

A DETERMINISTIC PREDICTION MODEL FOR THE AMERICAN GAME OF FOOTBALL

John A. Trono, Saint Michael's College

Introduction

This article describes a simulation model of the sport known as football. It was created to predict results of post season football games, most notably college bowl games. By constructing a totally deterministic model of the game, one in which there are no random events, and by using data that is directly accessible to represent the participants, an objective prediction can be reached. The remainder of this paper is divided as follows: Section 2 discusses more about the model's internal workings; Section 3 describes the all-important play selection strategy; Section 4 presents the results collected for verifying the model's accuracy; and finally Section 5 presents some observations and shortcomings of the model along with possible directions for further investigation.

The Model's Description and Background

As mentioned previously, the model uses information about two opposing teams to play a simulated game of football. Runs, passes, punts, fumbles, kick-off returns, and other plays, are all part of this model that attempts to determine which team will win. How this model actually performs these plays will now be discussed in more detail.

The Model's Play Table. To take the most realistic model, it was necessary to incorporate as many features of an actual game as possible. In addition to the plays mentioned above, interceptions, quarterback (QB) sacks, punt returns, field goals, and extra point kicks comprise the basic plays of this model. Field goals are broken down into five yardage categories and passes are either complete, incomplete, intercepted, or never thrown due to the QB being thrown for a loss (sacked). Those passes that are completed must then have their completed yardage determined. A completed pass is obviously a two-step operation. Other two-step operations exist, such as a punt and the punt return.

There are fourteen different plays, as listed above, in the model. All of the information for these plays, representing the plays' "possible outcomes" in a simulated game, is stored in a fourteen-by-twenty-one play table. The play table was constructed using probabilistic methods, relying upon actual averages from several college football seasons. The expected result for a simulated play is just that play's average outcome during those years. The twenty-one different "outcome selectors" are the twenty-one different values one could achieve by rolling four regular six sided die. This model will allow the offense to determine the value of two die and the defense to determine the value of the other two die.

Now how is this outcome selector determined? A reference was previously made to directly accessible data concerning the two opponents, and the outcome selector is determined from this data. Each team has played some number of games during the regular season, and for most college football teams, these scores are listed each week in Tuesday's issue of The New York Times. Given a team that has played N games, there would be N offensive scores and N defensive scores that represent this team. The order of these scores when inputted to the model is chronological. These scores are then translated into more meaningful numbers that the model uses. More specifically, any score, offensive or defensive, is converted into an integral value between two and twelve inclusively. The translation table is given below:

<u>Score</u>	<u>Translated Number</u>
0 - 3	7
4 - 10	6
11 - 17	8
18 - 24	5
25 - 31	9
32 - 38	4
39 - 45	10
46 - 52	3
53 - 59	11
60 - 66	2
67 - ...	12

If a translated offensive score is added to a translated defensive score, the result is a number between four and twenty-four inclusive. The number of distinct integers falling in this range is twenty-one, the number of distinct outcome selectors described earlier.

Motivation Behind the Translation Table. The basic "yardstick" of football is essentially the all important touchdown. This seven point phenomenon was the sole factor in deriving the translation table. Each touchdown implies a more potent offense (or less effective defense) and a team that scores more touchdowns (has more touchdowns scored against them) will probably produce more big plays (allow more big plays) during the simulated game. The ever-present play table of outcomes used in the model reflects this behavior quite nicely. Using the expected probabilities for rolling four dice (which is a discrete normal distribution), the more likely outcomes like one, two, and three yard runs occur towards the center of the outcome selector's possibilities (say between eleven and sixteen) where the more likely rolls occur. Runs like twenty, thirty-five, and seventy-seven yards occur much more infrequently and they appear more towards the extreme values of the four dice distribution (say four through six and twenty-two through twenty-four) where the more unlikely dice rolls appear. (For more information on the feasibility of this translation table, see Appendix A.) Looking at the translation table a little more closely, one observes that each touchdown draws one

farther from the most likely occurring two dice outcome (7) and more towards the extreme values (2 and 12).

Examples of a Simulated Game. The translated game scores for a hypothetical visiting and home team are listed below. An underlying assumption of this football model is that the visitors receive the opening kick-off and the home team does likewise in the second half. Think of it as a courtesy offered by the home team!

VISITING TEAM		HOME TEAM	
OFFENSE		DEFENSE	
6		10	
9		6	
5		8	
10		7	
11		3	
2		8	
3		9	
9		10	
12		4	
7		4	
6		9	

DEFENSE		OFFENSE	
5		3	
5		4	
4		5	
3		6	
2		9	
7		10	
7		10	
6		11	
7		7	
8		7	
10		9	

The first play called in this model, a kick-off return, yields the yardage it was returned from the goal line. By adding the visitors' offensive number 6 to the home's defensive number 10, and by examining the result of returning a kick-off using 16 as the outcome selector (the value 19 would be found in the play table), the ball would be placed on the 19 yard line, first down and ten yards to go for the visitors.

For the purpose of this example, let's assume the visitors' first play is a run. To determine the result of this running play, the next two numbers must be added together; the 9 and the 6. Using 15 for a running play, the play table shows no gain. On second and ten, the visitors attempt to throw a pass. The next two numbers, 5 and 8, when added together result in a completed pass. The next two numbers, 10 and 7, are used to tell how many yards the completed pass covered, nine yards in this case, making it third down and one yard to go. For the final play in this example, the visitors are going to try and

grind it out on the ground. But 11 and 3 yield a minus two yard gain so, on fourth and three, a punt is performed. A forty-six yard punt ($2 + 8$) is launched and now we must use the 5 from the visitors' defense and the 3 from the home's offense to determine the punt return yardage, since the possession of the football has changed hands. To avoid using the same pairs of number combination, after all eleven obvious choices have been exhausted, the visitors' first number is matched with the home's second number the next time through, then the first with the third after the next eleven plays and so on. This needs to be done only when the opposing teams have both played the same number of regular season games, or when the different number of games played by each team are not relatively prime. The latter occurs rarely, e.g., 12 and 10 games.

The model uses one hundred "dice rolls" per half, two hundred for an entire game. This "clocking mechanism" coincides nicely with the college teams' schedules. Why? Because most major universities play eleven games. The maximum number of different outcomes combining the eleven translated offensive scores with the eleven translated defensive scores, would then be $11 \times 11 = 121$. On the average, only one hundred of these outcomes would be used since each team's offense will use, on average, one-half of the model's two hundred plays. This alleviates any sort of intended bias caused by cycling back to the outcome selector combination used in the early part of the game.

Of course, some play calling decisions are never done. For instance, on fourth down, the team with the ball will attempt a field goal if it is 39 yards or less from its goal line or it will punt the ball to the opposing team. In the real game, a running play might be called on fourth and two at your opponent's two yard line when time is running out and your team is down by more than three points. It is a difficult task to come up with a finite set of realistic guidelines on how the model should make such a decision. This type of decision making is not part of the model.

Play Selection Strategy

The model currently uses a deterministic play calling strategy, therefore the model's results are also deterministic. (Obviously, if the model randomly chose the plays, the results would be nondeterministic.) Many different strategies have been examined. The first strategy that was examined chose a run on the first two downs and a pass on third down only if more than three yards were needed to get a first down. Another strategy chose a set of plays which predicted previously played games accurately, and used this set for all future games. Neither of these proved very successful in predicting the winners in college bowl games that had yet to be played. The model's current strategy is by far the most consistent and reliable predictor implemented so far. It is a logical choice and one that now appears obvious.

In choosing the particular play to be called next, why not choose the one gaining the most yards? A better team should gain more yards on its plays than a weaker team, therefore, the strategy is a one play lookahead; the model determines how many yards a run would gain, and how many yards a pass would gain, and then chooses the play yielding the most yards. (A tie can occur; in this case a pass was chosen for reasons too detailed to go into here.) After incorporating this strategy into the model, a fairly modest increase in prediction accuracy was observed. In some respects, this strategy makes sense since the better team, when playing its best, should defeat a weaker team that is also playing its best.

The Model's Results

The model's accuracy was tested by comparing a team's predicted won-loss record during the season with the won-loss record produced by the program. To do this, several previous college football seasons were simulated and the results are summarized below. (A detailed report can be found in Appendix B.) On average, each team's won-loss record is off by only one game and the average difference in each team's offensive and defensive total points is between 30 and 35, which when divided by the average number of games per year (11) yields an average discrepancy of 3 points per team per game - one field goal only! Appendix C lists 4 teams' season's results, for the three simulated years, to show how well the model has performed on these individual games. Now that the simulator has shown it is successful at modelling the behavior of football teams, let's take a look at the more interesting results of prediction.

The model correctly predicted 58.7% of the winners in all of the Division I-A college bowl games played over the last eight years. As seen at the top of the next page, the model worked quite well in 1986. (The games marked by an "*" are quite close. More data on previous years can be found in Appendix D.)

Observations, Shortcomings and Conclusions

As previously mentioned, the model functions well when "looking back" to replay an entire collegiate season. Unfortunately, this really is of no particular use to anyone. The model should accurately predict post season games; if it can not do this well, it is not a correct model.

One of the shortcomings of the model is that there is no indication of how strongly one can place confidence on the model's prediction for any one simulated game. Given a group of ten games to predict, the model will usually predict six or more games correctly. But which six? And is there a way to say that a certain team has an N% chance of beating its opponent? These questions are beyond the capability of the current model. Maybe there is a method to answer the latter with this model, but it does not seem likely to this author.

1986 Prediction for the College Bowl Games

						<u>Actual</u>
L	31	Michigan	VS.	Arizona State	24	(15-22)
W	30	Nebraska	VS.	LSU	13	(30-15)*
W	38	Oklahoma	VS.	Arkansas	7	(42-8)*
W	27	Ohio State	VS.	Texas A&M	23	(28-12)
L	24	Washington	VS.	Alabama	10	(6-28)
W	3	Stanford	VS.	Clemson	31	(21-27)
W	17	Minnesota	VS.	Tennessee	21	(14-21)*
L	16	North Carolina				
		State	VS.	Virginia Tech	10	(24-25)
(T)	10	Colorado	VS.	Baylor	10	(9-21)
W	28	Penn State	VS.	Miami (F)	14	(14-10)*
W	3	USC	VS.	Auburn	31	(7-16)*
L	13	Boston College	VS.	Georgia	24	(27-24)
(T)	24	Iowa	VS.	San Diego State	24	(39-38)*
W	14	North Carolina	VS.	Arizona	38	(21-30)
W	10	BYU	VS.	UCLA	42	(10-31)*
W	24	Texas Tech	VS.	Mississippi	28	(17-20)*
W	23	Indiana	VS.	Florida State	24	(13-27)
L	35	Miami (O)	VS.	San Jose State	21	(7-37)

Another point is the interpretation of a game's predicted outcome. Currently, I am content that the model predicts the correct winner. Some games are close in actuality and are predicted as "blow-outs" -- where one team scores thirty (or more) points more than the other -- and vice versa. The "Las Vegas Line" is not always going to say the game is a toss up and ask you to pick your own winner. Unfortunately, one must consider what is called the point spread. One team is bound to be favored over the other and therefore to make this an even bet, points are given to the underdog. The favorite must defeat the underdog by more than this number of points, for the person betting on the favorite to win the bet. This model does not concern itself with the point favorite as of now, nor do I plan to do so. If the point spread is set for one team and the model chooses the other, then that is a game which might be considered for a wager; but then again, is it one of the six or more that are correct or one of those that is incorrect? What a catch-22!

Acknowledgements

I would like to thank my neighbor in youth, Pat Burke, for being older, wiser, and more knowledgeable in the field of prognostication. Without his superior insights, and my competitive nature, I would never have spent the time to find a more reliable, objective algorithm for predicting a football game's outcome. Special thanks must also go to one of my old associates, Michael Tamny, whose patient ear, constant criticism, drive for excellence and persistent pushes towards my writing about this model gave me the confidence that someone else might also desire to hear about it. I would also like to extend my thanks to Richard Cleary, Linda Halsted, and Vincent

Naramore for their careful reading of, and critical commenting on, this article.

Bibliography

Balci, Osman. "Credibility Assessment of Simulation Results: The State of the art," Technical Report 86-31, Department of Computer Science, Virginia Tech, November 1986.

Balci, Osman. "Guidelines for Successful Simulation Studies," Technical Report TR-85-2, Department of Computer Science, Virginia Tech, November 1985.

Dixon, Wilfrid and Massey, Frank. Introduction to Statistical Analysis, McGraw-Hill, 1969.

National Collegiate Athletic Association (NCAA) Official Football Guides, NCAA Publishing, 1966-1987.

Schaeffer, Richard and Mendenhall, William. Introduction to Probability, Duxbury Press, 1975.

Schriber, Thomas, Simulation Using GPSS, Wiley, 1974.

Wagner, Harvey. Principles of Operations Research, Prentice-Hall, 1975.

APPENDIX A

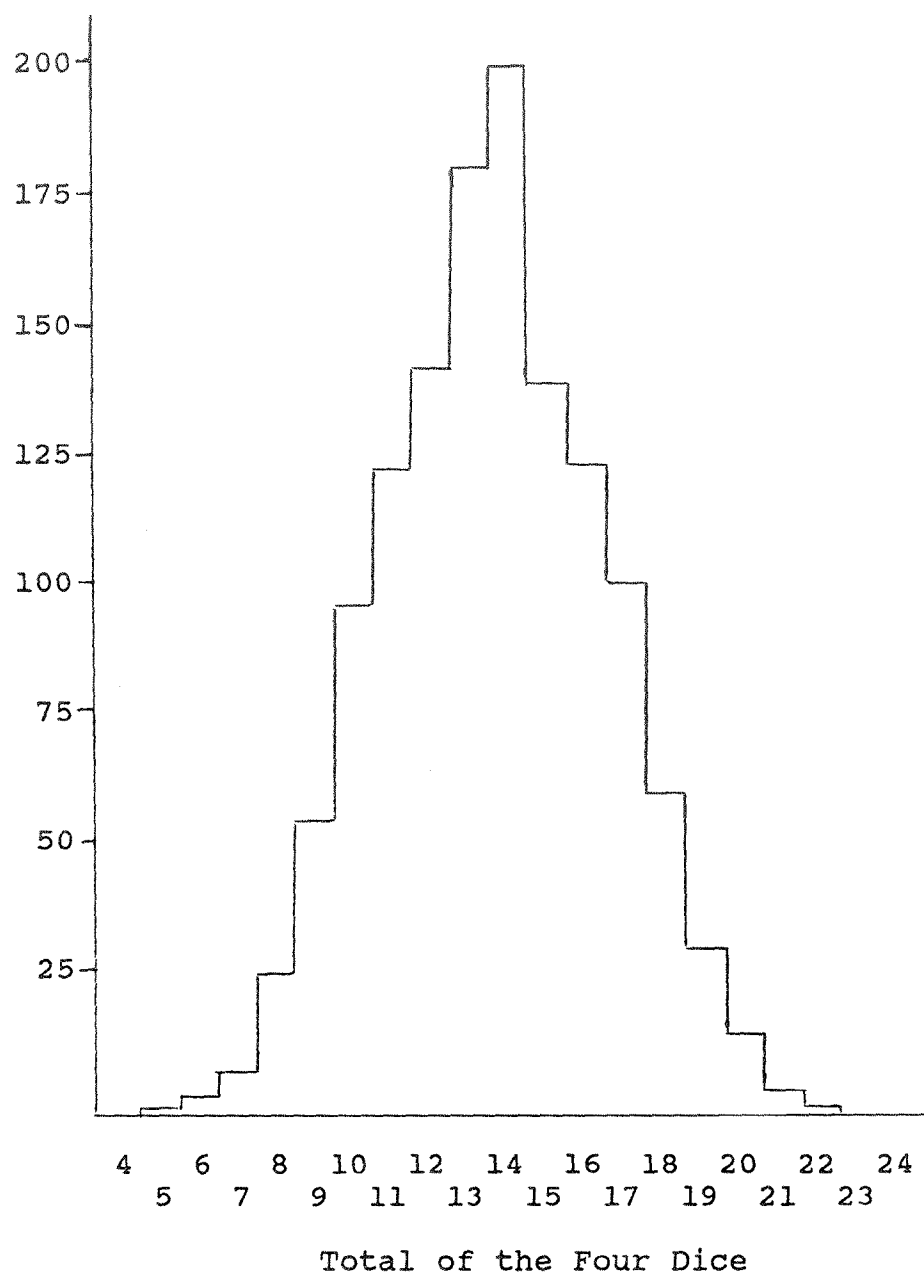
Empirical Justification of the Model's Translation Table

The translation table given earlier seems to work well in the model, but does it really yield the same distribution as when four regular six sided die are added together? The table below lists expected die throwing totals against observed offensive and defensive combinations for all games played in the college season of 1986. As one can easily see, the outcomes are not drastically different. The observed graph on the next page does seem to have fewer outlying values than the expected graph (which is two pages away) and that is due to the fact that not many college teams score forty-six points or more in their games. The graph does appear to be a little skewed on the lower side of fourteen but that is due to choosing six before eight, five before nine, etc. in the translation table. This bias was taken into account when the model's table was originally created. For example the running yardage for thirteen is minus one which is less than the yardage for fifteen which is zero (fourteen being the middle value in this distribution).

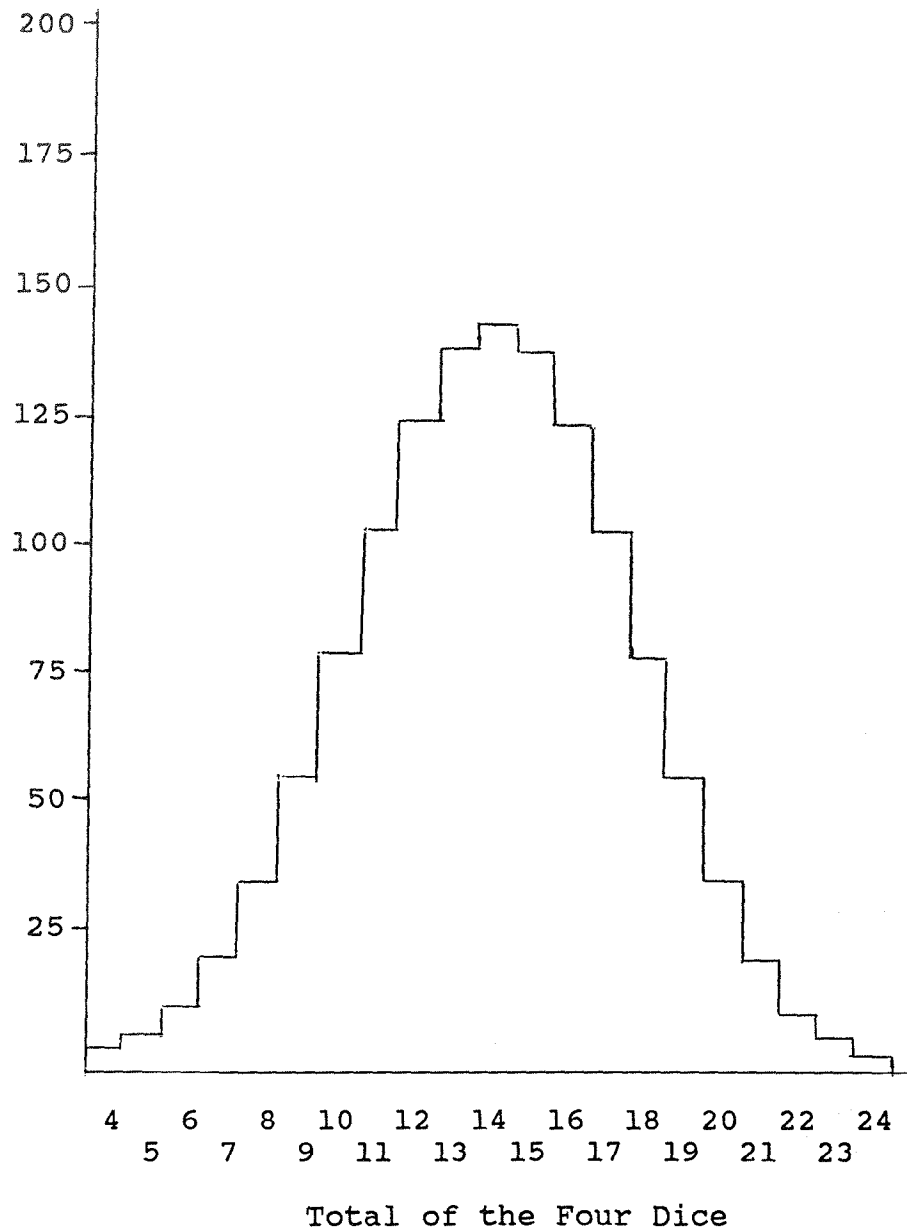
Comparison of Expected and Observed Values

Die Total	All Games in 1986	Normalized Totals From 1986	Expected Number	The Difference Between Them
4	18	0	1	1
5	60	1	4	3
6	305	3	10	7
7	880	9	20	11
8	2507	25	35	10
9	5263	54	56	2
10	9338	95	80	15
11	11813	120	104	16
12	14026	143	125	18
13	17718	180	140	40
14	19411	198	146	52
15	13742	140	140	0
16	11958	122	125	3
17	9896	101	104	3
18	5938	60	80	20
19	2709	28	56	28
20	1134	12	35	23
21	367	4	20	16
22	98	1	10	9
23	12	0	4	4
24	7	0	1	1

GRAPH OF OBSERVED VALUES



GRAPH OF EXPECTED VALUES



APPENDIX B

Summary of the Model's Results for All Teams Over Three Years

For the Year 1981

<u>Difference in Total of Actual and Predicted</u>	<u>Wins</u>	<u>Losses</u>	<u>Ties</u>
0	25	32	62
1	38	37	34
2	28	20	3
3	2	5	0
4	5	4	0
5	1	1	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
Averages Per Column	1.26	1.14	0.40

The total number of teams for this year was 99.

The average difference for yearly offensive and defensive total points was 34.020 and 34.242.

The maximum differences for offensive and defensive totals were 127 and 100.

The number of teams less than the average offensive difference was 56.

The number of teams less than the average defensive difference was 57.

The standard deviation for the offensive and defensive difference distribution was 24.08 and 23.77.

For the Year 1982

<u>Difference in Total of Actual and Predicted</u>	<u>Wins</u>	<u>Losses</u>	<u>Ties</u>
0	21	24	60
1	43	42	36
2	25	25	7
3	13	10	2
4	3	4	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
Averages Per Column	1.37	1.31	0.53

The total number of teams for this year was 105.
 The average difference for yearly offensive and defensive total points was 30.952 and 32.019.
 The maximum differences for offensive and defensive totals were 96 and 121.
 The number of teams less than the average offensive difference was 58.
 The number of teams less than the average defensive difference was 64.
 The standard deviation for the offensive and defensive difference distribution was 21.42 and 25.08.

For the Year 1986

<u>Difference in Total of Actual and Predicted</u>	<u>Wins</u>	<u>Losses</u>	<u>Ties</u>
0	21	31	46
1	46	45	48
2	25	19	10
3	12	9	1
4	0	1	0
5	0	0	0
6	1	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
Averages Per Column	1.31	1.09	0.68

The total number of teams for this year was 105.
 The average difference for yearly offensive and defensive total points was 34.286 and 28.648.
 The maximum differences for offensive and defensive totals were 94 and 90.
 The number of teams less than the average offensive difference was 61.
 The number of teams less than the average defensive difference was 55.
 The standard deviation for the offensive and defensive difference distribution was 23.77 and 22.70.

All teams categorized as Division I-A in 1981 are listed below.

These are the results predicted by the model. Actual results are inside (). Only games where each team is in Division I-A were simulated.

<u>Wins</u>	<u>Losses</u>	<u>Ties</u>	<u>Offensive</u>	<u>Defensive</u>	<u>Team Name</u>
6(4)	5(7)	0(0)	181(171)	201(252)	Air Force
9(9)	3(2)	0(1)	246(296)	102(151)	Alabama
7(6)	3(5)	1(0)	290(253)	174(205)	Arizona
8(9)	2(2)	1(0)	406(394)	235(193)	Arizona State
8(8)	4(4)	0(0)	297(325)	195(219)	Arkansas
1(0)	5(5)	0(1)	53(22)	119(140)	Army
4(4)	5(6)	1(0)	102(166)	152(166)	Auburn
3(3)	5(5)	0(0)	133(169)	200(206)	Baylor
3(3)	6(6)	0(0)	129(188)	217(253)	Boston College
12(11)	1(2)	0(0)	454(503)	222(256)	BYU
1(2)	10(9)	0(0)	143(197)	338(287)	California
3(1)	1(3)	0(0)	76(24)	34(47)	Central Michigan
4(4)	4(4)	0(0)	87(112)	139(141)	Cincinnati
9(11)	1(0)	1(0)	300(293)	83(95)	Clemson
0(3)	11(8)	0(0)	77(141)	349(322)	Colorado
0(0)	12(12)	0(0)	142(164)	491(502)	Colorado State
4(6)	7(5)	0(0)	149(210)	216(230)	Duke
2(1)	5(6)	0(0)	111(99)	183(224)	East Carolina
11(6)	0(5)	0(0)	268(249)	75(159)	Florida
1(5)	9(5)	0(0)	129(184)	301(255)	Florida State
6(5)	3(4)	0(0)	259(220)	178(256)	Fresno State
3(1)	5(7)	0(0)	97(111)	179(209)	Fullerton
9(10)	2(2)	1(0)	368(372)	94(122)	Georgia
0(1)	11(10)	0(0)	43(124)	372(309)	Georgia Tech
8(8)	2(2)	0(0)	329(307)	122(124)	Hawaii
9(7)	3(4)	0(1)	248(238)	120(174)	Houston
8(7)	3(4)	0(0)	273(287)	240(288)	Illinois
2(3)	9(8)	0(0)	122(144)	385(293)	Indiana
6(8)	6(4)	0(0)	298(260)	228(157)	Iowa
4(3)	5(5)	0(1)	120(144)	135(186)	Iowa State
6(7)	4(4)	1(0)	200(171)	120(179)	Kansas
1(1)	8(8)	0(0)	60(116)	274(269)	Kansas State
1(2)	9(8)	0(0)	52(106)	254(216)	Kentucky
2(1)	6(7)	0(0)	84(126)	165(207)	Long Beach
4(3)	4(5)	0(0)	148(106)	66(166)	Louisville
4(3)	6(7)	1(1)	141(169)	174(272)	LSU
6(4)	5(6)	0(1)	181(232)	176(194)	Maryland
2(1)	8(10)	1(0)	62(82)	177(209)	Memphis State
7(9)	4(2)	0(0)	194(245)	113(145)	Miami (F)
2(3)	3(2)	0(0)	66(51)	71(91)	Miami (O)
11(9)	1(3)	0(0)	353(355)	135(162)	Michigan
4(4)	5(6)	1(0)	243(253)	223(242)	Michigan State
5(5)	4(5)	1(0)	226(255)	188(247)	Minnesota
3(4)	7(6)	1(1)	117(167)	249(284)	Mississippi
7(8)	4(4)	1(0)	180(212)	108(137)	Mississippi State
10(8)	2(4)	0(0)	287(276)	92(159)	Missouri
6(4)	2(3)	0(1)	171(157)	91(153)	Navy

<u>Wins</u>	<u>Losses</u>	<u>Ties</u>	<u>Offensive</u>	<u>Defensive</u>	<u>Team Name</u>
11(9)	1(3)	0(0)	318(364)	105(125)	Nebraska
6(4)	5(7)	1(1)	254(225)	224(286)	New Mexico
1(1)	3(3)	0(0)	30(47)	77(79)	New Mexico State
11(10)	1(2)	0(0)	400(375)	78(150)	North Carolina
1(3)	9(7)	0(0)	101(155)	248(202)	North Carolina State
0(0)	11(11)	0(0)	70(82)	489(505)	Northwestern
7(5)	4(6)	0(0)	203(232)	161(160)	Notre Dame
9(9)	2(3)	1(0)	418(387)	258(253)	Ohio State
5(7)	7(4)	0(1)	237(341)	183(193)	Oklahoma
5(6)	6(5)	0(0)	142(188)	189(216)	Oklahoma State
2(2)	9(9)	0(0)	144(155)	319(247)	Oregon
0(1)	11(10)	0(0)	97(145)	458(469)	Oregon State
1(5)	9(6)	1(0)	43(170)	236(253)	Pacific
8(10)	4(2)	0(0)	281(371)	163(162)	Penn State
11(11)	1(1)	0(0)	384(385)	130(160)	Pittsburgh
1(5)	10(6)	0(0)	209(242)	310(241)	Purdue
0(4)	11(7)	0(0)	106(183)	348(347)	Rice
2(3)	7(6)	0(0)	68(95)	174(186)	Rutgers
6(6)	4(5)	1(0)	276(279)	187(227)	San Diego State
8(7)	2(3)	0(0)	298(311)	204(231)	San Jose State
7(7)	1(1)	0(0)	220(221)	126(103)	SMU
4(6)	7(6)	1(0)	122(225)	208(222)	South Carolina
6(5)	2(2)	0(1)	131(169)	54(75)	Southern Mississippi
0(0)	2(2)	0(0)	10(38)	47(68)	SW Louisiana
6(4)	3(7)	2(0)	353(314)	295(281)	Stanford
4(3)	6(6)	0(1)	201(201)	204(241)	Syracuse
3(1)	7(7)	0(2)	188(192)	214(183)	TCU
2(3)	5(4)	0(0)	84(101)	141(182)	Temple
5(8)	6(4)	1(0)	231(244)	233(265)	Tennessee
10(9)	1(1)	0(1)	227(239)	60(148)	Texas
6(6)	5(5)	0(0)	183(237)	192(196)	Texas A&M
2(1)	9(9)	0(1)	182(198)	325(298)	Texas Tech
5(4)	1(2)	0(0)	86(119)	74(111)	Toledo
8(6)	3(5)	0(0)	177(213)	79(144)	Tulane
3(3)	3(3)	0(0)	120(160)	108(94)	Tulsa
5(7)	6(4)	1(1)	265(302)	259(197)	UCLA
2(6)	8(5)	1(0)	260(309)	385(412)	UNLV
9(9)	2(3)	1(0)	334(294)	125(170)	USC
9(7)	1(2)	0(1)	344(275)	177(207)	Utah
4(4)	5(4)	0(1)	137(149)	158(142)	Utah State
1(1)	9(9)	0(0)	127(131)	386(404)	UTEP
3(3)	7(7)	0(0)	131(127)	212(261)	Vanderbilt
2(0)	7(10)	1(0)	84(114)	246(251)	Virginia
6(4)	1(3)	0(0)	177(123)	50(95)	Virginia Tech
1(2)	7(7)	1(0)	141(168)	271(329)	Wake Forest
11(10)	1(2)	0(0)	337(281)	124(171)	Washington
6(7)	3(3)	2(1)	277(297)	182(197)	Washington State
1(0)	3(4)	0(0)	43(56)	67(94)	Western Michigan
8(9)	4(3)	0(0)	263(284)	158(155)	West Virginia

<u>Wins</u>	<u>Losses</u>	<u>Ties</u>	<u>Offensive</u>	<u>Defensive</u>	<u>Team Name</u>
3(1)	1(3)	0(0)	123(87)	100(129)	Wichita State
5(7)	5(5)	2(0)	332(268)	226(191)	Wisconsin
7(8)	3(3)	1(0)	320(344)	202(203)	Wyoming

Division I-A Teams Simulated (Actual) Records and Statistics
for 1982:

<u>Wins</u>	<u>Losses</u>	<u>Ties</u>	<u>Offensive</u>	<u>Defensive</u>	<u>Team Name</u>
5(8)	5(5)	3(0)	343(395)	325(367)	Air Force
6(7)	5(4)	0(0)	260(304)	212(209)	Alabama
6(6)	5(4)	0(1)	279(311)	165(219)	Arizona
11(10)	1(2)	0(0)	325(294)	98(145)	Arizona State
8(9)	2(2)	2(1)	284(303)	104(139)	Arkansas
0(0)	7(7)	0(0)	36(60)	250(216)	Army
7(9)	4(3)	1(0)	244(274)	200(197)	Auburn
2(4)	6(5)	1(0)	85(125)	136(173)	Ball State
5(3)	5(6)	0(1)	214(212)	212(244)	Baylor
4(6)	6(3)	0(1)	190(255)	183(188)	Boston College
8(7)	2(5)	2(0)	205(265)	149(199)	BGU
10(8)	2(4)	0(0)	329(375)	185(214)	BYU
4(7)	6(4)	1(0)	239(220)	216(233)	California
2(5)	8(4)	0(1)	132(193)	202(189)	Central
					Michigan
3(4)	5(5)	1(0)	206(172)	190(203)	Cincinnati
8(8)	2(1)	0(1)	267(268)	107(137)	Clemson
0(2)	11(8)	0(1)	70(160)	324(301)	Colorado
4(4)	6(7)	1(0)	222(220)	214(267)	Colorado State
5(6)	6(5)	0(0)	302(307)	267(290)	Duke
3(2)	2(4)	1(0)	126(102)	127(163)	East Carolina
2(1)	7(7)	0(1)	46(66)	144(142)	Eastern
					Michigan
5(7)	3(4)	3(0)	261(219)	197(214)	Florida
10(8)	1(3)	0(0)	391(360)	225(246)	Florida State
7(8)	1(0)	0(0)	213(259)	122(159)	Fresno State
1(1)	7(7)	0(0)	67(78)	172(193)	Fullerton
8(11)	3(1)	1(0)	320(338)	147(160)	Georgia
3(5)	7(5)	0(0)	213(203)	256(279)	Georgia Tech
5(5)	4(5)	1(0)	161(200)	218(230)	Hawaii
3(4)	7(5)	0(1)	163(167)	308(259)	Houston
10(7)	2(5)	0(0)	370(338)	197(229)	Illinois
1(5)	9(6)	1(0)	173(203)	306(250)	Indiana
4(8)	7(4)	1(0)	177(229)	273(230)	Iowa
6(3)	2(6)	2(1)	170(178)	148(211)	Iowa State
3(2)	8(7)	0(2)	114(150)	265(276)	Kansas
4(5)	7(5)	0(1)	165(188)	145(177)	Kansas State
1(0)	9(10)	0(0)	63(93)	240(240)	Kent State
0(0)	11(10)	0(1)	22(96)	408(287)	Kentucky
5(6)	6(5)	0(0)	269(243)	250(294)	Long Beach
9(8)	3(3)	0(1)	430(385)	139(191)	LSU
2(2)	6(6)	0(0)	109(130)	257(322)	Louisville
6(7)	4(4)	1(0)	315(335)	210(220)	Maryland
1(0)	9(10)	0(0)	72(117)	278(284)	Memphis State
7(7)	4(4)	0(0)	201(241)	160(153)	Miami (F)

<u>Wins</u>	<u>Losses</u>	<u>Ties</u>	<u>Offensive</u>	<u>Defensive</u>	<u>Team Name</u>
9(6)	1(4)	0(0)	227(160)	43(104)	Miami (O)
5(8)	7(4)	0(0)	286(345)	233(204)	Michigan
4(2)	7(9)	0(0)	189(202)	254(242)	Michigan State
5(3)	6(8)	0(0)	250(247)	285(295)	Minnesota
2(4)	9(7)	0(0)	118(208)	290(262)	Mississippi
2(4)	7(6)	1(0)	125(221)	246(234)	Mississippi State
5(5)	4(4)	2(2)	176(207)	204(196)	Missouri
5(4)	3(5)	1(0)	161(153)	122(190)	Navy
11(12)	2(1)	0(0)	494(514)	124(167)	Nebraska
2(3)	9(8)	0(0)	228(246)	362(332)	UNLV
7(9)	1(1)	2(0)	322(354)	185(208)	New Mexico
0(0)	6(6)	0(0)	66(88)	234(241)	New Mexico State
9(8)	3(4)	0(0)	285(348)	168(149)	North Carolina
2(5)	7(5)	1(0)	156(180)	245(255)	North Carolina State
8(5)	1(5)	1(0)	150(137)	58(136)	Northern Illinois
1(3)	10(8)	0(0)	169(206)	318(379)	Northwestern
5(6)	3(4)	3(1)	132(206)	101(174)	Notre Dame
5(5)	5(5)	0(0)	139(137)	133(245)	Ohio U
10(9)	2(3)	0(0)	354(348)	191(208)	Ohio State
11(8)	1(4)	0(0)	336(317)	100(203)	Oklahoma
5(3)	5(5)	0(2)	207(214)	259(261)	Oklahoma State
2(2)	8(8)	1(1)	81(103)	286(223)	Oregon
1(0)	9(9)	0(0)	66(104)	318(296)	Oregon State
0(2)	8(6)	0(0)	122(146)	242(249)	Pacific
11(11)	0(1)	1(0)	370(395)	191(196)	Penn State
8(9)	4(3)	0(0)	337(300)	152(139)	Pittsburgh
2(3)	7(8)	2(0)	164(211)	254(324)	Purdue
1(0)	10(11)	0(0)	115(138)	380(361)	Rice
2(2)	6(6)	0(0)	84(106)	173(230)	Rutgers
4(7)	8(5)	0(0)	261(308)	355(320)	San Diego State
8(7)	2(3)	0(0)	299(291)	179(199)	San Jose State
2(3)	7(6)	0(0)	182(171)	218(221)	South Carolina
8(8)	2(3)	1(0)	258(302)	132(143)	USC
9(11)	1(0)	1(1)	347(354)	116(160)	SMU
7(6)	2(3)	0(0)	248(253)	142(140)	Southern Mississippi
2(1)	0(1)	0(1)	52(21)	20(50)	SW Louisiana
4(5)	7(6)	0(0)	284(328)	292(297)	Stanford
3(1)	7(9)	0(0)	134(110)	307(229)	Syracuse
4(3)	4(6)	1(0)	144(191)	179(178)	Temple
7(6)	4(5)	1(1)	286(281)	183(239)	Tennessee
9(9)	3(3)	0(0)	327(357)	158(170)	Texas
3(2)	8(10)	1(0)	203(177)	377(417)	UTEP
3(3)	6(6)	0(0)	188(187)	273(265)	Texas A&M
3(3)	8(8)	0(0)	171(203)	214(266)	TCU
3(4)	8(7)	0(0)	121(157)	261(234)	Texas Tech
4(5)	6(5)	0(0)	89(167)	114(153)	Toledo
5(4)	6(7)	0(0)	155(201)	284(271)	Tulane
5(5)	1(1)	0(0)	210(141)	92(120)	Tulsa
11(10)	1(1)	0(1)	419(399)	213(231)	UCLA

<u>Wins</u>	<u>Losses</u>	<u>Ties</u>	<u>Offensive</u>	<u>Defensive</u>	<u>Team Name</u>
8(4)	2(6)	0(0)	195(217)	115(176)	Utah
5(3)	3(5)	0(0)	128(121)	123(219)	Utah State
8(7)	3(4)	0(0)	251(266)	188(226)	Vanderbilt
0(1)	9(8)	0(0)	97(154)	316(293)	Virginia
5(3)	2(4)	0(0)	174(96)	95(126)	Virginia Tech
3(1)	6(8)	0(0)	135(138)	299(290)	Wake Forest
9(10)	3(2)	0(0)	324(354)	196(193)	Washington
1(2)	9(7)	0(1)	119(136)	267(241)	Washington State
6(8)	5(3)	0(0)	212(241)	206(172)	West Virginia
7(5)	2(2)	0(2)	152(124)	47(75)	Western Michigan
5(3)	1(3)	0(0)	165(122)	83(141)	Wichita State
9(7)	3(5)	0(0)	288(287)	234(252)	Wisconsin
5(5)	6(7)	1(0)	247(267)	257(280)	Wyoming

Division I-A Teams Simulated (Actual) Records and Statistics
for 1986:

<u>Wins</u>	<u>Losses</u>	<u>Ties</u>	<u>Offensive</u>	<u>Defensive</u>	<u>Team Name</u>
4(6)	7(5)	0(0)	232(229)	229(215)	Air Force
8(10)	3(3)	2(0)	317(351)	168(163)	Alabama
11(9)	0(3)	1(0)	379(352)	143(204)	Arizona
10(10)	2(1)	0(1)	333(379)	186(167)	Arizona State
10(9)	1(3)	1(0)	383(311)	125(184)	Arkansas
7(4)	1(4)	0(0)	243(165)	183(203)	Army
10(8)	0(2)	0(0)	285(306)	121(108)	Auburn
6(5)	4(5)	0(0)	210(183)	108(198)	Ball State
9(8)	1(3)	1(0)	296(287)	140(200)	Baylor
6(8)	4(3)	1(0)	242(282)	220(207)	Boston College
7(5)	4(6)	0(0)	208(148)	193(222)	BGU
8(8)	4(5)	1(0)	340(310)	234(236)	BYU
1(2)	10(9)	0(0)	94(145)	368(325)	California
4(4)	4(5)	1(0)	199(224)	227(263)	Central Michigan
3(4)	6(6)	1(0)	217(221)	308(331)	Cincinnati
8(7)	2(2)	1(2)	237(272)	139(187)	Clemson
6(6)	6(6)	0(0)	221(242)	205(193)	Colorado
6(5)	3(5)	1(0)	267(220)	241(223)	Colorado State
3(4)	8(7)	0(0)	217(200)	251(284)	Duke
0(1)	9(9)	1(0)	140(152)	411(331)	East Carolina
6(4)	3(5)	0(0)	234(180)	132(190)	Eastern Michigan
2(5)	7(5)	1(0)	106(185)	182(159)	Florida
7(7)	4(4)	1(1)	332(393)	268(218)	Florida State
9(7)	0(2)	0(0)	266(220)	111(148)	Fresno State
3(2)	6(7)	0(0)	209(205)	256(256)	Fullerton
5(7)	4(4)	1(0)	187(281)	194(220)	Georgia
4(4)	4(5)	1(0)	206(213)	157(188)	Georgia Tech
6(7)	6(5)	0(0)	224(238)	234(235)	Hawaii
2(1)	8(10)	1(0)	108(125)	258(267)	Houston
3(4)	7(7)	1(0)	161(189)	253(299)	Illinois
7(6)	5(6)	0(0)	274(273)	208(227)	Indiana

<u>Wins</u>	<u>Losses</u>	<u>Ties</u>	<u>Offensive</u>	<u>Defensive</u>	<u>Team Name</u>
10(9)	2(3)	0(0)	375(391)	222(214)	Iowa
5(5)	5(5)	0(0)	215(193)	250(235)	Iowa State
0(1)	9(8)	0(0)	72(57)	332(298)	Kansas
2(1)	6(8)	1(0)	123(99)	266(319)	Kansas State
3(4)	7(6)	0(0)	133(172)	183(271)	Kent State
2(5)	7(5)	2(1)	146(228)	204(207)	Kentucky
3(5)	6(5)	1(0)	213(215)	240(226)	Long Beach
9(9)	2(3)	1(0)	311(306)	164(185)	LSU
2(2)	7(8)	1(0)	186(134)	303(297)	Louisville
7(5)	4(5)	0(1)	230(262)	185(211)	Maryland
2(1)	8(9)	0(0)	115(94)	305(262)	Memphis State
10(11)	1(1)	1(0)	457(430)	148(150)	Miami (F)
11(8)	1(4)	0(0)	408(346)	143(228)	Miami (O)
9(11)	2(2)	2(0)	343(379)	201(203)	Michigan
6(6)	4(5)	1(0)	326(285)	164(197)	Michigan State
5(6)	7(6)	0(0)	240(261)	340(316)	Minnesota
6(8)	4(3)	1(0)	254(230)	149(157)	Mississippi
4(5)	5(5)	1(0)	162(171)	237(266)	Mississippi State
2(3)	8(8)	1(0)	172(196)	325(314)	Missouri
2(1)	5(6)	0(0)	145(112)	199(249)	Navy
10(10)	2(2)	0(0)	403(446)	198(165)	Nebraska
3(5)	5(4)	1(0)	227(221)	210(193)	UNLV
6(4)	5(8)	1(0)	349(317)	309(338)	New Mexico
1(1)	9(9)	0(0)	155(175)	362(396)	New Mexico State
7(6)	4(4)	0(1)	310(260)	198(265)	North Carolina
7(7)	4(3)	0(1)	267(297)	251(256)	North Carolina State
0(2)	10(8)	0(0)	75(144)	337(298)	Northern Illinois
3(3)	6(7)	1(0)	195(180)	250(251)	Northwestern
3(5)	6(6)	2(0)	248(299)	245(219)	Notre Dame
1(1)	9(9)	0(0)	109(189)	301(308)	Ohio U
8(10)	4(3)	1(0)	303(347)	178(179)	Ohio State
12(11)	0(1)	0(0)	549(508)	116(81)	Oklahoma
5(5)	4(5)	1(0)	163(158)	194(184)	Oklahoma State
3(5)	8(6)	0(0)	207(235)	304(338)	Oregon
1(2)	9(8)	0(0)	60(143)	285(270)	Oregon State
5(3)	4(6)	0(0)	214(199)	188(217)	Pacific
10(12)	0(0)	2(0)	336(340)	109(133)	Penn State
8(5)	3(5)	0(1)	254(253)	188(209)	Pittsburgh
1(3)	10(8)	0(0)	71(160)	390(335)	Purdue
1(3)	7(8)	1(0)	93(151)	329(285)	Rice
6(5)	5(5)	0(1)	183(221)	202(189)	Rutgers
5(8)	4(4)	3(0)	254(292)	278(279)	San Diego State
9(10)	3(2)	0(0)	373(397)	206(232)	San Jose State
3(2)	7(6)	0(2)	237(268)	268(262)	South Carolina
6(7)	6(5)	0(0)	229(264)	209(239)	USC
3(6)	8(5)	0(0)	184(245)	281(282)	SMU
2(5)	6(5)	2(0)	149(170)	236(233)	Southern Mississippi
5(3)	2(4)	0(0)	179(143)	75(134)	SW Louisiana
7(8)	5(4)	0(0)	228(279)	226(191)	Stanford

<u>Wins</u>	<u>Losses</u>	<u>Ties</u>	<u>Offensive</u>	<u>Defensive</u>	<u>Team Name</u>
2(5)	8(6)	1(0)	204(241)	261(266)	Syracuse
5(5)	4(5)	1(0)	246(259)	199(254)	Temple
8(7)	4(5)	0(0)	321(293)	215(249)	Tennessee
6(5)	5(6)	0(0)	223(229)	192(245)	Texas
3(3)	8(8)	0(0)	311(245)	369(362)	UTEP
7(8)	2(3)	2(0)	326(324)	192(187)	Texas A&M
2(3)	6(7)	2(0)	240(239)	341(352)	TCU
1(7)	9(5)	2(0)	179(271)	343(268)	Texas Tech
6(7)	4(4)	1(0)	227(216)	142(197)	Toledo
3(4)	6(7)	2(0)	236(265)	328(334)	Tulane
6(6)	3(3)	0(0)	202(225)	164(164)	Tulsa
9(8)	3(3)	0(1)	361(385)	181(222)	UCLA
2(2)	8(9)	1(0)	255(278)	399(444)	Utah
5(3)	5(8)	1(0)	167(134)	208(243)	Utah State
0(1)	10(10)	1(0)	111(193)	354(347)	Vanderbilt
0(3)	10(7)	0(0)	112(161)	345(274)	Virginia
8(7)	2(2)	0(1)	227(232)	109(188)	Virginia Tech
6(3)	3(6)	0(0)	258(273)	234(282)	Wake Forest
9(8)	3(3)	0(1)	374(378)	178(187)	Washington
4(3)	6(7)	1(1)	188(221)	320(312)	Washington State
3(4)	7(7)	1(0)	179(210)	285(286)	West Virginia
2(3)	9(8)	0(0)	109(183)	304(257)	Western Michigan
1(1)	6(6)	0(0)	126(86)	226(259)	Wichita State
2(3)	9(9)	1(0)	146(201)	261(266)	Wisconsin
9(6)	3(6)	0(0)	373(299)	232(272)	Wyoming

APPENDIX C

Results for Four Chosen Teams Over the Three Years Simulated

The model's predictions are listed below with the actual scores in (). These games were chosen to cover the different types of teams one encounters -- a perennial winner and loser, a middle of the pack team, and the team which gave the model the most trouble in predicting its performance.

Maryland was chosen as the team to best represent those teams that are around the fifty-fifty mark; they win as many as they lose.

1981:

(17)	24	Maryland	VS.	Vanderbilt	17	(23)
(17)	13	West Virginia	VS.	Maryland	6	(13)
(34)	38	Maryland	VS.	North Carolina State	7	(9)
(17)	24	Syracuse	VS.	Maryland	14	(17)
(10)	7	Maryland	VS.	Florida	27	(15)
(45)	31	Maryland	VS.	Wake Forest	17	(33)
(21)	3	Duke	VS.	Maryland	24	(24)
(17)	23	North Carolina	VS.	Maryland	3	(10)
(7)	13	Maryland	VS.	Tulane	7	(14)
(7)	7	Maryland	VS.	Clemson	31	(21)
(7)	7	Virginia	VS.	Maryland	17	(48)

Prediction	6-5-0	pts. for	181	pts. against	176
Actual	4-6-1	pts. for	232	pts. against	194

1982:

(31)	24	Maryland	VS.	Penn State	24	(39)
(18)	17	Maryland	VS.	West Virginia	21	(19)
(6)	3	North Carolina State	VS.	Maryland	38	(23)
(26)	45	Maryland	VS.	Syracuse	10	(3)
(31)	21	Wake Forest	VS.	Maryland	42	(52)
(22)	24	Duke	VS.	Maryland	34	(49)
(24)	14	Maryland	VS.	North Carolina	20	(31)
(17)	14	Miami (F)	VS.	Maryland	35	(18)
(24)	28	Clemson	VS.	Maryland	10	(22)
(45)	35	Maryland	VS.	Virginia	14	(14)
(20)	21	Maryland	VS.	Washington	31	(21)

Prediction	6-4-1	pts. for	315	pts. against	210
Actual	7-4-0	pts. for	335	pts. against	220

1986:

(10)	13	Maryland	VS.	Pittsburgh	14	(7)
(21)	6	Vanderbilt	VS.	Maryland	31	(35)
(24)	17	Maryland	VS.	West Virginia	12	(3)
(28)	14	North Carolina State	VS.	Maryland	24	(16)
(30)	19	Boston College	VS.	Maryland	24	(25)
(27)	31	Wake Forest	VS.	Maryland	28	(21)
(27)	24	Maryland	VS.	Duke	7	(19)
(30)	10	Maryland	VS.	North Carolina	35	(32)
(15)	7	Maryland	VS.	Penn State	28	(17)
(17)	13	Clemson	VS.	Maryland	14	(17)
(42)	38	Maryland	VS.	Virginia	6	(10)

Prediction	7-4-0	pts. for	230	pts. against	185
Actual	5-5-1	pts. for	262	pts. against	211

Of the chosen teams, Nebraska is the perennial powerhouse.

1981:

(7)	27	Nebraska	VS.	Iowa	6	(10)
(14)	20	Florida State	VS.	Nebraska	28	(34)
(30)	13	Penn State	VS.	Nebraska	17	(24)
(3)	7	Auburn	VS.	Nebraska	28	(17)
(0)	3	Colorado	VS.	Nebraska	44	(59)
(49)	45	Nebraska	VS.	Kansas State	0	(3)
(6)	17	Nebraska	VS.	Missouri	14	(0)
(15)	0	Kansas	VS.	Nebraska	17	(31)
(54)	30	Nebraska	VS.	Oklahoma State	6	(7)
(7)	6	Iowa State	VS.	Nebraska	28	(31)
(37)	17	Nebraska	VS.	Oklahoma	20	(14)
(15)	20	Nebraska	VS.	Clemson	10	(22)

Prediction	11-1	pts. for	318	pts. against	105
Actual	9-3	pts. for	364	pts. against	125

1982:

(7)	3	Iowa	VS.	Nebraska	51	(42)
(0)	6	New Mexico State	VS.	Nebraska	41	(68)
(24)	21	Nebraska	VS.	Penn State	31	(27)
(41)	49	Nebraska	VS.	Auburn	3	(7)
(40)	52	Nebraska	VS.	Colorado	3	(14)
(13)	13	Kansas State	VS.	Nebraska	31	(42)
(19)	3	Missouri	VS.	Nebraska	35	(23)
(52)	44	Nebraska	VS.	Kansas	7	(0)
(10)	10	Oklahoma State	VS.	Nebraska	35	(48)
(48)	42	Nebraska	VS.	Iowa State	7	(10)
(24)	14	Oklahoma	VS.	Nebraska	6	(28)
(37)	52	Nebraska	VS.	Hawaii	3	(16)
(21)	35	Nebraska	VS.	LSU	21	(20)

Prediction	11-2	pts. for	494	pts. against	124
Actual	12-1	pts. for	514	pts. against	167

1986:

(17)	28	Florida State	VS.	Nebraska	31	(34)
(59)	31	Nebraska	VS.	Illinois	6	(14)
(14)	9	Oregon	VS.	Nebraska	31	(48)
(27)	35	Nebraska	VS.	South Carolina	24	(24)
(10)	3	Oklahoma State	VS.	Nebraska	34	(30)
(17)	20	Missouri	VS.	Nebraska	42	(48)
(10)	34	Nebraska	VS.	Colorado	14	(20)
(0)	10	Kansas State	VS.	Nebraska	48	(38)
(35)	38	Nebraska	VS.	Iowa State	17	(14)
(70)	35	Nebraska	VS.	Kansas	6	(0)
(20)	34	Oklahoma	VS.	Nebraska	20	(17)
(30)	24	Nebraska	VS.	LSU	27	(15)

Prediction	10-2	pts. for	403	pts. against	198
Actual	10-2	pts. for	446	pts. against	165

The hardest team to pick for the three years of '81, '82, and '86 was Florida. In fact, in 1981 they were predicted to be 11-0 and were in reality 6-5. As one can see, even those games predicted incorrectly were not far from being right.

1981:

(20)	10	Florida	VS.	Miami (F)	6	(21)
(6)	0	Georgia Tech	VS.	Florida	28	(27)
(7)	14	Florida	VS.	Mississippi State	13	(28)
(10)	28	Florida	VS.	LSU	3	(24)
(10)	7	Maryland	VS.	Florida	27	(15)
(3)	3	Mississippi	VS.	Florida	37	(49)
(12)	27	Florida	VS.	Auburn	0	(14)
(26)	17	Georgia	VS.	Florida	21	(21)
(12)	3	Kentucky	VS.	Florida	31	(33)
(3)	13	Florida State	VS.	Florida	28	(35)
(26)	10	West Virginia	VS.	Florida	17	(6)

Prediction	11-0	pts. for	268	pts. against	75
Actual	6-5	pts. for	249	pts. against	159

1982:

(14)	28	Miami (F)	VS.	Florida	10	(17)
(9)	20	USC	VS.	Florida	24	(17)
(17)	21	Mississippi State	VS.	Florida	21	(27)
(13)	20	LSU	VS.	Florida	27	(24)
(29)	21	Florida	VS.	Vanderbilt	31	(31)
(17)	12	Auburn	VS.	Florida	10	(19)
(44)	24	Georgia	VS.	Florida	24	(0)

(21)	42	Florida	VS.	Tulane	7	(7)
(13)	27	Florida	VS.	Florida State	24	(10)
(24)	10	Florida	VS.	Arkansas	10	(28)

Prediction	5-3-3	pts. for	261	pts. against	197
Actual	7-4-0	pts. for	219	pts. against	214

1986:

(23)	34	Miami (F)	VS.	Florida	0	(15)
(7)	6	Florida	VS.	Alabama	14	(21)
(10)	10	Florida	VS.	Mississippi State	13	(16)
(28)	20	LSU	VS.	Florida	10	(17)
(9)	6	Kent State	VS.	Florida	10	(52)
(15)	17	Florida	VS.	Rutgers	3	(3)
(17)	20	Auburn	VS.	Florida	9	(18)
(31)	20	Georgia	VS.	Florida	14	(19)
(3)	14	Florida	VS.	Kentucky	14	(10)
(17)	16	Florida	VS.	Florida State	38	(13)

Prediction	2-7-1	pts. for	106	pts. against	182
Actual	5-5-1	pts. for	185	pts. against	159

And last but not least is the team which seems to be an underachiever -- the University of Texas at El Paso (UTEP).

1981:

(14)	24	New Mexico State	VS.	UTEP	6	(7)
(65)	50	BYU	VS.	UTEP	10	(8)
(10)	23	UTEP	VS.	Utah	31	(38)
(3)	3	UTEP	VS.	New Mexico	31	(26)
(29)	35	Colorado State	VS.	UTEP	45	(35)
(15)	10	UTEP	VS.	Arizona	28	(48)
(35)	63	Hawaii	VS.	UTEP	0	(7)
(14)	3	UTEP	VS.	San Diego State	41	(59)
(12)	10	UTEP	VS.	Wyoming	45	(63)
(27)	38	UNLV	VS.	UTEP	17	(20)

Prediction	1-9	pts. for	127	pts. against	386
Actual	1-9	pts. for	131	pts. against	404

1982:

(20)	35	UTEP	VS.	New Mexico State	17	(17)
(0)	6	UTEP	VS.	Washington	41	(55)
(31)	35	SMU	VS.	UTEP	0	(10)
(10)	17	UTEP	VS.	Hawaii	27	(17)
(3)	13	UTEP	VS.	BYU	41	(51)
(21)	31	UTEP	VS.	UNLV	27	(28)
(7)	6	UTEP	VS.	Arizona State	45	(37)
(35)	28	Air Force	VS.	UTEP	31	(7)
(13)	21	UTEP	VS.	Colorado State	30	(38)

(31)	27	New Mexico	VS.	UTEP	27	(18)
(45)	31	Utah	VS.	UTEP	6	(30)
(32)	28	Wyoming	VS.	UTEP	10	(39)

Prediction	3-8-1	pts. for	203	pts. against	377
Actual	2-10-0	pts. for	177	pts. against	417

1986:

(23)	35	Air Force	VS.	UTEP	31	(21)
(47)	35	UTEP	VS.	New Mexico State	31	(33)
(21)	24	UTEP	VS.	Hawaii	31	(31)
(69)	34	Iowa	VS.	UTEP	24	(7)
(16)	21	UTEP	VS.	Tennessee	38	(26)
(22)	34	UTEP	VS.	New Mexico	42	(24)
(15)	20	San Diego State	VS.	UTEP	21	(10)
(13)	35	UTEP	VS.	BYU	28	(37)
(12)	27	UTEP	VS.	Wyoming	35	(41)
(19)	31	Colorado State	VS.	UTEP	28	(21)
(44)	44	Utah	VS.	UTEP	31	(55)

Prediction	3-8	pts. for	311	pts. against	369
Actual	3-8	pts. for	245	pts. against	362

APPENDIX D

Bowl Game Predictions Since 1979

Listed below are the model's results, with the "W" depicting a correctly chosen victor, a "L" is an incorrect choice, a "T" is when the teams really did end up in a tie, and a "(T)" is when the model predicted a tie which did not occur. The combined win-loss-tie-(tie) record for the eight years listed below is 74-52-2-(4) which yields a winning percentage of 58.7%.

1986 OVERALL 11-5-(2)

L	31	Michigan	VS.	Arizona State	24	(15-22)
W	30	Nebraska	VS.	LSU	13	(30-15)
W	38	Oklahoma	VS.	Arkansas	7	(42- 8)
W	27	Ohio State	VS.	Texas A&M	23	(28-12)
L	24	Washington	VS.	Alabama	10	(6-28)
W	3	Stanford	VS.	Clemson	31	(21-27)
W	17	Minnesota	VS.	Tennessee	21	(14-21)
L	16	North Carolina				
		State	VS.	Virginia Tech	10	(24-25)
(T)	10	Colorado	VS.	Baylor	10	(9-21)
W	28	Penn State	VS.	Miami (F)	14	(14-10)
W	3	USC	VS.	Auburn	31	(7-16)
L	13	Boston College	VS.	Georgia	24	(27-24)
(T)	24	Iowa	VS.	San Diego State	24	(39-38)
W	14	North Carolina	VS.	Arizona	38	(21-30)
W	10	BYU	VS.	UCLA	42	(10-31)
W	24	Texas Tech	VS.	Mississippi	28	(17-20)
W	23	Indiana	VS.	Florida State	24	(13-27)
L	35	Miami (O)	VS.	San Jose State	21	(7-37)

1985 OVERALL 9-8-1

W	14	Iowa	VS.	UCLA	24	(28-45)
L	23	Miami (F)	VS.	Tennessee	14	(7-35)
W	3	Penn State	VS.	Oklahoma	24	(10-25)
W	20	Auburn	VS.	Texas A&M	21	(16-36)
T	10	Georgia	VS.	Arizona	17	(13-13)
W	21	Oklahoma State	VS.	Florida State	42	(23-34)
L	3	Baylor	VS.	LSU	10	(21- 7)
W	45	Air Force	VS.	Texas	3	(24-16)
W	41	Army	VS.	Illinois	35	(31-29)
L	20	Michigan	VS.	Nebraska	24	(27-23)
L	42	BYU	VS.	Ohio State	17	(7-10)
W	3	Michigan State	VS.	Georgia Tech	10	(14-17)
W	17	Arkansas	VS.	Arizona State	0	(18-17)
W	24	Minnesota	VS.	Clemson	21	(20-13)
L	10	Alabama	VS.	USC	16	(24- 3)
L	7	Washington	VS.	Colorado	24	(20-17)
L	10	Maryland	VS.	Syracuse	21	(35-18)
L	35	Bowling Green	VS.	Fresno State	34	(7-51)

1984

OVERALL 11-6-1

L	35	Ohio State	VS.	USC	3	(17-20)
W	35	Nebraska	VS.	LSU	17	(28-10)
W	10	Washington	VS.	Oklahoma	7	(28-17)
L	14	Boston College	VS.	Houston	21	(45-28)
W	21	Tennessee	VS.	Maryland	34	(27-28)
W	28	Oklahoma State	VS.	South Carolina	9	(21-14)
W	28	Auburn	VS.	Arkansas	27	(21-15)
L	13	West Virginia	VS.	TCU	34	(31-14)
W	20	Purdue	VS.	Virginia	31	(24-27)
W	21	Miami (F)	VS.	UCLA	24	(37-39)
T	14	Georgia	VS.	Florida State	23	(17-17)
L	21	Wisconsin	VS.	Kentucky	10	(19-20)
W	17	Michigan	VS.	BYU	28	(17-24)
W	14	Virginia Tech	VS.	Air Force	24	(7-23)
L	14	Toledo	VS.	UNLV	9	(13-30)
W	17	Notre Dame	VS.	SMU	24	(20-27)
L	16	Iowa	VS.	Texas	17	(55-17)
W	35	Army	VS.	Michigan State	0	(10- 6)

1983

OVERALL 9-7

L	24	Illinois	VS.	UCLA	17	(9-45)
L	28	Michigan	VS.	Auburn	13	(7- 9)
L	40	Nebraska	VS.	Miami (F)	17	(30-31)
L	6	Georgia	VS.	Texas	28	(10- 9)
L	7	Alabama	VS.	SMU	23	(28- 7)
L	27	Iowa	VS.	Florida	7	(6-14)
W	21	Boston College	VS.	Notre Dame	28	(18-19)
W	28	Oklahoma State	VS.	Baylor	27	(24-14)
W	17	North Carolina	VS.	Florida State	30	(3-28)
W	17	Pittsburgh	VS.	Ohio State	20	(23-28)
W	10	Maryland	VS.	Tennessee	16	(23-30)
W	20	West Virginia	VS.	Kentucky	17	(20-16)
W	19	Missouri	VS.	BYU	45	(17-21)
W	31	Airforce	VS.	Mississippi	14	(9- 3)
W	21	Northern				
		Illinois	VS.	Fullerton State	20	(20-13)
L	3	Penn State	VS.	Washington	31	(13-10)

1982

OVERALL

8-8

W	31	Michigan	VS.	UCLA	35	(14-24)
W	27	Penn State	VS.	Georgia	16	(27-23)
W	24	Nebraska	VS.	LSU	10	(21-20)
L	17	Pittsburgh	VS.	SMU	14	(3- 7)
L	17	North Carolina	VS.	Texas	20	(26-10)
L	31	West Virginia	VS.	Florida State	24	(12-31)
W	24	Illinois	VS.	Alabama	28	(15-21)
W	6	Florida	VS.	Arkansas	14	(24-28)
L	10	Iowa	VS.	Tennessee	27	(28-22)
W	10	Oklahoma	VS.	Arizona State	14	(21-32)
L	20	Boston College	VS.	Auburn	10	(26-33)
L	17	Air Force	VS.	Vanderbilt	42	(36-28)
W	25	Ohio State	VS.	BYU	10	(47-17)
L	10	Wisconsin	VS.	Kansas State	14	(3-14)
L	21	BGU	VS.	Fresno State	7	(28-29)
W	17	Maryland	VS.	Washington	31	(20-21)

1981

OVERALL

8-7-(1)

L	17	Iowa	VS.	Washington	14	(0-28)
W	30	Pittsburgh	VS.	Georgia	10	(24-20)
L	28	Nebraska	VS.	Clemson	24	(15-22)
W	7	Alabama	VS.	Texas	24	(12-14)
L	17	Houston	VS.	Oklahoma	14	(14-40)
W	10	Arkansas	VS.	North Carolina	34	(27-31)
W	20	Ohio State	VS.	Navy	14	(31-28)
W	17	UCLA	VS.	Michigan	24	(14-33)
W	16	West Virginia	VS.	Florida	10	(26-10)
L	10	Penn State	VS.	USC	24	(26-10)
L	10	Missouri	VS.	Southern		
				Mississippi	17	(19-17)
W	7	Kansas	VS.	Mississippi State	13	(0-10)
W	24	Washington State	VS.	BYU	31	(36-38)
L	17	Wisconsin	VS.	Tennessee	10	(21-28)
(T)	6	Oklahoma State	VS.	Texas A&M	6	(16-33)
L	13	Toledo	VS.	San Jose State	28	(27-25)

1980

OVERALL 10-3-(1)

W	27	Michigan	VS.	Washington	14	(23- 6)
W	0	Notre Dame	VS.	Georgia	14	(10-17)
W	20	Oklahoma	VS.	Florida State	13	(18-17)
W	35	Alabama	VS.	Baylor	0	(30- 2)
W	13	Mississippi State	VS.	Nebraska	35	(17-31)
W	28	Pittsburgh	VS.	South Carolina	10	(37- 9)
L	17	Purdue	VS.	Missouri	31	(28-25)
W	14	North Carolina	VS.	Texas	10	(16- 7)
(T)	28	Penn State	VS.	Ohio State	28	(31-19)
W	17	Miami (F)	VS.	Virginia Tech	3	(20-10)
L	17	Maryland	VS.	Florida	3	(20-35)
W	24	Arkansas	VS.	Tulane	10	(34-15)
W	10	SMU	VS.	BYU	38	(45-46)
L	14	Houston	VS.	Navy	17	(35- 0)

1979

OVERALL 8-6

W	17	Ohio State	VS.	USC	20	(16-17)
W	0	Arkansas	VS.	Alabama	24	(9-24)
W	27	Oklahoma	VS.	Florida State	17	(24- 7)
W	7	Nebraska	VS.	Houston	27	(14-17)
L	0	Washington	VS.	Texas	9	(14- 7)
L	17	Michigan	VS.	North Carolina	16	(15-17)
L	10	Penn State	VS.	Tulane	30	(9- 6)
L	20	Purdue	VS.	Tennessee	24	(27-22)
L	3	Baylor	VS.	Clemson	20	(24-18)
W	31	Pittsburgh	VS.	Arizona	3	(16-10)
W	21	LSU	VS.	Wake Forest	10	(34-10)
W	17	Missouri	VS.	South Carolina	14	(24-14)
L	6	Indiana	VS.	BYU	31	(38-37)
W	6	California	VS.	Temple	21	(17-28)