Scheduling in Australian Rules Football: Does it Affect Performance?

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Abstract

This paper examines the fairness of the schedule of games in Australian Rules football. Using ordinary least squares regression, the effect of different numbers of days preparation by any team can be quantified, while allowing for the home ground advantage of not having to travel interstate. The results suggest that, for 2007 to 2009, the effect of differing number of days preparation is independent of interstate travel. Furthermore, an in-game (quarter by quarter) analysis shows the effect differing number of days preparation is more crucial earlier in the match, meaning there is no significant fadeout for teams coming off a shorter break than their opposition.

Keywords: performance analysis, scheduling, sport, Australian Rules football

1. Introduction

In Australian Rules football (more commonly know as AFL) the home and away season comprises of 176 matches played over 22 weeks (known as rounds) of eight games each between the 16 teams. Due to the physical nature of the game, teams only play one match every week which is the same in the National Rugby League (NRL). A typical round comprises of one match on Friday night, two matches on Saturday afternoon, two matches Saturday night and three matches on Sunday afternoon. Occasional matches are played on other days, for example traditionally Essendon and Collingwood play on Anzac day (25th April). This implies that for a typical round it is plausible that any one team can have up to an additional two days preparation for any one game. An interesting research question is what is the value of an additional or reduced time between the schedule of two teams, and/or the impact of the net effect?

This study reports an in-game (quarter by quarter) and post-game analysis which evaluates the effect of differing number of days preparation for teams in each match. The analyses presented cover seasons from 2007 to 2009 inclusive.

2. History

Bailey [2] conducted a comprehensive study of team and player predictions in Australian Rules football. A relationship was shown to exist between the number of days rest between matches and the average number of possessions per player. No significant difference was found between players coming off a six, seven or eight day break, and these players averaged approximately 14 disposals. Players coming off a five day break averaged approximately 13 disposals and players coming off a nine day break or more averaged approximately 12 disposals. This however is likely to be attributed to fringe players or players coming back from injury.

It is widely acknowledged that AFL is a much quicker game today than ever before. From a recruiting perspective more and more emphasis is placed on draft camp results (a three kilometre time trial, agility test, repeat sprints, standing vertical jump, 20 metre sprint and a beep test). Today’s player is more an athlete that plays football. Table 1 shows the average number of interchanges (substitution of players) for all AFL teams over the previous seven seasons, which show a significant jump in the previous three seasons (2007 to 2009). A summary of the research project conducted by Norton [4] on modelling the effect of interchanges in AFL is given in the laws of Australian football in [1]. The results suggest that rotating fresh players off the bench keep the game speed higher which in turn suggest
players are exerting more energy and covering more
ground in today’s game than ever before. This indicates
the number of days between each match (recovery) is
increasingly more important.

Year 2003 2004 2005 2006 2007 2008 2009
Average no. of Interchanges 22.8 30.5 36.1 46.1 58.3 80.2 91.5

Table 1 Average number of interchanges

3. Results

Data was collected from Wikipedia which consisted of
year, round, (nominal) home team, away team, ground,
match day and home team winning margin. For each
season round 1 and the “split round” were removed from
the analysis since teams did not play the previous week.
There is a widely held belief in the football community
that the importance of days rest between each match is
more profound when interstate travel is involved. To test
this hypothesis a factorial model (ANOVA) is proposed
using Margin of Victory (MOV) as the outcome
variable. The predictor variables include the differing
number of days preparation (DAY) split by; at least one
less day preparation (DAY_-1), equal number of days
preparation (DAY_0) and at least one day more
preparation (DAY_+1) and interstate travel (TRAV) split
by; opposition travels interstate (OPPTRAV), neither
team travels interstate (NOTRAV) and interstate travel
(TRAV). Table 2 shows the results.

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<tr>
<th>Source</th>
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<th>MS</th>
<th>F</th>
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Table 2 Factorial ANOVA: Post-game analysis

Ordinary Least Squares (OLS) is applied. Table 3 shows
the results.

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<th>Parameter</th>
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<th>Std Err</th>
<th>P - value</th>
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Table 3 Linear regression results: Post-game analysis

To test whether the assumption of normality is
justified the distribution of matches by days rest
between matches and interstate travel is shown in table
4, which show all groups are approximately equal. In
addition a Cook-Weisberg test for heteroskedasticity
was performed yielding a P-value of 0.9886 indicating
constant variance. Plots of the residuals against the
fitted values and each of the predictor variables showed
very few outliers that would have influenced the
significance of the predictor variables.

<table>
<thead>
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<th>No Interstate Travel</th>
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<td>One day or less preparation</td>
<td>71 (15.57%)</td>
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<td>Equal number of days preparation</td>
<td>60 (13.16%)</td>
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<td>One day or more preparation</td>
<td>72 (15.79%)</td>
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Table 4 Breakdown of matches – days rest by interstate travel

An F-test of (DAY_-1 = DAY_+1) yields a P-value
of 0.0033, that is, the difference between having at least
one day less preparation compared to at least one day
more preparation relative to the opposition is significant
at the 1% significance level.

The results of table 3 can be condensed into an
interaction plot of MOV against days rest between
matches split by interstate travel which is given in
figure 1.
It would be reasonable to presume that since the number of days preparation is significant in terms of predicting \( \text{MOV} \), then a quarter by quarter analysis would show the final quarter being the most statistically significant as teams would fadeout. A similar approach the post-game analysis is implemented: Apply a factorial model (ANOVA) for each quarter using the previously mentioned predictor variables and \( \text{MOV} \) as the outcome variable where \( \text{MOV} \) is now defined as \( \text{MOV} \) of each quarter (non cumulative). Then calculate the contribution of the significant predictors (\( \alpha = 0.10 \)) towards \( \text{MOV} \) for each quarter using OLS. Table 5 shows the results of the ANOVA analysis.

Interestingly the interaction term between interstate travel and days rest between matches is statistically significant (P-value = 0.058) in the last quarter. Additionally days rest between matches is only statistically significant in the second quarter. (P-value = 0.008). Table 6 shows the results of the OLS analysis for quarters two and four (NB quarters one and three are omitted due to \( \text{DAY} \) and \( \text{TRAV} \times \text{DAY} \) not being statistically significant).

An F-test of \( (\text{DAY}_{-1} = \text{DAY}_{+1}) \) for quarter two yields a P-value < 0.001, that is, the difference between having at least one day less preparation compared to at least one day more preparation relative to the opposition is significant at the 1% significance level. Similarly in quarter 4 an F-test of \( (\text{TRAV} \times \text{DAY}_{-1} = \text{TRAV} \times \text{DAY}_{+1}) \) yields a P-value of 0.037, that is, the difference between having at least one day less preparation compared to at least one day more preparation relative to the opposition when interstate travel is involved is significant at the 5% significance level.

### Table 5

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**Table 5** Factorial ANOVA: In-game analysis

![Interaction plot: Days rest against Margin of Victory](image)
Again plots of the residuals against the fitted values and each of the predictor variables showed very few outliers that would have influenced the significance of the predictor variables.

The results somewhat render the notion that teams coming off a shorter break than their opposition fadeout towards the end of the match, since only teams travelling interstate are affected by coming off a shorter break than their opposition in the final quarter. Instead teams coming off a shorter (or longer) break are predominately affected (2 points) in the second quarter regardless of interstate travel.

4. Discussion

It is unreasonable for all teams to have the same number of days break between each match since all matches would have to be played on the same day. However surely the proportion of games where teams have at least one day less preparation, an equal number of days preparation, and at least one day more preparation should be relatively equal for all teams. Table 7 shows the results.

The distribution of matches for each team based on days rest relative to the opposition is considerably different. More than half of Brisbane’s matches (54%) they had at least one additional days rest whereas Port Adelaide had only 9 matches (16%) with at least one additional days rest. Considering an additional days rest is nearly worth a goal (4.90 points) this is interesting finding.

5. Conclusion

Based on this simple analysis, it seems that an unbalanced draw coupled with unbalanced days preparation leads to point advantages that seem small for team totals, but are significant for the final result of the competition. These results provide a useful addition to predictive rating models; determination of draw bias and tactics in-play since the number of days break has been shown to affect team performance.

References


