
Original Article


Examining the effects of a variation to the ruck law in Rugby Union

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ABSTRACT

Spencer, K., & Brady, H. (2015). Examining the effects of a variation to the ruck law in Rugby Union. *J. Hum. Sport Exerc.*, 10(2), pp.550-562. Arias, Argudo and Alonso's review (2011) found that when rule changes were introduced to achieve a certain outcome, less than 60% were actually accomplished. Reflecting on past law changes in Rugby Union, the subject ELV is similar to the 'use it or lose it' law that was applied to mauls in 1994 (the aim being to increase open play and encourage continuity). Interestingly the number of mauls actually decreased as they resulted in greater possibility of turnovers (Quarrie & Hopkins, 2007) and the ruck became the more favoured play. Many of the studies which have examined rule modification, for example, Eaves and Hughes (2003), Eaves, Hughes and Lamb (2005) and Quarrie and Hopkins (2007) have concluded that the changes ultimately achieved a different outcome from that predicted (Arias, Argudo & Alonso, 2011). Thus emphasising the need for this analysis. The aim of this study is to determine whether limiting the time the ball is allowed to remain stationary improves the continuity of the game through increasing the time the ball is in open play. **Key words:** RULE CHANGE, ANALYSIS, PERFORMANCE.

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INTRODUCTION

Rugby Union is a highly adaptive invasion game (Hughes & Bartlett, 2002), with assessments and modifications to the Laws (IRB, 2012b) occurring regularly (Kew, 1987; Quarrie & Hopkins, 2007). In 2012 eight Experimental Law Variations (ELVs) were trialled by the IRB and the New Zealand Rugby Union (NZRU) in the ITM Cup (New Zealand's premier domestic competition, allblacks.com, 2012).

The subject of this study is how the ruck ELV, relating to rucks, effects the game. A ruck typically takes place after a tackle and is where "one or more players from each team, who are on their feet, in physical contact, close around the ball on the ground" (IRB, 2012b, p. 98). The amendment is an addition law 16.7: Unsuccessful end to a ruck:

When the ball has been clearly won by a team at a ruck and the ball is available to be played the referee will call "Use it!" after which the ball must be played within five seconds. If the ball is not played within the five seconds the referee will award a scrum and the team not in possession of the ball at the ruck is awarded the throw in. (IRB, 2012a, para. 1)

While no official source states the exact objectives of the ELV, anecdotal evidence and a brief mention in an IRB analysis (IRB, 2012c) suggested that the large number of rucks where the ball remains available for well over five seconds is a problem area. It is often used as a legal way to 'run down' the clock but is seen to slow the pace of the game and disrupt game-continuity.

Kew's 1987 study of rule changes in invasion games stated that one of the main drivers of changes is the need to improve and maintain the defining characteristics of that game. In this study, the characteristic is running forward and handling the ball. The ELV is proposed to reduce the time where the ball is stationary and neither team is contesting or handling it. Reducing these continual lulls in play will help Rugby Union to develop as a fast attacking invasion game.

MATERIAL AND METHODS

This study analysed and compared game rucks under the Current Laws ($n = 136$), to those under the Experimental Law Variation (ELV) ($n = 221$). The 2012 Currie Cup competition provided games played under the current Laws, while the 2012 ITM Cup competition provided games played under the ELV. Only round-robin games, not play-offs, were used, and for the ITM Cup, Ranfurly Shield games were omitted. Each ruck and offload was notated with reference to match time and position on the field. The field of play was divided into four: areas between each line and 22-metre line; areas between the halfway line and 22-metre line.

Performance Indicators

The indicators have been categorised as either Game Time (n= 2) or Ruck (n = 12).

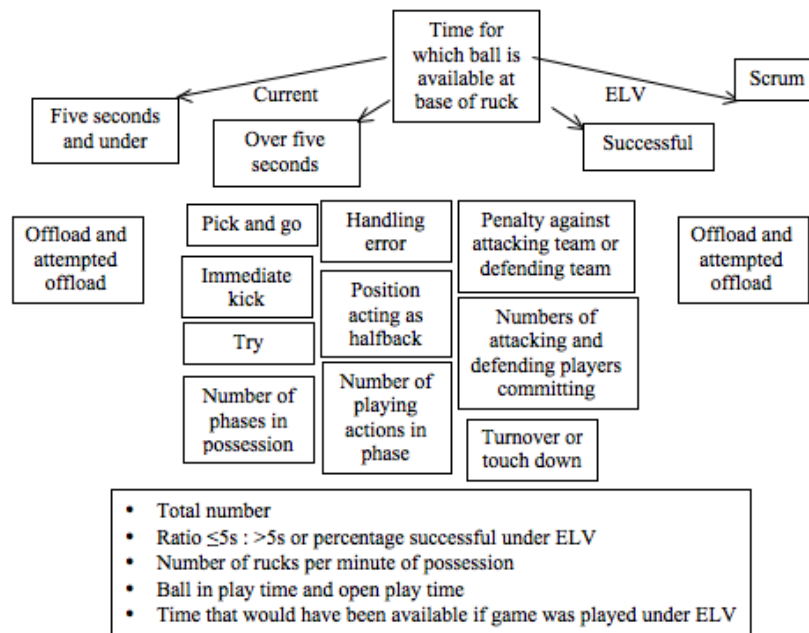


Figure 1. Performance indicators

Rucks will be divided into two categories:

For games under the current law the ball is available;

1. for five seconds or under (as would be required under the ELV).
2. for over five seconds.

For games under the ELV rucks that are

1. successful.
2. unsuccessful and a scrum is awarded to the defending team.

Game time performance indicators

- Ball in play. The total time that the ball is in possession or is available to be contested for possession.
- Open play. Time the ball is not involved in a breakdown (ruck or maul), scrum or lineout, conversion or penalty goal attempt, becomes dead, or the referee has stopped play.

Ruck performance indicators

- Duration ball is available. Time from when the ball is available to play to when the dummy/scrumhalf touches the ball.
- Immediate kick. Taken immediately after the ball is taken out of the ruck. It will not be taken into account whether the kicker is kicking for territory (i.e. ball remains in field of play), or for touch (i.e. out of play).

- Pick and go. Picking the ball up from the back of the ruck and immediately attacking a defending player.
- Dummy scrumhalf. Number of times the ball is taken out of the ruck by a dummy scrum half.
- Try. Number of tries scored.
- Handling error. Number of handling errors occurring at the ruck by the dummy/scrumhalf or the first player to whom he passes.
- Penalty at the ruck. Number of infringements occurring at the ruck where the referee stops play.
- Ruck Players. Number of players who have joined the ruck (by binding, using the whole arm, onto a teammate or opponent in the ruck).
- Turnover. Number of turnovers at the ruck and a touch down.
- Phase Actions. Number of passes and kicks in a phase of open play.
- Phase. Number of phases in possession.
- Offloads. Number of attempted and successful offloads.

Design of the Data Analysis

The analysis will compare three groups of data. The first is a comparison of data collected from games under the current law. This will determine the differences in play associated with rucks where the ball is used in five seconds or under once becoming available and rucks where the ball is used in over five seconds. The second is a comparison of data from rucks under the ELV that are successful and rucks under the current law where the ball is available for five seconds and under. This will show how the introduction of a time constraint has changed the mind-sets of players. The third comparison will be between all rucks under the current law and all rucks under the ELV. This will give an initial indication of how the game is adapting to the rule change.

The analysis will use both descriptive and inferential statistics to give the broadest understanding of the results. Descriptive statistics, especially ratios, percentages and frequencies, will give an overview of the study's finding. These will be presented in table format, and where appropriate, using bar charts. Inferential statistics, such as t-tests and correlations, will give a more in-depth understanding of the differences between groups of data, and their significance. The t-test will use an alpha level of 0.02, due to the potential of a small sample size and the short length of time that the ELV has been in place (i.e. players are still adapting to it).

RESULTS

Reliability

Intra-rater reliability was tested using the un-weighted kappa statistic (O'Donoghue, 2007) on a random sample of 26 rucks from the Current Law and ELV samples. The kappa statistic calculates the proportion of results that are in agreement, excluding those that agree by chance. recommends using a reliability test that has construct validity. In other words, it must produce higher values when the same performance is being reliability tested than when different performances are compared. The kappa statistic was shown to have construct validity.

Eleven sets of performance indicators were tested for both the Current Law and ELV sample. The results are presented in Table 1, below. The strength of agreement was obtained using the benchmarks set by Landis and Koch (1977).

Table 1. Kappa statistic values and strength of agreement for performance indicators for Current Law and ELV samples

Performance indicator	Current Law		ELV	
	Kappa statistic	Strength of agreement	Kappa statistic	Strength of agreement
Area, Turnover, Position playing scrum/dummy half, Pick and go, Kick, Penalty	1.00	Perfect	1.00	Perfect
Number of playing actions in phase	0.90	Almost perfect	1.00	Perfect
Maximum number of defenders in ruck	0.77	Substantial	0.85	Almost perfect
Number of defenders at end of ruck	0.51	Moderate	0.83	Almost perfect
Maximum number of attackers in ruck	0.59	Moderate	1.00	Perfect
Number of attackers at end of ruck	0.60	Moderate	0.76	Substantial

Game time indicators

Table 2. Average ball in play times per quarter as a percentage of total average game time and open play times per quarter as a percentage of average ball in play time (\pm SEM)

Performance indicator	Current Law	ELV	P-value
Ball in play time	44.14% (2.18)	41.11% (3.69)	0.4848
Open play time	59.19% (1.66)	51.26% (1.48)	0.0110* ↓

Note. * denotes statistical significant difference between groups ($p < 0.02$), ↑ increase, and ↓ decrease in ELV group from Current Law group.

There was no significant change in ball in play time, though the value was consistently lower in the ELV sample. Open play time, expressed as a percentage of ball in play time, was significantly lower in the ELV sample, as shown in Table 1.

Ruck Indicators

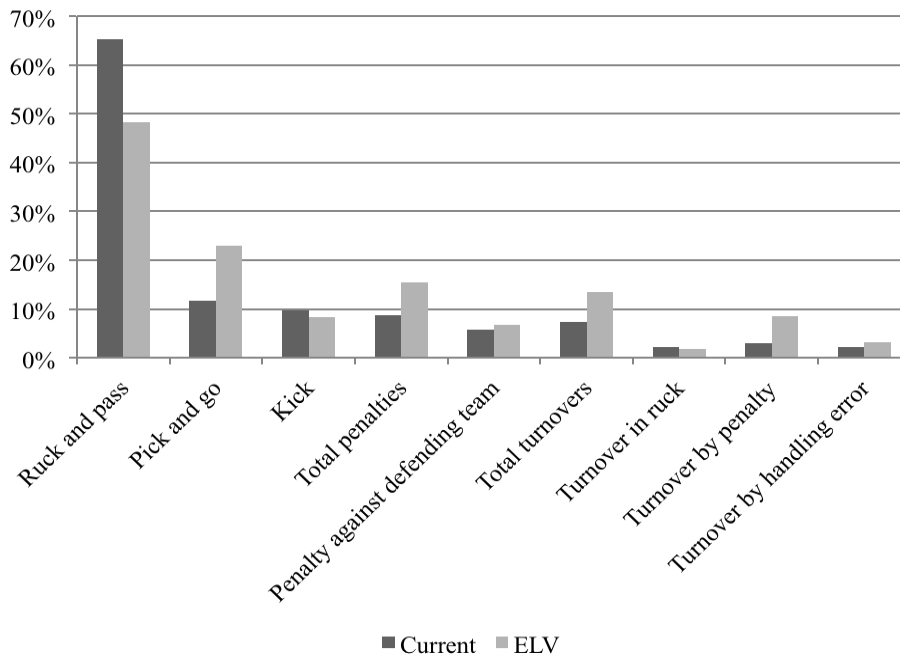


Figure 2. Comparison of the outcome of rucks under current law with the outcome of rucks under ELV.

Figure 2 gives a visual representation of the changes in the outcome of the ELV rucks from the Current Law rucks. Most apparent is the increase in pick and go and total penalties and the decrease in the number of rucks with no specific outcome (i.e. ruck and pass). These changes are examined in more detail in Table 3.

Table 3. Performance indicators for rucks under the current law ($\bar{x}\bar{x} = 27.2$) and ELV ($\bar{x}\bar{x} = 31.6$). Data are means per game quarter (\pm SEM).

Performance indicator	Current Law	ELV	P-value
Pick and Go	3.20 (1.02)	7.29	0.0080* ↑
Ruck and pass	17.8	15.29	0.0001* ↓
Immediate kick	2.80 (0.34)	2.57 (0.28)	0.5679
Total turnovers	2.00 (0.69)	4.29 (0.60)	0.0841
Total penalties	2.4	4.86	0.0760
Try	0.60 (0.25)	1.00 (0.19)	0.7475
Handling error	1.00 (0.42)	1.29 (0.10)	1.0000

Note. * denotes statistical significant difference between groups ($p < 0.02$), ↑ increase, and ↓ decrease in ELV group from Current Law group.

Time that the ball is available at back of ruck

If the examined Current Law rucks had been played under the ELV just over 5% would have been disallowed. The average time lost due to the ball being static at these rucks equates to just 2.86 seconds per ruck, 4 seconds per quarter, or 16 seconds per game. Every examined ELV ruck was successful under the conditions stipulated by the trial.

Area

The frequency of rucks in area 1 (the defending 22) was the only significant change between rucks played under the Current Law and the ELV ($p = 0.0142$). This was a decrease from 6% to 2% of the total rucks.

Pick and go

The use of the pick and go tactic significantly increased from the Current Law to the ELV. Concurrently, the number of rucks where no specific outcome (i.e. ruck and pass) was recorded decrease.

Position acting as dummy/scrumhalf

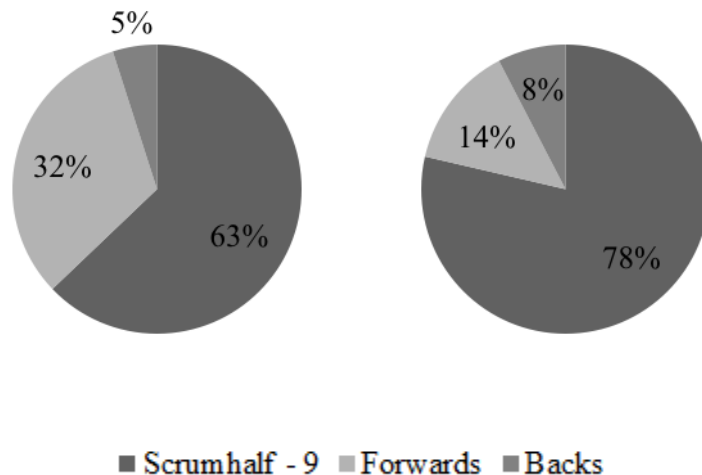
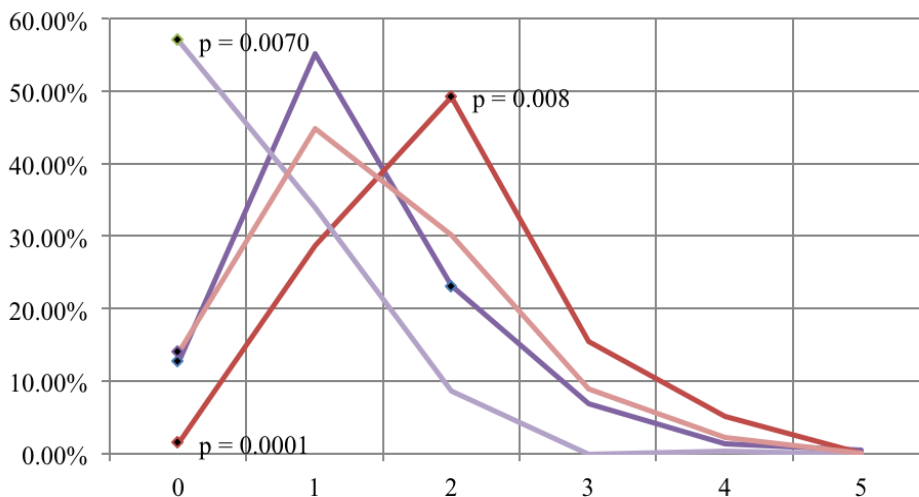
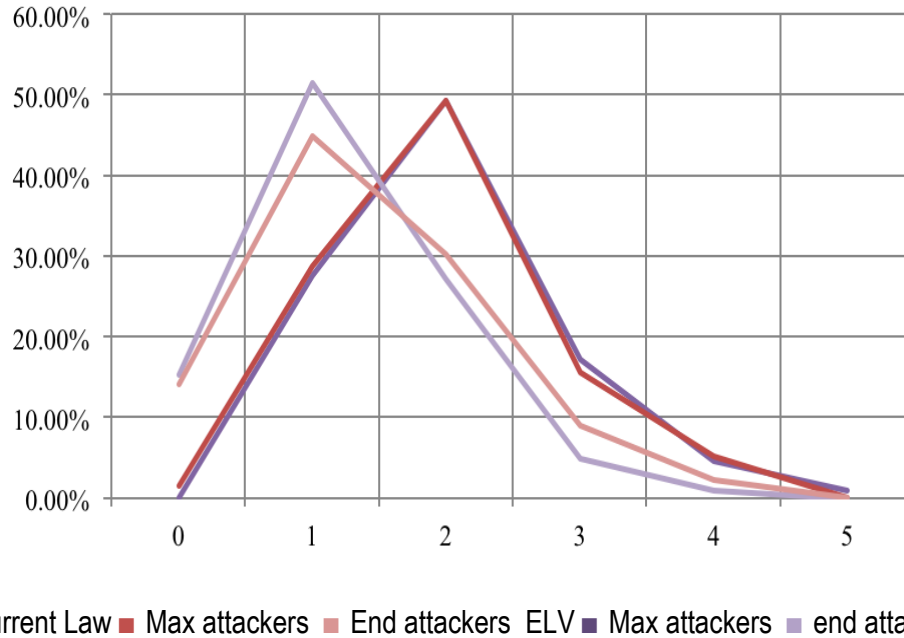


Figure 3. Comparison of the proportion of times a player type performed the duty of dummy/scrumhalf under current law and under ELV

Number of players committing to ruck





Figures 4 and 5. Comparison of maximum and end number of defenders and attackers committing to the ruck under current law and under ELV.

Number of playing actions in phase

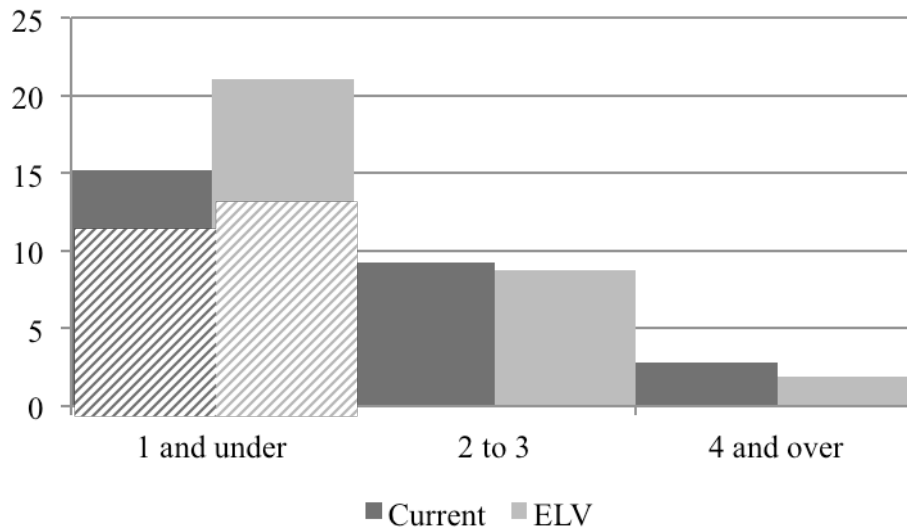


Figure 6. Frequency of phases with different numbers of playing actions under the current law and under ELV. The hashed sections in the 1 and under category are phases where pick and go was used.

There was a significant increase in phases with one or fewer playing actions under the ELV. This is mainly attributable to the significant increase in pick and go. Once this factor has been removed and the remaining rucks are compared the difference is found to not be significant.

DISCUSSION

The aim of this study was, firstly, to determine whether limiting the time the ball is allowed to remain available at the base of the ruck would increase continuity of play and decrease time wasting at the ruck, and secondly, to establish what other areas of the Game were affected. While every ruck analysed from the ELV group was successful under the law trial, thereby eliminating this form of time wasting, the time that the ball was in open play was significantly reduced. Other differences that reached significance included an increase in the use of the pick and go tactic, and similarly, an increase in the number of phases with one or fewer playing actions and an decrease in the number of rucks where there was no specific recorded outcome i.e. ruck and pass. Many of these results could be interpreted as contrary to the intent of the IRB.

In the most rudimentary sense, the International Rugby Board (IRB) was successful in their aim to remove stationary ball at the ruck as a type of time wasting. However, it can be assumed that they intended that the time gained from removing this piece of play would be used positively in other aspects of a game. Kew (1987) states that one of the leading reasons for rule changes in games is to develop and sustain that game's key characteristics. In Rugby Union, one of the key Principles of the Game, as stated in the Playing Charter (IRB, 2012a), is the concept of Contest and Continuity. Having the ball stationary at the back of the ruck takes away the ability of teams to contest the ball and reduces the continuity of a game. Putting the ball back into play more quickly, as the ELV has been shown to do, should increase the Contest and Continuity elsewhere in a game.

Game time indicators

Ball in play time

Logically, a law that facilitates the speed that the ball is recycled from the ruck can be expected to directly increase the time that the ball is in play. Ball in play time increased greatly in the decade after the introduction of professionalism to Rugby Union in 1995 (Eaves & Hughes, 2003; Quarrie & Hopkins, 2007; Williams, Hughes & O'Donoghue, 2005). IRB analyses (e.g. IRB, 2011a, 2012b) shows that this trend has continued since then, though at a lesser rate. It has been postulated that this is the result of rule changes made around the time of professionalization to make the game more open and appealing for spectators (Eaves, Hughes & Lamb, 2005; Williams et al., 2005).

Converse to these studies, there was no significant difference in ball in play time found between the Current Law group and the ELV group. Moreover, the ELV group showed consistently lower average ball in play times than the Current Law group. It is unclear why this is, though time is usually lost while scrums and lineouts are being set, or during kicks at goal. The average number of tries per quarter was higher under the ELV, meaning more conversion kicks were attempted, though the difference was not significant. The number of scrums, lineouts and penalties taken as kicks at goal were not recorded, but could have been a factor.

Open play time

A time indicator that did differ significantly from the Current Law to the ELV was the total average time that the ball was in open play each game quarter. Open play time was considerably lower in games played under the ELV. While there are no studies examining the total open play time of games in Rugby Union, a few (e.g. Eaves et al., 2005; Williams et al., 2005) have looked at individual open play times. Since the introduction of professionalism, average individual open play times have decreased. This means that the

time between rucks has decrease. This is concurrent with the vast increase in rucks during this time (Eaves & Hughes, 2003; Quarrie & Hopkins, 2007).

Likewise, the increase in the use of pick and go in ELV games could be negatively influencing the proportion of those games where the ball is in open play. By definition there is very little time between rucks when pick and go is used. However, as the increase in pick and go was not matched with a significant increase in ruck frequency, as the decrease in individual open play times in post-professionalism studies are, total average open play time in the ELV sample has decreased.

It is unclear whether the IRB would view this consequence of the ELV favourably. Several of the law changes that have been made or trialled in Rugby Union, especially in the professional era, have intended to make the Game more entertaining for spectators (Eaves & Hughes, 2003; Malcolm, Sheard & White, 2000). The subject ELV can be included in this category. Rugby fans often regard attractive Rugby, rather ambiguously, as being running Rugby. This might be defined as a fast paced, open game. Spectators may see the decrease in open play time as the Game moving away from the running Rugby concept.

Ruck Indicators

Time that the ball is available at back of ruck

Both the number of rucks where the ball was stationary and available for more than five seconds and the average time that was lost due to this was surprisingly low. The IRB analysis of the 2012 6 Nations tournament found that in one particular game over two extra minutes of game time could have been gained had these types of rucks been cleared within five seconds. In addition, in order for a law trial to be justified, an aspect of play has to be substantially affecting game play. The results derived in the present study do not show substantial effect on game play.

Another interesting point that was noted about rucks played under the ELV, though not quantified in the research method, was the speed at which the halfback cleared the ball from the ruck. Five seconds is a relatively long time in which to play the ball, however, the scrum/dummy half would often take the ball out of the ruck as soon as the referee made the 'use it' call. This action gave the impression that the player was interpreting 'use it' as a call to play the ball immediately, rather than a signal that the ball was available and the countdown from five had started. This observation could indicate that players do not properly understand the ELV.

Pick and go

The increase in the use of the pick and go tactic, while not the most statistically significant, is perhaps the most influential result in this study. Many other changes from the Current Law to the ELV are either directly related to, or can be explained by this result. For example, the decrease in open play time, changes in the playing position of the dummy/scrum half, and the increase in the number of phases with one or fewer playing actions can all be attributed to this increase in pick and go.

The increase itself could be a symptom of the ELV causing a perceived lack of time at the breakdown. That is, players may feel that they do not have the time to establish other playing options. Alternatively, it may be a response to the lack of defenders committing to the ruck under the ELV. Players may be trying to combat a perceived readiness of defenders. Rather than risk loss of territory or ball by passing, they opt to immediately attack the line of defence.

Pick and go is a tactic usually associated with forwards. Current forward player passing ratios are usually between 1:3 and 1:4, with both New Zealand and South Africa having ratios closer to 1:3 in test matches (IRB, 2011a). This means that for every three times a forward player gets the ball he will only pass once. While this ratio does not directly show the amount of pick and go used in a game, a higher ratio is generally indicative of more pick and go. This ratio has been increasing in the years since the introduction of professionalism (IRB, 2005). It could be that the ELV encourages this process.

Performance indicators influence by pick and go

As is predictable, with the increase in pick and go under the ELV, forward players are significantly more likely to be the ones to clear the ball from a ruck. Similarly, the scrumhalf's role in this has been reduced. As forwards generally use pick and go more than any other player does, it follows that they would have to be in the position of dummy/scrumhalf more often.

While it may seem undesirable to have more other players acting as dummy/scrumhalf, in this instance the effect would be negligible. The scrumhalf is an expert at passing the ball, making half of all the total passes in the game, while forwards tend to use the ball in breakdown situations, such as rucks and mauls (IRB, 2005). Using pick and go is working to the forwards' skills; therefore, there is no negative consequence of the scrumhalf making less passes from the ruck.

Likewise, as pick and go increases, the number of phases containing one or fewer playing actions can be expected to also increase. This was the case in the present study, although, once the data was adjusted for this change in pick and go, the difference was not found to be significant.

Number of players committing to ruck

While there was little difference in the number of attackers committing to the ruck, there were significantly less defenders committing. It could be that the defending team, knowing the ruck is required to be over quickly, are prioritising the defence of their territory over the option to contest for the ball and win a turnover. This drop in a team's willingness to contest the ball does not help to maintain the Contest and Continuity principle that is so important in the Game of Rugby Union, and is likely that the IRB will view this reprovably.

Other performance indicators

There was no significant difference in the number of handling errors, penalties, immediate kicks, tries scored, or turnovers at the ruck. There was a decrease in rucks occurring in area 1 (i.e. the team in possession's own 22) that reached significance, however this was not translated into more rucks occurring in the attacking half (areas 3 and 4). Similarly, a decrease in offload attempts in area 3 approached significance but overall there was no meaningful result.

CONCLUSIONS

Using the results of this study, the IRB would likely have to state that the ELV did not achieve what they intended. While the aim of the law trial was primarily to reduce the amount of time the ball is left stationary and available at the ruck, and this was accomplished, the effects of the ELV on other aspects of the Game did not improve Contest and Continuity. The increase in closed game tactics such as pick and go caused an increase in the number of phases with one playing action or fewer, and a decrease in open play time and the number of times the scrumhalf cleared the ball from the ruck. There was also reduced contest at the ruck with less defenders committing under the ELV. In general, these changes cannot be seen as a

positive progression of the Game of Rugby Union. However, due to the limitations of this study, further analysis using larger sample sizes and Current Law footage corresponding to the ELV footage may find more constructive results.

LIMITATIONS

There are several limitations to this study, which may have affected the results.

Sample size

The size of the samples used in this study were small, and likely not indicative of the population as a whole. While rucks from a range of games were used, it is very possible that these games had characteristics outside the population average that did not cancel each other out. For example, some of the game segments used in the ELV sample may have had higher than average pick and go usage, while others met the population mean. This would result in a pick and go average in the ELV sample that is higher than the average across all games played under the ELV. The population mean is an unknown, so it is not possible to tell how sample size has affected the results of this study.

Use of games from different competitions

As mentioned previously, the use of 2012 Currie Cup games was dictated by the lack of footage available of ITM Cup games played under the Current Law. Rugby has different playing styles and characteristics in different parts of the world (Vaz, van Rooyen & Sampaio, 2010; van Rooyen, Lambert & Noakes, 2006). At international level, South African Rugby, compared to that of New Zealand, has a higher rate of kicks and lower rate of rucks and passes. Passes are less likely to be from forwards than from other players and South Africa is far more likely to score from phases originating in area 4 (i.e. attacking 22) (IRB, 2011b; van Rooyen et al., 2006).

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