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COMPARISONS OF PERFORMANCE INDICATORS BETWEEN SUPER RUGBY AND CURRIE CUP COMPETITION DURING 2014 SEASON

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ABSTRACT

Previous studies on differences in level of competition in rugby focused on physiological and psychological components, yet little research is available on comparing performance indicators between different levels of play. This study attempted to compare performance indicators of Currie Cup and Super Rugby, and to differentiate between the winning and losing teams of both competitions. A total of 30 games played during the 2014 Super Rugby competition and 30 games played during the 2014 Currie Cup were observed. The numbers of most match activities were similar for two competitions, with the average numbers of lineouts, scrums, rucks, tackles and penalties differing by 3% or less between competitions. Statistically and practically significant differences between competitions were for mauls and missed tackles. The average of 6.4 mauls in Super Rugby was significantly lower than the average of 9.6 in the Currie Cup, with a rate ratio of 0.69, implying a difference in the average number of mauls of about 30%. Similarly, the average number of missed tackles was about 20% lower in the Super Rugby competition compared to the Currie Cup. Average numbers of activities were also generally similar for winning and losing teams in the two competitions.

***Keywords*:** Levels of competition; Performance indicators; Currie Cup Rugby; Super Rugby.

INTRODUCTION

In any domain with a discrepancy between the recommended level of performance and the level that is commonly achieved, there is the opportunity for gaining a competitive advantage for players, who can successfully train to reduce the discrepancy (Pavely *et al.*, 2010). The increasingly business-like environment of professional sport has resulted in greater scrutiny and analysis of players' performance (Colby & Sheard, 2004). However, there is still a large knowledge gap that shows the difference in performance indicators as players move from one competitive level of play to the next. As a result, Hendricks and Lambert (2010) concluded that the game of rugby, progressing from amateur to professional, has become more physical and quicker, which involves more frequent and forceful contact events as determined by in-depth game analysis. Quarrie and Hopkins (2007) determined that professionalism was associated with increases in passes, tackles, rucks, tries, ball-in play time and body mass, while large reductions in participation time per player and kicks during play, and moderate reductions in lineouts and mauls were recorded.

Increases and decreases associated with performance indicators is also true with regard to skills exhibited by players from different levels of competition. The number of rucks and tackles performed by players are just some of the indicators that can be increased due to higher fitness levels and improved capacity of players to perform certain tasks for prolonged periods of time. Vivian *et al.* (2001) reported that differences were evident in the number of behaviours completed by individuals as a function of both playing position and level of competition. Eaves *et al.* (2005) reported significant increases in the frequency of rucks and lineouts and a significant decrease in the frequency of mauls, scrums, total game kicks, kicks out of play, kicks in play and set possessions over the years, which can also be true for different levels.

Sirotic *et al*. (2009) provided evidence in rugby league that two standards of competition have similar game-specific skills and physical demands during a match, but there can be variation within a match according to standard. Variations in match standard are also mentioned by the International Rugby Board (IRB, 2003), who stated that the competitive level of play will dictate such match activities as "ball in play" time. For example, at the 2003 Rugby World Cup, the ball was in play 42% of the time, compared to 40% during the 2006 under-21 Rugby World Cup.

It has been suggested by Van Rooyen (2012) that the higher the standard of play, the better the tackle technique, although this technique was not related to the outcome of matches played by teams that were composed of players with a similar quality of tackle execution. Changes in match activities are also reflected in the match outcome. Vaz *et al*. (2010) showed that winning teams in international and regional matches during 2003 and 2006 were consistently more effective at retaining the ball on their own lineout than losing teams. Teams that are not able to protect the ball during rucks will lose their ball possession to the opposing team and may conceive points against them due to the turnover ball (Rugby Football Union, 2004).

Another area of concern, as playing levels increase, is the changes in territory and possession. Van den Berg and Malan (2010) stated that for a team to score points and be successful, teams need ball possession and to gain territory. Ball possession includes passes made, rucks and turnovers (Groenewald & SARFU Technical Committee, 2001). Although metres gained are not a match activity of play as such, it is a unit to measure performance, such as the percentage of territory gained (Agnew, 2006). Van den Berg and Malan (2010) concluded that the match profile variables which emerged as the biggest predictors of ranking among the Super 14 rugby union teams were in order of contribution: metres gained (46%), kicks from hand (28%) and line breaks (8%). The importance of metres gained as the major discriminator and contributor to rugby performance was highlighted by O'Shea (2003). Hunter and O'Donoghue (2001) suggested distinct differences in terms of changes in possession and methods used by the teams to gain territory.

Referees and the interpretation of rules, such as the length of advantage time played, can also impact on level of competition. Quarrie and Hopkins (2007) reported that the variability in match activities that acts over longer periods, can arise from modifications to laws and the interpretation of laws that exist at a given time. More experienced referees will officiate at a higher level. Referees are key sport personnel who have important responsibilities both on and off the field. From a service perspective, they ensure that competitions are conducted safely and in accordance with sanctioned rules and regulations (Warner *et al.*, 2013). The decisions by referees can impact on the number of match activities performed by teams and players, and can therefore be seen as a possible influence on changes in match activities.

PURPOSE OF RESEARCH

Due to the various influences on performance indicators associated with the changes in the level of play, this study set out to compare the incidence of performance indicators between Super Rugby and Currie Cup rugby, to report any significance between levels of competition, and to differentiate between winning and losing teams from both competitions.

METHODOLOGY

Subjects

A total of 30 games played during the 2014 Super Rugby competition and 30 games played during the 2014 Currie Cup were observed, resulting in 60 observations per competition. Super Rugby games were played in South Africa, New Zealand and Australia, while all Currie Cup games were played in South Africa. Data were statistically analysed to evaluate and compare the number of lineouts, lineouts lost, scrums, scrums lost, mauls, rucks, tackles, missed tackles and penalties conceded by losing and winning teams on these two levels of rugby to provide a sufficient body of data for coaches to determine the importance of variables to focus on during training.

Research method and techniques

Time-motion analysis was conducted on all games played. Data was supplied by the Cheetahs Super Rugby Franchise in Bloemfontein, South Africa, using the Verusco TryMaker Pro (Verusco Technologies Ltd.; Palmerston North, New Zealand). Only data from 2014 could be used due to changing variables being used by team management during a season. The 2014 season was the only season available where both Currie Cup and Super Rugby measured similar variables. The Currie Cup is the local provincial rugby competition of South Africa involving between 6 to 8 teams and usually do not include any international players, while the Super Rugby competition involves teams from South Africa, Australia and New Zealand and have evolved from 15 to 18 teams. Super Rugby teams include international players from all three countries and is rated as an international tournament.

Verusco has been supplying Super Rugby teams with TryMaker Pro since 2000, and provides a notational analysis of each individual player for each game played (Smart *et al.*, 2014).

TryMaker Pro is an advanced analysis system developed exclusively for rugby, and it is the preferred system for professional teams using Verusco. The Verusco coding centre codes all the games for registered teams and delivers high detail, high speed analysis within hours of the game being played. The Verusco coding centre oversees' reliability with more than twenty analysts and the head of coding before data is sent to the franchises. The reliability of the coding was determined by the re-analysis method (test-retest reliability) for inter-rater reliability. This method entails that a different analyst does a re-analysis of the video material after the original analysis. Twenty-five percent of matches were re-analysed by a different experienced performance analyst at the Cheetahs Super Rugby Franchise to avoid bias (James *et al.*, 2013). Ethics clearance was obtained from the University of the Free State where the study was conducted under ethical clearance number UFS-HUM-2013-009.

Analysis of data

All data were captured in a Microsoft Excel 2007 spreadsheet and subsequently converted into a SAS (Statistical Analysis System) data set (SAS Institute Inc., 2013). Descriptive statistics for the count and percentage data were calculated for the 2014 Super Rugby and Currie Cup competitions. Descriptive statistics were calculated per competition for the winning and losing teams separately, and for the two teams involved in each game combined (that is, for the total count per game). The extension to generalised responses, such as binary and count variables, entails generalised mixed models. The most common is the generalised linear mixed model (Ngo & Wand, 2004). Each count variable (such as number of lineouts, scrums, rucks, mauls) was analysed using a Generalised Linear Mixed Model (GLIMM) with competition (Super versus Currie Cup) as fixed effect, and both winning team and losing team as random effect. The fitting of the variables winning team and losing team as random effects allowed for correlation between the counts in question for a given team across several games.

Furthermore, the GLIMM was specified with Poisson error distribution and the natural logarithm as link function. Residual over-dispersion was allowed for in the model. Based on the GLIMM, the mean rates of variables, such as lineouts, scrums, rucks, mauls, per game were estimated for the 2014 Super Rugby and Currie Cup competitions. Similarly, in order to compare the mean rates between the 2014 Super Rugby and Currie Cup competitions, rate ratios of the different variables between the 2014 Super Rugby and Currie Cup competitions were estimated, together with 95% Confidence Intervals (CIs) for the rate ratios. Confidence Intervals can also use information to calculate boundaries within which researchers believe a population will fall (Field, 2013). Procedure GLIMMIX of the SAS Version 9.22 statistical software package was used for this analysis (SAS Institute Inc., 2013).

The analyses were carried out separately for the data of the winning teams, for the data of the losing teams, and for the data of two teams involved in each game combined (that is, for the game). Percentage territory and percentage possession of the *winning team* in each game were analysed using a linear mixed model with competition as fixed effect, and both winning team and losing team as random effects. Based on the linear mixed model, the mean percentage territory (and possession) was estimated for each competition, with a 95% CI for the mean percentage. Similarly, in order to compare the mean percentage between the 2014 Super Rugby and Currie Cup competitions, mean differences – that is, differences of mean percentage territory and possession – between the 2014 Super Rugby and Currie Cup competitions were estimated, with 95% CIs for the mean differences. The analysis was carried out using SAS procedure MIXED (SAS Institute Inc., 2013).

RESULTS

Table 1 presents the mean number and standard deviation of match activities for Currie Cup and Super Rugby competitions during the 2014 rugby season. Differences in match activities between the Currie Cup and Super Rugby competitions are expressed as rate ratios and 95% CIs for the rate ratios, which allow one to judge the reported differences on a meaningful scale, namely the percentage scale.

The numbers of most match activities were similar for the two competitions: the rate ratios for lineouts, scrums, rucks, tackles and penalties all fell between 0.97 to 1.03, which implies that the corresponding average numbers of activities did differ by 3% or less between competitions. The “Super Rugby/Currie Cup” rate ratio for lineouts lost was 0.90, and for scrums lost 1.15,

meaning 10% fewer lineouts lost but 15% more scrums lost on average in Super Rugby compared to the Currie Cup. However, these are percentages of low mean counts, so that the differences between the competitions, namely fractions of a line out or scrum, are practically of no importance. Furthermore, all the above-mentioned differences in activities were not statistically significant.

The only statistically significant differences between competitions were for mauls and missed tackles. The average of 6.4 mauls in Super Rugby was significantly lower than the average of 9.6 in the Currie Cup, with a rate ratio of 0.69, implying a difference in the average number of mauls of about 30% (p=0.0071). Similarly, the average number of missed tackles was about 20% lower in the Super Rugby competition compared to the Currie Cup (rate ratio of 0.80; p=0.0014).

***Table 1*. MATCH ACTIVITIES (PER GAME) FOR BOTH COMPETITIONS DURING 2014 RUGBY SEASON**

Variable	**Currie Cup** Mean±SD	**Super Rugby** Mean±SD	**Rate Ratio Super/Currie**	**95% CI for Rate Ratio**	**p-Value**
Lineouts	21.8±5.44	21.9±4.63	1.033	0.903 to 1.184	0.6314
Lineouts lost	4.5±2.08	4.3±2.07	0.901	0.684 to 1.187	0.4479
Scrums	15.7±4.70	16.4±4.27	1.005	0.856 to 1.179	0.9544
Scrums lost	2.1±1.68	2.4±1.73	1.148	0.746 to 1.767	0.5219
Rucks	139.6±26.86	143.1±22.80	1.015	0.917 to 1.123	0.7697
Mauls	9.6±4.16	6.4±3.25	0.692	0.532 to 0.900	0.0071*
Tackles	275.1±45.58	270.8±38.32	0.991	0.900 to 1.090	0.8434
Tackles missed	45.3±10.68	36.4±9.84	0.804	0.705 to 0.916	0.0014*
Penalties	24.1±4.54	23.4± 4.12	0.972	0.885 to 1.069	0.5532

*Statistically significant difference p<0.05

Table 2 presents the data in a stratified manner, namely by winning and losing team. The results indicate that the average numbers of match activities were generally similar for winning and losing teams in both types of competition, and were similar for the two competitions within each stratum, with some exceptions. For winning teams, the average of 2.6 mauls in Super Rugby was significantly lower than the average of 5.4 mauls in the Currie Cup, with a rate ratio of 0.57, implying a difference in the average number of mauls of about 40% (p=0.0074). Similarly, among winning teams, the average number of missed tackles was about 25% lower in the Super Rugby competition compared to the Currie Cup (rate ratio of 0.73; p=0.0009). In contrast, among losing teams the average number of mauls and missed tackles were similar for the two competitions, and no statistically significant differences were found between either the two competitions in either stratum.

***Table 2*. MATCH ACTIVITIES (PER GAME) STRATIFIED BY MATCH OUTCOME (WINNING VS. LOSING TEAM) FOR BOTH COMPETITIONS**

WINNING TEAM					
Variable	**Super Rugby** Mean±SD	**Currie Cup** Mean±SD	**Rate Ratio Super/Currie**	**95% CI for Rate Ratio**	**p-Value**
Line outs	10.3±2.5	10.4±3.2	0.992	0.849 to 1.159	0.9153
Line outs lost	2.1±2.1	1.8±1.0	0.883	0.537 to 1.451	0.6158
Scrums	8.4±2.7	8.1±3.3	1.032	0.847 to 1.258	0.7502
Scrums lost	1.2±1.1	0.9±0.8	1.385	0.830 to 2.312	0.2069
Rucks	71.4±21.7	64.8±20.8	1.102	0.936 to 1.297	0.2374
Mauls	2.6±2.1	5.4±3.3	0.570	0.380 to 0.854	0.0074*
Tackles	139.1±36.3	143.7±39.1	0.996	0.857 to 1.158	0.9611
Tackles missed	17.7±4.8	24.6±8.9	0.726	0.604 to 0.871	0.0009*
Penalties	12.0±3.1	11.3±3.3	1.054	0.902 to 1.233	0.4993
LOSING TEAM					
Variable	**Super Rugby** Mean±SD	**Currie Cup** Mean±SD	**Rate Ratio Super/Currie**	**95% CI for Rate Ratio**	**p-Value**
Line outs	11.6±3.7	11.4±3.9	1.039	0.856 to 1.261	0.6912
Line outs lost	2.2±1.6	2.7±1.7	0.817	0.574 to 1.163	0.2573
Scrums	8.2±3.2	7.5±3.4	1.083	0.855 to 1.371	0.4992
Scrums lost	1.2±1.2	1.2±1.3	0.960	0.542 to 1.703	0.8865
Rucks	71.7 ±19.8	74.8±23.9	0.959	0.821 to 1.122	0.5975
Mauls	3.6±3.1	4.2±2.1	0.921	0.636 to 1.334	0.6575
Tackles	131.5±39.7	131.3±40.7	1.034	0.864 to 1.251	0.6707
Tackles missed	18.3±8.5	20.7±6.7	0.886	0.721 to 1.089	0.2456
Penalties	11.2±3.1	12.6±3.6	0.901	0.761 to 1.067	0.2169

*Statistically significant difference $p<0.05$

Table 3 shows that the percentages possession and territory of losing teams in the two competitions were practically identical. Furthermore, the percentages possession and territory of losing teams in both competitions were very close to 50%, which means that the percentages possession and territory of winning teams and losing teams were practically identical, namely about 50%.

Table 3. **POSSESSION AND TERRITORY FOR LOSING TEAMS IN SUPER RUGBY AND CURRY CUP RUGBY[1]**

Variable	Currie Cup	Super Rugby	Difference Super/Currie	95% CI for Difference	p-Value
Possession	51.9	50.6	-1.3	-5.7 to 3.2	0.5690
Territory	50.5	50.7	0.2	-4.7 to 4.4	0.9353

[1] Possession and territory of winning team are the complement to sum to 100%

DISCUSSION

The results of this study emphasise the importance of specific demands on the various levels of play regarding match activities, such as the lineout, scrum, ruck, maul and tackle counts by Super Rugby and Currie Cup players. The current study showed that a significant difference exists between the winning teams of the different competitions with regard to mauls (p=0.0074) and missed tackles (p=0.0009). The same variables, mauls (p=0.0071) and tackles missed, (p=0.0014) also differed significantly when both winning and losing teams from the two competitions were compared.

This research supports that of Sirotic *et al*. (2009) who showed that while two standards of competition have similar game-specific skills during a match, there is variation within a match according to standard. The current study agrees with that of Vivian *et al.* (2001) who reported that differences were evident in the number of match activities completed by individuals as a function of both playing position and level of competition. This study also found that in Super Rugby, the number of lineouts, scrums, scrums lost and rucks were higher than in the Currie Cup, although there were no significant differences (p=0.6314, p=0.7697, p=0.5291 and p=0.9544, respectively). In Super Rugby, teams lost fewer lineouts even though the number of lineouts increased, thus differentiating between the different levels of competition. This indicates that higher levels of competition show improved performance in lineouts and that higher level team's place greater emphasis on the execution of set pieces. Increases in scrums can be due to a more open and running game by the higher level teams.

In addition, the findings show that the Currie Cup competition had higher means for missed tackles and mauls. Both these activities showed significant differences between competitions with p=0.0014 for tackles missed and p=0.0071 for mauls. These findings support Van Rooyen (2012) who stated that the higher the standard of play, the better the tackle technique. Super Rugby players spend more time improving tackle technique and are bigger and more physical and can therefore handle the higher collision impacts from the ball carrier. Consequently, it is noteworthy that in our study winning teams had a higher missed tackle count (24.6) than losing teams (20.7) in Currie Cup, while the contrary was observed in Super Rugby, with 18.3 missed tackles by losing teams and 17.7 missed tackles by winning teams. It is apparent that in the Currie Cup, which is a local South African competition, teams make use of the maul significantly more than Super Rugby teams (p=0.0071). This might indicate the more physical style of play associated with South African teams.

Results from this study show that average numbers of activities for winning teams were not greater than losing teams in all variables, but rather indicate that winning teams place greater

emphasis on the set phases, such as lineouts and scrums, by losing fewer of these set phases as losing teams. This is supported by Vaz *et al*. (2010) who found that winning teams in international and regional matches were consistently more effective at their own lineout than losing teams. Winning teams also have a higher number of tackles performed due to the continuous offense and pressure applied by the losing teams, and show better tackle completion than losing teams in all competitions. For this reason, there is a significant difference in the number of missed tackles by winning teams at all levels of play. Higher level teams spend more time on perfecting their defensive structure and handle the collision situation better than lower level teams.

The possession is higher for losing teams in both competitions. Our data, which stem from 2014, suggest that there was a slight increase in the number of tackles for winning teams when compared to losing teams, but both winning and losing teams missed fewer tackles in Super Rugby than in Currie Cup Rugby. This suggests the more physical nature of Super Rugby with players being better conditioned, heavier and better skilled. The increase in tackles can be due to the more intensive and expanding game plan applied by Super Rugby teams. Winning teams have better defensive structures and can sustain pressure over longer periods or phases of attack by losing teams with higher tackle completion, which can be due to better physical improvement in players from the higher level of competition.

Eaves and Hughes (2003) also concluded that the professional approach to rugby resulted in an increase in match activities. It must be kept in mind that weather conditions, game plan and the competition structure can also affect the match activities during match play.

CONCLUSION AND PRACTICAL IMPLICATIONS

This paper reports the number of tackles, rucks, mauls, scrums, lineouts, percentage possession and territory for Super Rugby and Currie Cup rugby, and also changes observed between winning and losing teams from both competitions. The differences in match activities performed by teams over different competitions emphasise the different physiological demands on and preparation of teams. It is recommended that coaching and conditioning be designed to improve these performance indicators by including a substantial amount of tackling, rucking and lineouts, as these are the prominent activities that increase to higher levels of play. Ultimately, players in higher level rugby receive more and better coaching and conditioning, increasing the skill level of each player, physique and fitness levels.

Coaches need to be aware of the differences in the number of scrums and lineouts when planning training programmes. Players are getting bigger and more conditioned to perform higher number of mauls and to break tackles. Teams seeking improvement need to increase tackle completion, improve lineout contesting and emphasise the maul as an attacking measure.

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