PREDICTING THE OUTCOME OF FOOTBALL GAMES OR CAN YOU MAKE A LIVING WORKING ONE DAY A WEEK

Larry T. Revo, Meharry Medical College

It seems that every few years some individual comes along who claims to have supernatural powers of prognostication. The latest and, perhaps best, prognosticator currently performing is applying his specialized talents to the prediction of football games. His name is Danny Sheridan and he lives in Mobile, Alabama. This paper will present the results of Mr. Sheridan's selections in 1974 and 1975 and compute the probabilities associated with his performance under the assumption that his chances of picking the winner are 50-50 (i.e., the null hypothesis of no predictive power).

What Mr. Sheridan does so well is predict the outcome of football games "against the spread". The spread is the number of points that the favorite has to give to the underdog to make the game even (i.e., to make betting a supposedly 50-50 proposition). If the favorite wins the game by more than the point spread, the favorite is considered to have beat or "covered" the spread. Conversely, if the favorite wins by less than the spread or loses the game outright, the underdog is considered to have beaten the spread. If the favorite beats the underdog by an amount exactly equal to the spread, the outcome is a tie.

In September of 1974, Sheridan started sending his weekly selections to Bill Sellers, a Mobile Press Register reporter. He usually sent them on Thursday and Sellers opened them on the Monday following the games. By November, he had interested Sports Illustrated writer, Harold Peterson, in his forecasting talent and started sending Peterson his weekly selections. In 1975, he continued sending Sellers his weekly selections and started sending same to Donald Friedlander, a Mobile lawyer. In response to increasing requests, Sheridan started a phone and "football newsletter" service to paying customers in September of 1975. Thus, for all of 1974 and 1975, his weekly selections can be fully documented and it can be verified that he made these selections prior to game time. In addition, I have checked the outcome of Sheridan's selections myself. As far as can be determined, the results presented in this paper are reliable and verifiable.

The following table summarizes the results of Mr. Sheridan's selections in 1974 and 1975 versus the spread, with the selections separated into the categories of "favorite" or "underdog" and College or Professional:

		1974			1975		
		Won	Lost	Total	Won	Lost	Total
College	Favorite	51 (.89)	6	57	39 (.76)	12	51
	Underdog	123 (.87)	19	142	87 (.77)	26	113
	Total	174 (.87)	25	199	126 (.77)	38	164
Pro	Favorite	4 (1.0)	0	4	14 (.74)	5	19
	Underdog	15 (.94)	1	16	46 (.66)	24	70
	Total	19 (.95)	1	20	60 (.67)	29	89

Thus, for instance, there were 57 college games in 1974 in which Sheridan picked the favorite; the favorite won (beat the spread) 51 of these games for an astounding 89% correct. Similarly, there were 70 pro games in 1975 in which Sheridan picked the underdog; the underdog won 46 of these games for a winning percentage of 66%, still hard to believe, since each game is supposed to be a 50-50 proposition.

Under the null hypothesis that Mr. Sheridan has a 50% probability of correctly predicting the winner of a single game (versus the spread), the number of correct predictions, X, is a binomial variate with parameters p = .5 and n, the total number of predictions. This model assumes that the outcomes of Sheridan's selections are independent - that is, that the outcome of one game vis-a-vis his prediction has no effect on the outcome of any other of his predictions. This is clearly a reasonable assumption since the outcomes of any two games played on the same day are independent for all practical purposes.

The probability of correctly predicting X or more games in n attempts is given by

$$\sum_{i=x}^{n} \binom{n}{i} p^i (1-p)^{n-i} = \sum_{i=x}^{n} \binom{n}{i} (.5)^n \quad \text{with } p = .5$$

under the null hypothesis.

This quantity was computed for the various entries in Table 1, with the following exact results:

Table 2

Exact Probabilities (P Values) Under Ho for the number of Successes (Wins) in Table 1

		1974	1975
	Favorite	2.84 E-10	9.90 E-05
College	Underdog	3.86 E-20	3.56 E-09
	Total	5.74 E-29	1.61 E-12
	Favorite	6.25 E-02	3.18 E-02
Pro	Underdog	2.59 E-04	5.76 E-03
	Total	2.00 E-05	6.68 E-04

All probabilities are given in scientific notation; the number after the E (exponent) specifies the exponent of 10 which the number preceeding the E is to be multiplied by. Thus, 2.84 E-10 = 2.84 x 10^{-10} which is equivalent to .000000000284 in decimal notation.

Clearly, there is overwhelming evidence against the null hypothesis of no predictive power, especially in 1974. However, 1974 was a year in which college underdogs did much better than 50% versus the spread. In fact, college underdogs won 174 of 297 games, a winning percentage of .596. Thus, had a prognosticator simply selected all college underdogs in 1974, he would have beaten the spread in almost 60% of those games.

A glance at Table 1 indicates that Mr. Sheridan concentrated on underdogs in 1974; 71% of his college selections were underdogs. Thus, a reasonable question is - did Mr. Sheridan do so well simply because he selected so many underdogs, or did he in fact do substantially better than someone could have done by selecting every 1974 college underdog, i.e., did he do substantially better than win 59.6% of his selections? Thus H_o: $p = .596$

H_a: $p > .596$

The exact probability of having 174 winners in 199 selections under H_o is 5.64 E-18. Thus, we can not attribute Mr. Sheridan's 1974 college record to simply selecting underdogs indiscriminantly.

Summary

The binomial model has been used to test the hypothesis that Danny Sheridan has no powers of prognostication. The model was applied to his 1974 and 1975 football selections. The results emphatically reject the null hypothesis, and argue that his powers, at least during 1974 and 1975, were of a supernatural order.