Performance and Home Advantage in Women's Collegiate Basketball

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Abstract

The purpose of this study was to determine if a women's basketball team at a private liberal arts college performed better when they played at home versus when they played away. This study included statistics which were recorded throughout the 2016-2017 season. The statistics that were included were points, field- goal percentage, three-pointers percentage, fouls, rebounds, assists, steals, blocks, turnovers, points on turnovers, 2nd chance points, and missed layups. Other factors that were taken into account were the opponent's record, the team's record, opponent's points, point differential, and the crowd size. The null hypothesis was that there was no significant difference in performance whether the team plays at home or away for women's basketball during the 2016-2017 season. The results found that the team performed better at home in terms of number of points scored, field goals percentages, three-pointers made, rebounds, assists, blocks, and points scored on turnovers. The team performed better away in terms of percentage of wins, fouls, steals, and missed layups. There was no difference when it came to the number of turnovers and points scored on second chances in the home and away sample. There was a home court advantage for the categories listed above, although the differences were not statistically significant at the 0.05 level.

CHAPTER I

INTRODUCTION

When it comes to performance there are several different ways in which it can be defined in terms of sports. When it comes to basketball, some people might base their performance on how they perform on offense or defense. There are several factors that can affect how a team performs and one of those factors is called. Home advantage is when the home team has a higher chance of winning when they play at home (Jamieson, 2010). This study focused on a women's basketball team at a small liberal arts college and compared performance based off of location and statistics to determine if they perform better at home or away. The statistics that were included are: field goal percentage, 3-point percentage, free throw percentage, points, rebounds, assists, steals, blocks, turnovers, fouls, and missed layups.

Statement of Problem

The purpose of this research is to determine if women's basketball team performs better during games played at home versus away.

Hypothesis

The null hypothesis is that there is no significant difference in performance whether the team plays at home or away for women's basketball during the 2016-17 season.

Operational Definitions

Home advantage is when the home team has an advantage when they play at home (Jamieson, 2010). Performance includes the statistics for field goal percentage, 3-point

percentage, free throw percentage, points, rebounds, assists, steals, blocks, turnovers, fouls, and missed layups.

CHAPTER II

REVIEW OF THE LITERATURE

Overview

The way that a collegiate basketball team performs can be linked to several different factors such as location, quality of the team, and skill level. Some people believe that the location of the game plays a major role in how a team performs, specifically with regard to playing a game at home. This idea, that there is an advantage when they a team plays at home, is aptly called the home advantage (Jamieson, 2010).

The purpose of this literature review is to focus on home advantage when it comes to collegiate basketball teams and how it affects their performance. The themes that will be discussed are home advantage in relation to sports and home advantage in basketball.

Home Advantage Across Several Sports

When it comes to home advantage, there are many athletes, coaches, and fans who believe that home advantage does exist regardless of the sport. Jamieson (2010) states that when it comes to home advantage teams have a greater chance of winning when they play at home. In a study conducted by Gómez, Pollard, & Luis-Pascual (2011), they mention that in Jamieson's research he observed nine sports to determine if there is such a concept as home advantage. The sports that were included were baseball, golf, cricket, football, hockey, boxing, tennis, basketball, rugby, and soccer, and it was concluded that home advantage exists for these sports. While there is a home advantage in these sports, soccer had the greatest advantage followed by rugby and basketball.

Factors That Contribute to Home Advantage

As one might infer, game location can have a major impact on whether a team has a home advantage, no matter what the sport is. As mentioned previously, teams tend to have a home advantage across several different sports (Jamieson, 2010). It was also found that teams win less when they are away. This could be due to several different factors. One factor that is partially responsible is traveling because it can cause the team to be fatigued, especially when traveling a long distance (Allen & Jones, 2014). A second factor is facility familiarity, which can impact teams and affect the way that they perform (Legaz-Arrese, Moliner-Urdiales, & Munguía-Izquierdo, 2013). When a team is familiar with the facility, they know what to expect in terms of temperature of the venue, the court/ field conditions, and familiarity with the crowd. Regularly playing at home can make players more comfortable with the venue because they get used to it. Furthermore, if a team is not familiar with the venue, then they would be unaware of these conditions, which could cause them to be unprepared and ultimately affect their performance.

The effects that the crowd can have on a team and the surrounding environment can also contribute to home advantage in sports. Some researchers have tried to determine whether crowd size, density, and noise is an aspect of home advantage (Legaz-Arrese et al., 2013). Studies have indicated that these effects do not make a difference, however whether a crowd is displaying positive and encouraging behavior does affect a team's success (Allen & Jones, 2014).

A crowd can influence referees, players, and coaches as well. Referees are more likely to make calls in favor of the home team and make more calls against the opposing team when there is a noisy crowd (Legaz-Arrese, et al., 2013). The fact that the crowd could cause an increase in anxiety, decrease in self-confidence, and affect their psychological state may contribute to these

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calls. Jamieson states that the "psychological state created in the referee ("This crowd will be angry if I call fouls against the home team") by the actions of the fans (cheering/jeering) has a direct impact on the behavior of the referee (fewer fouls)" (Jamieson, 2010, p. 1822). In terms of the crowd affecting players and coaches, the intensity and proximity of the crowd makes a difference (Legaz-Arrese et al., 2013). If a crowd is intense and is near the players and coaches, it could distract them and cause them to lose focus on the game.

Territoriality is a major factor in terms of home advantage. Allen & Jones (2014) state that "the home advantage is a manifestation of the natural protective response to territorial incursion" (p. 49), which means that teams naturally try to protect their home by winning at home. Territoriality also causes an increase in testosterone and cortisol. Having an increase in testosterone can help improve performance because it causes the players to become more aggressive and increases motivation. While an increase in testosterone at home can improve performance, an increase in cortisol can have a negative effect. Cortisol is a hormone that is released when a person is responding to a threat that causes psychological stress, which can cause a team to perform poorly. This contributes to the idea of home disadvantage.

Home Disadvantage

While many people believe that home advantage is real, some believe that home disadvantage exists, too. Home disadvantage, is described by Jamieson (2010) as the home team being "hypothesized to choke and to perform more poorly in high-pressure games" (p.1833). Even though some teams perform better at home during high pressure games, some teams do choke. Jamieson cites Schlenker et al. (1995) for claiming that home teams choke when they doubt their ability to perform. From this information, one can infer that teams that have negative

beliefs about their ability to perform prior to a game, will likely cause them to perform poorly, especially during high pressure games.

Home Advantage and Performance in Basketball

In basketball, when it comes to home advantage, good performance is key. Some people focus on the outcome of the game and statistics when determining if a team had a good game. Gómez, Lorenzo, Barakat, Ortega, & Palao (2008) consider "free-throws (successful and unsuccessful), 2- and 3-point field goals (successful and unsuccessful), offensive and defensive rebounds, block, assists, fouls, steals, and turnovers" when comparing winning and losing teams in the Spanish professional men's ABC League (p. 43). Even though the research focused on teams in the Spanish professional men's league and winning and losing teams, their results can indicate which team performed better. Gómez, et al. mention that the statistics that the winning teams typically lead in are defensive rebounds and assists. Defensive rebounds allow the teams to have more fast break opportunities to score and doesn't allow the opposing team a chance to get second chance points.

Furthermore, while winning and losing teams differentiate in defensive rebounds and assists, field-goal percentage is an important factor as well (Gómez et al., 2008). Home teams usually have a higher field-goal percentage than away teams, which helps support the claim that when teams are at home they are more aggressive.

Jones (2007) examines the data of NBA games from previous seasons, which includes some information by quarter, to determine if a team had a home advantage. Jones found that "the home team scored 3.89 more points on average than the away team and won 62.9% of the games" (p. 4). It was also mentioned that home advantage was determined by each quarter by

excluding games where both teams scored the same amount of points in the quarter, and only included games when a team had a lead. Jones found that home advantage from the first quarter had the greatest impact on the game with 8.8% advantage, and that home advantage at the end of the game was 12.9% (2002-03 season) and 11.3% (2003-04 season) (2007). Another factor that can add to home advantage that Jones mentions is that "the home team tends to come back when it is down" (p. 8). This could help explain why it is difficult to beat a team when they play at home.

Home Advantage and Performance in Other Sports

Home advantage in basketball, can be similar to other sports, such as football and soccer. Staufenbiel, Lobinger, and Strauss (2015) mention that coaches play a role in home advantage. Before games, coaches have a pregame speech that they say to the team to inspire and motivate them to try to win the game. These pregame speeches might "influence the expectations of their athletes" and make them want to perform well (p. 2). Although this article focuses on soccer, coaches in every sport have expectations for their team. Emphasizing those expectations, especially when playing at home, can inspire the players to have more confidence. Coaches can also affect home advantage by focusing more on a specific part of the game, such as offensive strategy, when playing at home (Lago-Penas & Lago-Ballesteros, 2011). Furthermore, Lago-Penas and Lago-Ballesteros mention that "home teams have significantly higher figures for attack indicators, such as goal scored, total shots, shots on goal, attacking moves, box moves, crosses, offsides committed, assists, passes made, successful passes, dribbles, and ball possessions. These findings are also similar to those reported in other team sports such as basketball" (p. 469).

The quality of the team that the home team is playing against can affect home advantage as well. Lago-Penas and Lago-Ballesteros (2011) mention that stronger teams have more of a home advantage than weaker teams. It was mentioned that teams were described as "superior and those described as inferior did not experience the same home advantage", and that superior teams performed better (p. 469). Taylor, Mellalieu, James, & Shearer (2008) also suggested the quality of their opponent can affect their performance as well. While this information is not focused on basketball specifically, this can be applied as well.

CHAPTER III

METHODS

Design

This study is a descriptive study using statistics to determine if a private liberal arts college women's basketball team performs better at home. The study uses statistics that were taken from the previous 2016-2017 season. Variables include location of the game, defined measures of basketball performance, and whether the opponent was non-conference or conference. Table 1 lists the dependent variable and the independent variables.

Table 1. Independent and Dependent Variables

Variable	Type	Scale	Coded or Measured
Location	Indep	Categorical	Away=0, Home=1
Conference	Dep	Categorical	Non-conf=0, Conference=1
Outcome	Dep	Categorical	Game lost=0, won=1
Crowd size	Dep	Continuous	Number of tickets sold
LAC (liberal arts college) points	Dep	Continuous	Number of points scored by game
Field goals	Dep	Continuous	Percent of attempts made
Three-pointers	Dep	Continuous	Percent of attempts made
Fouls	Dep	Continuous	Percent of attempts made
Rebounds	Dep	Continuous	Number of rebounds secured

Variable	Type	Scale	Coded or Measured
Assists	Dep	Continuous	Number of assists on scoring plays
Stolen balls	Dep	Continuous	Number of balls taken away
Blocks	Dep	Continuous	Number of shots blocked
Turnovers	Dep	Continuous	Number of turnovers by opponent
Points on turnovers	Dep	Continuous	Number of points on turnovers
2nd chance points	Dep	Continuous	Number of points from turnovers
Missed layups	Dep	Continuous	Number of layups missed
Opponents record	Dep	Continuous	Percent of games won
LAC's record	Dep	Continuous	Percent of games won
Opponents' points	Dep	Continuous	Number of points scored by game
Point differential	Dep	Continuous	LAC pts–opponent pts by game

Participants

The participants used in this study are the women's basketball team at a private liberal arts college and its opponents during the 2016-2017 regular season of 25 games. The ages of the athletes are between 17-21 years of age.

Instrument

The instrument used in this study was a set of performance measures for each game, as defined in Table 1. The statistics were gathered from the women's basketball athletic page of the private, liberal arts college, excluding missed layups which the researcher kept record of. The data was compiled into an Excel spreadsheet (see Appendix 1). The Excel sheet became the source for the

statistics package Stata version 13.1 used on an I-MAC desktop computer. The summaries and hypothesis tests were computed from within Stata, and then the tables were formatted and copied into Microsoft Word.

Procedure

The statistics were gathered from the women's basketball athletic page, excluding missed layups which the researcher kept record of for the 2016-2017 season. The crowd attendance was also collected from the women's basketball team athletic page as well. The t-test was used to find the difference in means and the Chi-square test was used to find the difference in percentages.

CHAPTER IV

RESULTS

The purpose of this study was to determine if the women's basketball team performed better at home. Determining if the women's basketball team performed better at home was based on the location, conference, outcome, crowd size, the sample points, field- goal percentage, three-pointers percentage, fouls, rebounds, assists, steals, blocks, turnovers, points on turnovers, 2nd chance points, and missed layups. Other factors that were taken into account were the opponent's record, the team's record, opponent's points, and point differential. The null hypothesis is that there is no significant difference in performance whether the team was at home or away for women's basketball during the 2016-2017 season.

During the 2016-2017 regular season, the women's basketball team finished with a record of 4-20 with a win percentage of 16%. The team lost their last 14 games, including 13 consecutive conference games. They finished 3-12 in away games with a win percentage of 20% and 1-10 for home games with a win percentage of 10%. There was no significant difference between the win percentages of wins away (20%) and at home (10%), although the sample favored percent favored the away games. The record in non-conference games was 4-7 with a win percentage of 36%. The record for in conference games was 0-14 with 0% for games won. There was no significant difference between the percentage of wins in non-conference and conference games, although the sample percentages favored non-conference games. The average points scored by the team studied were not significantly different between away games (54 points) and home games (57 points), although the sample favored home games. The average percent of field goals made was not significantly different between away games (33%) and home games (37%), although the sample favored home games. The average percent of 3-pointers made

was not significantly different between away games (18%) and home games (26%), although the sample percent favored home games. The average percent of fouls made was not significantly different between away games (60%) and home games (55%), although the sample percent favored away games. The average number of rebounds was not significantly different between away games (40) and home games (42), although the sample numbers favored home games. The average number of assists was not significantly different between away games (10) and home games (12), although the sample number favored home games. The average number of steals was not significantly different between away games (10) and home games (8), although sample numbers favored away games. The average number of blocks was not significantly different between away games (1) and home games (2), although the sample numbers favored home games. The average number of turnovers was not significantly different between away games (18) and home games (18). The average number of points scored off of turnovers was not significantly different between away games (15) and home games (16), although the sample numbers favored home games. The average number of points scored on second chance was not significantly different between away games (11) and home games (11). The average number of missed layups was significantly different (p=0.035) between away games (14) and home games (17) and was worse at home.

Overall, the selected measures of the 2016-2017 season favored the home games, although the differences did not reach statistical significance at the p=0.05 level. The exception was the number of missed layups, wherein the difference was statistically significant (p=0.035) in favor of away games. The away games were also favored in the percentage of wins, the percentage of fouls made, and the number of steals, although the differences were not statistically significant.

The home games were favored in the number of points scored by the team studied, the percentages of field goals and three-pointers made, and the numbers of rebounds, assists, blocks, and points scored on turnovers. The differences, however, were not statistically significant. The average numbers of turnovers and points scored on second chance did not differ in the away and home samples, much less reach statistical significance. The number of people in the crowd supporting each team was not measured.

Table 1. *Outcome of Games*

	A Game	B Opponent	C Conference	D Location	E Crowd Size	F Won/Lost	G Goucher P	H Opp. Point	I FGM-A	J 3PM-A	K FTM-A	L REB	M AST	N STL	O BLK	P TO	Q PTS off TO	R 2nd Chance	S Missed Layups	T
2	1	Shenadoa	No	Away	344	Lost	59	64	25-56 (44.	1-5 (20%)	8-16 (50%	43	13	10	1	22	7	9	4	
3	2	Roanoke (	No	Away	150	Lost	52	87	19-74 (25.	1-13 (7.7%	13-23 (56.	46	6	5	3	18	9	16	13	
4	3	Hollins U.	No	Away	109	Lost	44	55	13-56 (23.	1-12 (8.3%	17-28 (60.	47	3	8	0	22	15	15	11	
5	4	York Colle	No	Home	200	Lost	50	90	19-70 (27.	1-12 (8.3%	11-17 (64.7	38	6	8	1	12	11	11	18	
6	5	Delaware V	No	Home	150	Won	75	65	28-59 (50.	2-4 (50%)	15-25 (60.	37	17	5	0	15	23	19	17	
7	6	Susqueha	Yes	Home	150	Lost	55	62	23-69 (33.	2-12 (16.7	7-11 (63.6	44	11	11	1	13	18	12	14	
8	7	Navy	No	Away	227	Lost	40	93	15-54 (27.	2-10 (20%	8-15 (53.3	35	11	11	0	29	30	13	15	
9	8	Immaculat	No	Away	228	Won	62	48	28-85 (32.	2-11 (18.2	4-9 (44.4	59	13	17	2	18	16	10	16	
10	9	Alvernia U.	No	Away	43	Won	64	51	26-71 (36.	0-2 (0%)	12-23 (52.	53	11	13	0	14	12	12	15	
11	10	Ohio Wesl	No	Away	200	Lost	56	82	20-66 (30.	1-4 (25%)	15-22 (68.	33	5	10	2	13	13	11	17	
12	11	Kalamzoo	No	Away	75	Won	68	61	28-67 (41.	0-5 (0%)	12-14 (85.	50	11	12	1	18	19	8	18	
13	12	Penn Stat	No	Home	137	Lost	68	76	27-72 (37.	0-5 (0%)	14-20 (70.	44	12	13	2	17	22	12	12	
14	13	Drew U.	Yes	Away	154	Lost	50	65	21-57 (36.	2-4 (50%)	6-8 (75%)	26	11	7	4	15	12	8	17	
15	14	Juniata Cc	Yes	Away	220	Lost	60	79	22-64 (34.	0-3 (0%)	16-21 (76.2	44	5	12	0	23	15	19	19	
16	15	U. of Scrar	Yes	Home	149	Lost	48	76	27-51 (52.	11-21 (52.4	11-17 (64.7	44	18	7	2	21	14	0	19	
17	16	Catholic U	Yes	Away	193	Lost	50	79	20-57 (35.	3-12 (25%	7-12 (58.3	38	12	6	0	23	10	2	9	
18	17	Elizabetht	Yes	Away	249	Lost	37	82	17-63 (27%	1-6 (16.7%	2-6 (33.3	30	9	7	0	16	8	12	20	
19	18	Moravian (	Yes	Home	156	Lost	66	72	27-73 (37.	2-8 (25%)	10-21 (47.6	39	15	13	4	15	23	13	19	
20	19	Drew U.	Yes	Home	287	Lost	50	54	19-56 (33.	1-8 (12.5%	11-22 (50%	51	10	5	1	27	12	13	17	
21	20	Catholic U	Yes	Home	164	Lost	46	75	21-67 (31.	2-10 (20%	2-8 (25%)	39	13	7	3	21	11	9	15	
22	21	Susqueha	Yes	Away	200	Lost	54	74	22-65 (33.	1-12 (8.3%	7-9 (77.8	32	9	11	0	9	17	6	11	
23	22	Moravian (	Yes	Away	303	Lost	66	78	27-80 (33.	5-11 (45.5	7-16 (43.8	44	17	9	5	13	15	16	12	
24	23	Elizabetht	Yes	Home	213	Lost	49	63	21-64 (32.	2-4 (50%)	5-8 (62.5	46	6	6	1	18	4	7	24	
25	24	Juniata Cc	Yes	Home	168	Lost	64	70	24-64 (37.	2-7 (28.6	14-30 (46.	40	14	8	2	17	18	11	19	
26	25	U. of Scrar	Yes	Away	500	Lost	52	82	20-59 (33.	4-18 (22.2	8-12 (66.7	23	7	13	1	16	23	6	9	

Table 2. *Percentage of Won/Lost by Site*

Tabulated Statistics: site, won_lost

Rows: site   Columns: won_lost

	Lost	Won	All
away	12	3	15
	80.00	20.00	100.00
home	9	1	10
	90.00	10.00	100.00
All	21	4	25
	84.00	16.00	100.00

Cell Contents: Count
                  % of Row

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	0.45	1	0.5040
Likelihood Ratio	0.47	1	0.4931

2 cell(s) with expected counts less than 5.

Table 3. *Mean Scores by Site, Points Scored by the Team Studied*

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
away	15	54.26667	2.383408	9.2309	49.15476	59.37857
home	10	57.1	3.236768	10.23556	49.77792	64.42208
combined	25	55.4	1.907878	9.539392	51.46233	59.33767
diff		-2.833333	3.934089		-10.97162	5.304949

diff = mean(**away**) − mean(**home**)   t = -0.7202

Ho: diff = 0   degrees of freedom = 23

Ha: diff < 0   Ha: diff != 0   Ha: diff > 0

Pr(T < t) = 0.2393   Pr(|T| > |t|) = 0.4787   Pr(T > t) = 0.7607

Table 4. *Mean Scores by Site, Percentage of Field Goals Made by the Team Studied*

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
away	15	33.18	1.491315	5.775836	29.98145	36.37855
home	10	37.27	2.575744	8.145217	31.44326	43.09674
combined	25	34.816	1.393146	6.96573	31.94069	37.69131
diff		-4.09	2.776904		-9.834464	1.654464

```
    diff = mean(away) - mean(home)                               t =  -1.4729
Ho: diff = 0                                  degrees of freedom =       23

   Ha: diff < 0                   Ha: diff != 0                   Ha: diff > 0
 Pr(T < t) = 0.0772         Pr(|T| > |t|) = 0.1543          Pr(T > t) = 0.9228
```

Table 5. *Mean Scores by Site, Percentage of Three-Pointers Made by the Team Studied*

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
away	15	17.79333	3.886025	15.05051	9.458639	26.12803
home	10	26.35	5.915634	18.70688	12.96791	39.73209
combined	25	21.216	3.356604	16.78302	14.28831	28.14369
diff		-8.556667	6.76777		-22.55687	5.443533

```
    diff = mean(away) - mean(home)                               t =  -1.2643
Ho: diff = 0                                  degrees of freedom =       23

   Ha: diff < 0                   Ha: diff != 0                   Ha: diff > 0
 Pr(T < t) = 0.1094         Pr(|T| > |t|) = 0.2188          Pr(T > t) = 0.8906
```

Table 6. *Mean Scores by Site, Percentage of Foul Shots Made by the Team Studied*

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
away	15	60.14667	3.789671	14.67733	52.01863	68.2747
home	10	55.48	4.235742	13.39459	45.89809	65.06191
combined	25	58.28	2.817014	14.08507	52.46597	64.09403
diff		4.666667	5.79272		-7.316487	16.64982

```
    diff = mean(away) - mean(home)                          t =    0.8056
Ho: diff = 0                               degrees of freedom =       23

   Ha: diff < 0                 Ha: diff != 0                  Ha: diff > 0
Pr(T < t) = 0.7856       Pr(|T| > |t|) = 0.4287       Pr(T > t) = 0.2144
```

Table 7. *Mean Scores by Site, Number of Rebounds by the Team Studied*

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
away	15	40.2	2.656887	10.29008	34.50154	45.89846
home	10	42.2	1.380821	4.366539	39.07637	45.32363
combined	25	41	1.672324	8.361619	37.54849	44.45151
diff		-2	3.462009		-9.161712	5.161712

```
    diff = mean(away) - mean(home)                          t =   -0.5777
Ho: diff = 0                               degrees of freedom =       23

   Ha: diff < 0                 Ha: diff != 0                  Ha: diff > 0
Pr(T < t) = 0.2845       Pr(|T| > |t|) = 0.5691       Pr(T > t) = 0.7155
```

Table 8. *Mean Scores by Site, Number of Assists by the Team Studied*

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
away	15	9.533333	.9703542	3.758166	7.452131	11.61454
home	10	12.2	1.297861	4.104198	9.264033	15.13597
combined	25	10.6	.8082904	4.041452	8.931771	12.26823
diff		-2.666667	1.591038		-5.957979	.6246456

```
    diff = mean(away) - mean(home)                          t =   -1.6761
Ho: diff = 0                               degrees of freedom =       23

   Ha: diff < 0                 Ha: diff != 0                  Ha: diff > 0
Pr(T < t) = 0.0536       Pr(|T| > |t|) = 0.1073       Pr(T > t) = 0.9464
```

Table 9. *Mean Scores by Site, Number of Steals by the Team Studied*

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
away	15	10.06667	.8192137	3.172801	8.309628	11.82371
home	10	8.3	.9551033	3.020302	6.139406	10.46059
combined	25	9.36	.6347703	3.173851	8.049898	10.6701
diff		1.766667	1.271292		-.8632014	4.396535

```
    diff = mean(away) - mean(home)                              t =    1.3897
Ho: diff = 0                                  degrees of freedom =        23

    Ha: diff < 0                   Ha: diff != 0                   Ha: diff > 0
 Pr(T < t) = 0.9110        Pr(|T| > |t|) = 0.1779          Pr(T > t) = 0.0890
```


Table 10. *Mean Scores by Site, Number of Blocked Shots by the Team Studied*

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
away	15	1.266667	.4193722	1.624221	.3672028	2.166131
home	10	1.7	.3666667	1.159502	.8705424	2.529458
combined	25	1.44	.2891366	1.445683	.8432513	2.036749
diff		-.4333333	.5960822		-1.666423	.7997567

```
    diff = mean(away) - mean(home)                              t =   -0.7270
Ho: diff = 0                                  degrees of freedom =        23

    Ha: diff < 0                   Ha: diff != 0                   Ha: diff > 0
 Pr(T < t) = 0.2373        Pr(|T| > |t|) = 0.4746          Pr(T > t) = 0.7627
```


Table 11. *Mean Scores by Site, Number of Turnovers Recovered by the Team Studied*

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
away	15	17.93333	1.321855	5.119524	15.09824	20.76843
home	10	17.6	1.407914	4.452215	14.41508	20.78492
combined	25	17.8	.9539392	4.769696	15.83117	19.76883
diff		.3333333	1.987886		-3.778922	4.445589

```
    diff = mean(away) - mean(home)                              t =    0.1677
Ho: diff = 0                                  degrees of freedom =        23

    Ha: diff < 0                   Ha: diff != 0                   Ha: diff > 0
 Pr(T < t) = 0.5659        Pr(|T| > |t|) = 0.8683          Pr(T > t) = 0.4341
```

Table 12. *Mean Scores by Site, Number of Points Scored Off Turnovers by the Team Studied*

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
away	15	14.73333	1.550627	6.005553	11.40757	18.0591
home	10	15.6	1.984383	6.275172	11.11101	20.08899
combined	25	15.08	1.199889	5.999444	12.60355	17.55645
diff		-.8666667	2.495406		-6.028808	4.295475

```
    diff = mean(away) - mean(home)                          t =  -0.3473
Ho: diff = 0                               degrees of freedom =       23

    Ha: diff < 0                 Ha: diff != 0                   Ha: diff > 0
 Pr(T < t) = 0.3658        Pr(|T| > |t|) = 0.7315        Pr(T > t) = 0.6342
```

Table 13. *Mean Scores by Site, Number of the Team Studied Points Off Second Chances*

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
away	15	10.86667	1.174599	4.549202	8.347403	13.38593
home	10	10.7	1.542365	4.877385	7.210929	14.18907
combined	25	10.8	.9165151	4.582576	8.908406	12.69159
diff		.1666667	1.91075		-3.786021	4.119355

```
    diff = mean(away) - mean(home)                          t =   0.0872
Ho: diff = 0                               degrees of freedom =       23

    Ha: diff < 0                 Ha: diff != 0                   Ha: diff > 0
 Pr(T < t) = 0.5344        Pr(|T| > |t|) = 0.9312        Pr(T > t) = 0.4656
```

Table 14. *Mean Scores by Site, Number of Missed Layups by the Team Studied*

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
away	15	13.73333	1.140036	4.415341	11.2882	16.17847
home	10	17.4	1.045626	3.306559	15.03463	19.76537
combined	25	15.2	.8679478	4.339739	13.40864	16.99136
diff		-3.666667	1.640372		-7.060035	-.273298

```
    diff = mean(away) - mean(home)                          t =  -2.2353
Ho: diff = 0                               degrees of freedom =       23

    Ha: diff < 0                 Ha: diff != 0                   Ha: diff > 0
 Pr(T < t) = 0.0177        Pr(|T| > |t|) = 0.0354        Pr(T > t) = 0.9823
```

Table 15. *Mean Scores by Site, Crowd Size*

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
away	15	213	28.97815	112.2319	150.848	275.152
home	10	177.4	14.3203	45.28478	145.0052	209.7948
combined	25	198.76	18.36684	91.83422	160.8527	236.6673
diff		35.6	37.57123		-42.122	113.322

```
 diff = mean(away) - mean(home)                            t =    0.9475
Ho: diff = 0                            degrees of freedom =        23

  Ha: diff < 0              Ha: diff != 0                Ha: diff > 0
Pr(T < t) = 0.8234     Pr(|T| > |t|) = 0.3532        Pr(T > t) = 0.1766
```

Table 16. *Mean Scores by Site, point differentials between the Team Studied and its Opponents*

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
away	15	-17.73333	5.093849	19.72839	-28.65855	-6.808113
home	10	-13.2	4.689942	14.8309	-23.80939	-2.590614
combined	25	-15.92	3.547732	17.73866	-23.24216	-8.597842
diff		-4.533333	7.33689		-19.71085	10.64418

```
 diff = mean(away) - mean(home)                            t =   -0.6179
Ho: diff = 0                            degrees of freedom =        23

  Ha: diff < 0              Ha: diff != 0                Ha: diff > 0
Pr(T < t) = 0.2714     Pr(|T| > |t|) = 0.5427        Pr(T > t) = 0.7286
```

CHAPTER V

DISCUSSION

The results for this study show that the home or away advantages observed for the 2016-2017 season may be applied only to the 2016-2017 season. That is because there were no significant differences between performances at home or away when it comes to basketball at a private liberal arts college for the 2016-2017 season. The results showed that the 2016-17 season, taken only as a sample, favored the home games for certain outcomes, although the differences did not reach statistical significance at the $p=0.05$ level. The home games were favored in the number of points scored, field goal percentages, three-pointers made, rebounds, assists, blocks, and points scored on turnovers. The away games were favored in the percentage of wins, the percentage of fouls made, and the number of steals, although the differences were not statistically significant. The number of missed layups was an exception, because the difference was statistically significant ($p=0.035$) in favor of away games. The average numbers of turnovers and points scored on second chance did not differ in the away and home samples.

Implications of the Results

The results found that the team performed better at home in terms of number of points scored, field goals percentages, three-pointers made, rebounds, assists, blocks, and points scored on turnovers. The team performed better away in terms of percentage of wins, fouls, steals, and missed layups. There was no difference when it came to the number of turnovers and points scored on second chances in the home and away sample. Comparing the number of categories for home and away games, the team performed better at home games, but the results were not significant. Descriptively, there was a home court advantage for the aspects of basketball listed above. There is insufficient evidence, however, that the observed differences will generalize to

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subsequent seasons. The same was true for away game advantages. An exception was missed layups; where the away game advantage reached statistical significance at the 0.05 level. A team or coach could learn that while there may be such thing as home advantage, this action research study did not demonstrate that the advantage would occur in subsequent samples of seasonal games. The team should try to perform their best regardless of the location, the crowd size, etc. to try to win games.

Theoretical Consequences

From a theoretical standpoint, this study suggests that teams do not perform better at home because the results were not significant. To be fair, however, the overall seasonal record of 4 wins and 20 losses minimized the chance of uncovering a home court victory trend.

Threats of Validity

There were several factors in this study that could have compromised the validity of the results. In terms of external validity threat, the season that was looked at applied to one team and was made up of all women. The sample that season and team could be a threat as well. This was a convenience sample because the researcher coached the team during the 2016-2017 season. The study should not be generalized further than the season that was observed.

An internal validity threat that could apply to this study is that all of the statistics that were recorded might not have been correct for every game. People that record game statistics make mistakes sometimes, and that could affect the validity. Another factor that has to be taken into consideration was the number of injuries that the team was dealing with during the games because that too could compromise the validity.

Connections to Previous Studies/ Existing Literature

With much research, there have been studies that have looked at home advantage and have compared teams based on statistics. One study by Gómez, Lorenzo, Barakat, Ortega, & Palao (2008) examines the statistics of a winning and losing teams in the Spanish professional men's league basketball team that has a balanced schedule. They found that game location probably influences who wins and losses and that winning and losing teams performed better in certain statistics.

Lago-Penas and Lago-Ballesteros (2011) mention that stronger teams have a stronger advantage. This relates to the research because statistically, all but five of the teams that the team played against had records that were worse than theirs. The sample team only lost against one team that had a record that was worse than theirs, and beat the other four teams.

Implications for Future Research

There have been many studies done on home advantage and performance in sports, but there are not many that focus on collegiate basketball. Several studies could be performed on women's collegiate basketball teams to see if they have a home advantage and perform better at home.

Future studies could give out a survey to the players to see if the crowd affects their performance or concentration level. The players could also be given a survey to see if they felt more comfortable at home or away and could give them a list of factors and have them circle what they though affected them. There could also be space for them to write in other factors that might not be on the survey.

Future research could look at more than one team or could even look at men's teams. Also, future research could look at a team that has won at least half of their games or half of their home games to try to determine whether home advantage exists.

Conclusion/ Summary

Home advantage may exist and could affect the way that teams perform. However, this study did not reject the null hypotheses for home court advantage. The results indicate the team performed better in certain categories at home and did better in some categories when they were away. These differences may only apply to the 2016-17 season. Furthermore, with 4 wins and 20 losses, the chance was low of finding statistically significant home court advantages. Although the study provided valuable information about home advantage and performance among collegiate women's basketball, more research needs to be done on the topic, especially using teams that have more successful seasons.

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