

Which numbers matter? Exploring the relevance of statistical data to team success in rugby union.

— — James Tesoriero Rugby Australia L4 Coach — —

Introduction

There is a rapidly increasing use of data analytics in modern team sports, and professional teams of all codes and ball shapes are using statistical data to measure performance, find scope for team improvement, and to analyse opponents with a view to finding advantages to exploit. Rugby is a unique sport in most regards, however, and the uptake in data analytics has been slower than that for North American Sports such as Basketball, Baseball and American Football. According to the analytics-driven approach (popularised by the movie *Moneyball* featuring team Baseball Manager Billy Beane), coaches of sports teams can gain a competitive advantage by finding the key statistics which drive winning, and to devise a game-plan which maximises these winning aspects.

This paper seeks to explore whether statistical data can be used to predict performance in elite level rugby teams. If, in fact, the numbers can accurately tell a story regarding performance, which numbers actually matter and how do we manipulate these on the field to win more games? As a secondary focus, I will aim to determine whether the winning statistics are common across different levels of rugby (Test/Super/Club).

Methodology

This topic was inspired by a podcast episode of The Wandering Bear in which host Duncan Chubb interviewed International coach Matt Taylor, who cited a study by Vic Meyer on which statistical markers were most important to winning games of rugby at an elite level in Tier 1 nations. This study title *How to Win a Game of Rugby* was the starting point for my research. Vic was very helpful in sending me the entire study and data set, which gave direction and shape to this paper.

I was also able to access the 2023 season data from the Super Rugby Pacific and the Shute Shield (Sydney's Premier Grade) competition, courtesy of OPTA. With the dozens of statistical measures provided, I spent time re-ordering the competition's teams according to rankings in each statistical category and measured these against the final competition standings, and looked for correlation.

And finally I was fortunate to have access to Randwick's head coach Stephen Hoiles and sat down with him in the days following his team winning the Shute Shield Grand Final. Hoiles was able to help me analyse the numbers from the 2023 Shute Shield competition, provide some context to why certain teams had certain statistical profiles, and we were able to come to some level of consensus about which statistics were most responsible for wins and losses.

Trends- What the data tells us

Meyer's study covered 110 elite professional matches, 67 of which were test matches, featuring a mix of Northern and Southern Hemisphere Tier 1 Nations. His major finding were as such:

1. Possession is a disadvantage- 59% of winning teams carried less and 60.55% of teams made more tackles.
2. Winning teams tactically kick more- 76.5% of teams kick more than their opposition. During the 2019 RWC the Champion Springboks kicked more than any other team, they famously relied very heavily on box kicks. IUN the 2020 Six Nations tournament, England were the Champions and averaged the most kicks (30 per game).
3. Winning teams have fewer turnovers- 76% of winning teams had fewer turnovers than their opponents.

As a coach deeply schooled in Randwick's ethos of running rugby, these trends painted a bleak picture: kicking 30 times each game and being risk-averse in attack were the most successful ways to win rugby International matches. Running the ball and accepting the risk of a turnover were likely to lead to losses at test match level. Randwick won the 2023 Shute Shield with a low kick total, so perhaps the picture was more positive at Super and Club level.

In the 2023 Super Rugby Pacific competition, high running meters correlated more to winning. The 4 teams ranked highest in run meters/game (Blues, Chiefs, Hurricanes and Crusaders in that order) all placed in the top 5 of the season ladder. In the 2023 Shute Shield competition, the picture regarding run meters wasn't as clear. The Grand-finalists Norths and Randwick were 3rd and 4th in the competition in run meters respectively, but the 1st and 2nd teams in this metric (Warringah and West Harbour) both finished lower on the competition ladder and missed the Final Series. A look further down the rankings of run meters doesn't seem to show a constant link between meters run/game and team success during the 2023 season.

	Ladder Position	Team	Played	Won	Lost	Carry Metres/Game	Carry Ms/Game Rank
2023 Super Rugby Pacific	3	Blues	14	10	4	927.88	1
	1	Chiefs	14	13	1	899.18	2
	5	Hurricanes	14	9	5	867.47	3
	2	Crusaders	14	10	4	852.76	4
	10	Western Force	14	5	9	834.79	5
	7	Fijian Drua	14	6	8	834.07	6
	11	Melbourne Rebels	14	4	10	815.86	7
	12	Moana Pasifika	14	1	13	787.64	8
	4	ACT Brumbies	14	10	4	780.19	9
	8	Queensland Reds	14	5	9	757.33	10
9	Highlanders	14	5	9	726.93	11	
6	NSW Waratahs	14	6	8	711.13	12	
2023 Shute Shield	11	Warringah	18	4	14	864	1
	9	West Harbour	18	6	11	795.78	2
	1	Northern Suburbs	18	14	4	777.15	3
	2	Randwick	18	13	4	772.3	4
	12	Southern Districts	18	4	14	760.39	5
	4	Manly	18	9	7	730.35	6
	7	Western Sydney	18	9	9	720.56	7
	6	Hunter Wildfires	18	10	8	706.53	8
	3	Eastwood	18	11	7	688.6	9
	5	Gordon	18	11	7	686.53	10
	8	Sydney University	18	9	9	646.94	11
10	Eastern Suburbs	18	6	12	637.17	12	

Table 1- Carry Meters/Game & Rank within competition (source- www.optaprorgby.com)

As with Meyers' study, OPTA's Super and Shute Shield data demonstrated that the teams which won the most also kicked the most. The highest ranked Chiefs kicked more (29/game) than any other team in the Super competition, and also had the highest kick meters/game. The second ranked Crusaders, who were Super Rugby Champions, ranked second in kicks (26/game) and were 3rd in total kick meters/game. In the Sydney Club competition, there was also a clear correlation between kicking frequently and for high meters, and games won. The ladder's top 6 positions and the ranking in both kick metrics (kicks/game and kick meters/game) were very similar, with only 2023 Premiers Randwick last in kicks/game (17 per) and 8th placed Sydney University (3rd in kicks/game) as the outliers in this correlation. Randwick traditionally have a philosophy of minimal kicking and enjoyed their best season in many year, while University have dominated the Shute Shield over the last 15 seasons on a game plan built around an outstanding kick-chase strategy, yet the Students had a poor 2023 by their high standards .

	Ladder Position	Team	Played	Won	Lost	Kicks/Game	Kicks/Game Rank	Kick Metres/Game	Kick Ms/Game Rank
2023 Super Rugby Pacific	3	Eastwood	18	11	7	25.7	1	804.75	1
	1	Northern Suburbs	18	14	4	24.8	2	729.25	2
	5	Gordon	18	11	7	24.21	4	728.74	3
	8	Sydney University	18	9	9	24.39	3	702.17	4
	7	Western Sydney	18	9	9	22.44	5	695.44	5
	11	Warringah	18	4	14	21	8	625.28	6
	6	Hunter Wildfires	18	10	8	21.53	6	608.89	7
	10	Eastern Suburbs	18	6	12	19.56	9	591.39	8
	12	Southern Districts	18	4	14	17.94	10	555.22	9
	4	Manly	18	9	7	21.35	7	530.85	10
2	Randwick	18	13	4	16.8	12	525.4	11	
9	West Harbour	18	6	11	17.5	11	500	12	
2023 Shute Shield	1	Chiefs	14	13	1	29.35	1	1,005.71	1
	8	Queensland Reds	14	5	9	25.07	3	839.27	2
	2	Crusaders	14	10	4	25.88	2	752.29	3
	10	Western Force	14	5	9	23.36	5	723.21	4
	6	NSW Waratahs	14	6	8	22.07	8	697.13	5
	5	Hurricanes	14	9	5	22.67	6	691.53	6
	4	ACT Brumbies	14	10	4	23.63	4	657.06	7
	9	Highlanders	14	5	9	22.14	7	654.5	8
	11	Melbourne Rebels	14	4	10	20	10	580.93	9
	3	Blues	14	10	4	21.81	9	577.06	10
	12	Moana Pasifika	14	1	13	17.79	11	514.21	11
7	Fijian Drua	14	6	8	14.13	12	374.73	12	

Table 2- Kick/Game, Kick Meters/Games & Rank within competition (source- www.optaprourugby.com)

Exploring the data further, two surprising and potentially impactful statistical trends became apparent. Teams which attempted and converted more penalty goals won more games, by a significant margin. Northern Suburbs have 'taken the three' on penalty options more than any other Sydney club for a number of seasons, and have won the last two Shute Shield Minor Premierships. In 2023, Premiers Randwick finished 3rd in Total Points from Penalty Goals followed closely by Eastwood who finished 3rd in the competition while kicking the 4th most points from the kicking tee. Likewise in the 2023 Super tournament, the highest 3 teams in terms of Total Points from Penalty Goals (Chiefs, Blues and Brumbies) all finished in the competition's top 4.

	Ladder Position	Team	Played	Won	Lost	Penalty Goals Made	Penalty Goals Attempted	Penalty Goal %	Total Points from PGs	Total Points PGs Rank
2023 Super Rugby Pacific	1	Chiefs	14	13	1	33	42	78.60%	99	1
	3	Blues	14	10	4	23	26	88.50%	69	2
	4	ACT Brumbies	14	10	4	18	20	90.00%	54	3
	10	Western Force	14	5	9	18	20	90.00%	54	4
	5	Hurricanes	14	9	5	16	20	80.00%	48	5
	2	Crusaders	14	10	4	15	19	78.90%	45	6
	8	Queensland Reds	14	5	9	14	17	82.40%	42	7
	9	Highlanders	14	5	9	14	16	87.50%	42	8
	6	NSW Waratahs	14	6	8	13	17	76.50%	39	9
	11	Melbourne Rebels	14	4	10	11	12	91.70%	33	10
12	Moana Pasifika	14	1	13	10	13	76.90%	30	11	
	7	Fijian Drua	14	6	8	9	15	60.00%	27	12
2023 Shute Shield	1	Northern Suburbs	18	14	4	35	40	87.50%	105	1
	12	Southern Districts	18	4	14	22	26	84.60%	66	2
	2	Randwick	18	13	4	20	20	100.00%	60	3
	9	West Harbour	18	6	11	17	20	85.00%	51	4
	3	Eastwood	18	11	7	17	21	81.00%	51	4
	10	Eastern Suburbs	18	6	12	15	15	100.00%	45	6
	7	Western Sydney	18	9	9	14	20	70.00%	42	7
	4	Manly	18	9	7	11	15	73.30%	33	8
	5	Gordon	18	11	7	11	15	73.30%	33	8
	6	Hunter Wildfires	18	10	8	9	9	100.00%	27	10
	11	Warringah	18	4	14	7	10	70.00%	21	11
	8	Sydney University	18	9	9	7	9	77.80%	21	11

Table 3- Penalty Goals as Total Points and Rank within competition (source- www.optaprorugby.com)

The second trend relates to how teams were scoring tries. We are now accustomed to seeing hookers topping the try-scoring lists in various competition around the world. The lineout maul is clearly a massive weapon in modern rugby and leads to more tries than any other area of play. In the 2023 Shute Competition, 46.4% of all tries came lineout as the source of possession, and 21.1% of all tries came from the 1st phase of an attacking lineout. Two teams (Manly and Sydney University) scored more than half of their tries from the lineout.

Trend Report 2023 - Round 1-20 SHUTE SHIELD										
Ladder	PERCENTAGE	Total Tries	Lineout Total	Lineout %	Scrum Total	Scrum %	Turnover Total	Turnover %	Counter Att. Total	Counter Att. %
Position	SHUTE SHIELD	871	404	46.40%	160	18.40%	112	12.90%	116	13.30%
3	EASTWOOD	97	46	47.40%	16	16.50%	13	13.40%	12	12.40%
4	MANLY	81	45	55.60%	7	8.60%	8	9.90%	13	16.00%
8	SYDNEY UNIVERSITY	70	42	60.00%	13	18.60%	5	7.10%	6	8.60%
2	RANDWICK	88	39	44.30%	17	19.30%	13	14.80%	15	17.00%
5	GORDON	77	38	49.40%	10	13.00%	10	13.00%	15	19.50%
6	HUNTER WILDFIRES	75	35	46.70%	21	28.00%	10	13.30%	7	9.30%
1	NORTHERN SUBURBS	74	35	47.30%	9	12.20%	15	20.30%	12	16.20%
11	WARRINGAH	64	31	48.40%	11	17.20%	2	3.10%	8	12.50%
7	WESTERN SYDNEY	76	27	35.50%	15	19.70%	16	21.10%	8	10.50%
10	EASTERN SUBURBS	62	26	41.90%	16	25.80%	5	8.10%	6	9.70%
9	WEST HARBOUR	58	24	41.40%	11	19.00%	9	15.50%	8	13.80%
12	SOUTHERN DISTRICTS	49	16	32.70%	14	28.60%	6	12.20%	6	12.20%

Table 4- Try Origin as Shute Shield season total and as percentage of total tries scored (source- www.optaprorugby.com)

At Super Rugby level, nearly half (48.7%) of the season's 731 tries came from lineout as the source of possession, with half of the competition's team scoring more than half of their tries from lineout ball.

Trend Report 2023 - Round 1-20 SUPER RUGBY PACIFIC										
Ladder	TOTAL	Total	Lineout	Lineout %	Scrum	Scrum %	Turnover	Turnover %	Counter Attack	Counter Attack %
Position	SUPER RUGBY PACIFIC	731	356	48.70%	110	15.00%	120	16.40%	93	12.70%
2	CRUSADERS	81	48	59.30%	9	11.10%	10	12.30%	11	13.60%
4	ACT BRUMBIES	71	40	56.30%	15	21.10%	5	7.00%	7	9.90%
8	QUEENSLAND REDS	57	39	68.40%	1	1.80%	7	12.30%	4	7.00%
5	HURRICANES	73	31	42.50%	13	17.80%	14	19.20%	12	16.40%
12	MOANA PASIFIKA	50	28	56.00%	6	12.00%	7	14.00%	3	6.00%
6	NSW WARATAHS	56	27	48.20%	9	16.10%	11	19.60%	6	10.70%
3	BLUES	67	27	40.30%	11	16.40%	13	19.40%	12	17.90%
9	HIGHLANDERS	48	26	54.20%	10	20.80%	4	8.30%	6	12.50%
11	MELBOURNE REBELS	57	25	43.90%	9	15.80%	13	22.80%	8	14.00%
10	WESTERN FORCE	46	24	52.20%	6	13.00%	4	8.70%	4	8.70%
1	CHIEFS	70	24	34.30%	11	15.70%	19	27.10%	13	18.60%
7	FIJIAN DRUA	55	17	30.90%	10	18.20%	13	23.60%	7	12.70%

Table 5- Try Origin as Super Rugby season total and as percentage of total tries scored (source- www.optaprorugby.com)

Summary and Conclusion (How would Billy Beane coach rugby?)

Successful teams in Super and Shute Shield seem to both run more, and kick more. While this seems to be a paradox, we can summarise that these winning teams have more possessions each game, and are therefore winning more of the contest areas (ie. set piece and tackle contest). So, set piece and breakdown excellence logically provides teams more possessions each match, and this remains the foundation of winning rugby.

With penalty goals and lineout mauls comprising such a high percentage of points scored and conceded each match, it is extremely costly to concede penalties within kicking distance of the posts or within a kick to touch of a lineout maul. An analytics-driven coach would ensure his/her team avoids penalties inside 40m of their line, pulling back on any behaviours that may draw a referee's whistle in that area of the field.

In attack, decisions on penalty options become critical when in the opposition's half. Table 3 outlines the value of taking penalty goals when these are available. Most Super and Shute Shield kickers are averaging between 80-95%, equating to 2.4-2.85 points per attempt at goal. Every time a captain turns down a shot at goal they are forgoing 2.4-2.85 points in the hope of 5 or 7 points. [An article in The Economist newspaper](#) exploring 'Game Theory' for rugby, favourably compares the maths on an a penalty goal against the other available penalty options. Data collected from 2015 Rugby World Cup found that in 32 pool matches, Tier 1 nations allowed their opponents to score a try from about 10% of line-outs (equating to 0.5-0.7 points per attempt). So, despite the high numbers of tries currently being scored from lineout mauls, it seems the maths on a penalty goal makes it a better option in many cases.

And finally, working towards superior tactical kicking out of hand would be a priority for any analytically-minded coach. More kicks each game, and more effective kicking for meters, are two of the largest drivers of winning rugby games, and so tactical kicking should become a cornerstone of recruitment, selection and training.

References

Meyer, V- [How to Win a Game of Rugby?](#) 2022

<https://www.optaprorgby.com/competitions> > Super Rugby Pacific / Shute Shield [wandering-bear-sports podcast](#) - 16th August 2023

[Why rugby teams should go for penalties not tries-](#) The Economist Oct 16th 2015

Further reading

[The Hidden Mathematics Behind Sports Strategies: A Deep Dive into Game Theory and Sports](#)