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WIN LACROSSE GAMES

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Lacrosse, a game popular with Native Americans long before Europeans first settled in North America,[1] has received scant attention from statisticians relative to other "stick-and-ball" games, like baseball and golf. Easily quantifiable measures of performance abound in baseball (for examples, slugging average, on-base percentage, and earned run averages) and golf (for examples, distance of a player's tee shot, greens in regulation – or the percentage of time that a player gets his ball onto the putting green within two shots of par, and the average number of putts per hole). But, what about lacrosse? In this brief note, we focus on one key statistic: ground balls. In lacrosse, a "ground ball" is when the ball is scooped up off the ground. When the ball is on the ground, however, neither team has possession. And, since records are kept of the number of times in a game each team successfully scoops up a ground ball, we will determine whether or not "ground balls" are critical to team winning.

All colleges in the New England Small College Athletic Conference (hereafter NESCAC) play Division III lacrosse. We examined the box scores of every men's lacrosse game for all but one of the ten NESCAC schools from 2005 through 2009.[2] Over the five-year period, Wesleyan and Williams won one NESCAC title each (in 2009 and 2008, respectively). Middlebury College won seven consecutive NESCAC championship games since the inception of the NESCAC Men's Lacrosse Tournament in 2001. Of the ten NESCAC schools examined here, Middlebury College had the best overall record since 2005 (69 wins and 19 losses for a .784 winning percentage) and Colby had the worst (26 – 44, .371).

To test the null hypothesis that ground balls won is not related to games won, we use a chi-square test. All lacrosse games are either won or lost; there are no ties, with as many "sudden-death" overtime periods as are necessary to break ties at the end of regulation. We

excluded games where the number of ground balls for and against each team was the same.[3] All

games for each NESCAC school are divided into four groups as shown, for example, by one

NESCAC school, Middlebury College, in Table 1. In 54 [9] games, Middlebury College

recorded more [fewer] ground balls than her opponent (that is, "ground balls for" exceeded [was

less than] "ground balls against") *and* Middlebury College won [lost] the game. The calculated

chi-square (χ^2) statistic is 5.476. The probability that the chi-square test statistic will be as large

as this (or larger) is only .019. The diagonal elements in the contingency table in Table 1 were

much larger than would be expected if the null hypothesis were true. That is, when Middlebury

College scooped up more (fewer) ground balls than her opponent, more often than not

Middlebury won (lost) the game. The results for all of the other NESCAC schools are reported in

Table 2. And, in every case, the diagonal elements of the contingency table are

disproportionately large. Still, in other words, ground balls (for) are indeed key to success.

Table 3 shows the results of regressing (for each game at each NESCAC school over the

five-year period, 2005-09) the margin of victory (that is, "goals for" minus "goals against")

against the percentage of ground balls won. How well the regression line fits the scatter of points

(as measured by the R^2 or the coefficient of determination) is best for Amherst and is shown in

Figure 1. In every case (that is, for all ten NESCAC schools), there is evidence of a strong direct

relationship between the team's margin of victory and the percentage of ground balls won. One

can use the regression results in Table 3 to find the percentage of ground balls won above which

the winning margin is greater than or equal to "1" goal (as reported in the last column of Table 3).

Three of the four schools with the best winning records over the five-year period

[Middlebury, .784 winning percentage; Wesleyan, .766; and Tufts, .679] had minimum threshold

percentages of ground balls won less than 50 percent of the time. For these schools, while

"ground balls for" is important, other facets of the game (collectively) might be even more

important (for examples, goalie save percentage, extra-man opportunities, and man-down

defense). Curiously, the school with the worst winning record over the five-year period

[Colby, .371] needed to win, on average, at least 58.4 percent of ground balls to win a game.

Concluding Remarks

The evidence presented here for Division III schools in the NESCAC conference suggests

that ground balls win games in men's lacrosse. Lacrosse involves numerous body and stick

checks (as long as contact is from the front or side and above the knees but not above the

shoulders and one's opponent has possession of the ball or is within five yards of a loose ball).

As a consequence, the ball is knocked loose from the pocket of a player's stick and frequently

ends up on the ground. An errant pass or shot suffers a similar fate. What we have found is that

the team that wins the battle for ground balls more often than not wins the game. After all, more

ground balls scooped up leads to more possessions. More possessions in turn lead to more

scoring opportunities. And, more possessions by one team decreases the opposing team's time of

possession and scoring chances.

Table 1. Contingency Table Relating
Ground Balls Won and Games Won,
Middlebury College, 2005-2009

	Ground Balls Won?	
	Yes	No
Won Game?		
Yes	54	14
No	10	9

**Table 2. Summary of Chi-Square Tests,
Men's Lacrosse in NESCAC,
2005-2009**

| School	Won Game, Won GBs	Won Game, Lost GBs	Lost Game, Won GBs	Lost Game, Lost GBs	χ^2_{Calc}	p-value
Amherst	24	5	9	25	19.880	<.001
Bates	17	9	8	25	10.081	.001
Bowdoin	33	10	13	16	7.647	.006
Colby	21	2	17	24	15.174	<.001
Middlebury	54	14	10	9	5.476	.019
Trinity	30	3	13	23	22.017	<.001
Tufts	40	13	8	16	12.494	<.001
Wesleyan	51	21	1	21	29.957	<.001
Williams	21	9	5	23	15.921	<.001

Table 3. Summary of Regression Results,
Men's Lacrosse in NESCAC,
2005-2009

Dependent variable: Winning margin (Goals for – Goals against)

School	Constant	Percentage of ground balls won	R^2	Percentage of ground balls won, winning margin ≥ 1
Amherst	-24.702 (<.001)[*]	.482 (<.001)	.482	53.3
Bates	-15.454 (<.001)	.313 (<.001)	.328	52.6
Bowdoin	-13.152 (<.001)	.262 (<.001)	.257	54.0
Colby	-22.770 (<.001)	.407 (<.001)	.358	58.4
Middlebury	-14.443 (<.001)	.326 (<.001)	.209	47.4
Trinity	-21.016 (<.001)	.404 (<.001)	.401	54.5
Tufts	-15.947 (<.001)	.341 (<.001)	.376	49.7
Wesleyan	-14.798 (<.001)	.352 (<.001)	.315	44.9
Williams	-11.644 (<.001)	.260 (<.001)	.282	48.6

[*]Numbers in parentheses are *p*-values.

**Figure 1. Margin of Victory *v*. Percentage of Ground Balls Won,
Amherst College, 2005-2009**
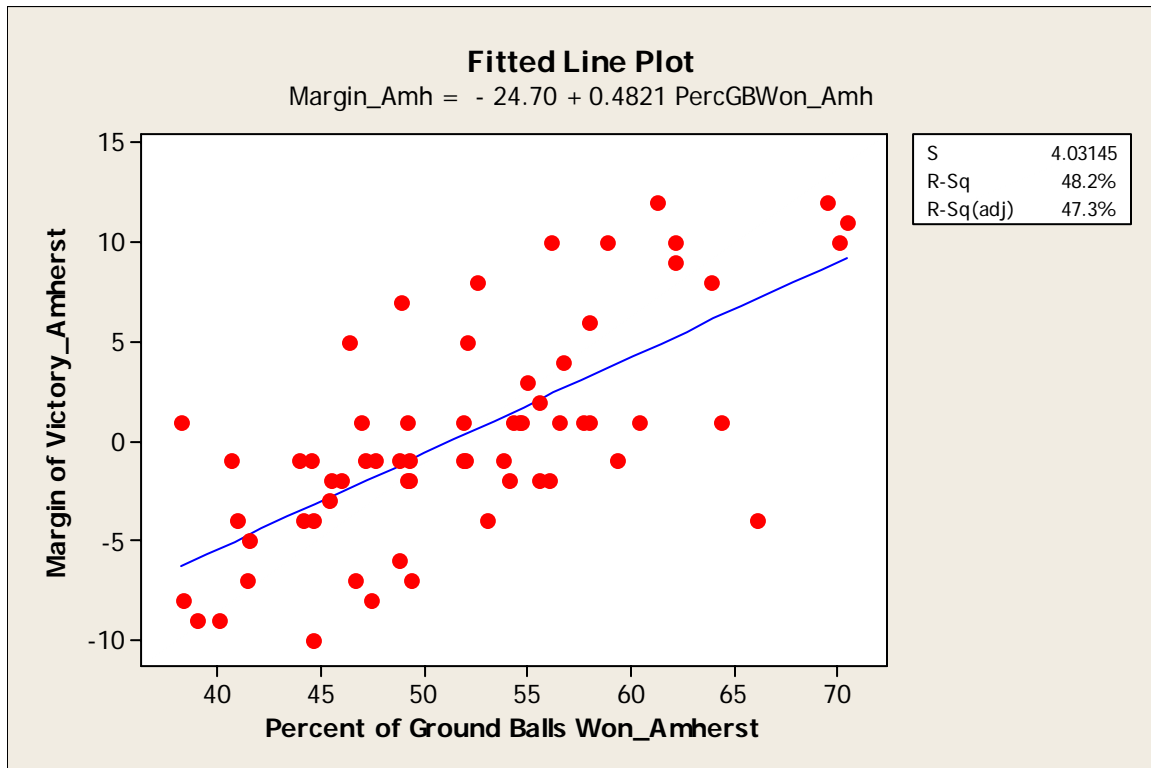
References

1.   D.M. Fisher, *Lacrosse: A History of the Game*, Johns Hopkins University Press, Baltimore, MD, 2002.

2.   D.G. Pietramala and N.A. Grauer, *Lacrosse: Technique and Tradition*, Johns Hopkins University Press, Baltimore, MD, 2006.

Footnotes

1.   For a brief history of the game of lacrosse, see, for examples, Fisher [1] and Pietramala and Grauer [2].

2.   NESCAC schools include: Amherst, Bates, Bowdoin, Colby, Connecticut College, Hamilton, Middlebury, Trinity (in Connecticut), Tufts, Wesleyan, and Williams. The archive (at each school's Web site) for all schools but Connecticut College reported box scores for individual games from 2005 through 2009. Hamilton College competes in the Liberty League in men's lacrosse.

3.   Over the five-year period, we excluded: three ties each for Amherst and Tufts; two ties each for Bates, Trinity, and Williams; and one tie for Middlebury College. In some instances, the number of ground balls would be reported for the home team, but not for its opponent. And, in such cases, we checked the box score (for the same game) on the opponent school's athletics Web page.