

THE HOME ADVANTAGE MYTH; MAJOR LEAGUE SPORTS

As high school students, we're always receiving emails or seeing Instagram posts, advertising high school sports matches. They always emphasize home games, pulling out all the stops, and blasting the fields with school spirit. Does this really increase the chances of our team winning?

*All graphs drawn with R and Excel.



1. Data Collection & Variables

	From www.mlb.com			From online search		
	PCT	Home	Away	Hwin (%)	Awin (%)	Capacity
Yankees	0.58	44-37	50-31	0.54	0.62	46537
RedSox	0.50	38-43	43-38	0.47	0.53	37755

- Data for NBA, NHL, and NFL were collected in the same manner.
- Most recent and complete season in each sport
- 30 teams in NBA and MLB, and 32 teams in NHL and NFL.
- PCT = Overall Winning Percentage & Miles = Total Mileage of Travel
- Hwin (Awin) = Winning Percentage in Home (Away) Games
For example, 0.47 = 38/81 and 0.62 = 50/81

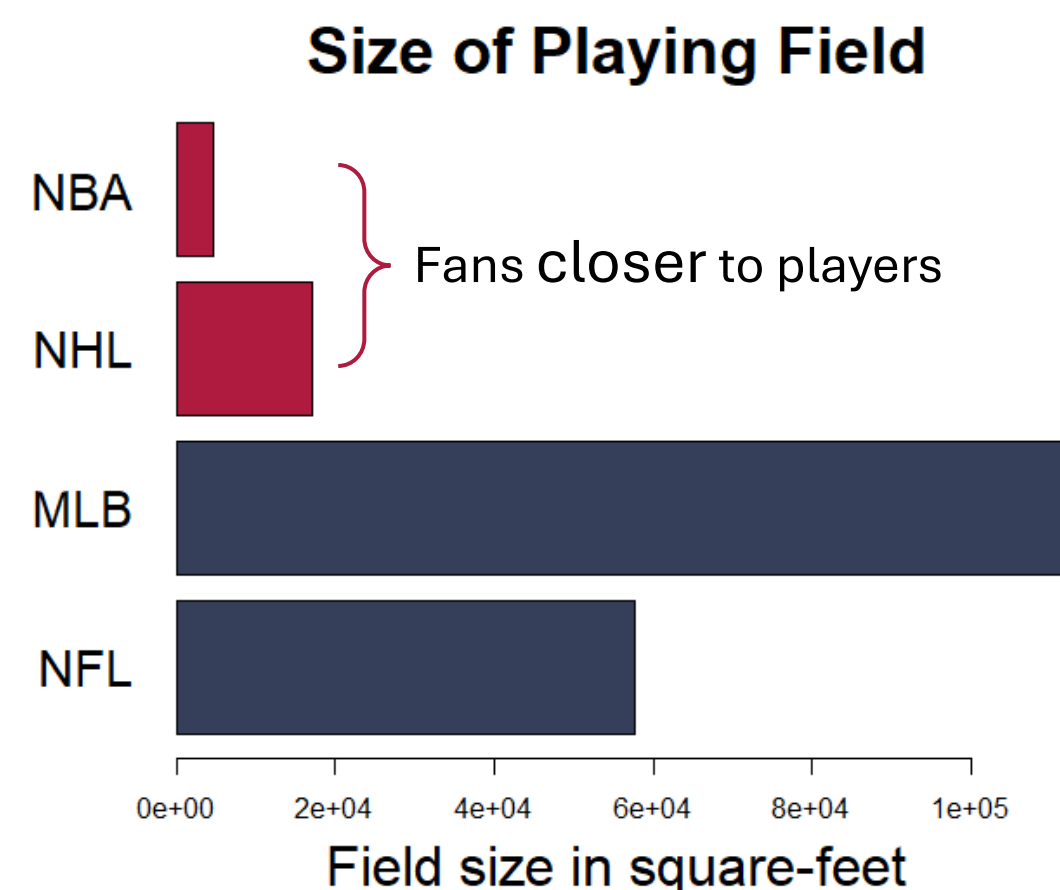
2. Are Hwin and Awin Independent?

	PCT	Hwin	Awin
PCT	1	0.94	0.91
Hwin	0.94	1	0.73
Awin	0.91	0.73	1

This heatmap proves that correlation between home and away game wins exists, therefore we shouldn't look at them separately.

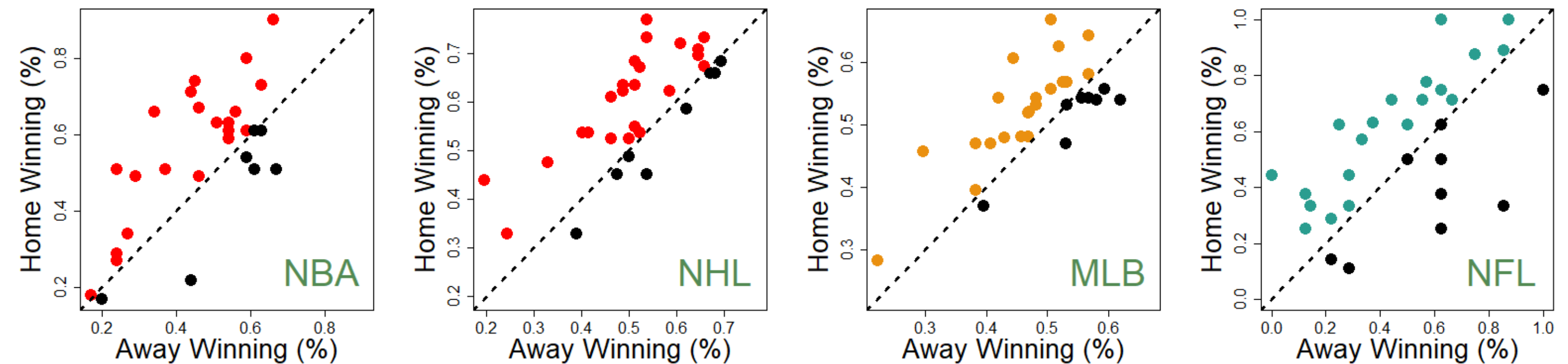
All 4 major sports yield very similar Correlation Heatmaps.

4A. Possible Reasons (Factor: Fans)

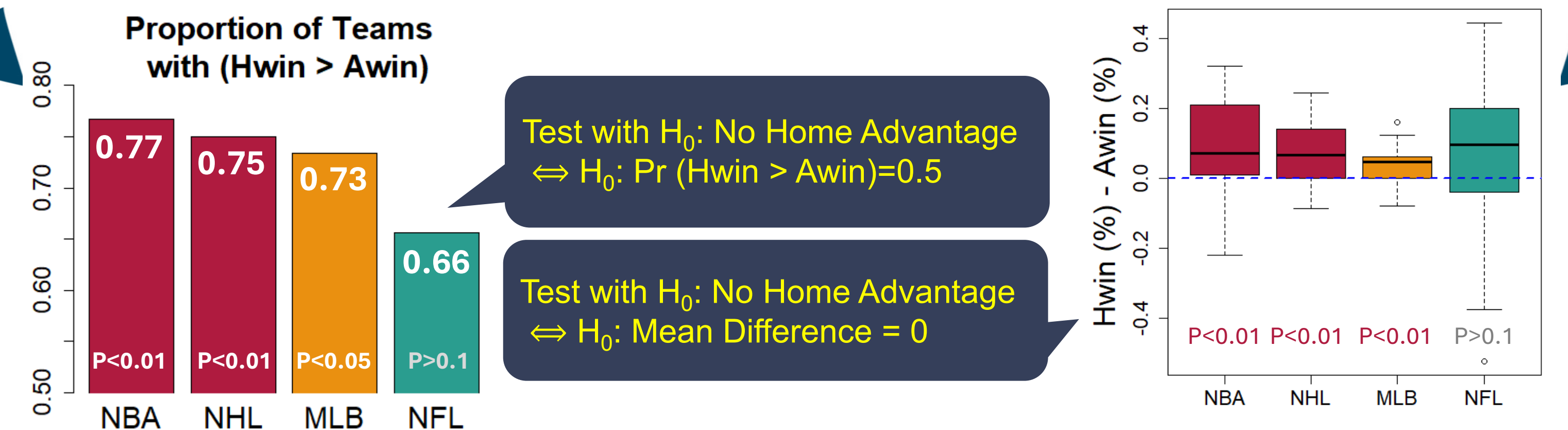


The **smaller** the playing field, the **closer** the fans are to the players, which can affect their performance.

3. Does Home Advantage Actually Exist?

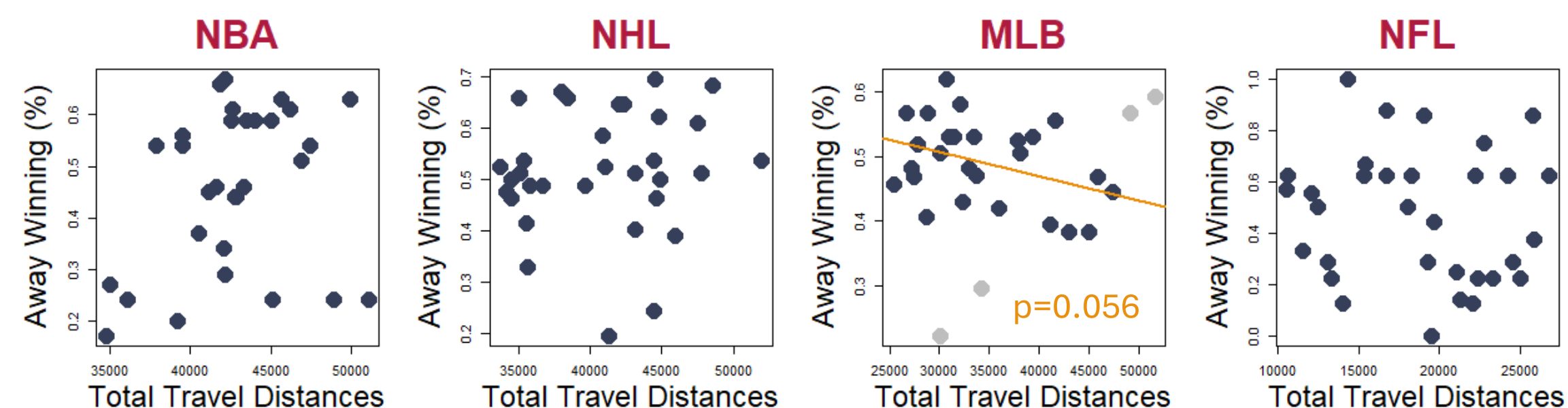


Check Point: Teams (Colored dots) above the reference line ($y=x$) are the ones with higher winning percentage at Home games than Away games.



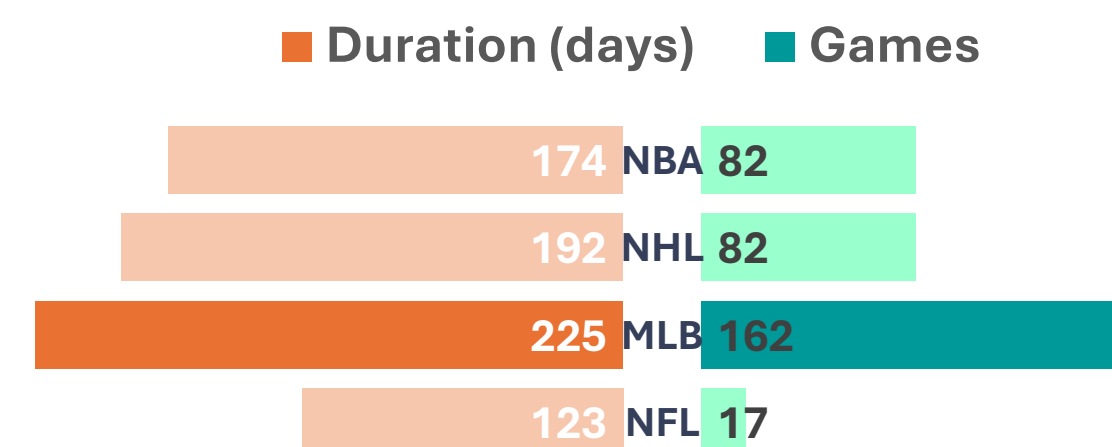
■ ■ Presence of Home Advantage : NBA, NHL (definitely) > MLB (somewhat) >> NFL (little to none) ■ ■

4B. Possible Reasons (Factor: Travel Fatigue)



Check Point: A downward linear indicates adverse effect of travel.

- NBA, NHL, NFL hardly reveal any relationship.
- Only MLB shows a marginal negative relationship without 4 outliers.



Why MLB?

- MLB: 1 game every 2 days.
- NFL: 1 game every 10 days.

Conclusion:

Home advantage exists, though with varying degrees in different major league sports.

- NBA and NHL have definite home advantage due to proximity of fans.
- MLB is affected by travel fatigue.
- Home advantage hardly exists in NFL due to its lenient schedule and distance from fans.

Further Analysis:

We could analyze more detailed factors about travel fatigue, such as data from specific games after a certain travel distance from MLB. We could also research data from minor league sports or high school sports. Professionals in major league sports will be less affected by fans cheering or booing, whereas younger players in college teams or high school teams are younger and less experienced possibly resulting in more dramatic home advantage.