AN ANALYSIS OF THE AFL FINAL EIGHT SYSTEM

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Abstract

An extensive analysis into the new final eight system employed by the AFL was undertaken using certain criteria as a benchmark. An Excel spreadsheet was set up to fully examine every possible outcome. It was found that the new system failed on a number of important criteria such as the probability of a premiership decreasing for lower ranked teams, and the most likely scenario of the grand final being the top two ranked sides. This makes the new system more unjust than the previous McIntyre Final Eight system.

1 Introduction

Recently, many debates have occurred over the finals system played in Australian Rules football. The Australian Football League (AFL), in response to public pressure, released a new finals system to replace the McIntyre Final Eight system. Despite a general acceptance of the system by the football clubs, a thorough statistical examination of this system is yet to be undertaken. It is the aim of this paper to examine the new system and to compare it to the previous McIntyre Final Eight system.

In 1931, the "Page Final Four" system was put into place for the AFL finals. As the number of teams in the competition grew, so to did the number of finalists. The "McIntyre Final Five" was introduced in 1972, and a system involving six teams was in place in 1991. This was changed to the "McIntyre Final Six" system the next year, and was changed yet again to the "McIntyre Final Eight" in 1994. This system has been used despite much controversy until the year 1999. In that year the Western Bulldogs and Carlton lost the first round of the finals, Carlton played West Coast Eagles in Melbourne and the Western Bulldogs played Brisbane at Brisbane in the second round of the finals. Hence, Carlton, who finished lower on the ladder, played a lower ranked team than the Western Bulldogs. Consequently, the authors received at least ten finals systems from the AFL to analyse. Christos [1] also developed several alternative models to the McIntyre and new system. However, the AFL delivered another different method for the year 2000. This new system uses an interesting combination of single knockout tournament systems and double knockout tournament systems where certain teams are eliminated after one loss or two losses depending on their ranking. However, under certain conditions, a lower ranked side may have a greater probability of winning the premiership than a higher ranked side throughout the tournament if teams are not re-seeded after each round [2, 7]. The McIntyre Final Eight system involved reseeding of teams after Round 1 of the finals, but the new system does not.

Monahan and Berger [11] established some criteria for determining the appropriateness of a fair playoff or finals system. They said that the system has to maximise the probability that the highest ranked team wins the premiership, and maximise the probability that the best two teams play in the grand final. Clarke [3] suggested further criteria for a good system: the probability that a team finishes in any position or higher should be greater than for any lower-ranked team; the expected final position should be in order of original ranking; the probability that a team finishes above a team of lower rank should be greater than 0.5, and should increase as the difference in rank increases; the probability of any two teams playing in the grand final should decrease as the sum of the ranks of those teams decreases. In addition, the organisation of a finals system may have additional requirements such as the number of matches, number of repeat games and closeness of matches.

Using the above criteria, Clarke analysed the McIntyre Final Eight system based on a equal probability of winning. It is assumed that each team has a 50% chance of winning, despite the opposition and the venue of the match. He also used a model based on past results, where victory in each match depended on the match participants and the venue. Other authors have used a variety of different methods to analyse the probability of teams winning matches. The use of paired comparisons in the analysis of round robin and knockout tournaments began with David [5], Kendall [8] and Maurice [9]. McGarry and Schutz [10] constructed a probability matrix of certain teams defeating other teams based on their ranking.

All these methods of analysis assume stationarity and independence within this playing matrix. That is, the probabilities of teams defeating other teams do not change as a function of time (stationarity) and do not change as a function of past events (independence). It is most unlikely that these assumptions are valid, as a team might build confidence following a victory or lose morale following a loss. Although transient probabilities have been considered in paired comparison tournaments [6], this study will assume stationarity and independence within the playing matrix for simplicity reasons. Clarke [4] found that in the years from 1980 to 1995, the average home ground advantage was 58%, and away teams were expected to win 42% of games.

This study will use both the equal probability method and home ground advantage as outlined by the following criteria.

- The probability of a team finishing in any position or higher should be greater than for any lower-ranked team.
- The expected final position should be in order of original ranking.
- The probability of a team finishing above a team of lower rank should be greater than 0.5, and should increase as the difference in rank increases.
- The probability of any two teams playing in the grand final should decrease as the ranks of those teams decrease.
- Systems with no repeat games excluding the grand final are preferable.
- No system should have a fatal flaw. A fatal flaw might include dead matches, where the outcome is inconsequential, or giving teams "unfair" advantages.

2 The new final eight system

In this system, the winners of the top four sides obtain the bye, whilst the losers play at home to the winners of the bottom four teams. The two losers of the bottom four sides are eliminated. After the first round where first, second, fifth and sixth placed sides obtain the home state advantage, only teams who finished the year in the top four get to play at home.

In short, the system is as follows:

Week 1	Game A	Team 1 v Team 4	Winners obtain the bye
	Game B	Team 2 v Team 3	Winners obtain the bye
	Game C	Team 5 v Team 8	Losers are eliminated
	Game D	Team 6 v Team 7	Losers are eliminated
Week 2	Game E	Loser Game A v Winner Game C	
	Game F	Loser Game B v Winner Game D	
Week 3	Game H	Winner Game A v Winner Game F	
	Game I	Winner Game B v Winner Game E	
Week 4	Game J	Winner Game H v Winner Game I	

All teams that are mentioned first receive a home ground advantage (if it exists) with the exception of the grand final (Game J) which is played at the MCG. There is no reseeding in the new model, unlike the McIntyre model that re-seeds after the first round. In the McIntyre system, the outcome of a game could involve one team obtaining a bye, and the other being eliminated; however, this doesn't occur in the new system. The following week's matches in the McIntyre system could not be established until all the matches were complete. The new system is very simple and clear as to what teams are competing in the next round after each match.

3 Performance of the new system using the equal probability model

The following tables were calculated using the equal probability model where it is assumed that each team has a 50% chance of winning the game. Clarke [3] gives similar tables for the McIntyre Final Eight system.

Team	*Current system*	*McIntyre Final Eight*
1	18.75	18.75
2	18.75	18.75
3	18.75	15.62
4	18.75	12.50
5	6.25	12.50
6	6.25	9.37
7	6.25	6.25
8	6.25	6.25

Table 1: Percentage chance of teams winning the premiership given equal probabilities.

Table 1 shows the probability of the premiership is the same for each team in the top four, as well as for teams 5 to 8, although teams 1, 2, 5 and 6 play at home. But what happens if there is no significant home ground advantage, that is, when two teams of the same state play each other? Given this, there may be situations where teams will deliberately lose in the last home and away round so as to play in their home state.

Also note that Table 2 shows that the most likely scenario for the grand final is not the best two teams. It is more likely that Team 2 will play Team 3 or Team 1 will play Team 4, than Team 1 vs Team 2. This means that this system does not give the two best teams throughout the year the greatest chance of meeting in the grand final. This is a major problem with the system. Table 3 shows that Team 1 is more likely to finish above Team 2 and Team 3 than it is Team 4. This is obviously because

Teams	2	3	4	5	6	7	8
1	7.8	7.8	12.5	3.1	1.6	1.6	3.1
2		12.5	7.8	1.6	3.1	3.1	1.6
3			7.8	1.6	3.1	3.1	1.6
4				3.1	1.6	1.6	3.1
5					1.6	1.6	0
6						0	1.6
7							1.6

Table 2: Percentage chance of teams playing other teams in the grand final given equal probabilities.

	Final position								
Team	1	2	3	4	5	6	7	8	EFP
1	18.8	18.8	31.3	6.3	25.0	0	0	0	3.00
2	18.8	18.8	23.4	14.1	18.8	6.3	0	0	3.14
3	18.8	18.8	23.4	14.1	18.8	6.3	0	0	3.14
4	18.8	18.8	15.6	21.9	12.5	12.5	0	0	3.28
5	6.3	6.3	3.1	9.4	12.5	12.5	50.0	0	5.53
6	6.3	6.3	1.6	10.9	6.3	18.8	25.0	25.0	5.86
7	6.3	6.3	1.6	10.9	6.3	18.8	25.0	25.0	5.86
8	6.3	6.3	0	12.5	0	25.0	0	50.0	6.19

Table 3: Percentage chance of teams finishing in certain positions with the Expected Final Position (EFP) using equal probability matches.

	Team j							
Team i	1	2	3	4	5	6	7	8
1	–	57.0	57.0	50.0	82.8	85.2	85.2	82.8
2	43.0	–	50.0	57.0	85.2	82.8	82.8	85.2
3	43.0	50.0	–	57.0	85.2	82.8	82.8	85.2
4	50.0	43.0	43.0	–	82.8	85.2	85.2	82.8
5	17.2	14.8	14.8	17.2	–	66.5	66.5	50.0
6	14.8	17.2	17.2	14.8	33.5	–	50.0	66.5
7	14.8	17.2	17.2	14.8	33.5	50.0	–	66.5
8	17.2	14.8	14.8	17.2	50.0	33.5	33.5	–

Table 4: Percentage chance of team i (row) finishing above team j (column) using equal probabilities.

Team 1 plays Team 4 in the opening round. Likewise, it is more likely to finish above Team 5 than it is Team 8.

Table 3 shows that the expected final position for the top four teams does not differ significantly, but is considerably greater than the expected finals position of the fifth and lower teams. This is also highlighted in the premiership probabilities with fourth being three times more likely to win the grand final than fifth.

The system has removed the possibility of playing repeated games by swapping the semi-finals. If all the favourites were to win leading up to the semi-final, Team 1 would then play Team 3, and Team 2 plays Team 4. This means that Team 2 has an easier game than Team 1. If repeat games were not undesirable, then it is understandable that Team 1 would play Team 4 and Team 2 play Team 3 in the semi-finals. Team 1 should be rewarded for finishing on top of the ladder by playing a less difficult team (Team 4 as opposed to Team 3). But in this case repeat games occur, and the AFL has chosen to "swap" the semi-finals, so that Team 1 plays a harder side than Team 2 so as not to get repeat games. In fact, it is quite possible for Team 2 to play Team 8 in the semi-final, and Team 1 to play Team 3, despite both teams winning the same number of games in the finals. This agrees with Chung [2] and Israel [7] who found that in tournaments that do not re-seed after each round, lower ranked sides could have a greater chance of winning the premiership, which is the case here. This shows an unjustness in the system.

4 Home ground advantage model

If the only difference between teams in the top four and teams in the bottom four is home ground advantage, what happens if there is no significant home ground advantage? No significant home advantage can occur in a number of different scenarios. For example, if Carlton play Geelong, this match would be played at either the MCG or Colonial stadium, giving neither team an advantage. Likewise Richmond can play Melbourne at the MCG, which is a neutral game. Adelaide might meet Brisbane in the grand final at the MCG which is also neutral. Given this, there may be situations where teams will deliberately lose in the last home and away round so as to play in their home state.

As mentioned earlier there is a large problem with home ground advantage. If the first and fourth teams share a home ground, then there is no greater advantage in finishing first than there is fourth. Also as highlighted by an unjust situation that occurred in 1997, Geelong could play away at the MCG versus Melbourne or Richmond, for example, despite finishing higher on the ladder. This problem would not occur in the previous McIntyre system as the top ranked team has a distinct advantage over the fourth ranked team irrespective of any home ground advantage.

In 1999, approximately 58% of matches were won at home. Clarke [4] found similar results to this in the years 1980–1995. Given this distinct advantage for playing a home game, one can analyse the new finals system and compare it to the previous finals system for certain teams. Considering the home grounds of the 16 teams in the AFL, they will be split up into five groups according to their home ground nature.

GROUP 1		GROUP 2		GROUP 3	
Team	*Home Ground*	*Team*	*Home Ground*	*Team*	*Home Ground*
Brisbane	'Gabba	Carlton	Optus Oval	Adelaide	Football Park
Sydney	SCG	Geelong	Kardinia Park	Port Adelaide	Football Park
				West Coast	Subiaco/WACA
				Fremantle	Subiaco/WACA

GROUP 4		GROUP 5	
Team	*Home Ground*	*Team*	*Home Ground*
Essendon	Colonial	Collingwood	MCG
St Kilda	Colonial	Hawthorn	MCG
West Bulldogs	Colonial	Kangaroos	MCG
		Melbourne	MCG
		Richmond	MCG

The reasons these groups have been set up are as follows:

- Group 1 teams do not share their ground with any other team in the league and are guaranteed a home ground advantage if they finish in a position which deems a home ground.

- Group 2 teams do not share their ground with any other team, so will not achieve a home ground advantage in any final. Moreover, they may be at a disadvantage if they play an MCG or Colonial based team.

- Group 3 teams share their ground with one other team, and Group 4 share theirs with two others, and will get a home ground advantage if they finish in a position which deems a home ground, unless they play a co-tenant.
- Group 5 teams share their ground with four other teams and will get a home ground advantage in the finals if they finish in a position which deems a home ground. They are also guaranteed a home grand final.

Quite obviously, Carlton and Geelong are at a disadvantage because they will receive no home ground advantage despite their final position at the end of the year. Whilst teams in Group 5 will have the advantage of playing on their home ground in the grand final if they are to make it, there would be no distinct advantage if they were playing someone else in Group 5. We investigate whether these advantages and disadvantages are greater or less in the new finals system as opposed to the McIntyre system.

Premiership odds for each group given their final position and taking home advantage into account can be calculated. For example, if Adelaide were to finish fifth, then their first game would be at their home ground. However, there is a $\frac{1}{15}$ chance that there will be no home ground advantage if they play Port Adelaide. If Geelong finish second, then it is assumed the match will be played at the MCG. This means that there is a $\frac{1}{3}$ chance that they will play away (a team from Group 5) and a $\frac{2}{3}$ chance that it will be a neutral ground. These premiership probabilities for each of the groups are given in the following table.

Final position	Group 1	Group 2	Group 3	Group 4	Group 5
1	20.9	15.6	20.7	20.5	22.6
2	20.9	15.6	20.7	20.5	22.6
3	18.6	14.9	18.5	18.5	19.7
4	18.6	14.9	18.5	18.5	19.7
5	5.1	4.1	5.2	5.3	6.1
6	5.1	4.1	5.2	5.3	6.1
7	3.8	3.6	3.9	4.1	5.1
8	3.8	3.6	3.9	4.1	5.1

Table 5: Percentage chance of a premiership for each of the five groups of teams given their final position and home ground advantage for the new finals system.

As shown in Table 5, premiership probabilities between Groups 1, 3 and 4 do not differ that significantly. However, Group 2's chances are well below average, whilst Group 5's probabilities are higher than normal despite sharing the MCG with four other tenants. This is largely because Group 5 will always enjoy either a home game or neutral grand final, whilst other groups will either play a neutral or away grand final. This problem is common to any system. The MCG is the largest capacity sporting ground in Australia and well deserves the right to host the grand final.

Of greater importance is that Group 2's (Carlton, Geelong) probabilities are somewhat significantly less than other groups. In fact, they are so low that any other team that finishes fourth has a greater probability of winning the premiership than Carlton or Geelong do if they finish first. Of course, one of the reasons this occurs is that they will never obtain a home ground in any of their matches, but this highlights the problem with the new system in that the top four sides have the same probabilities of winning the premiership given equal probability matches. In the McIntyre system and most other ranking systems, first place has a significant advantage over fourth despite any home ground advantage, but this does not occur in this system.

Carlton and Geelong are 26% less likely to win the premiership given their home ground status than other teams, whereas teams in Group 5 are 11% more likely to win the premiership because of their MCG advantage.

Final position	Group 1	Group 2	Group 3	Group 4	Group 5
1	19.72	15.11	19.46	19.31	21.52
2	19.72	15.11	19.46	19.31	21.52
3	16.29	12.73	16.21	16.13	18.10
4	12.59	12.73	12.54	12.49	14.00
5	10.75	9.62	10.86	10.97	12.76
6	7.27	9.18	7.37	7.47	8.74
7	5.09	4.05	5.10	5.24	6.14
8	5.09	4.05	5.10	5.24	6.14

Table 6: Percentage chance of premiership for each of the five groups of teams given their final position and home ground advantage for the McIntyre Final Eight system

These results can be compared to that of the old McIntyre Final Eight system.

Table 6 shows that the same pattern still occurs; that Group 2's probabilities are below average whilst Group 5's probabilities are greater than average. In fact, the probabilities of each of the groups winning the premiership has barely changed from system to system. However, the new system has given a greater chance of premiership for the top four teams than the bottom four. This is because Team 7 and Team 8 will receive no home games in the new system, but will obtain a home game in the McIntyre system if they win the first game. But probably the greatest difference is that under the McIntyre system, if teams from Group 2 finish first or second, then their probability of a premiership is greater than any other team who has finished fourth. This is not the case in the new system.

For the new system to work properly, every team needs to have their own different and distinct home ground that they will be guaranteed a home game at in the finals if they finish in the required positions. This of course will never happen, with ten teams in Victoria. It is our conclusion that the McIntyre system performs better on the criteria.

The question remains that although the McIntyre Final Eight system takes preference over the new system, is it fair and just? The answer to this is no.

5 Conclusions

These results show that the new finals system is far from perfect. It does not match the criteria that higher ranked sides have a higher probability of winning the premiership, as Team 1 has an equal chance with Team 4, and Team 5 has an equal chance with Team 8. There is also little difference between the expected final position of the top four, and little difference between the bottom four. Fifth place is three times less likely to win than fourth. Also, the best two teams are not the most likely grand final quinella. With the possibility of teams deliberately losing games in the final home and away season round and unfair match-ups in the semi-finals, the new system has several problems. As the new system is so dependent on higher ranked teams having a significant home ground advantage, certain teams may be more likely to win the premiership when finishing fourth, than others finishing first or second. The system would be more just if every team possessed their own separate home ground, but still some problems would occur. Like the McIntyre Final Eight system, the general public will respect the new system until one of its inadequacies is shown up by a particular draw.

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