Assessing the influence of neutral grounds on match outcomes (Kneafsey & Müller, 2018)

Replicated by Mason Ricci

April 2, 2024

Introduction

- This article measures the effect of neutral ground on the outcome of hurling and Gaelic football games.
- Hypothesis: Is the probability of the favored team winning less likely at a neutral venue compared to a home game?
- Outcomes: The research suggests, with high statistical significance, that neutral grounds are a more fair venue for sporting matches, especially in important elimination games.

Data

Data for matches and players are available on the GAA Rankings and GAA website pages.

Variables

- The independent variable is whether the favored team wins or loses the game.
- Treatment Variable: Location of the match (home, away, or neutral).
- Control variables: Importance of match (league game or championship game), year, sport, and relative strength of each team.

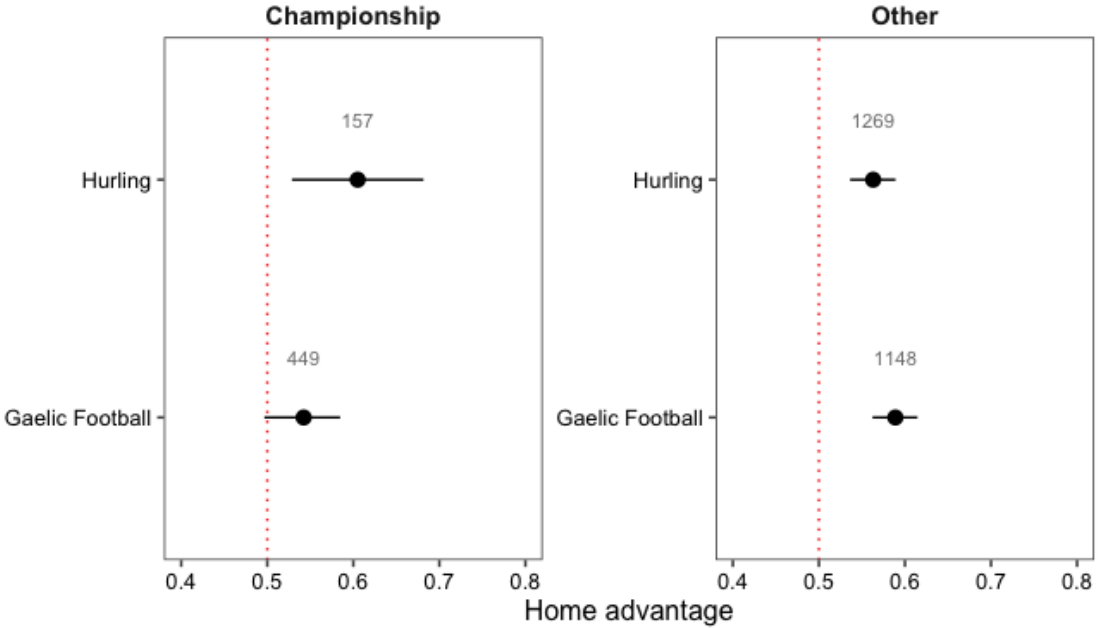
Other Statistical Considerations

- Random Intercepts: This is a method to account for different subcategories that are not known due to difficulty in measurement such as team cohesion, coaching strategy ect.

- Interactions: Interactions are added between competition type, match location, and sport. We will see later if the results remain significant without interaction.

Analysis Part One: Home Field Advantage

- First, the authors test the existing theory that home-field advantage affects match outcomes in Hurling and Football.
- A value of 1 indicates the home team always wins, while 0.5 indicates even chances for both teams.



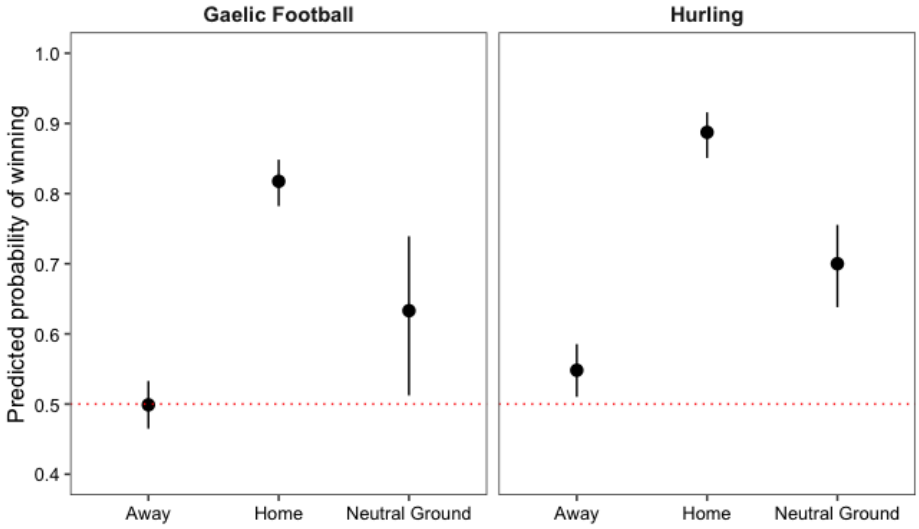
Analysis Part Two: Neutral Ground

- The probability of the favored team winning the match at home, away, and on neutral ground.
- Binary Logistic Regression is used with the outcome variable being win or loss. When accounting for draws, results do not change.

```
# Model for both sports
glmer_total <- glmer(result_dummy ~
   competition_dummy_factor * match_place
   * sport + elo_diff_adjusted_log + year +
   (1 | team_sport), family = binomial,
   data = data_long_one_team_dummy)
```

Results

- The probability of the favored team winning is 0.8 (football) and 0.9 (hurling)
- The probability of the favored team winning is much lower, 0.5(football) and 0.55(hurling).
- The probability of the favored team winning on neutral ground is between 0.6 and 0.7 for both sports.



Table

	(1) Combined	(2) Football	(3) Hurling
(Intercept)	-2.92 (0.47)***	-2.49 (0.36)***	-3.08 (0.39)***
Other Competition (ref: Championship)	-0.09 (0.27)	-0.42 (0.16)**	0.13 (0.23)
Home (ref: Away)	1.18 (0.41)**	1.26 (0.26)***	2.39 (0.54)***
Neutral Ground (ref: Away)	0.99 (0.39)*	0.65 (0.23)**	1.01 (0.31)**
Hurling (ref: Gaelic Football)	-0.34 (0.64)		
Elo Difference (log)	0.51 (0.07)***	0.49 (0.05)***	0.66 (0.06)***
2010	0.11 (0.28)	-0.00 (0.23)	-0.37 (0.24)
2011	0.51 (0.29)	0.46 (0.24)	0.10 (0.24)
2012	0.54 (0.30)	0.40 (0.23)	0.01 (0.25)
2013	0.48 (0.29)	0.27 (0.24)	-0.14 (0.25)
2014	0.19 (0.29)	0.61 (0.24)*	-0.22 (0.25)
2015	0.52 (0.29)	0.34 (0.24)	-0.11 (0.24)
2016	0.53 (0.30)	0.37 (0.24)	0.03 (0.25)
2017	0.25 (0.29)	0.38 (0.24)	-0.23 (0.24)
2018	0.71 (0.31)*	0.90 (0.26)***	-0.20 (0.24)
Other Competition * Home	0.43 (0.49)	0.28 (0.30)	-0.58 (0.56)
Other Competition * Neutral Ground	-0.33 (0.68)	-0.15 (0.41)	-0.38 (0.37)
Hurling * Other Competition	0.80 (0.66)		
Hurling * Home	1.52 (1.30)		
Hurling * Neutral Ground	15.04 (1029.20)		
Other competition * Home * Hurling	-1.46 (1.36)		
Other competition * Neutral Ground * Hurling	-15.57 (1029.20)		
Log likelihood	-637.44	-983.07	-915.03
N	1086	1687	1615
N (Team/Sport)	64		
N (Team)		32	37

***p < 0.001; **p < 0.01; *p < 0.05

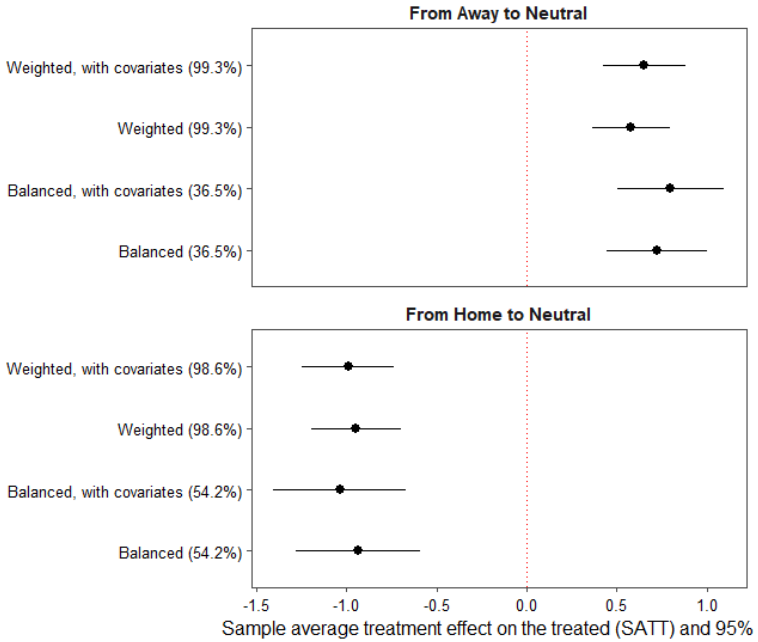
Statistical models

Coarsened Exact Matching

- Coarsened Exact Matching is a method employed to compare cases (games) based on similar values for key covariates, aside from the variable of interest.
- The groups would possess similar differences in team strength, and the games would be of the same type (league or championship); however, they would differ in the treatment variable, which is the location of the match.
- CEM weights groups to account for imbalances, as there are many more home and away games than neutral games.

Matchmaking Figure

- A positive value means neutral venues raise the chance of the favored team winning, while a negative value suggests a decrease in the likelihood of victory.



My Twist!

- Is the effect of neutral grounds different for teams in Northern Ireland?
- Neutral Matches are typically played in the Republic of Ireland. A leading theory for the influence of home and away games is the crowd. Theoretically, for Northern Ireland teams, playing on neutral ground, which is in the Republic of Ireland, maybe more similar to playing an away game.
- I created a new dataframe where all games without Northern Ireland teams are removed. Games where Northern Ireland teams play each other are also removed, and the model is rerun.

My Twist!

- Overall, the twist did not change the results much, as we still see relatively the same values for the coefficients of interest.
- The change in Hurling matches from away to neutral is very large but it is not significant. A limited number of observations explains this figure.

	(1) Combined	(2) Football	(3) Hurling
(Intercept)	-2.92 (0.47)***	-2.92 (0.63)***	-3.64 (0.86)***
Other Competition (ref: Championship)	-0.09 (0.27)	-0.08 (0.27)	0.77 (0.65)
Home (ref: Away)	1.18 (0.41)**	1.13 (0.42)**	2.84 (1.28)*
Neutral Ground (ref: Away)	0.99 (0.39)*	0.96 (0.40)*	16.81 (105.62)
Hurling (ref: Gaelic Football)	-0.34 (0.64)		
Elo Difference (log)	0.51 (0.07)***	0.41 (0.09)***	0.71 (0.11)***
2010	0.11 (0.28)	0.56 (0.39)	-0.49 (0.43)
2011	0.51 (0.29)	1.13 (0.42)**	-0.22 (0.43)
2012	0.54 (0.30)	1.27 (0.41)**	-0.34 (0.45)
2013	0.48 (0.29)	1.07 (0.41)**	-0.28 (0.45)
2014	0.19 (0.29)	0.43 (0.41)	-0.11 (0.46)
2015	0.52 (0.29)	1.33 (0.42)**	-0.41 (0.43)
2016	0.53 (0.30)	1.37 (0.44)**	-0.38 (0.43)
2017	0.25 (0.29)	0.95 (0.43)*	-0.55 (0.43)
2018	0.71 (0.31)*	1.51 (0.43)***	-0.27 (0.46)
Other Competition * Home	0.43 (0.49)	0.40 (0.49)	-0.99 (1.30)
Other Competition * Neutral Ground	-0.33 (0.68)	-0.40 (0.68)	-16.60 (105.62)
Hurling * Other Competition	0.80 (0.66)		
Hurling * Home	1.52 (1.30)		
Hurling * Neutral Ground	15.04 (1029.20)		
Other competition * Home * Hurling	-1.46 (1.36)		
Other competition * Neutral Ground * Hurling	-15.57 (1029.20)		
Log likelihood	-637.44	-331.75	-294.32
N	1086	556	530
N (Team/Sport)	64		
N (Team)		30	34

***p < 0.001; **p < 0.01; *p < 0.05

Statistical models

Significance without Interaction???

	Dependent variable:
	result_dummy
competition_dummy_factorOther	-0.262^{***}
	(0.100)
match_placeHome	1.620^{***}
	(0.104)
match_placeNeutral Ground	0.639^{***}
	(0.123)

Thank You!