self and others in a rugby match. Referees should be able to overcome the external interference that could affect performance. A referee should also be able to deal with the "chaos", and focus on what's important, which in turn leads them to make accurate decisions.

Tenenbaum, Stewart, Singer, and Duda (1996) stated that effective decision making results from the identification of cues and patterns. Studies have shown that expert umpires use shorter times to identify the cue, and need less visual information in order to make the correct decision (Abernethy, 1991; Bard, Fleury, & Goulet, 1994). Abernethy (1991) suggested that the use of appropriate cues earlier allow decision-makers to prepare mechanisms, such as schema activation prior to actual use. When a decision has to be made, the time required is reduced to the selection process. Time constraints can be reduced, and decision-making tasks can be guided.

Racquet sport umpires and judges have been known to anticipate game situations in the course of their duties. Rugby referees need to anticipate the result of an action by a player to be in the correct place at the correct time. For example, when anticipating a punt kick, a referee will start running towards the location of the next action. Positioning correctly for the next action will enable the referee to have an optimal view, contributing to increased information, which in turn helps him to make accurate decisions. The use of advanced cue identification strategies aids elite sportsmen in making decisions under time constraints (Abernethy, 1991). For rugby referees, situation accurate temporal anticipation could be affected by cognitive stress (Suppiah & Abdullah, 2012)

Referees often make decisions in challenging situations, and research has shown that referee decisions can be affected by the noise of the audience (Nevill, Balmer, & Williams, 2002), or the advantages of the host team (Boyko et al., 2007; Garicano Palacios-Huerta, & Prendergast, 2005; Sutter & Kocher, 2004). In addition, Plessner and Betsch (2001) held discussions on referee decisions, and summarized that decisions were indirectly influenced by the previous judgment.

Application of the law in a match requires evaluation of the match situation, which means that the referee must make a judgment based on available evidence (Mascarenhas, O'Hare, & Plessner, 2006; Plessner & Haar, 2006). Mascarenhas, Collins, and Mortimer (2005) stated that, in a study which reviewed the accuracy of decision-making between high performances rugby referees, evaluation and training for elite referees must use the naturalist paradigm, such as actual performance made in the field rather than in the laboratory. For example, simulated quasi naturalist as the use of video clips for complex laws tackle in rugby. Past research found that a national panel of referees makes correct decision only half of the time (Mascarenhas et al., 2002; Mascarenhas, 2004), and 65% in the exact situation (Mascarenhas, 2004). The study shows there remain mistakes in decision making among referees at the national level.

The current study aims to evaluate the decision making and officiating performance level of Malaysian rugby sevens referees, and the effects of age and experience in decision making and officiating performance. The relationship between decision making and performance among Malaysian rugby sevens referees was also investigated.

## **Methods**

### *Participants*

Malaysian Rugby Union referees (mean age 33.4 + 1.5 years; 132 males) have volunteered to take part as participants. To determine the sample size of 200 people in the referee sevens population, the researcher refers to the determination of sample size tables built by Krejcie and Morgan (1970). A total of 132 participants were selected at random from ten rugby sevens tournaments held in Malaysia. Power analysis has confirmed that the samples were in accordance with: Alpha = 0.0276, Power = 0.9724, Critical F (4,127) = 2.9040, and Lambda = 25.33. A total of 33 people (25.0%) were under the age of 30 years, 35 people (26.5%) were aged 30 to 35 years, 34 people (25.8%) were aged 36 to 40 years and 30 people (22.7%) were aged over 40 years. A total of 33 people (25.0%) had refereeing experience between 1 to 5 years, 34 (25.8%) between 6 to 10 years, 34 (25.8%) between 11 to 15 years, and 31 (23.5%) over 15 years (Table 1).

**Table 1:** Distribution participant ages and refereeing experiences.

Age	<30 years	30 – 35 years	36 -40 years	>40 years
	33 (25.0%)	35 (26.5%)	34 (25.8%)	30 (22.7%)
Refereeing experience	1 – 5 years	6 – 10 years	11 – 15 years	> 15 years
	33 (25.0%)	34 (25.8%)	34(25.8%)	31(23.5%)

### *Instrument and Data Analyses*

To measure the performance of the participants in decision making, a video based instrument was developed by the researcher. The Rugby Referee Decision Making test was designed based on theories and previous studies (MacMahon, Starkes, & Deakin 2007; MacMahon & Ste-Marie, 2002; Mascarenhas et al., 2005), in accordance with the Developing Test model suggested by McIntire and Miller (2007). The test was designed to evaluate infraction detection and making decisions based on the infraction. The test comprised of three sets of video clips. The clips were filmed using cameras attached to eyewear, which were commercially available during a local inter-varsity rugby sevens tournament. This enabled the researcher to produce video clips of game situations from the referee's perspective, thus, enhancing the ecological validity. The clips were edited to present relevant events leading to the commitment of an infraction, and in some cases, no infractions were committed.

The clips were evaluated in a two-phase process. In the first phase, the lead author and the MRU referee’s chairman viewed the prepared clips, together with the required responses from the participants. The objective of the first evaluation was to determine the accuracy of the expected responses of the participants. In the second phase, a panel comprising of an IRB referee (n = 1), IRB Instructor (n = 1), IRB referee evaluator (n = 1), national coach (n = 1) and national players (n = 1); graded the video clips’ difficulty levels; where Grade 1 = Easy, Grade 2 = Moderate and Grade 3 = Difficult. Video clips that were deemed ambiguous were removed.

The video clips were randomly sequenced in three sets. It was important to randomly sequence the game situations to prevent discussions among participants regarding their responses. Each set began with a video clip explaining the test procedure; followed by five video clips to familiarize the participants with the impending decision making test. The decision making test comprised of 18 video clips, with six clips of tackles, four of kicks, four of scrums and four of lineouts. Six clips of tackles were included, as tackling is deemed to be associated with a difficult decision in most cases (Collins, 2005). The clips were put into three continuous parts. The first part included the clip number and instructions. The second part presents plays on a rugby pitch where infractions might be called, and were representative of situations referees would normally encounter (e.g., potential infraction of tackling). In the third part of the clip, the participants were required to respond to two questions regarding the nature of infraction and the decision made.

The participants’ performance in officiating matches were evaluated via the IRB Referee Sevens Performance Evaluation form (r = 0.94), which is the standard evaluation method utilized to measure refereeing performance. This instrument evaluates performance via various dimensions, i.e., communication, application of the law, and positioning. Each successful implementation or action is given five points. The playing time half was seven minutes each.

The statistical tests employed in this study were Mean, Standard Deviation, Percentage, One Way ANOVA, and Pearson’s Correlation (Table 2).

**Table 2:** Instrument and Statistical Tests.

No	Objective	Instrument	Statistical Tests
1	To examine decision making and performance level among the Malaysian rugby sevens referees.	Questionnaire Performance Evaluation form	Mean, Standard Deviation & Percentage
2	To indicate differences in decision making and performance across age level and experience level among the Malaysian rugby sevens referees.	Questionnaire Performance Evaluation form	One Way ANOVA
3	To identify relationships between decision making and performance among the Malaysian rugby sevens referees.	Questionnaire Performance Evaluation form	Pearson’s Correlation

## Procedures

Predefined questionnaires were administered to the referees at their respective tournament locations. Data collection took about two days for each tournament, and was held the day before, as well as on the first day of the competition. The respondents were required to take the decision making test a day before the tournament. No problems were encountered in completing either section of the test, or in understanding the nature of the test. On the first day of the competition, the respondents evaluated their first game using the performance measures form to evaluate the referee's performance in the field by qualified ARFU rugby referee coaches (CMO). The approval by the MRU had been obtained prior to the start of the study.

## Results and discussion

Based on Table 3, for detecting correct infringement ( $\bar{x}$ =12.11) and awarding correct penalty ( $\bar{x}$ =12.03), 66.7% and 64.4% of respondents, respectively, were at intermediate levels. Overall, decision making ( $\bar{x}$ =24.13) was identified at a moderate level with 67.4% of respondents.

**Table 3:** Level of Decision Making Subscales.

Subscales	%	$\bar{x}$	SD	Level
Detecting Correct Infringement		12.11	2.67	Intermediate
Low (1.00-13.33)	2.3			
Intermediate (13.34-26.67)	66.7			
High (26.68-40.00)	31.1			
Awarding Correct Penalty		12.03	2.63	Intermediate
Low (1.00-13.33)	4.5			
Intermediate (13.34-26.67)	64.4			
High (26.68-40.00)	31.1			
Overall Decision Making		24.13	5.24	Intermediate
Low (1.00-13.33)	1.5			
Intermediate (13.34-26.67)	67.4			
High (26.68-40.00)	31.1			

n=132

Table 4 shows the level of performance subscales. Based on the table, Positioning ( $\bar{x}$ =13.52) is at a high level, but 54.5% of respondents were at an intermediate level. Control ( $\bar{x}$ =13.42) is at a high level, but 55.3% of respondents were at an intermediate level. Communication ( $\bar{x}$ =13.52) is at a high level, but 56.1% of respondents were at an intermediate level. For Application of Law ( $\bar{x}$ =96.05), 55.3% of respondents were at an intermediate level. Overall, for Performance ( $\bar{x}$ =136.45), 69.7% of respondents were also at an intermediate level.

**Table 4:** Level of Performance Subscales.

Subscales	%	$\bar{x}$	SD	Level
Control		13.42	3.17	High
Low (0.00-6.67)	0.0			
Intermediate (6.68-13.33)	55.3			
High (13.34-20.00)	44.7			
Communication		13.45	3.25	High
Low (0.00-6.67)	0.0			
Intermediate (6.68-13.33)	56.1			
High (13.34-20.00)	43.9			
Positioning		13.52	3.26	High
Low (0.00-6.67)	0.0			
Intermediate (6.68-13.33)	54.5			
High (13.34-20.00)	45.5			
Law Application		96.05	4.40	Intermediate
Low (0.00-50.99)	0.0			
Intermediate (51.00-100.99)	55.3			
High (101.00-150.00)	44.7			
Overall Performance		136.45	4.47	Intermediate
Low (0.00-70.99)	0.0			
Intermediate (71.00-140.99)	69.7			
High (141.00-210.00)	30.3			

n=132

Table 5 shows a one way ANOVA test for comparison of decision making level and referee age. Based on the table, the ANOVA test results show that levels of all decision making subscales among the four age groups were not significantly different [Detecting correct infringement ( $F= (3, 128) =.130, p=.942$ ); Awarding Correct Penalty ( $F= (3, 128) =.246, p=.864$ )]. Levels of decision making among the four age groups was also not significantly different [ $F= (3, 128) =.159, p=.924$ ]. This means that there were no differences overall in the level of decision making based on the age of the referees.

**Table 5:** One Way ANOVA Test for Comparison of Decision Making Level and Referees Age.

Subscales	Age	SS	df	MS	F	P
Detecting correct infringement	Between Groups	.100	3	.033	.130	.942
	Within Groups	32.961	128	.258		
	Total	33.061	131			
Awarding Correct Penalty	Between Groups	.216	3	.072	.246	.864
	Within Groups	37.503	128	.293		
	Total	37.720	131			
Decision Making	Between Groups	.117	3	.039	.159	.924
	Within Groups	31.361	128	.245		
	Total	31.477	131			

n=132

\*Sig. Level :  $p<0.05$

Table 6 shows a one way ANOVA test for comparison of performance level and referee age. Based on the table, the ANOVA test results show that levels of all performance subscales among the four age groups were not significantly different [Control ( $F=(3, 128) = .320, p=.811$ ); Communication ( $F= (3, 128) = .398, p=.755$ ); Positioning ( $F= (3, 128) = .811, p=.490$ ); Law Application ( $F= (3, 128) = .265, p=.850$ )]. The level of performance among the four age groups was also not significantly different [ $F= (3, 128) = .193, p=.901$ ]. This means that there were no differences overall in the level of performance based on the age of the referees.

**Table 6:** One Way ANOVA Test for Comparison of Performance Level and Referees Age.

Subscales	Age	SS	Df	MS	F	P
Control	Between	.243	3	.081	.320	.811
	Groups					
	Within Groups	32.386	128	.253		
	Total	32.629	131			
Communication	Between	.300	3	.100	.398	.755
	Groups					
	Within Groups	32.215	128	.252		
	Total	32.515	131			
Positioning	Between	.611	3	.204	.811	.490
	Groups					
	Within Groups	32.117	128	.251		
	Total	32.727	131			
Law Application	Between	.202	3	.067	.265	.850
	Groups					
	Within Groups	32.427	128	.253		
	Total	32.629	131			
Overall Performance	Between	.126	3	.042	.193	.901
	Groups					
	Within Groups	27.753	128	.217		
	Total	27.879	131			

n=132

\*Sig. Level :  $p<0.05$

Table 7 shows a one way ANOVA test for comparison of decision making level and referee experience. Based on the table, the ANOVA test results show that levels of all decision making subscales among the four experience groups were significantly different [Detecting correct infringement ( $F= (3, 128) = 59.704, p<0.05$ ); Awarding Correct Penalty ( $F= (3, 128) = 57.029, p<0.05$ )]. The level of decision making among the four age groups was also significantly different [ $F= (3, 128) = 63.159, p<0.05$ ]. This means that there were differences overall in the level of decision making based on the experience of the referees.



**Table 7:** One Way ANOVA Test for Comparison of Decision Making Level and Referees Experience.

Subscales	Age	SS	df	MS	F	P
Detecting correct infringement	Between Groups	19.281	3	6.427	59.704	.000
	Within Groups	13.779	128	.108		
	Total	33.061	131			
Awarding Correct Penalty	Between Groups	21.577	3	7.192	57.029	.000
	Within Groups	16.143	128	.126		
	Total	37.720	131			
Overall Decision making	Between Groups	18.786	3	6.262	63.159	.000
	Within Groups	12.691	128	.099		
	Total	31.477	131			

n=132

\*Sig. Level :  $p < 0.05$ 

Table 8 shows a one way ANOVA test for comparison of performance level and referee experience. Based on the table, the ANOVA test results show that levels of all performance subscales among the four experience groups were significantly different [Control ( $F = (3, 128) = 11.316, p < .05$ ); Communication ( $F = (3, 128) = 12.170, p < 0.05$ ); Positioning ( $F = (3, 128) = 11.617, p < 0.05$ ); Law Application ( $F = (3, 128) = 21.744, p < 0.05$ )]. The level of performance among the four age groups was also significantly different [ $F = (3, 128) = 81.060, p < 0.05$ ]. This means that there were differences overall in the level of performance based on the experience of the referees.

**Table 8:** One Way ANOVA Test for Comparison of Performance Level and Referees Experience.

Subscales	Age	SS	df	MS	F	P
Control	Between Groups	6.983	3	2.328	11.617	.000*
	Within Groups	25.646	128	.200		
	Total	32.629	131			
Communication	Between Groups	6.816	3	2.272	11.316	.000*
	Within Groups	25.699	128	.201		
	Total	32.515	131			
Positioning	Between Groups	7.263	3	2.421	12.170	.000*
	Within Groups	25.464	128	.199		
	Total	32.727	131			
Law Application	Between Groups	11.015	3	3.672	21.744	.000*
	Within Groups	21.614	128	.169		
	Total	32.629	131			
Overall Performance	Between Groups	18.265	3	6.088	81.060	.000*
	Within Groups	9.614	128	.075		
	Total	27.879	131			

n=132

\*Sig. Level :  $p < 0.05$

The findings indicated no significant differences [ $F = (3, 128) = .246, p > 0.05$ ] in decision making across age level, but there were significant differences [ $F = (3, 128) = 63.159, p < 0.05$ ] across experience level. Highly experienced referees scored significantly higher in all decision making constructs compared to less experienced referees. The research findings showed a positive and significant relationship between decision making ( $r = .61, p < .05$ ) and referee performance.

Table 9 shows the relationship between variables and dimensions with performance. Based on the table, the findings show that decision making has a significant correlation and strong relationship with referee performance.

**Table 9:** Relationship between Variables and Dimensions with Performance.

Variable	Colleration	Relationship Level
Decision making		
Detecting correct infriengement	$r = .61, p < .05$	Strong
Awarding Correct Penalty	$r = .60, p < .05$	Strong
Overall	$r = .61, p < .05$	Strong

## Discussion

Decision making is the product of a cognitive process that leads to the selection of a course of action from several alternatives (Kahnemann & Tversky, 2000). The decision making process can be viewed from two perspectives. The cognitive perspective views the decision making process as an integration of a continuous process of interaction with the environment. On the other hand, the normative perspective views decision making as the analysis of individual decision making logic and rationale of individual to the selection of an action.

The decision making process is influenced by various factors, such as concentration, attention, cognitive styles, general intelligence, short term memory and anticipation (Suppiah & Abdullah, 2012). Participants of this study were in the moderate level when it came to detecting infringement accurately, awarding appropriate penalties and overall decision making.

The findings of this study replicated the findings of Gullen and Feltz (2011), with regard to referee performance and experience. Gullen and Feltz (2011) claimed that past experience, past performances, guided mentoring and knowledge of the law influenced referees' performance. In the current study, the performance of referees with over 15 years of experience was better than referees who had less experience. This difference could be acknowledged when comparing groups of referees based on the years of experience, with the group of referees with less than five years of experience performing the poorest in the decision making test. Kanneman and Tersky (2000) state that decision making is a product of cognitive processes, leading to the selection of a course of action among several alternatives. Decision making, when viewed from a cognitive

perspective, describes the decision making process as an integration of a continuous process of interaction with the environment.

Ross (2001) states that the level of expertise influences decision making. Referees with intensive experience are able to draw upon significantly more resources when compared to referees with less experience. William and Ericsson (2005) showed that decision making among expert athletes showed their decision making skills in extensive practice sessions over the years. The same could be likened to the better performance by the more experienced referee in the decision making test.

Although experienced referees performed better, there were no significant differences in decision making performance across ages. The statement “experience comes with age” does not hold true here, as the point of entry of referees is not age determined, but more so by opportunity.

The relationship between level of decision making and performance was significantly strong and positive. Accurate decision making enabled referees to control the game, communicate effectively, apply the law and acquire the best position during a match. Rugby is seen as a gentlemen’s sport where dissent is frowned upon. Players and team officials are known to criticize bad decisions by referees, and accuse these decisions of being biased. They also attribute defeats in matches to the referee (Price, 2006; Cornelly, 2003). To accurately make a decision under temporal constraints, referees need to be well versed in the laws of the game.

Referees should be encouraged to continuously analyze their performance, and honestly grade it based on performance assessment. The results from the IRB performance appraisal of rugby sevens referees showed that they were at a high level when it came to the dimensions of positioning, control and communication. However, the referees were only at a moderate level when it came to the application of the law, hence, their overall performance was categorized as moderate. Based on Maslow’s (2013) suggestion that knowledge and understanding of a subject matter is necessary before one can effectively apply the knowledge, referees should make concerted efforts to study the laws of rugby and continuously keep themselves up to date with changes in the game.

## **Conclusion**

In conclusion, the role of referees in ensuring rugby is played in a fair and flowing sequence is undeniable. With the increasing popularity of rugby as a professional sport, the game is increasingly robust, fast and powerful, and the players have improved their knowledge in the laws of the game. The improvisation by the coaches and players in their tactics and skills has made it imperative for referees to enhance their knowledge and interpret the laws accurately. As such, referee educators should utilize new approaches (e.g., video simulators) when educating young referees, and continuously plan interventions to keep their referees at peak levels of performance. Further experimental studies to determine the effectiveness of approaches undertaken to improve the knowledge acquisition process would be of great importance in the future.

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