

485 paper 3

2025-04-17

Overview

Paper 3 appendix provides Bradley-Terry models to rank NCAA women's basketball teams for the 2024-2025 season using the provided win-loss data for Division 1 contests. 1. We fit a plain-vanilla Bradley-Terry model. 2. We fit a model using a penalized form of logistic regression. 3. We then fit a model to account for game location (additional parameter permitting an increased (or decreased) probability of winning and measuring relative strengths of teams at the end of the regular season. 4. We then choose model 3 and rank the teams while also checking Michigan's odds against each of the 3 teams it played or it could have played in the first 2 rounds of the tournament. 5. We are finding the standard error of each rival team pair (3 in total) and adding a correction that controls the familywise type 1 error rate

```
womens <- read.csv("http://stat.lsa.umich.edu/~bbh/s485/data/cbb-womens-2025-03-16.csv")
womens$date <- as.Date(womens$date)
```

1

```
model_1 <- glm(formula = home_win ~ . - 1 - Abilene.Christian,
               family = binomial, data = womens)
summary(model_1)
```

```
##
## Call:
## glm(formula = home_win ~ . - 1 - Abilene.Christian, family = binomial,
##      data = womens)
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## date              2.024e-05  1.975e-06  10.248  < 2e-16 ***
## Air.Force         -1.591e-02   7.198e-01  -0.022  0.982367
## Akron             -1.760e+00   7.492e-01  -2.350  0.018798 *
## Alabama            4.785e+00   8.613e-01   5.556  2.76e-08 ***
## Alabama.A.M        -7.895e-01   7.615e-01  -1.037  0.299859
## Alabama.State      -4.365e+00   9.638e-01  -4.529  5.92e-06 ***
## Alaska.Anchorage    5.526e-02   1.554e+00   0.036  0.971627
## Alcorn.State       -2.158e+00   8.116e-01  -2.659  0.007835 **
## American.University -4.657e+00   1.193e+00  -3.904  9.48e-05 ***
## App.State          -6.602e-01   7.260e-01  -0.909  0.363104
## Arizona            2.745e+00   7.491e-01   3.664  0.000248 ***
## Arizona.State       7.437e-01   7.393e-01   1.006  0.314426
## Arkansas            8.987e-01   7.529e-01   1.194  0.232612
## Arkansas.Baptist    -2.122e+01   1.606e+03  -0.013  0.989460
```

## Arkansas.State	3.680e-01	7.087e-01	0.519	0.603541	
## Arkansas.Pine.Bluff	-5.808e+00	1.282e+00	-4.530	5.89e-06	***
## Arlington.Baptist	-1.766e+01	2.765e+03	-0.006	0.994905	
## Army	6.477e-01	7.766e-01	0.834	0.404268	
## Auburn	1.815e+00	8.039e-01	2.258	0.023930	*
## Austin.Peay	-1.272e+00	7.368e-01	-1.726	0.084346	.
## Ball.State	2.789e+00	8.421e-01	3.312	0.000926	***
## Baylor	4.931e+00	8.340e-01	5.913	3.37e-09	***
## Bellarmine	-8.197e-01	7.189e-01	-1.140	0.254183	
## Bellevue.University	-1.789e+01	2.773e+03	-0.006	0.994853	
## Belmont	2.106e+00	7.764e-01	2.712	0.006681	**
## Berry	-1.823e+01	2.707e+03	-0.007	0.994627	
## Bethel..TN.	-9.709e-01	1.569e+00	-0.619	0.535959	
## Bethesda.University	-1.884e+01	1.282e+03	-0.015	0.988274	
## Bethune.Cookman	-3.200e+00	8.114e-01	-3.944	8.00e-05	***
## Binghamton	-1.509e+00	7.555e-01	-1.997	0.045844	*
## Boise.State	3.541e-01	7.154e-01	0.495	0.620675	
## Boston.College	1.898e+00	7.741e-01	2.451	0.014228	*
## Boston.University	-1.698e+00	7.871e-01	-2.157	0.031023	*
## Bowie.State	-1.881e+01	2.085e+03	-0.009	0.992803	
## Bowling.Green	6.056e-01	7.397e-01	0.819	0.412944	
## Bradley	-9.606e-01	7.645e-01	-1.257	0.208925	
## Brown	-3.123e-01	8.167e-01	-0.382	0.702196	
## Bryant	-9.995e-01	7.510e-01	-1.331	0.183199	
## Bryn.Athyn	-1.823e+01	2.695e+03	-0.007	0.994603	
## Bucknell	-2.730e-01	7.428e-01	-0.368	0.713234	
## Buffalo	1.503e+00	7.971e-01	1.885	0.059364	.
## Butler	1.240e+00	7.897e-01	1.570	0.116468	
## BYU	1.422e+00	7.457e-01	1.908	0.056434	.
## Cal.Maritime	-1.733e+01	2.787e+03	-0.006	0.995038	
## Cal.Poly	-1.483e+00	7.600e-01	-1.952	0.050947	.
## Cal.State.Bakersfield	-4.784e+00	1.059e+00	-4.517	6.26e-06	***
## Cal.State.Fullerton	-3.544e+00	9.050e-01	-3.916	9.00e-05	***
## Cal.State.Northridge	-4.138e+00	9.837e-01	-4.207	2.59e-05	***
## Cal.State.San.Marcos	-1.787e+01	2.369e+03	-0.008	0.993982	
## California	4.569e+00	8.123e-01	5.625	1.86e-08	***
## California.Baptist	-9.774e-01	6.673e-01	-1.465	0.142998	
## Campbell	-3.699e-01	7.227e-01	-0.512	0.608747	
## Canisius	-2.311e+00	7.603e-01	-3.039	0.002370	**
## Cedarville	-1.796e+01	2.384e+03	-0.008	0.993990	
## Central.Arkansas	4.714e-01	7.630e-01	0.618	0.536707	
## Central.Baptist.College	-1.758e+01	1.876e+03	-0.009	0.992524	
## Central.Connecticut	-3.846e+00	8.634e-01	-4.454	8.42e-06	***
## Central.Michigan	-3.437e-01	7.471e-01	-0.460	0.645499	
## Charleston	1.906e-01	7.527e-01	0.253	0.800135	
## Charleston.Southern	-2.134e+00	7.870e-01	-2.711	0.006701	**
## Charlotte	-7.901e-01	7.516e-01	-1.051	0.293185	
## Chattanooga	-6.549e-01	7.452e-01	-0.879	0.379528	
## Cheyney..PA.	-2.285e+01	2.347e+03	-0.010	0.992231	
## Chicago.State	-4.411e+00	8.973e-01	-4.916	8.85e-07	***
## Cincinnati	2.311e+00	7.762e-01	2.977	0.002911	**
## Cleary.University	-1.856e+01	2.224e+03	-0.008	0.993339	
## Clemson	2.163e+00	7.829e-01	2.763	0.005733	**
## Cleveland.State	3.533e-02	7.889e-01	0.045	0.964282	

## Clinton.College	-1.983e+01	2.053e+03	-0.010	0.992293	
## Coastal.Carolina	1.108e+00	7.887e-01	1.405	0.160110	
## Coastal.Georgia	-2.000e+01	2.514e+03	-0.008	0.993655	
## Colgate	9.783e-02	7.907e-01	0.124	0.901530	
## College.Of.Biblical.Studies	-1.951e+01	2.713e+03	-0.007	0.994265	
## Colorado	3.146e+00	7.881e-01	3.991	6.57e-05	***
## Colorado.Christian	4.725e-01	2.062e+00	0.229	0.818707	
## Colorado.State	1.408e+00	7.012e-01	2.008	0.044660	*
## Columbia	3.465e+00	8.800e-01	3.937	8.25e-05	***
## Coppin.State	-2.733e-01	7.998e-01	-0.342	0.732602	
## Cornell	-1.734e+00	8.206e-01	-2.113	0.034583	*
## Creighton	5.129e+00	9.366e-01	5.476	4.35e-08	***
## Cumberland..TN.	-1.883e+01	2.772e+03	-0.007	0.994580	
## Dakota.Wesleyan	-1.554e+01	2.364e+03	-0.007	0.994757	
## Dartmouth	-2.244e+00	8.438e-01	-2.659	0.007835	**
## Davidson	1.274e+00	7.493e-01	1.700	0.089165	.
## Davis...Elkins	-2.078e+01	2.386e+03	-0.009	0.993050	
## Dayton	3.799e-01	7.342e-01	0.517	0.604891	
## Defiance	-1.602e+01	2.706e+03	-0.006	0.995276	
## Delaware	-1.351e+00	7.095e-01	-1.905	0.056800	.
## Delaware.State	-6.732e+00	1.502e+00	-4.483	7.35e-06	***
## Delta.State	-1.881e+01	2.357e+03	-0.008	0.993633	
## Denver	-1.642e+00	7.368e-01	-2.228	0.025855	*
## DePaul	1.244e+00	7.652e-01	1.626	0.103877	
## Detroit.Mercy	-1.191e+00	7.603e-01	-1.567	0.117170	
## Drake	1.770e+00	7.486e-01	2.364	0.018060	*
## Drexel	-5.855e-01	7.343e-01	-0.797	0.425248	
## Duke	5.941e+00	8.217e-01	7.230	4.82e-13	***
## Duquesne	5.839e-01	7.355e-01	0.794	0.427219	
## East.Carolina	6.433e-01	7.260e-01	0.886	0.375574	
## East.Tennessee.State	-7.853e-01	7.551e-01	-1.040	0.298342	
## East.Texas.A.M	-3.008e+00	8.530e-01	-3.526	0.000422	***
## Eastern.Illinois	-9.781e-03	7.829e-01	-0.012	0.990032	
## Eastern.Kentucky	-4.352e-01	7.443e-01	-0.585	0.558734	
## Eastern.Michigan	-3.174e+00	9.425e-01	-3.368	0.000758	***
## Eastern.New.Mexico	-1.772e+01	2.640e+03	-0.007	0.994643	
## Eastern.Washington	-1.129e+00	7.513e-01	-1.503	0.132770	
## Edward.Waters	-1.816e+01	2.796e+03	-0.006	0.994819	
## Elon	-1.109e+00	7.151e-01	-1.552	0.120777	
## Erskine	-1.798e+01	2.250e+03	-0.008	0.993623	
## Evansville	-2.663e+00	8.192e-01	-3.251	0.001152	**
## Evergreen.State	-2.013e+01	2.355e+03	-0.009	0.993181	
## Fairfield	2.824e+00	9.365e-01	3.016	0.002561	**
## Fairleigh.Dickinson	1.168e+00	1.143e+00	1.022	0.306771	
## Faulkner	-2.089e+01	2.657e+03	-0.008	0.993726	
## Fisk	-1.850e+01	2.780e+03	-0.007	0.994690	
## Florida	2.581e+00	8.073e-01	3.197	0.001387	**
## Florida.A.M	-3.185e+00	8.285e-01	-3.845	0.000121	***
## Florida.Atlantic	-1.029e+00	7.200e-01	-1.429	0.152976	
## Florida.Gulf.Coast	2.570e+00	9.386e-01	2.738	0.006179	**
## Florida.International	-1.166e+00	6.816e-01	-1.711	0.087096	.
## Florida.State	4.546e+00	8.104e-01	5.609	2.03e-08	***
## Fordham	-2.018e-01	7.411e-01	-0.272	0.785375	
## Fort.Lauderdale	-1.962e+01	2.583e+03	-0.008	0.993939	

## Fresno.State	3.162e-01	7.239e-01	0.437	0.662246	
## Furman	-1.121e+00	7.466e-01	-1.502	0.133097	
## Gardner.Webb	-2.938e+00	7.839e-01	-3.748	0.000178	***
## George.Mason	2.475e+00	8.419e-01	2.940	0.003284	**
## George.Washington	-1.003e+00	7.198e-01	-1.394	0.163373	
## Georgetown	1.052e+00	7.521e-01	1.399	0.161819	
## Georgia	1.338e+00	7.984e-01	1.676	0.093772	.
## Georgia.Southern	-9.137e-01	6.984e-01	-1.308	0.190765	
## Georgia.State	-2.291e-01	7.144e-01	-0.321	0.748434	
## Georgia.Tech	4.186e+00	7.927e-01	5.280	1.29e-07	***
## Georgian.Court.University	-2.290e+01	2.403e+03	-0.010	0.992396	
## Gonzaga	1.796e+00	7.247e-01	2.478	0.013214	*
## Grambling	-1.902e+00	8.204e-01	-2.318	0.020440	*
## Grand.Canyon	3.724e+00	1.055e+00	3.530	0.000415	***
## Green.Bay	2.162e+00	8.766e-01	2.466	0.013670	*
## Guilford	-1.799e+01	2.764e+03	-0.007	0.994806	
## Hampton	-2.651e+00	7.727e-01	-3.431	0.000601	***
## Harvard	3.840e+00	9.189e-01	4.179	2.93e-05	***
## Hawai.i	2.079e-01	7.595e-01	0.274	0.784296	
## High.Point	-1.184e+00	7.655e-01	-1.547	0.121859	
## Hofstra	-1.365e+00	7.134e-01	-1.914	0.055677	.
## Holy.Cross	1.539e-01	7.603e-01	0.202	0.839568	
## Houston	-9.591e-01	8.902e-01	-1.077	0.281296	
## Houston.Christian	-3.266e+00	8.718e-01	-3.746	0.000180	***
## Howard	5.913e-02	7.655e-01	0.077	0.938432	
## Idaho	-1.138e-01	7.288e-01	-0.156	0.875900	
## Idaho.State	-4.802e-01	7.234e-01	-0.664	0.506760	
## Illinois	4.487e+00	8.221e-01	5.458	4.82e-08	***
## Illinois.State	7.756e-01	7.506e-01	1.033	0.301477	
## Incarnate.Word	-4.355e-01	7.635e-01	-0.570	0.568408	
## Indiana	4.336e+00	7.872e-01	5.509	3.62e-08	***
## Indiana.State	-2.906e+00	8.758e-01	-3.318	0.000908	***
## Indiana.Southeast	-1.760e+01	2.756e+03	-0.006	0.994904	
## Iona	-2.104e+00	7.478e-01	-2.813	0.004907	**
## Iowa	4.797e+00	7.954e-01	6.031	1.63e-09	***
## Iowa.State	3.694e+00	8.031e-01	4.600	4.23e-06	***
## IU.Columbus	-1.961e+01	2.786e+03	-0.007	0.994384	
## IU.Indianapolis	-2.231e+00	7.700e-01	-2.897	0.003766	**
## Jackson.State	-1.537e+00	7.849e-01	-1.958	0.050270	.
## Jacksonville	-9.397e-01	7.402e-01	-1.270	0.204254	
## Jacksonville.State	-1.404e+00	7.389e-01	-1.900	0.057457	.
## James.Madison	3.379e+00	9.535e-01	3.544	0.000395	***
## Jarvis.Christian	-1.928e+01	2.038e+03	-0.009	0.992453	
## Jessup.University	-1.775e+01	2.764e+03	-0.006	0.994877	
## Johnson...Wales..NC.	-1.968e+01	2.788e+03	-0.007	0.994370	
## Johnson.C.Smith	-1.884e+01	2.100e+03	-0.009	0.992843	
## Kansas	2.394e+00	7.767e-01	3.082	0.002054	**
## Kansas.City	-1.181e+00	7.167e-01	-1.648	0.099421	.
## Kansas.State	4.502e+00	8.105e-01	5.554	2.79e-08	***
## Kennesaw.State	-8.318e-01	7.027e-01	-1.184	0.236520	
## Kent.State	1.012e+00	7.395e-01	1.368	0.171334	
## Kentucky	5.289e+00	8.620e-01	6.135	8.51e-10	***
## Kentucky.State	-1.731e+01	2.548e+03	-0.007	0.994579	
## King..TN.	-1.774e+01	2.794e+03	-0.006	0.994934	

## La.Salle	-1.283e+00	7.394e-01	-1.734	0.082836	.
## La.Sierra	-2.056e+01	2.607e+03	-0.008	0.993707	
## Lafayette	-1.923e+00	8.129e-01	-2.366	0.017997	*
## Lamar	8.402e-01	7.759e-01	1.083	0.278901	
## Le.Moyne	-4.542e+00	8.765e-01	-5.182	2.20e-07	***
## Lees.McRae	-2.015e+01	2.519e+03	-0.008	0.993618	
## Lehigh	1.165e+00	8.024e-01	1.452	0.146619	
## LeTourneau	-1.931e+01	2.499e+03	-0.008	0.993833	
## Liberty	2.413e+00	8.513e-01	2.835	0.004586	**
## Life.Pacific	-1.805e+01	2.234e+03	-0.008	0.993555	
## Life.University	-1.830e+01	2.773e+03	-0.007	0.994735	
## Lincoln..PA.	-1.865e+01	2.762e+03	-0.007	0.994614	
## Lindenwood	2.889e-01	7.813e-01	0.370	0.711591	
## Lipscomb	-2.376e-01	7.545e-01	-0.315	0.752804	
## Little.Rock	-5.723e-01	7.671e-01	-0.746	0.455656	
## Long.Beach.State	-9.055e-01	7.379e-01	-1.227	0.219796	
## Long.Island.University	-5.100e+00	8.707e-01	-5.857	4.70e-09	***
## Longwood	-1.721e+00	7.601e-01	-2.264	0.023565	*
## Louisiana	-7.096e-01	7.197e-01	-0.986	0.324160	
## Louisiana.Tech	4.561e-03	7.247e-01	0.006	0.994978	
## Louisville	4.814e+00	8.206e-01	5.866	4.46e-09	***
## Loyola.Chicago	-9.036e-01	7.368e-01	-1.226	0.220085	
## Loyola.Maryland	-2.377e+00	8.137e-01	-2.921	0.003484	**
## Loyola.Marymount	-1.817e-01	7.214e-01	-0.252	0.801156	
## LSU	6.308e+00	9.529e-01	6.620	3.60e-11	***
## Maine	-8.069e-01	7.591e-01	-1.063	0.287800	
## Manhattan	-1.262e+00	7.467e-01	-1.690	0.090975	.
## Marist	-1.143e+00	7.408e-01	-1.543	0.122760	
## Marquette	2.412e+00	7.957e-01	3.031	0.002437	**
## Marshall	-5.825e-01	7.063e-01	-0.825	0.409481	
## Maryland	5.571e+00	8.515e-01	6.542	6.07e-11	***
## Maryland.Eastern.Shore	-1.245e+00	8.536e-01	-1.459	0.144616	
## Massachusetts	-2.334e-01	7.344e-01	-0.318	0.750625	
## McNeese	-2.825e+00	8.321e-01	-3.395	0.000686	***
## Memphis	-9.276e-01	7.698e-01	-1.205	0.228224	
## Mercer	-2.088e+00	7.423e-01	-2.813	0.004912	**
## Mercyhurst	-4.612e+00	9.126e-01	-5.054	4.33e-07	***
## Merrimack	-1.328e+00	7.617e-01	-1.744	0.081214	.
## Miami	2.154e+00	7.927e-01	2.717	0.006584	**
## Miami..OH.	4.517e-01	7.294e-01	0.619	0.535699	
## Michigan	5.146e+00	8.315e-01	6.189	6.04e-10	***
## Michigan.State	4.790e+00	8.187e-01	5.850	4.90e-09	***
## Middle.Tennessee	2.481e+00	7.906e-01	3.138	0.001701	**
## Milwaukee	-2.525e+00	7.881e-01	-3.204	0.001355	**
## Minnesota	3.568e+00	8.448e-01	4.223	2.41e-05	***
## Mississippi.State	3.759e+00	8.435e-01	4.457	8.33e-06	***
## Mississippi.Valley.State	-3.189e+00	8.286e-01	-3.848	0.000119	***
## Missouri	1.492e+00	7.649e-01	1.950	0.051147	.
## Missouri.State	1.935e+00	7.572e-01	2.555	0.010615	*
## Monmouth	-1.336e+00	7.145e-01	-1.870	0.061512	.
## Montana	-2.023e-01	7.475e-01	-0.271	0.786699	
## Montana.State	3.129e+00	9.407e-01	3.327	0.000879	***
## Morehead.State	-2.197e+00	7.902e-01	-2.780	0.005436	**
## Morgan.State	-2.218e+00	8.146e-01	-2.723	0.006463	**

## Mount.Olive	-1.754e+01	2.797e+03	-0.006	0.994998	
## Mount.St..Mary.s	-1.039e+00	7.749e-01	-1.341	0.179898	
## Murray.State	2.110e+00	8.205e-01	2.571	0.010135	*
## Navy	-3.026e-01	7.670e-01	-0.395	0.693169	
## NC.State	5.884e+00	8.453e-01	6.961	3.38e-12	***
## Nebraska	4.470e+00	8.175e-01	5.467	4.57e-08	***
## Nelson	-1.739e+01	2.786e+03	-0.006	0.995019	
## Nevada	-9.233e-01	7.424e-01	-1.244	0.213574	
## New.Hampshire	-1.989e+00	7.677e-01	-2.591	0.009572	**
## New.Mexico	6.706e-01	6.868e-01	0.976	0.328844	
## New.Mexico.State	3.881e-01	7.026e-01	0.552	0.580742	
## New.Orleans	-2.986e+00	8.299e-01	-3.598	0.000320	***
## Newberry	-2.075e+01	2.247e+03	-0.009	0.992632	
## Niagara	-4.021e+00	9.934e-01	-4.048	5.17e-05	***
## Nicholls	-6.326e-01	7.209e-01	-0.877	0.380241	
## NJIT	-2.112e+00	7.517e-01	-2.809	0.004966	**
## Norfolk.State	2.689e+00	9.591e-01	2.804	0.005054	**
## North.Alabama	-1.482e+00	7.452e-01	-1.989	0.046716	*
## North.Carolina	5.359e+00	8.167e-01	6.562	5.32e-11	***
## North.Carolina.A.T	-3.837e-01	7.549e-01	-0.508	0.611236	
## North.Carolina.Central	-2.461e+00	8.778e-01	-2.804	0.005054	**
## North.Dakota	-8.915e-01	7.304e-01	-1.220	0.222296	
## North.Dakota.State	6.020e-01	7.309e-01	0.824	0.410126	
## North.Florida	-3.682e+00	9.371e-01	-3.929	8.52e-05	***
## North.Texas	1.689e+00	7.318e-01	2.309	0.020971	*
## Northeastern	-4.137e+00	9.168e-01	-4.512	6.42e-06	***
## Northern.Arizona	2.190e+00	7.787e-01	2.813	0.004915	**
## Northern.Colorado	-8.613e-01	7.381e-01	-1.167	0.243272	
## Northern.Illinois	-8.257e-01	7.341e-01	-1.125	0.260700	
## Northern.Iowa	1.072e+00	7.566e-01	1.416	0.156681	
## Northern.Kentucky	-1.774e+00	7.521e-01	-2.359	0.018335	*
## Northwestern	1.340e+00	8.052e-01	1.664	0.096100	.
## Northwestern.State	-6.735e-01	7.605e-01	-0.886	0.375838	
## Notre.Dame	6.390e+00	8.823e-01	7.242	4.41e-13	***
## Oakland	-2.037e+00	7.887e-01	-2.583	0.009804	**
## Ohio	-2.077e+00	8.011e-01	-2.592	0.009539	**
## Ohio.Christian	-1.841e+01	2.467e+03	-0.007	0.994047	
## Ohio.State	5.789e+00	9.094e-01	6.366	1.95e-10	***
## Oklahoma	5.780e+00	8.741e-01	6.613	3.76e-11	***
## Oklahoma.State	4.467e+00	8.288e-01	5.390	7.07e-08	***
## Old.Dominion	-5.424e-04	7.258e-01	-0.001	0.999404	
## Ole.Miss	4.891e+00	8.817e-01	5.547	2.90e-08	***
## Omaha	-5.142e-01	7.402e-01	-0.695	0.487290	
## Oral.Roberts	2.263e+00	8.594e-01	2.633	0.008459	**
## Oregon	4.326e+00	7.850e-01	5.511	3.58e-08	***
## Oregon.State	1.112e+00	7.112e-01	1.563	0.117956	
## Our.Lady.Of.The.Lake	-1.815e+01	2.738e+03	-0.007	0.994712	
## Pacific	2.295e-02	7.148e-01	0.032	0.974389	
## Park.University.Gilbert	-1.784e+01	1.703e+03	-0.010	0.991643	
## Penn.State	1.024e+00	8.164e-01	1.254	0.209721	
## Pennsylvania	-7.305e-02	8.022e-01	-0.091	0.927435	
## Pepperdine	-1.399e+00	7.567e-01	-1.849	0.064464	.
## Pittsburgh	1.005e+00	7.825e-01	1.284	0.199101	
## Pittsburgh.Johnstown	-1.803e+01	2.620e+03	-0.007	0.994510	

## Point.Park	-1.903e+01	2.752e+03	-0.007	0.994484	
## Portland	2.387e+00	8.210e-01	2.907	0.003645	**
## Portland.State	-2.700e+00	8.398e-01	-3.215	0.001303	**
## Prairie.View.A.M	-3.289e+00	8.645e-01	-3.804	0.000142	***
## Presbyterian	-4.710e+00	9.035e-01	-5.213	1.86e-07	***
## Princeton	3.127e+00	8.123e-01	3.850	0.000118	***
## Providence	8.052e-01	7.325e-01	1.099	0.271647	
## Puerto.Rico.Mayaguez	-1.706e+01	2.498e+03	-0.007	0.994551	
## Purdue	1.921e+00	8.564e-01	2.243	0.024886	*
## Purdue.Fort.Wayne	5.939e-01	8.046e-01	0.738	0.460427	
## Queens.University	-2.527e+00	7.850e-01	-3.219	0.001287	**
## Quinnipiac	2.726e+00	9.334e-01	2.920	0.003502	**
## Radford	-2.541e+00	7.814e-01	-3.252	0.001145	**
## Rhode.Island	2.457e-01	7.277e-01	0.338	0.735590	
## Rice	6.084e-01	7.099e-01	0.857	0.391460	
## Richmond	3.313e+00	8.508e-01	3.894	9.84e-05	***
## Rider	-2.954e+00	7.991e-01	-3.697	0.000218	***
## Robert.Morris	-1.437e+00	7.579e-01	-1.896	0.057963	.
## Rutgers	1.379e+00	8.706e-01	1.584	0.113108	
## Sacramento.State	-9.374e-01	6.792e-01	-1.380	0.167560	
## Sacred.Heart	-2.292e+00	7.735e-01	-2.963	0.003048	**
## Saint.Joseph.s	1.867e+00	7.822e-01	2.387	0.016983	*
## Saint.Louis	3.642e-03	7.013e-01	0.005	0.995856	
## Saint.Mary.s	-1.700e-01	7.076e-01	-0.240	0.810195	
## Saint.Peter.s	-2.055e+00	7.788e-01	-2.639	0.008317	**
## Salem.University	-1.776e+01	2.777e+03	-0.006	0.994896	
## Sam.Houston	-9.839e-01	7.537e-01	-1.305	0.191757	
## Samford	-1.607e+00	7.802e-01	-2.059	0.039454	*
## San.Diego	-1.833e+00	7.997e-01	-2.293	0.021873	*
## San.Diego.State	1.587e+00	7.179e-01	2.210	0.027110	*
## San.Francisco	4.422e-01	7.205e-01	0.614	0.539333	
## San.José.State	-1.457e+00	7.487e-01	-1.946	0.051675	.
## Santa.Clara	-1.187e-01	7.135e-01	-0.166	0.867919	
## Schreiner	-1.815e+01	2.738e+03	-0.007	0.994712	
## SE.Louisiana	1.515e+00	8.464e-01	1.790	0.073459	.
## Seattle.U	-3.983e+00	8.930e-01	-4.461	8.16e-06	***
## Seton.Hall	3.463e+00	8.729e-01	3.968	7.26e-05	***
## Sewanee	-1.806e+01	2.691e+03	-0.007	0.994645	
## Siena	-8.652e-01	7.557e-01	-1.145	0.252226	
## SIU.Edwardsville	-2.718e+00	8.445e-01	-3.219	0.001287	**
## SMU	8.776e-01	7.596e-01	1.155	0.247943	
## South.Alabama	-2.639e+00	8.078e-01	-3.267	0.001088	**
## South.Carolina	8.111e+00	1.009e+00	8.038	9.16e-16	***
## South.Carolina.State	-6.097e+00	1.291e+00	-4.725	2.30e-06	***
## South.Carolina.Upstate	-3.826e+00	8.410e-01	-4.549	5.39e-06	***
## South.Dakota	-9.318e-01	7.459e-01	-1.249	0.211604	
## South.Dakota.State	5.239e+00	1.053e+00	4.975	6.53e-07	***
## South.Florida	2.431e+00	8.125e-01	2.992	0.002769	**
## Southeast.Missouri.State	-2.868e+00	8.448e-01	-3.395	0.000687	***
## Southern	-6.498e-01	8.784e-01	-0.740	0.459440	
## Southern.Illinois	-3.294e+00	9.207e-01	-3.578	0.000346	***
## Southern.Indiana	6.765e-02	7.877e-01	0.086	0.931565	
## Southern.Miss	-1.612e+00	7.523e-01	-2.142	0.032184	*
## Southern.Utah	-1.956e+00	7.250e-01	-2.697	0.006989	**

## Southern.Wesleyan	-1.839e+01	2.218e+03	-0.008	0.993384	
## Southern.New.Orleans	-1.781e+01	2.786e+03	-0.006	0.994899	
## St..Bonaventure	-2.196e+00	7.821e-01	-2.808	0.004992	**
## St..Francis..IL.	-1.749e+01	2.657e+03	-0.007	0.994749	
## St..Francis..PA.	-3.896e+00	8.441e-01	-4.616	3.92e-06	***
## St..John.s	1.517e+00	7.723e-01	1.965	0.049449	*
## St..Mary.s..TX.	-1.774e+01	2.781e+03	-0.006	0.994911	
## St..Thomas..TX.	-1.931e+01	1.705e+03	-0.011	0.990965	
## St..Thomas.Minnesota	-1.793e-01	7.315e-01	-0.245	0.806384	
## Stanford	2.926e+00	7.918e-01	3.696	0.000219	***
## Stephen.F..Austin	1.807e+00	7.729e-01	2.337	0.019424	*
## Stetson	-1.053e+00	7.298e-01	-1.443	0.148964	
## Stonehill	-2.908e+00	8.211e-01	-3.542	0.000397	***
## Stony.Brook	-1.804e+00	7.449e-01	-2.422	0.015442	*
## Sul.Ross.State	-1.837e+01	2.781e+03	-0.007	0.994730	
## Syracuse	1.563e+00	7.813e-01	2.001	0.045425	*
## Tarleton.State	-2.729e-01	6.441e-01	-0.424	0.671789	
## TCU	6.447e+00	9.704e-01	6.644	3.06e-11	***
## Temple	1.516e+00	7.412e-01	2.046	0.040776	*
## Tennessee	4.943e+00	8.348e-01	5.921	3.20e-09	***
## Tennessee.State	-1.855e+00	7.822e-01	-2.371	0.017719	*
## Tennessee.Tech	1.282e+00	8.474e-01	1.513	0.130217	
## Texas	7.881e+00	1.026e+00	7.681	1.57e-14	***
## Texas.A.M	1.247e+00	8.267e-01	1.509	0.131305	
## Texas.A.M.Campus.Christi	-1.399e+00	7.471e-01	-1.873	0.061075	.
## Texas.A.M.San.Antonio	-1.591e+01	2.746e+03	-0.006	0.995377	
## Texas.Southern	-1.670e+00	8.030e-01	-2.079	0.037574	*
## Texas.State	-1.001e+00	7.127e-01	-1.405	0.159987	
## Texas.Tech	2.236e+00	7.227e-01	3.094	0.001974	**
## Toledo	2.024e+00	8.015e-01	2.525	0.011568	*
## Towson	-1.898e+00	7.381e-01	-2.571	0.010127	*
## Trinity.Baptist	-2.062e+01	2.783e+03	-0.007	0.994089	
## Troy	5.482e-01	7.235e-01	0.758	0.448638	
## Tulane	7.081e-01	7.243e-01	0.978	0.328247	
## Tulsa	6.285e-01	7.283e-01	0.863	0.388176	
## UAB	1.138e-02	7.274e-01	0.016	0.987519	
## UAlbany	8.254e-01	8.324e-01	0.992	0.321399	
## UC.Davis	-2.372e-01	7.280e-01	-0.326	0.744606	
## UC.Irvine	4.478e-02	7.199e-01	0.062	0.950396	
## UC.Merced	-1.799e+01	2.645e+03	-0.007	0.994572	
## UC.Riverside	-8.877e-01	7.271e-01	-1.221	0.222148	
## UC.San.Diego	-7.008e-01	7.007e-01	-1.000	0.317292	
## UC.Santa.Barbara	-9.951e-01	7.328e-01	-1.358	0.174467	
## UCF	1.155e+00	8.235e-01	1.402	0.160875	
## UCLA	8.385e+00	1.156e+00	7.255	4.02e-13	***
## UConn	7.027e+00	1.009e+00	6.966	3.27e-12	***
## UIC	-4.035e-02	7.731e-01	-0.052	0.958380	
## UL.Monroe	-1.212e+00	7.422e-01	-1.633	0.102382	
## UMass.Lowell	-3.630e+00	8.939e-01	-4.061	4.89e-05	***
## UMBC	-1.599e+00	7.666e-01	-2.086	0.036971	*
## UNC.Asheville	-5.482e+00	1.034e+00	-5.301	1.15e-07	***
## UNC.Greensboro	8.586e-01	8.414e-01	1.020	0.307516	
## UNC.Wilmington	-1.758e+00	7.333e-01	-2.397	0.016529	*
## UNLV	2.433e+00	7.646e-01	3.182	0.001462	**


```

## UNT.Dallas          -1.948e+01  2.639e+03  -0.007  0.994109
## USC                  7.819e+00  1.080e+00   7.237  4.60e-13 ***
## UT.Arlington        -6.012e-02  6.690e-01  -0.090  0.928394
## UT.Martin            -1.007e+00  7.569e-01  -1.330  0.183582
## UT.Rio.Grande.Valley -8.328e-01  7.215e-01  -1.154  0.248432
## Utah                 4.018e+00  7.867e-01   5.108  3.26e-07 ***
## Utah.State          -2.628e+00  8.960e-01  -2.933  0.003352 **
## Utah.Tech           -3.538e+00  8.544e-01  -4.141  3.45e-05 ***
## Utah.Valley         -2.523e-01  6.310e-01  -0.400  0.689304
## UTEP                -1.185e+00  7.330e-01  -1.617  0.105967
## UTSA                 2.548e+00  8.172e-01   3.118  0.001821 **
## UVA.Wise            -1.906e+01  2.654e+03  -0.007  0.994269
## Valparaiso          -8.877e-01  7.575e-01  -1.172  0.241239
## Vanderbilt           4.438e+00  8.405e-01   5.281  1.29e-07 ***
## VCU                 -4.829e-01  7.353e-01  -0.657  0.511364
## Vermont              3.740e-01  7.363e-01   0.508  0.611482
## Villanova            2.700e+00  7.533e-01   3.584  0.000339 ***
## Virginia             2.398e+00  7.709e-01   3.110  0.001868 **
## Virginia.Tech        3.198e+00  7.927e-01   4.035  5.47e-05 ***
## Virginia.Lynchburg  -2.125e+01  1.053e+03  -0.020  0.983901
## Wagner              -4.779e+00  8.876e-01  -5.384  7.27e-08 ***
## Wake.Forest          8.305e-01  7.999e-01   1.038  0.299137
## Walla.Walla         -1.785e+01  2.717e+03  -0.007  0.994759
## Warren.Wilson       -2.163e+01  2.361e+03  -0.009  0.992688
## Washington           3.794e+00  8.254e-01   4.597  4.30e-06 ***
## Washington.State     1.450e+00  7.316e-01   1.982  0.047532 *
## Weber.State          -8.152e-01  7.259e-01  -1.123  0.261436
## West.Georgia         -1.744e+00  7.540e-01  -2.312  0.020760 *
## West.Virginia        4.531e+00  8.501e-01   5.330  9.81e-08 ***
## Westcliff           -1.937e+01  2.032e+03  -0.010  0.992397
## Western.Carolina     -1.825e+00  7.723e-01  -2.363  0.018147 *
## Western.Illinois     -8.478e-01  7.488e-01  -1.132  0.257511
## Western.Kentucky      1.106e+00  7.292e-01   1.516  0.129463
## Western.Michigan     -6.618e-01  7.410e-01  -0.893  0.371808
## Western.New.Mexico   -1.664e+01  2.793e+03  -0.006  0.995248
## Wichita.State       -4.345e-01  7.382e-01  -0.589  0.556110
## Wiley               -1.891e+01  1.793e+03  -0.011  0.991587
## William...Mary       -1.259e+00  7.197e-01  -1.749  0.080243 .
## Winston.Salem        -1.800e+01  2.765e+03  -0.007  0.994807
## Winthrop            -2.518e+00  7.806e-01  -3.225  0.001258 **
## Wisconsin            2.427e+00  8.162e-01   2.973  0.002946 **
## Wofford             -5.031e-01  7.929e-01  -0.635  0.525732
## Wright.State        -2.212e+00  7.442e-01  -2.972  0.002958 **
## Wyoming              1.776e+00  7.124e-01   2.492  0.012692 *
## Xavier              -5.577e-01  8.033e-01  -0.694  0.487514
## Yale                -2.588e+00  8.360e-01  -3.095  0.001965 **
## Youngstown.State    -2.213e+00  7.694e-01  -2.877  0.004017 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 7796.5 on 5624 degrees of freedom
## Residual deviance: 4175.3 on 5185 degrees of freedom

```

```
## AIC: 5053.3
##
## Number of Fisher Scoring iterations: 16
```

2

```
model_2 <- bayesglm(formula = home_win ~ . - 1 - Abilene.Christian,
                    family = binomial, data = womens)
summary(model_2)
```

```
##
## Call:
## bayesglm(formula = home_win ~ . - 1 - Abilene.Christian, family = binomial,
## data = womens)
##
## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## date           2.123e-05  1.954e-06  10.862 < 2e-16 ***
## Air.Force       2.100e+00  5.920e-01   3.548 0.000388 ***
## Akron           5.242e-01  6.060e-01   0.865 0.387038
## Alabama         6.831e+00  7.364e-01   9.276 < 2e-16 ***
## Alabama.A.M     1.554e+00  6.169e-01   2.520 0.011745 *
## Alabama.State  -1.698e+00  7.782e-01  -2.181 0.029148 *
## Alaska.Anchorage 1.613e+00  1.290e+00   1.251 0.211061
## Alcorn.State     3.034e-01  6.513e-01   0.466 0.641358
## American.University -2.311e+00  1.096e+00  -2.109 0.034912 *
## App.State        1.639e+00  5.748e-01   2.851 0.004355 **
## Arizona          4.799e+00  6.214e-01   7.723 1.14e-14 ***
## Arizona.State    2.872e+00  6.028e-01   4.765 1.89e-06 ***
## Arkansas         3.029e+00  6.202e-01   4.883 1.04e-06 ***
## Arkansas.Baptist -3.431e+00  1.861e+00  -1.844 0.065213 .
## Arkansas.State    2.614e+00  5.606e-01   4.663 3.11e-06 ***
## Arkansas.Pine.Bluff -2.949e+00  1.021e+00  -2.889 0.003864 **
## Arlington.Baptist -6.870e-01  1.733e+00  -0.396 0.691783
## Army             2.917e+00  6.371e-01   4.579 4.67e-06 ***
## Auburn           3.926e+00  6.732e-01   5.831 5.50e-09 ***
## Austin.Peay       1.091e+00  5.763e-01   1.892 0.058448 .
## Ball.State        4.972e+00  7.136e-01   6.967 3.23e-12 ***
## Baylor           6.964e+00  7.123e-01   9.777 < 2e-16 ***
## Bellarmine        1.572e+00  5.547e-01   2.833 0.004610 **
## Bellevue.University -7.036e-01  1.729e+00  -0.407 0.684015
## Belmont          4.271e+00  6.402e-01   6.672 2.53e-11 ***
## Berry            -7.460e-01  1.720e+00  -0.434 0.664483
## Bethel..TN.       9.689e-01  1.237e+00   0.783 0.433519
## Bethesda.University -2.301e+00  1.554e+00  -1.481 0.138651
## Bethune.Cookman   -6.265e-01  6.311e-01  -0.993 0.320848
## Binghamton        7.928e-01  6.012e-01   1.319 0.187300
## Boise.State       2.474e+00  5.828e-01   4.244 2.20e-05 ***
## Boston.College    4.007e+00  6.382e-01   6.279 3.40e-10 ***
## Boston.University  5.886e-01  6.452e-01   0.912 0.361599
## Bowie.State       -1.330e+00  1.592e+00  -0.835 0.403755
```

## Bowling.Green	2.842e+00	5.949e-01	4.778	1.77e-06	***
## Bradley	1.330e+00	6.120e-01	2.174	0.029736	*
## Brown	1.917e+00	6.843e-01	2.801	0.005091	**
## Bryant	1.273e+00	6.021e-01	2.115	0.034461	*
## Bryn.Athyn	-7.989e-01	1.704e+00	-0.469	0.639164	
## Bucknell	1.998e+00	5.926e-01	3.372	0.000747	***
## Buffalo	3.730e+00	6.635e-01	5.621	1.90e-08	***
## Butler	3.379e+00	6.564e-01	5.147	2.65e-07	***
## BYU	3.503e+00	6.200e-01	5.651	1.60e-08	***
## Cal.Maritime	-5.063e-01	1.832e+00	-0.276	0.782219	
## Cal.Poly	7.311e-01	6.168e-01	1.185	0.235897	
## Cal.State.Bakersfield	-2.536e+00	9.467e-01	-2.679	0.007376	**
## Cal.State.Fullerton	-1.231e+00	7.491e-01	-1.643	0.100342	
## Cal.State.Northridge	-1.784e+00	8.173e-01	-2.182	0.029091	*
## Cal.State.San.Marcos	-5.292e+00	1.956e+01	-0.271	0.786759	
## California	6.613e+00	6.828e-01	9.685	< 2e-16	***
## California.Baptist	7.601e-01	5.742e-01	1.324	0.185577	
## Campbell	1.987e+00	5.620e-01	3.534	0.000409	***
## Canisius	-2.605e-02	6.152e-01	-0.042	0.966218	
## Cedarville	-7.578e-01	1.742e+00	-0.435	0.663564	
## Central.Arkansas	2.818e+00	6.146e-01	4.585	4.55e-06	***
## Central.Baptist.College	-8.760e-01	1.643e+00	-0.533	0.593906	
## Central.Connecticut	-1.429e+00	7.143e-01	-2.000	0.045496	*
## Central.Michigan	1.884e+00	6.089e-01	3.095	0.001971	**
## Charleston	2.499e+00	6.067e-01	4.119	3.80e-05	***
## Charleston.Southern	4.035e-01	6.198e-01	0.651	0.515020	
## Charlotte	1.442e+00	6.083e-01	2.370	0.017804	*
## Chattanooga	1.754e+00	5.837e-01	3.004	0.002662	**
## Cheyney..PA.	-3.389e+00	1.896e+00	-1.788	0.073772	.
## Chicago.State	-1.975e+00	7.517e-01	-2.627	0.008605	**
## Cincinnati	4.406e+00	6.453e-01	6.827	8.64e-12	***
## Cleary.University	-1.163e+00	1.592e+00	-0.731	0.464947	
## Clemson	4.256e+00	6.488e-01	6.560	5.39e-11	***
## Cleveland.State	2.375e+00	6.394e-01	3.714	0.000204	***
## Clinton.College	-1.852e+00	1.591e+00	-1.164	0.244438	
## Coastal.Carolina	3.374e+00	6.518e-01	5.177	2.26e-07	***
## Coastal.Georgia	-1.669e+00	1.645e+00	-1.014	0.310424	
## Colgate	2.380e+00	6.490e-01	3.668	0.000244	***
## College.Of.Biblical.Studies	-1.430e+00	1.599e+00	-0.894	0.371100	
## Colorado	5.212e+00	6.621e-01	7.873	3.47e-15	***
## Colorado.Christian	1.556e+00	1.498e+00	1.039	0.298822	
## Colorado.State	3.521e+00	5.679e-01	6.200	5.66e-10	***
## Columbia	5.592e+00	7.593e-01	7.364	1.78e-13	***
## Coppin.State	2.016e+00	6.552e-01	3.077	0.002091	**
## Cornell	5.259e-01	6.892e-01	0.763	0.445440	
## Creighton	7.191e+00	8.172e-01	8.800	< 2e-16	***
## Cumberland..TN.	-1.047e+00	1.624e+00	-0.644	0.519403	
## Dakota.Wesleyan	-1.800e-01	2.162e+00	-0.083	0.933626	
## Dartmouth	2.831e-02	7.135e-01	0.040	0.968355	
## Davidson	3.478e+00	6.039e-01	5.759	8.45e-09	***
## Davis...Elkins	-2.459e+00	1.741e+00	-1.413	0.157649	
## Dayton	2.594e+00	5.886e-01	4.407	1.05e-05	***
## Defiance	-1.964e-01	2.136e+00	-0.092	0.926741	
## Delaware	9.440e-01	5.549e-01	1.701	0.088887	.

## Delaware.State	-3.018e+00	9.480e-01	-3.183	0.001456	**
## Delta.State	-1.143e+00	1.665e+00	-0.687	0.492381	
## Denver	4.944e-01	6.009e-01	0.823	0.410631	
## DePaul	3.393e+00	6.270e-01	5.411	6.25e-08	***
## Detroit.Mercy	1.147e+00	6.082e-01	1.885	0.059431	.
## Drake	3.940e+00	6.088e-01	6.472	9.66e-11	***
## Drexel	1.714e+00	5.845e-01	2.933	0.003358	**
## Duke	7.968e+00	6.937e-01	11.487	< 2e-16	***
## Duquesne	2.796e+00	5.893e-01	4.744	2.09e-06	***
## East.Carolina	2.844e+00	5.842e-01	4.869	1.12e-06	***
## East.Tennessee.State	1.642e+00	5.970e-01	2.750	0.005955	**
## East.Texas.A.M	-6.635e-01	6.782e-01	-0.978	0.327941	
## Eastern.Illinois	2.266e+00	6.426e-01	3.526	0.000422	***
## Eastern.Kentucky	1.948e+00	5.900e-01	3.301	0.000963	***
## Eastern.Michigan	-9.124e-01	8.352e-01	-1.092	0.274625	
## Eastern.New.Mexico	-6.937e-01	1.747e+00	-0.397	0.691395	
## Eastern.Washington	9.782e-01	6.256e-01	1.564	0.117924	
## Edward.Waters	-7.194e-01	1.719e+00	-0.418	0.675627	
## Elon	1.235e+00	5.565e-01	2.218	0.026534	*
## Erskine	-8.619e-01	1.651e+00	-0.522	0.601626	
## Evansville	-3.280e-01	6.726e-01	-0.488	0.625723	
## Evergreen.State	-2.290e+00	1.719e+00	-1.332	0.182761	
## Fairfield	4.968e+00	8.186e-01	6.069	1.29e-09	***
## Fairleigh.Dickinson	3.377e+00	1.025e+00	3.296	0.000981	***
## Faulkner	-2.355e+00	1.646e+00	-1.431	0.152379	
## Fisk	-8.561e-01	1.671e+00	-0.512	0.608541	
## Florida	4.673e+00	6.752e-01	6.921	4.47e-12	***
## Florida.A.M	-6.723e-01	6.708e-01	-1.002	0.316234	
## Florida.Atlantic	1.195e+00	5.768e-01	2.072	0.038304	*
## Florida.Gulf.Coast	4.793e+00	8.129e-01	5.896	3.72e-09	***
## Florida.International	7.313e-01	5.872e-01	1.245	0.213015	
## Florida.State	6.595e+00	6.800e-01	9.699	< 2e-16	***
## Fordham	2.027e+00	5.964e-01	3.398	0.000678	***
## Fort.Lauderdale	-1.442e+00	1.621e+00	-0.890	0.373625	
## Fresno.State	2.439e+00	5.937e-01	4.109	3.98e-05	***
## Furman	1.318e+00	5.788e-01	2.277	0.022793	*
## Gardner.Webb	-3.249e-01	6.050e-01	-0.537	0.591251	
## George.Mason	4.669e+00	7.140e-01	6.540	6.17e-11	***
## George.Washington	1.248e+00	5.677e-01	2.199	0.027895	*
## Georgetown	3.213e+00	6.111e-01	5.258	1.46e-07	***
## Georgia	3.470e+00	6.659e-01	5.211	1.88e-07	***
## Georgia.Southern	1.395e+00	5.385e-01	2.590	0.009597	**
## Georgia.State	2.064e+00	5.590e-01	3.693	0.000222	***
## Georgia.Tech	6.234e+00	6.599e-01	9.448	< 2e-16	***
## Georgian.Court.University	-3.414e+00	1.884e+00	-1.812	0.070000	.
## Gonzaga	3.907e+00	5.927e-01	6.591	4.38e-11	***
## Grambling	5.593e-01	6.626e-01	0.844	0.398634	
## Grand.Canyon	5.683e+00	9.979e-01	5.695	1.24e-08	***
## Green.Bay	4.370e+00	7.473e-01	5.848	4.98e-09	***
## Guilford	-6.351e-01	1.760e+00	-0.361	0.718286	
## Hampton	-2.454e-01	6.089e-01	-0.403	0.686934	
## Harvard	5.966e+00	8.033e-01	7.427	1.11e-13	***
## Hawai.i	2.377e+00	6.292e-01	3.778	0.000158	***
## High.Point	1.317e+00	5.937e-01	2.218	0.026539	*

## Hofstra	9.482e-01	5.584e-01	1.698	0.089507	.
## Holy.Cross	2.421e+00	6.140e-01	3.943	8.06e-05	***
## Houston	1.158e+00	7.760e-01	1.492	0.135797	
## Houston.Christian	-9.666e-01	7.345e-01	-1.316	0.188187	
## Howard	2.336e+00	6.179e-01	3.780	0.000157	***
## Idaho	1.991e+00	6.019e-01	3.308	0.000940	***
## Idaho.State	1.625e+00	5.956e-01	2.728	0.006381	**
## Illinois	6.508e+00	6.935e-01	9.385	< 2e-16	***
## Illinois.State	2.970e+00	6.093e-01	4.874	1.09e-06	***
## Incarnate.Word	1.706e+00	6.619e-01	2.577	0.009960	**
## Indiana	6.372e+00	6.527e-01	9.762	< 2e-16	***
## Indiana.State	-6.131e-01	7.500e-01	-0.817	0.413669	
## Indiana.Southeast	-5.340e-01	1.817e+00	-0.294	0.768847	
## Iona	1.855e-01	6.010e-01	0.309	0.757631	
## Iowa	6.825e+00	6.621e-01	10.308	< 2e-16	***
## Iowa.State	5.759e+00	6.779e-01	8.495	< 2e-16	***
## IU.Columbus	-1.518e+00	1.578e+00	-0.962	0.336278	
## IU.Indianapolis	1.063e-01	6.235e-01	0.170	0.864652	
## Jackson.State	9.167e-01	6.283e-01	1.459	0.144561	
## Jacksonville	1.426e+00	5.843e-01	2.441	0.014664	*
## Jacksonville.State	7.201e-01	6.119e-01	1.177	0.239281	
## James.Madison	5.544e+00	8.337e-01	6.650	2.94e-11	***
## Jarvis.Christian	-1.553e+00	1.595e+00	-0.974	0.330184	
## Jessup.University	-7.041e-01	1.732e+00	-0.407	0.684298	
## Johnson...Wales..NC.	-1.427e+00	1.576e+00	-0.905	0.365210	
## Johnson.C.Smith	-1.160e+00	1.677e+00	-0.692	0.489250	
## Kansas	4.473e+00	6.482e-01	6.900	5.21e-12	***
## Kansas.City	9.742e-01	5.844e-01	1.667	0.095530	.
## Kansas.State	6.559e+00	6.855e-01	9.568	< 2e-16	***
## Kennesaw.State	1.291e+00	5.758e-01	2.241	0.024995	*
## Kent.State	3.230e+00	5.963e-01	5.417	6.07e-08	***
## Kentucky	7.312e+00	7.385e-01	9.901	< 2e-16	***
## Kentucky.State	-5.288e-01	1.831e+00	-0.289	0.772696	
## King..TN.	-5.511e-01	1.805e+00	-0.305	0.760144	
## La.Salle	9.619e-01	5.944e-01	1.618	0.105577	
## La.Sierra	-2.320e+00	1.683e+00	-1.379	0.167929	
## Lafayette	3.701e-01	6.760e-01	0.548	0.584022	
## Lamar	3.027e+00	6.579e-01	4.601	4.21e-06	***
## Le.Moyne	-2.112e+00	7.302e-01	-2.892	0.003828	**
## Lees.McRae	-1.713e+00	1.632e+00	-1.050	0.293788	
## Lehigh	3.431e+00	6.649e-01	5.160	2.47e-07	***
## LeTourneau	-1.445e+00	1.632e+00	-0.885	0.376038	
## Liberty	4.481e+00	7.486e-01	5.987	2.14e-09	***
## Life.Pacific	-9.644e-01	1.629e+00	-0.592	0.553922	
## Life.University	-8.979e-01	1.662e+00	-0.540	0.589118	
## Lincoln..PA.	-9.042e-01	1.658e+00	-0.545	0.585426	
## Lindenwood	2.562e+00	6.420e-01	3.990	6.60e-05	***
## Lipscomb	2.136e+00	6.012e-01	3.553	0.000381	***
## Little.Rock	1.714e+00	6.189e-01	2.770	0.005612	**
## Long.Beach.State	1.279e+00	6.020e-01	2.125	0.033553	*
## Long.Island.University	-2.629e+00	7.123e-01	-3.691	0.000223	***
## Longwood	8.139e-01	5.909e-01	1.377	0.168377	
## Louisiana	1.555e+00	5.724e-01	2.716	0.006612	**
## Louisiana.Tech	2.088e+00	6.099e-01	3.424	0.000617	***

## Louisville	6.850e+00	6.912e-01	9.910	< 2e-16	***
## Loyola.Chicago	1.353e+00	5.845e-01	2.316	0.020574	*
## Loyola.Maryland	-5.215e-02	6.713e-01	-0.078	0.938087	
## Loyola.Marymount	1.942e+00	5.889e-01	3.297	0.000977	***
## LSU	8.320e+00	8.386e-01	9.921	< 2e-16	***
## Maine	1.457e+00	6.123e-01	2.380	0.017309	*
## Manhattan	1.019e+00	5.993e-01	1.700	0.089197	.
## Marist	1.130e+00	5.933e-01	1.906	0.056709	.
## Marquette	4.546e+00	6.634e-01	6.853	7.21e-12	***
## Marshall	1.701e+00	5.492e-01	3.098	0.001950	**
## Maryland	7.578e+00	7.249e-01	10.454	< 2e-16	***
## Maryland.Eastern.Shore	1.122e+00	6.927e-01	1.619	0.105381	
## Massachusetts	1.999e+00	5.873e-01	3.404	0.000665	***
## McNeese	-4.353e-01	6.808e-01	-0.639	0.522600	
## Memphis	1.303e+00	6.355e-01	2.050	0.040362	*
## Mercer	3.157e-01	5.850e-01	0.540	0.589477	
## Mercyhurst	-2.089e+00	7.542e-01	-2.769	0.005619	**
## Merrimack	9.433e-01	6.178e-01	1.527	0.126820	
## Miami	4.250e+00	6.607e-01	6.432	1.26e-10	***
## Miami..OH.	2.665e+00	5.873e-01	4.538	5.69e-06	***
## Michigan	7.167e+00	7.037e-01	10.184	< 2e-16	***
## Michigan.State	6.808e+00	6.909e-01	9.854	< 2e-16	***
## Middle.Tennessee	4.554e+00	6.811e-01	6.686	2.30e-11	***
## Milwaukee	-2.057e-01	6.440e-01	-0.319	0.749378	
## Minnesota	5.605e+00	7.182e-01	7.804	5.98e-15	***
## Mississippi.State	5.825e+00	7.153e-01	8.144	3.81e-16	***
## Mississippi.Valley.State	-6.943e-01	6.652e-01	-1.044	0.296609	
## Missouri	3.640e+00	6.250e-01	5.824	5.74e-09	***
## Missouri.State	4.098e+00	6.199e-01	6.610	3.85e-11	***
## Monmouth	9.745e-01	5.596e-01	1.742	0.081592	.
## Montana	1.901e+00	6.254e-01	3.040	0.002367	**
## Montana.State	5.251e+00	8.374e-01	6.271	3.60e-10	***
## Morehead.State	1.572e-01	6.388e-01	0.246	0.805556	
## Morgan.State	1.618e-01	6.604e-01	0.245	0.806472	
## Mount.Olive	-5.107e-01	1.829e+00	-0.279	0.780111	
## Mount.St..Mary.s	1.239e+00	6.320e-01	1.961	0.049905	*
## Murray.State	4.289e+00	6.904e-01	6.212	5.22e-10	***
## Navy	2.005e+00	6.166e-01	3.251	0.001150	**
## NC.State	7.903e+00	7.199e-01	10.979	< 2e-16	***
## Nebraska	6.496e+00	6.892e-01	9.426	< 2e-16	***
## Nelson	-1.095e+00	1.618e+00	-0.677	0.498684	
## Nevada	1.198e+00	6.181e-01	1.938	0.052599	.
## New.Hampshire	2.974e-01	6.220e-01	0.478	0.632573	
## New.Mexico	2.736e+00	5.731e-01	4.774	1.80e-06	***
## New.Mexico.State	2.473e+00	5.834e-01	4.240	2.24e-05	***
## New.Orleans	-7.032e-01	7.029e-01	-1.000	0.317072	
## Newberry	-2.310e+00	1.719e+00	-1.344	0.178984	
## Niagara	-1.737e+00	8.848e-01	-1.964	0.049579	*
## Nicholls	1.590e+00	5.886e-01	2.702	0.006891	**
## NJIT	1.823e-01	6.018e-01	0.303	0.761974	
## Norfolk.State	4.868e+00	8.408e-01	5.789	7.06e-09	***
## North.Alabama	9.017e-01	5.792e-01	1.557	0.119537	
## North.Carolina	7.389e+00	6.861e-01	10.770	< 2e-16	***
## North.Carolina.A.T	1.955e+00	6.008e-01	3.254	0.001139	**

## North.Carolina.Central	-2.561e-02	7.242e-01	-0.035	0.971785	
## North.Dakota	1.268e+00	5.962e-01	2.126	0.033470	*
## North.Dakota.State	2.787e+00	5.915e-01	4.712	2.45e-06	***
## North.Florida	-1.021e+00	7.279e-01	-1.402	0.160908	
## North.Texas	3.808e+00	6.200e-01	6.141	8.18e-10	***
## Northeastern	-1.774e+00	7.891e-01	-2.248	0.024580	*
## Northern.Arizona	4.287e+00	6.599e-01	6.497	8.19e-11	***
## Northern.Colorado	1.234e+00	6.153e-01	2.005	0.044966	*
## Northern.Illinois	1.421e+00	5.898e-01	2.409	0.016002	*
## Northern.Iowa	3.244e+00	6.167e-01	5.260	1.44e-07	***
## Northern.Kentucky	5.796e-01	5.941e-01	0.976	0.329272	
## Northwestern	3.468e+00	6.683e-01	5.189	2.11e-07	***
## Northwestern.State	1.544e+00	6.342e-01	2.435	0.014900	*
## Notre.Dame	8.392e+00	7.607e-01	11.031	< 2e-16	***
## Oakland	3.203e-01	6.363e-01	0.503	0.614658	
## Ohio	2.419e-01	6.532e-01	0.370	0.711177	
## Ohio.Christian	-9.445e-01	1.684e+00	-0.561	0.574778	
## Ohio.State	7.799e+00	7.908e-01	9.862	< 2e-16	***
## Oklahoma	7.802e+00	7.521e-01	10.373	< 2e-16	***
## Oklahoma.State	6.526e+00	7.069e-01	9.231	< 2e-16	***
## Old.Dominion	2.267e+00	5.761e-01	3.936	8.30e-05	***
## Ole.Miss	6.914e+00	7.599e-01	9.099	< 2e-16	***
## Omaha	1.631e+00	6.085e-01	2.681	0.007343	**
## Oral.Roberts	4.402e+00	7.403e-01	5.946	2.75e-09	***
## Oregon	6.345e+00	6.542e-01	9.700	< 2e-16	***
## Oregon.State	3.231e+00	5.767e-01	5.602	2.12e-08	***
## Our.Lady.Of.The.Lake	-7.818e-01	1.703e+00	-0.459	0.646294	
## Pacific	2.154e+00	5.809e-01	3.708	0.000209	***
## Park.University.Gilbert	-1.333e+00	1.577e+00	-0.845	0.398028	
## Penn.State	3.147e+00	6.833e-01	4.605	4.12e-06	***
## Pennsylvania	2.122e+00	6.744e-01	3.146	0.001657	**
## Pepperdine	7.227e-01	6.317e-01	1.144	0.252581	
## Pittsburgh	3.128e+00	6.469e-01	4.835	1.33e-06	***
## Pittsburgh.Johnstown	-7.415e-01	1.729e+00	-0.429	0.667986	
## Point.Park	-1.157e+00	1.614e+00	-0.717	0.473343	
## Portland	4.500e+00	7.055e-01	6.378	1.79e-10	***
## Portland.State	-5.950e-01	7.275e-01	-0.818	0.413474	
## Prairie.View.A.M	-6.572e-01	6.764e-01	-0.972	0.331218	
## Presbyterian	-1.930e+00	7.052e-01	-2.736	0.006210	**
## Princeton	5.254e+00	6.854e-01	7.666	1.77e-14	***
## Providence	2.957e+00	5.886e-01	5.023	5.08e-07	***
## Puerto.Rico.Mayaguez	-4.455e-01	1.895e+00	-0.235	0.814126	
## Purdue	4.006e+00	7.329e-01	5.466	4.60e-08	***
## Purdue.Fort.Wayne	2.908e+00	6.603e-01	4.404	1.06e-05	***
## Queens.University	-1.107e-02	6.149e-01	-0.018	0.985636	
## Quinnipiac	4.876e+00	8.146e-01	5.986	2.15e-09	***
## Radford	4.784e-02	6.070e-01	0.079	0.937178	
## Rhode.Island	2.451e+00	5.816e-01	4.214	2.51e-05	***
## Rice	2.788e+00	5.694e-01	4.896	9.77e-07	***
## Richmond	5.455e+00	7.203e-01	7.573	3.64e-14	***
## Rider	-6.634e-01	6.609e-01	-1.004	0.315500	
## Robert.Morris	9.049e-01	6.038e-01	1.499	0.133957	
## Rutgers	3.484e+00	7.453e-01	4.674	2.95e-06	***
## Sacramento.State	1.023e+00	5.594e-01	1.829	0.067390	.

## Sacred.Heart	-5.259e-03	6.323e-01	-0.008	0.993363	
## Saint.Joseph.s	4.055e+00	6.456e-01	6.280	3.38e-10	***
## Saint.Louis	2.207e+00	5.526e-01	3.994	6.49e-05	***
## Saint.Mary.s	1.957e+00	5.753e-01	3.402	0.000670	***
## Saint.Peter.s	2.236e-01	6.385e-01	0.350	0.726172	
## Salem.University	-5.904e-01	1.780e+00	-0.332	0.740080	
## Sam.Houston	1.100e+00	6.398e-01	1.720	0.085517	.
## Samford	8.687e-01	6.131e-01	1.417	0.156480	
## San.Diego	3.260e-01	6.755e-01	0.483	0.629411	
## San.Diego.State	3.686e+00	5.905e-01	6.243	4.30e-10	***
## San.Francisco	2.564e+00	5.885e-01	4.357	1.32e-05	***
## San.José.State	6.897e-01	6.193e-01	1.114	0.265397	
## Santa.Clara	2.038e+00	5.736e-01	3.552	0.000382	***
## Schreiner	-7.816e-01	1.704e+00	-0.459	0.646355	
## SE.Louisiana	3.684e+00	7.417e-01	4.967	6.81e-07	***
## Seattle.U	-1.902e+00	7.215e-01	-2.636	0.008380	**
## Seton.Hall	5.571e+00	7.497e-01	7.431	1.08e-13	***
## Sewanee	-7.927e-01	1.706e+00	-0.465	0.642096	
## Siena	1.401e+00	6.102e-01	2.296	0.021704	*
## SIU.Edwardsville	-4.138e-01	7.142e-01	-0.579	0.562269	
## SMU	2.991e+00	6.318e-01	4.734	2.20e-06	***
## South.Alabama	-2.211e-01	6.464e-01	-0.342	0.732350	
## South.Carolina	1.008e+01	8.961e-01	11.244	< 2e-16	***
## South.Carolina.State	-3.068e+00	9.760e-01	-3.144	0.001669	**
## South.Carolina.Upstate	-1.073e+00	6.420e-01	-1.671	0.094758	.
## South.Dakota	1.246e+00	6.072e-01	2.052	0.040161	*
## South.Dakota.State	7.277e+00	9.443e-01	7.707	1.29e-14	***
## South.Florida	4.573e+00	6.888e-01	6.640	3.14e-11	***
## Southeast.Missouri.State	-5.609e-01	7.156e-01	-0.784	0.433097	
## Southern	1.794e+00	7.213e-01	2.487	0.012869	*
## Southern.Illinois	-9.936e-01	8.019e-01	-1.239	0.215324	
## Southern.Indiana	2.362e+00	6.440e-01	3.668	0.000244	***
## Southern.Miss	6.713e-01	6.086e-01	1.103	0.270035	
## Southern.Utah	-1.517e-01	5.990e-01	-0.253	0.800030	
## Southern.Wesleyan	-1.002e+00	1.621e+00	-0.618	0.536506	
## Southern.New.Orleans	-6.137e-01	1.771e+00	-0.347	0.728879	
## St..Bonaventure	6.446e-02	6.442e-01	0.100	0.920287	
## St..Francis..IL.	-5.439e-01	1.822e+00	-0.298	0.765323	
## St..Francis..PA.	-1.447e+00	6.846e-01	-2.114	0.034516	*
## St..John.s	3.663e+00	6.350e-01	5.769	7.97e-09	***
## St..Mary.s..TX.	-7.061e-01	1.724e+00	-0.410	0.682022	
## St..Thomas..TX.	-2.080e+00	1.569e+00	-1.326	0.184892	
## St..Thomas.Minnesota	1.998e+00	5.940e-01	3.363	0.000770	***
## Stanford	4.999e+00	6.605e-01	7.568	3.78e-14	***
## Stephen.F..Austin	3.932e+00	6.781e-01	5.798	6.71e-09	***
## Stetson	1.340e+00	5.675e-01	2.362	0.018194	*
## Stonehill	-5.389e-01	6.734e-01	-0.800	0.423538	
## Stony.Brook	5.105e-01	5.962e-01	0.856	0.391861	
## Sul.Ross.State	-8.535e-01	1.671e+00	-0.511	0.609493	
## Syracuse	3.680e+00	6.471e-01	5.686	1.30e-08	***
## Tarleton.State	1.527e+00	5.558e-01	2.747	0.006007	**
## TCU	8.453e+00	8.599e-01	9.831	< 2e-16	***
## Temple	3.691e+00	6.037e-01	6.115	9.68e-10	***
## Tennessee	6.974e+00	7.071e-01	9.863	< 2e-16	***

## Tennessee.State	4.792e-01	6.318e-01	0.758	0.448223	
## Tennessee.Tech	3.571e+00	7.119e-01	5.016	5.27e-07	***
## Texas	9.859e+00	9.132e-01	10.795	< 2e-16	***
## Texas.A.M	3.372e+00	7.007e-01	4.812	1.50e-06	***
## Texas.A.M.Campus.Christi	8.968e-01	6.038e-01	1.485	0.137449	
## Texas.A.M.San.Antonio	-1.946e-01	2.137e+00	-0.091	0.927456	
## Texas.Southern	7.471e-01	6.381e-01	1.171	0.241631	
## Texas.State	1.266e+00	5.611e-01	2.256	0.024047	*
## Texas.Tech	4.312e+00	5.970e-01	7.223	5.10e-13	***
## Toledo	4.233e+00	6.669e-01	6.348	2.18e-10	***
## Towson	4.360e-01	5.871e-01	0.743	0.457672	
## Trinity.Baptist	-2.077e+00	1.582e+00	-1.313	0.189232	
## Troy	2.774e+00	5.710e-01	4.858	1.19e-06	***
## Tulane	2.895e+00	5.853e-01	4.946	7.59e-07	***
## Tulsa	2.810e+00	5.918e-01	4.748	2.05e-06	***
## UAB	2.211e+00	5.882e-01	3.758	0.000171	***
## UAlbany	3.061e+00	6.977e-01	4.387	1.15e-05	***
## UC.Davis	1.933e+00	5.914e-01	3.268	0.001082	**
## UC.Irvine	2.218e+00	5.837e-01	3.801	0.000144	***
## UC.Merced	-7.574e-01	1.725e+00	-0.439	0.660655	
## UC.Riverside	1.288e+00	5.910e-01	2.179	0.029338	*
## UC.San.Diego	1.462e+00	5.585e-01	2.617	0.008867	**
## UC.Santa.Barbara	1.175e+00	5.986e-01	1.963	0.049631	*
## UCF	3.267e+00	6.962e-01	4.693	2.69e-06	***
## UCLA	1.033e+01	1.048e+00	9.856	< 2e-16	***
## UConn	9.027e+00	8.947e-01	10.089	< 2e-16	***
## UIC	2.169e+00	6.326e-01	3.429	0.000605	***
## UL.Monroe	1.075e+00	5.931e-01	1.813	0.069872	.
## UMass.Lowell	-1.331e+00	7.682e-01	-1.733	0.083092	.
## UMBC	7.200e-01	6.137e-01	1.173	0.240759	
## UNC.Asheville	-2.635e+00	8.279e-01	-3.183	0.001456	**
## UNC.Greensboro	3.210e+00	6.973e-01	4.604	4.15e-06	***
## UNC.Wilmington	6.010e-01	5.764e-01	1.043	0.297069	
## UNLV	4.532e+00	6.410e-01	7.070	1.55e-12	***
## UNT.Dallas	-1.471e+00	1.623e+00	-0.907	0.364663	
## USC	9.771e+00	9.686e-01	10.087	< 2e-16	***
## UT.Arlington	1.640e+00	6.073e-01	2.700	0.006939	**
## UT.Martin	1.292e+00	6.051e-01	2.135	0.032775	*
## UT.Rio.Grande.Valley	1.312e+00	6.074e-01	2.160	0.030760	*
## Utah	6.079e+00	6.599e-01	9.213	< 2e-16	***
## Utah.State	-4.716e-01	7.874e-01	-0.599	0.549213	
## Utah.Tech	-1.492e+00	6.861e-01	-2.174	0.029691	*
## Utah.Valley	1.433e+00	5.563e-01	2.576	0.009986	**
## UTEP	9.205e-01	6.123e-01	1.503	0.132750	
## UTSA	4.712e+00	6.987e-01	6.745	1.53e-11	***
## UVA.Wise	-1.086e+00	1.641e+00	-0.662	0.508160	
## Valparaiso	1.359e+00	6.133e-01	2.216	0.026682	*
## Vanderbilt	6.478e+00	7.127e-01	9.089	< 2e-16	***
## VCU	1.742e+00	5.890e-01	2.958	0.003096	**
## Vermont	2.574e+00	5.837e-01	4.410	1.03e-05	***
## Villanova	4.835e+00	6.137e-01	7.878	3.33e-15	***
## Virginia	4.490e+00	6.358e-01	7.062	1.64e-12	***
## Virginia.Tech	5.273e+00	6.579e-01	8.015	1.10e-15	***
## Virginia.Lynchburg	-3.422e+00	1.878e+00	-1.822	0.068458	.

```
## Wagner -2.351e+00 7.425e-01 -3.167 0.001542 **
## Wake.Forest 2.985e+00 6.642e-01 4.495 6.97e-06 ***
## Walla.Walla -7.227e-01 1.729e+00 -0.418 0.675880
## Warren.Wilson -3.018e+00 1.804e+00 -1.673 0.094334 .
## Washington 5.826e+00 6.971e-01 8.357 < 2e-16 ***
## Washington.State 3.568e+00 6.011e-01 5.935 2.94e-09 ***
## Weber.State 1.264e+00 6.014e-01 2.102 0.035571 *
## West.Georgia 6.788e-01 5.948e-01 1.141 0.253830
## West.Virginia 6.581e+00 7.308e-01 9.004 < 2e-16 ***
## Westcliff -1.918e+00 1.699e+00 -1.129 0.258929
## Western.Carolina 6.695e-01 6.059e-01 1.105 0.269199
## Western.Illinois 1.432e+00 6.014e-01 2.380 0.017290 *
## Western.Kentucky 3.132e+00 6.354e-01 4.929 8.26e-07 ***
## Western.Michigan 1.602e+00 5.931e-01 2.700 0.006932 **
## Western.New.Mexico -3.418e-01 1.964e+00 -0.174 0.861814
## Wichita.State 1.741e+00 6.042e-01 2.882 0.003948 **
## Wiley -1.440e+00 1.632e+00 -0.882 0.377612
## William...Mary 1.076e+00 5.648e-01 1.904 0.056887 .
## Winston.Salem -6.392e-01 1.758e+00 -0.364 0.716215
## Winthrop 6.499e-02 6.063e-01 0.107 0.914635
## Wisconsin 4.513e+00 6.838e-01 6.599 4.14e-11 ***
## Wofford 1.943e+00 6.348e-01 3.062 0.002202 **
## Wright.State 1.199e-01 5.926e-01 0.202 0.839637
## Wyoming 3.866e+00 5.797e-01 6.669 2.57e-11 ***
## Xavier 1.618e+00 6.741e-01 2.401 0.016371 *
## Yale -3.455e-01 7.093e-01 -0.487 0.626202
## Youngstown.State 1.487e-01 6.144e-01 0.242 0.808811
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 7796.5 on 5624 degrees of freedom
## Residual deviance: 4231.7 on 5185 degrees of freedom
## AIC: 5109.7
##
## Number of Fisher Scoring iterations: 23
```

3a

```
model_3 <- glm(formula = home_win ~ . - Abilene.Christian, family = binomial,
               data = womens)
summary(model_3)
```

```
##
## Call:
## glm(formula = home_win ~ . - Abilene.Christian, family = binomial,
##      data = womens)
##
## Coefficients:
##
## Estimate Std. Error z value Pr(>|z|)
```

## (Intercept)	3.724e+01	2.199e+01	1.694	0.090299	.
## date	-1.832e-03	1.094e-03	-1.675	0.093870	.
## Air.Force	-4.133e-02	7.194e-01	-0.057	0.954190	
## Akron	-1.771e+00	7.485e-01	-2.366	0.017981	*
## Alabama	4.761e+00	8.624e-01	5.520	3.39e-08	***
## Alabama.A.M	-7.870e-01	7.601e-01	-1.035	0.300455	
## Alabama.State	-4.341e+00	9.638e-01	-4.504	6.66e-06	***
## Alaska.Anchorage	-3.987e-02	1.555e+00	-0.026	0.979538	
## Alcorn.State	-2.153e+00	8.121e-01	-2.651	0.008017	**
## American.University	-4.656e+00	1.192e+00	-3.905	9.42e-05	***
## App.State	-6.429e-01	7.255e-01	-0.886	0.375525	
## Arizona	2.707e+00	7.477e-01	3.620	0.000295	***
## Arizona.State	7.058e-01	7.376e-01	0.957	0.338582	
## Arkansas	8.459e-01	7.527e-01	1.124	0.261052	
## Arkansas.Baptist	-2.108e+01	1.609e+03	-0.013	0.989545	
## Arkansas.State	3.917e-01	7.084e-01	0.553	0.580299	
## Arkansas.Pine.Bluff	-5.772e+00	1.280e+00	-4.511	6.45e-06	***
## Arlington.Baptist	-1.755e+01	2.764e+03	-0.006	0.994934	
## Army	6.527e-01	7.755e-01	0.842	0.399982	
## Auburn	1.790e+00	8.057e-01	2.222	0.026276	*
## Austin.Peay	-1.265e+00	7.367e-01	-1.717	0.086059	.
## Ball.State	2.789e+00	8.430e-01	3.308	0.000940	***
## Baylor	4.891e+00	8.344e-01	5.862	4.57e-09	***
## Bellarmine	-8.198e-01	7.186e-01	-1.141	0.253917	
## Bellevue.University	-1.783e+01	2.772e+03	-0.006	0.994868	
## Belmont	2.083e+00	7.744e-01	2.690	0.007145	**
## Berry	-1.817e+01	2.702e+03	-0.007	0.994635	
## Bethel..TN.	-8.800e-01	1.572e+00	-0.560	0.575553	
## Bethesda.University	-1.878e+01	1.281e+03	-0.015	0.988299	
## Bethune.Cookman	-3.169e+00	8.111e-01	-3.907	9.34e-05	***
## Binghamton	-1.514e+00	7.542e-01	-2.007	0.044756	*
## Boise.State	3.095e-01	7.152e-01	0.433	0.665178	
## Boston.College	1.872e+00	7.748e-01	2.416	0.015679	*
## Boston.University	-1.701e+00	7.862e-01	-2.163	0.030536	*
## Bowie.State	-1.868e+01	2.085e+03	-0.009	0.992851	
## Bowling.Green	5.913e-01	7.402e-01	0.799	0.424387	
## Bradley	-9.712e-01	7.660e-01	-1.268	0.204842	
## Brown	-3.419e-01	8.185e-01	-0.418	0.676141	
## Bryant	-1.001e+00	7.508e-01	-1.333	0.182591	
## Bryn.Athyn	-1.818e+01	2.690e+03	-0.007	0.994606	
## Bucknell	-2.653e-01	7.434e-01	-0.357	0.721153	
## Buffalo	1.479e+00	7.953e-01	1.860	0.062859	.
## Butler	1.213e+00	7.884e-01	1.538	0.124054	
## BYU	1.392e+00	7.444e-01	1.869	0.061569	.
## Cal.Maritime	-1.729e+01	2.785e+03	-0.006	0.995048	
## Cal.Poly	-1.505e+00	7.591e-01	-1.983	0.047373	*
## Cal.State.Bakersfield	-4.786e+00	1.059e+00	-4.520	6.19e-06	***
## Cal.State.Fullerton	-3.528e+00	9.022e-01	-3.910	9.23e-05	***
## Cal.State.Northridge	-4.151e+00	9.838e-01	-4.219	2.45e-05	***
## Cal.State.San.Marcos	-1.796e+01	2.362e+03	-0.008	0.993935	
## California	4.537e+00	8.105e-01	5.598	2.17e-08	***
## California.Baptist	-1.019e+00	6.669e-01	-1.528	0.126396	
## Campbell	-3.699e-01	7.226e-01	-0.512	0.608712	
## Canisius	-2.315e+00	7.595e-01	-3.048	0.002306	**

## Cedarville	-1.787e+01	2.384e+03	-0.007	0.994018	
## Central.Arkansas	4.866e-01	7.621e-01	0.638	0.523188	
## Central.Baptist.College	-1.746e+01	1.877e+03	-0.009	0.992579	
## Central.Connecticut	-3.907e+00	8.630e-01	-4.526	6.00e-06	***
## Central.Michigan	-3.763e-01	7.468e-01	-0.504	0.614380	
## Charleston	1.795e-01	7.513e-01	0.239	0.811195	
## Charleston.Southern	-2.130e+00	7.869e-01	-2.707	0.006787	**
## Charlotte	-8.140e-01	7.500e-01	-1.085	0.277802	
## Chattanooga	-6.481e-01	7.435e-01	-0.872	0.383404	
## Cheyney..PA.	-2.277e+01	2.348e+03	-0.010	0.992261	
## Chicago.State	-4.469e+00	8.969e-01	-4.982	6.28e-07	***
## Cincinnati	2.279e+00	7.760e-01	2.937	0.003317	**
## Cleary.University	-1.849e+01	2.225e+03	-0.008	0.993372	
## Clemson	2.119e+00	7.823e-01	2.709	0.006748	**
## Cleveland.State	1.423e-02	7.886e-01	0.018	0.985607	
## Clinton.College	-1.975e+01	2.050e+03	-0.010	0.992316	
## Coastal.Carolina	1.125e+00	7.880e-01	1.428	0.153436	
## Coastal.Georgia	-1.992e+01	2.515e+03	-0.008	0.993680	
## Colgate	1.202e-01	7.912e-01	0.152	0.879278	
## College.Of.Biblical.Studies	-1.937e+01	2.716e+03	-0.007	0.994308	
## Colorado	3.098e+00	7.856e-01	3.943	8.06e-05	***
## Colorado.Christian	5.734e-01	2.056e+00	0.279	0.780314	
## Colorado.State	1.375e+00	7.021e-01	1.958	0.050172	.
## Columbia	3.491e+00	8.829e-01	3.954	7.68e-05	***
## Coppin.State	-2.656e-01	7.959e-01	-0.334	0.738592	
## Cornell	-1.739e+00	8.219e-01	-2.116	0.034318	*
## Creighton	5.128e+00	9.372e-01	5.472	4.46e-08	***
## Cumberland..TN.	-1.870e+01	2.771e+03	-0.007	0.994615	
## Dakota.Wesleyan	-1.552e+01	2.362e+03	-0.007	0.994756	
## Dartmouth	-2.265e+00	8.448e-01	-2.682	0.007326	**
## Davidson	1.267e+00	7.488e-01	1.692	0.090685	.
## Davis...Elkins	-2.071e+01	2.391e+03	-0.009	0.993090	
## Dayton	3.496e-01	7.344e-01	0.476	0.634101	
## Defiance	-1.593e+01	2.715e+03	-0.006	0.995319	
## Delaware	-1.346e+00	7.079e-01	-1.901	0.057266	.
## Delaware.State	-6.762e+00	1.504e+00	-4.498	6.87e-06	***
## Delta.State	-1.865e+01	2.359e+03	-0.008	0.993693	
## Denver	-1.666e+00	7.373e-01	-2.260	0.023845	*
## DePaul	1.228e+00	7.643e-01	1.607	0.108140	
## Detroit.Mercy	-1.227e+00	7.603e-01	-1.614	0.106423	
## Drake	1.749e+00	7.476e-01	2.340	0.019277	*
## Drexel	-6.006e-01	7.341e-01	-0.818	0.413280	
## Duke	5.907e+00	8.209e-01	7.196	6.20e-13	***
## Duquesne	5.618e-01	7.356e-01	0.764	0.445020	
## East.Carolina	6.274e-01	7.265e-01	0.864	0.387781	
## East.Tennessee.State	-7.655e-01	7.557e-01	-1.013	0.311090	
## East.Texas.A.M	-3.008e+00	8.555e-01	-3.516	0.000437	***
## Eastern.Illinois	-5.717e-03	7.839e-01	-0.007	0.994181	
## Eastern.Kentucky	-4.183e-01	7.443e-01	-0.562	0.574124	
## Eastern.Michigan	-3.221e+00	9.428e-01	-3.417	0.000634	***
## Eastern.New.Mexico	-1.770e+01	2.638e+03	-0.007	0.994647	
## Eastern.Washington	-1.131e+00	7.515e-01	-1.505	0.132284	
## Edward.Waters	-1.803e+01	2.796e+03	-0.006	0.994856	
## Elon	-1.111e+00	7.151e-01	-1.553	0.120404	

## Erskine	-1.788e+01	2.249e+03	-0.008	0.993657	
## Evansville	-2.675e+00	8.208e-01	-3.259	0.001119	**
## Evergreen.State	-2.004e+01	2.356e+03	-0.009	0.993214	
## Fairfield	2.816e+00	9.329e-01	3.019	0.002535	**
## Fairleigh.Dickinson	1.183e+00	1.149e+00	1.030	0.302888	
## Faulkner	-2.075e+01	2.666e+03	-0.008	0.993789	
## Fisk	-1.840e+01	2.785e+03	-0.007	0.994727	
## Florida	2.559e+00	8.094e-01	3.161	0.001572	**
## Florida.A.M	-3.160e+00	8.302e-01	-3.806	0.000141	***
## Florida.Atlantic	-1.059e+00	7.206e-01	-1.470	0.141687	
## Florida.Gulf.Coast	2.588e+00	9.416e-01	2.749	0.005980	**
## Florida.International	-1.210e+00	6.816e-01	-1.776	0.075723	.
## Florida.State	4.533e+00	8.116e-01	5.585	2.34e-08	***
## Fordham	-2.094e-01	7.403e-01	-0.283	0.777347	
## Fort.Lauderdale	-1.947e+01	2.584e+03	-0.008	0.993990	
## Fresno.State	2.813e-01	7.230e-01	0.389	0.697232	
## Furman	-1.115e+00	7.464e-01	-1.493	0.135346	
## Gardner.Webb	-2.956e+00	7.843e-01	-3.769	0.000164	***
## George.Mason	2.482e+00	8.402e-01	2.954	0.003140	**
## George.Washington	-1.025e+00	7.200e-01	-1.424	0.154393	
## Georgetown	1.037e+00	7.514e-01	1.380	0.167666	
## Georgia	1.305e+00	8.003e-01	1.630	0.103079	
## Georgia.Southern	-9.054e-01	6.976e-01	-1.298	0.194364	
## Georgia.State	-2.312e-01	7.135e-01	-0.324	0.745921	
## Georgia.Tech	4.129e+00	7.944e-01	5.197	2.03e-07	***
## Georgian.Court.University	-2.280e+01	2.410e+03	-0.009	0.992449	
## Gonzaga	1.780e+00	7.250e-01	2.455	0.014089	*
## Grambling	-1.869e+00	8.232e-01	-2.270	0.023196	*
## Grand.Canyon	3.747e+00	1.058e+00	3.541	0.000399	***
## Green.Bay	2.143e+00	8.757e-01	2.447	0.014410	*
## Guilford	-1.789e+01	2.768e+03	-0.006	0.994844	
## Hampton	-2.664e+00	7.715e-01	-3.453	0.000554	***
## Harvard	3.857e+00	9.191e-01	4.196	2.72e-05	***
## Hawai.i	1.771e-01	7.591e-01	0.233	0.815472	
## High.Point	-1.182e+00	7.665e-01	-1.542	0.123117	
## Hofstra	-1.359e+00	7.135e-01	-1.905	0.056759	.
## Holy.Cross	1.683e-01	7.589e-01	0.222	0.824511	
## Houston	-1.006e+00	8.965e-01	-1.123	0.261637	
## Houston.Christian	-3.298e+00	8.735e-01	-3.775	0.000160	***
## Howard	4.362e-02	7.644e-01	0.057	0.954498	
## Idaho	-1.124e-01	7.292e-01	-0.154	0.877527	
## Idaho.State	-5.007e-01	7.223e-01	-0.693	0.488225	
## Illinois	4.432e+00	8.230e-01	5.385	7.24e-08	***
## Illinois.State	7.648e-01	7.501e-01	1.020	0.307905	
## Incarnate.Word	-4.442e-01	7.655e-01	-0.580	0.561714	
## Indiana	4.266e+00	7.878e-01	5.416	6.11e-08	***
## Indiana.State	-2.912e+00	8.749e-01	-3.328	0.000874	***
## Indiana.Southeast	-1.748e+01	2.758e+03	-0.006	0.994943	
## Iona	-2.122e+00	7.470e-01	-2.841	0.004494	**
## Iowa	4.721e+00	7.949e-01	5.938	2.88e-09	***
## Iowa.State	3.647e+00	8.037e-01	4.538	5.69e-06	***
## IU.Columbus	-1.956e+01	2.785e+03	-0.007	0.994397	
## IU.Indianapolis	-2.253e+00	7.722e-01	-2.918	0.003527	**
## Jackson.State	-1.506e+00	7.872e-01	-1.913	0.055733	.

## Jacksonville	-9.197e-01	7.408e-01	-1.241	0.214462	
## Jacksonville.State	-1.440e+00	7.393e-01	-1.947	0.051520	.
## James.Madison	3.408e+00	9.554e-01	3.568	0.000360	***
## Jarvis.Christian	-1.915e+01	2.041e+03	-0.009	0.992513	
## Jessup.University	-1.763e+01	2.765e+03	-0.006	0.994911	
## Johnson...Wales..NC.	-1.960e+01	2.789e+03	-0.007	0.994393	
## Johnson.C.Smith	-1.875e+01	2.099e+03	-0.009	0.992872	
## Kansas	2.351e+00	7.783e-01	3.021	0.002518	**
## Kansas.City	-1.183e+00	7.164e-01	-1.652	0.098542	.
## Kansas.State	4.441e+00	8.115e-01	5.473	4.42e-08	***
## Kennesaw.State	-8.362e-01	7.006e-01	-1.193	0.232693	
## Kent.State	9.865e-01	7.379e-01	1.337	0.181268	
## Kentucky	5.285e+00	8.638e-01	6.118	9.47e-10	***
## Kentucky.State	-1.720e+01	2.548e+03	-0.007	0.994612	
## King..TN.	-1.767e+01	2.793e+03	-0.006	0.994952	
## La.Salle	-1.289e+00	7.390e-01	-1.744	0.081181	.
## La.Sierra	-2.045e+01	2.614e+03	-0.008	0.993758	
## Lafayette	-1.912e+00	8.145e-01	-2.347	0.018932	*
## Lamar	8.463e-01	7.771e-01	1.089	0.276147	
## Le.Moyne	-4.589e+00	8.758e-01	-5.240	1.60e-07	***
## Lees.McRae	-2.012e+01	2.520e+03	-0.008	0.993631	
## Lehigh	1.192e+00	8.029e-01	1.485	0.137480	
## LeTourneau	-1.920e+01	2.501e+03	-0.008	0.993877	
## Liberty	2.418e+00	8.548e-01	2.828	0.004681	**
## Life.Pacific	-1.799e+01	2.236e+03	-0.008	0.993582	
## Life.University	-1.826e+01	2.770e+03	-0.007	0.994741	
## Lincoln..PA.	-1.856e+01	2.771e+03	-0.007	0.994655	
## Lindenwood	2.758e-01	7.825e-01	0.352	0.724535	
## Lipscomb	-2.409e-01	7.533e-01	-0.320	0.749134	
## Little.Rock	-5.766e-01	7.670e-01	-0.752	0.452248	
## Long.Beach.State	-9.080e-01	7.393e-01	-1.228	0.219407	
## Long.Island.University	-5.155e+00	8.709e-01	-5.919	3.24e-09	***
## Longwood	-1.731e+00	7.596e-01	-2.279	0.022649	*
## Louisiana	-7.037e-01	7.187e-01	-0.979	0.327491	
## Louisiana.Tech	-3.485e-02	7.248e-01	-0.048	0.961645	
## Louisville	4.788e+00	8.185e-01	5.850	4.90e-09	***
## Loyola.Chicago	-9.310e-01	7.365e-01	-1.264	0.206201	
## Loyola.Maryland	-2.373e+00	8.144e-01	-2.914	0.003568	**
## Loyola.Marymount	-1.870e-01	7.209e-01	-0.259	0.795302	
## LSU	6.290e+00	9.526e-01	6.603	4.02e-11	***
## Maine	-8.186e-01	7.583e-01	-1.079	0.280370	
## Manhattan	-1.269e+00	7.464e-01	-1.700	0.089207	.
## Marist	-1.150e+00	7.426e-01	-1.548	0.121556	
## Marquette	2.409e+00	7.951e-01	3.030	0.002443	**
## Marshall	-5.982e-01	7.060e-01	-0.847	0.396878	
## Maryland	5.520e+00	8.511e-01	6.486	8.81e-11	***
## Maryland.Eastern.Shore	-1.234e+00	8.502e-01	-1.452	0.146514	
## Massachusetts	-2.496e-01	7.340e-01	-0.340	0.733839	
## McNeese	-2.812e+00	8.344e-01	-3.371	0.000750	***
## Memphis	-9.333e-01	7.695e-01	-1.213	0.225153	
## Mercer	-2.082e+00	7.413e-01	-2.808	0.004979	**
## Mercyhurst	-4.654e+00	9.145e-01	-5.089	3.60e-07	***
## Merrimack	-1.341e+00	7.624e-01	-1.759	0.078500	.
## Miami	2.123e+00	7.922e-01	2.680	0.007363	**

## Miami..OH.	4.366e-01	7.287e-01	0.599	0.549006	
## Michigan	5.094e+00	8.299e-01	6.138	8.34e-10	***
## Michigan.State	4.746e+00	8.181e-01	5.801	6.59e-09	***
## Middle.Tennessee	2.457e+00	7.907e-01	3.107	0.001892	**
## Milwaukee	-2.556e+00	7.881e-01	-3.244	0.001180	**
## Minnesota	3.515e+00	8.456e-01	4.156	3.23e-05	***
## Mississippi.State	3.731e+00	8.455e-01	4.412	1.02e-05	***
## Mississippi.Valley.State	-3.167e+00	8.294e-01	-3.818	0.000134	***
## Missouri	1.452e+00	7.656e-01	1.897	0.057894	.
## Missouri.State	1.913e+00	7.546e-01	2.534	0.011265	*
## Monmouth	-1.345e+00	7.134e-01	-1.885	0.059408	.
## Montana	-2.178e-01	7.480e-01	-0.291	0.770882	
## Montana.State	3.161e+00	9.449e-01	3.345	0.000822	***
## Morehead.State	-2.197e+00	7.897e-01	-2.782	0.005407	**
## Morgan.State	-2.226e+00	8.155e-01	-2.729	0.006344	**
## Mount.Olive	-1.745e+01	2.796e+03	-0.006	0.995021	
## Mount.St..Mary.s	-1.059e+00	7.744e-01	-1.367	0.171650	
## Murray.State	2.124e+00	8.203e-01	2.590	0.009606	**
## Navy	-2.844e-01	7.654e-01	-0.371	0.710271	
## NC.State	5.867e+00	8.470e-01	6.927	4.29e-12	***
## Nebraska	4.417e+00	8.180e-01	5.399	6.69e-08	***
## Nelson	-1.732e+01	2.790e+03	-0.006	0.995049	
## Nevada	-9.591e-01	7.440e-01	-1.289	0.197335	
## New.Hampshire	-1.992e+00	7.675e-01	-2.595	0.009450	**
## New.Mexico	6.267e-01	6.864e-01	0.913	0.361206	
## New.Mexico.State	3.903e-01	7.012e-01	0.557	0.577814	
## New.Orleans	-2.991e+00	8.313e-01	-3.598	0.000321	***
## Newberry	-2.073e+01	2.244e+03	-0.009	0.992629	
## Niagara	-4.004e+00	9.914e-01	-4.039	5.37e-05	***
## Nicholls	-6.227e-01	7.217e-01	-0.863	0.388278	
## NJIT	-2.128e+00	7.510e-01	-2.834	0.004598	**
## Norfolk.State	2.692e+00	9.638e-01	2.793	0.005215	**
## North.Alabama	-1.477e+00	7.459e-01	-1.981	0.047630	*
## North.Carolina	5.301e+00	8.156e-01	6.500	8.04e-11	***
## North.Carolina.A.T	-3.757e-01	7.554e-01	-0.497	0.618913	
## North.Carolina.Central	-2.467e+00	8.785e-01	-2.808	0.004985	**
## North.Dakota	-9.238e-01	7.307e-01	-1.264	0.206173	
## North.Dakota.State	5.816e-01	7.298e-01	0.797	0.425464	
## North.Florida	-3.663e+00	9.373e-01	-3.907	9.33e-05	***
## North.Texas	1.681e+00	7.295e-01	2.304	0.021207	*
## Northeastern	-4.146e+00	9.146e-01	-4.533	5.82e-06	***
## Northern.Arizona	2.195e+00	7.798e-01	2.815	0.004878	**
## Northern.Colorado	-8.688e-01	7.380e-01	-1.177	0.239121	
## Northern.Illinois	-8.578e-01	7.338e-01	-1.169	0.242387	
## Northern.Iowa	1.049e+00	7.555e-01	1.389	0.164912	
## Northern.Kentucky	-1.805e+00	7.541e-01	-2.393	0.016692	*
## Northwestern	1.270e+00	8.038e-01	1.580	0.114110	
## Northwestern.State	-6.580e-01	7.613e-01	-0.864	0.387406	
## Notre.Dame	6.360e+00	8.807e-01	7.222	5.14e-13	***
## Oakland	-2.064e+00	7.898e-01	-2.613	0.008975	**
## Ohio	-2.107e+00	8.011e-01	-2.631	0.008520	**
## Ohio.Christian	-1.837e+01	2.468e+03	-0.007	0.994062	
## Ohio.State	5.734e+00	9.063e-01	6.326	2.51e-10	***
## Oklahoma	5.765e+00	8.738e-01	6.597	4.19e-11	***

## Oklahoma.State	4.421e+00	8.284e-01	5.337	9.48e-08	***
## Old.Dominion	-2.955e-03	7.263e-01	-0.004	0.996754	
## Ole.Miss	4.873e+00	8.821e-01	5.525	3.29e-08	***
## Omaha	-5.316e-01	7.404e-01	-0.718	0.472729	
## Oral.Roberts	2.267e+00	8.602e-01	2.635	0.008414	**
## Oregon	4.248e+00	7.855e-01	5.408	6.39e-08	***
## Oregon.State	1.106e+00	7.116e-01	1.555	0.120047	
## Our.Lady.Of.The.Lake	-1.808e+01	2.740e+03	-0.007	0.994735	
## Pacific	-3.707e-04	7.137e-01	-0.001	0.999586	
## Park.University.Gilbert	-1.777e+01	1.699e+03	-0.010	0.991656	
## Penn.State	9.584e-01	8.199e-01	1.169	0.242418	
## Pennsylvania	-1.029e-01	8.035e-01	-0.128	0.898057	
## Pepperdine	-1.403e+00	7.576e-01	-1.852	0.064013	.
## Pittsburgh	9.447e-01	7.837e-01	1.205	0.228031	
## Pittsburgh.Johnstown	-1.791e+01	2.621e+03	-0.007	0.994548	
## Point.Park	-1.898e+01	2.749e+03	-0.007	0.994492	
## Portland	2.378e+00	8.207e-01	2.897	0.003770	**
## Portland.State	-2.713e+00	8.373e-01	-3.240	0.001194	**
## Prairie.View.A.M	-3.271e+00	8.636e-01	-3.787	0.000152	***
## Presbyterian	-4.723e+00	8.996e-01	-5.250	1.52e-07	***
## Princeton	3.162e+00	8.140e-01	3.885	0.000103	***
## Providence	7.861e-01	7.329e-01	1.073	0.283413	
## Puerto.Rico.Mayaguez	-1.713e+01	2.496e+03	-0.007	0.994524	
## Purdue	1.875e+00	8.585e-01	2.184	0.028926	*
## Purdue.Fort.Wayne	5.930e-01	8.038e-01	0.738	0.460675	
## Queens.University	-2.526e+00	7.847e-01	-3.219	0.001288	**
## Quinnipiac	2.711e+00	9.279e-01	2.921	0.003486	**
## Radford	-2.560e+00	7.807e-01	-3.279	0.001043	**
## Rhode.Island	2.252e-01	7.272e-01	0.310	0.756758	
## Rice	5.755e-01	7.100e-01	0.811	0.417640	
## Richmond	3.307e+00	8.475e-01	3.903	9.51e-05	***
## Rider	-2.959e+00	7.993e-01	-3.703	0.000213	***
## Robert.Morris	-1.456e+00	7.594e-01	-1.918	0.055132	.
## Rutgers	1.336e+00	8.711e-01	1.533	0.125199	
## Sacramento.State	-9.524e-01	6.794e-01	-1.402	0.160999	
## Sacred.Heart	-2.285e+00	7.730e-01	-2.957	0.003110	**
## Saint.Joseph.s	1.854e+00	7.819e-01	2.372	0.017715	*
## Saint.Louis	-1.378e-02	7.003e-01	-0.020	0.984296	
## Saint.Mary.s	-1.716e-01	7.087e-01	-0.242	0.808645	
## Saint.Peter.s	-2.058e+00	7.808e-01	-2.636	0.008398	**
## Salem.University	-1.770e+01	2.776e+03	-0.006	0.994913	
## Sam.Houston	-1.008e+00	7.527e-01	-1.339	0.180646	
## Samford	-1.581e+00	7.794e-01	-2.028	0.042544	*
## San.Diego	-1.847e+00	8.003e-01	-2.308	0.021011	*
## San.Diego.State	1.549e+00	7.166e-01	2.162	0.030625	*
## San.Francisco	4.283e-01	7.215e-01	0.594	0.552737	
## San.José.State	-1.480e+00	7.490e-01	-1.976	0.048176	*
## Santa.Clara	-1.285e-01	7.135e-01	-0.180	0.857082	
## Schreiner	-1.811e+01	2.737e+03	-0.007	0.994721	
## SE.Louisiana	1.551e+00	8.480e-01	1.829	0.067454	.
## Seattle.U	-3.992e+00	8.918e-01	-4.476	7.60e-06	***
## Seton.Hall	3.449e+00	8.725e-01	3.953	7.73e-05	***
## Sewanee	-1.800e+01	2.691e+03	-0.007	0.994664	
## Siena	-8.722e-01	7.550e-01	-1.155	0.247960	

## SIU.Edwardsville	-2.709e+00	8.435e-01	-3.211	0.001321	**
## SMU	8.349e-01	7.623e-01	1.095	0.273436	
## South.Alabama	-2.604e+00	8.047e-01	-3.236	0.001212	**
## South.Carolina	8.114e+00	1.012e+00	8.014	1.11e-15	***
## South.Carolina.State	-6.170e+00	1.298e+00	-4.755	1.99e-06	***
## South.Carolina.Upstate	-3.845e+00	8.396e-01	-4.580	4.66e-06	***
## South.Dakota	-9.718e-01	7.450e-01	-1.304	0.192098	
## South.Dakota.State	5.209e+00	1.047e+00	4.974	6.55e-07	***
## South.Florida	2.406e+00	8.101e-01	2.970	0.002977	**
## Southeast.Missouri.State	-2.876e+00	8.472e-01	-3.395	0.000687	***
## Southern	-6.134e-01	8.788e-01	-0.698	0.485179	
## Southern.Illinois	-3.275e+00	9.183e-01	-3.566	0.000362	***
## Southern.Indiana	4.921e-02	7.889e-01	0.062	0.950266	
## Southern.Miss	-1.607e+00	7.520e-01	-2.137	0.032585	*
## Southern.Utah	-1.967e+00	7.261e-01	-2.709	0.006742	**
## Southern.Wesleyan	-1.834e+01	2.217e+03	-0.008	0.993399	
## Southern.New.Orleans	-1.770e+01	2.787e+03	-0.006	0.994931	
## St..Bonaventure	-2.210e+00	7.824e-01	-2.825	0.004735	**
## St..Francis..IL.	-1.738e+01	2.661e+03	-0.007	0.994788	
## St..Francis..PA.	-3.943e+00	8.441e-01	-4.671	2.99e-06	***
## St..John.s	1.512e+00	7.707e-01	1.961	0.049844	*
## St..Mary.s..TX.	-1.766e+01	2.784e+03	-0.006	0.994938	
## St..Thomas..TX.	-1.925e+01	1.703e+03	-0.011	0.990980	
## St..Thomas.Minnesota	-1.882e-01	7.315e-01	-0.257	0.797024	
## Stanford	2.895e+00	7.923e-01	3.653	0.000259	***
## Stephen.F..Austin	1.815e+00	7.704e-01	2.355	0.018506	*
## Stetson	-1.057e+00	7.307e-01	-1.447	0.147809	
## Stonehill	-2.935e+00	8.216e-01	-3.573	0.000353	***
## Stony.Brook	-1.805e+00	7.437e-01	-2.426	0.015250	*
## Sul.Ross.State	-1.825e+01	2.782e+03	-0.007	0.994765	
## Syracuse	1.516e+00	7.811e-01	1.941	0.052241	.
## Tarleton.State	-2.718e-01	6.428e-01	-0.423	0.672427	
## TCU	6.408e+00	9.716e-01	6.595	4.24e-11	***
## Temple	1.512e+00	7.388e-01	2.046	0.040767	*
## Tennessee	4.914e+00	8.353e-01	5.884	4.02e-09	***
## Tennessee.State	-1.847e+00	7.838e-01	-2.356	0.018478	*
## Tennessee.Tech	1.316e+00	8.481e-01	1.551	0.120844	
## Texas	7.883e+00	1.026e+00	7.687	1.51e-14	***
## Texas.A.M	1.199e+00	8.265e-01	1.451	0.146745	
## Texas.A.M.Campus.Christi	-1.402e+00	7.479e-01	-1.875	0.060807	.
## Texas.A.M.San.Antonio	-1.580e+01	2.750e+03	-0.006	0.995415	
## Texas.Southern	-1.663e+00	8.028e-01	-2.071	0.038319	*
## Texas.State	-9.892e-01	7.120e-01	-1.389	0.164694	
## Texas.Tech	2.189e+00	7.237e-01	3.024	0.002491	**
## Toledo	2.014e+00	8.012e-01	2.514	0.011935	*
## Towson	-1.909e+00	7.374e-01	-2.589	0.009617	**
## Trinity.Baptist	-2.047e+01	2.784e+03	-0.007	0.994131	
## Troy	5.677e-01	7.231e-01	0.785	0.432452	
## Tulane	6.839e-01	7.241e-01	0.944	0.344926	
## Tulsa	6.129e-01	7.283e-01	0.842	0.400056	
## UAB	5.947e-03	7.257e-01	0.008	0.993461	
## UAlbany	8.212e-01	8.326e-01	0.986	0.323969	
## UC.Davis	-2.440e-01	7.266e-01	-0.336	0.737041	
## UC.Irvine	3.662e-02	7.204e-01	0.051	0.959457	

## UC.Merced	-1.790e+01	2.650e+03	-0.007	0.994611	
## UC.Riverside	-8.933e-01	7.272e-01	-1.228	0.219307	
## UC.San.Diego	-7.226e-01	6.999e-01	-1.032	0.301897	
## UC.Santa.Barbara	-1.018e+00	7.331e-01	-1.388	0.165039	
## UCF	1.104e+00	8.235e-01	1.340	0.180180	
## UCLA	8.322e+00	1.154e+00	7.208	5.66e-13	***
## UConn	7.022e+00	1.006e+00	6.983	2.90e-12	***
## UIC	-4.790e-02	7.720e-01	-0.062	0.950522	
## UL.Monroe	-1.200e+00	7.405e-01	-1.620	0.105261	
## UMass.Lowell	-3.635e+00	8.926e-01	-4.073	4.65e-05	***
## UMBC	-1.612e+00	7.667e-01	-2.103	0.035491	*
## UNC.Asheville	-5.497e+00	1.037e+00	-5.301	1.15e-07	***
## UNC.Greensboro	8.732e-01	8.416e-01	1.038	0.299459	
## UNC.Wilmington	-1.780e+00	7.330e-01	-2.428	0.015185	*
## UNLV	2.400e+00	7.651e-01	3.137	0.001707	**
## UNT.Dallas	-1.936e+01	2.645e+03	-0.007	0.994160	
## USC	7.785e+00	1.083e+00	7.191	6.43e-13	***
## UT.Arlington	-7.310e-02	6.691e-01	-0.109	0.912997	
## UT.Martin	-1.004e+00	7.568e-01	-1.327	0.184488	
## UT.Rio.Grande.Valley	-8.317e-01	7.216e-01	-1.153	0.249073	
## Utah	3.979e+00	7.867e-01	5.057	4.25e-07	***
## Utah.State	-2.651e+00	8.995e-01	-2.947	0.003207	**
## Utah.Tech	-3.552e+00	8.542e-01	-4.158	3.21e-05	***
## Utah.Valley	-2.586e-01	6.307e-01	-0.410	0.681772	
## UTEP	-1.199e+00	7.313e-01	-1.640	0.101024	
## UTSA	2.550e+00	8.162e-01	3.125	0.001780	**
## UVA.Wise	-1.902e+01	2.650e+03	-0.007	0.994274	
## Valparaiso	-8.856e-01	7.573e-01	-1.169	0.242260	
## Vanderbilt	4.424e+00	8.393e-01	5.271	1.36e-07	***
## VCU	-4.947e-01	7.356e-01	-0.672	0.501289	
## Vermont	3.656e-01	7.353e-01	0.497	0.619035	
## Villanova	2.689e+00	7.544e-01	3.564	0.000365	***
## Virginia	2.357e+00	7.732e-01	3.048	0.002302	**
## Virginia.Tech	3.167e+00	7.927e-01	3.995	6.46e-05	***
## Virginia.Lynchburg	-2.131e+01	1.047e+03	-0.020	0.983756	
## Wagner	-4.822e+00	8.880e-01	-5.430	5.64e-08	***
## Wake.Forest	7.986e-01	7.984e-01	1.000	0.317229	
## Walla.Walla	-1.772e+01	2.717e+03	-0.007	0.994795	
## Warren.Wilson	-2.157e+01	2.357e+03	-0.009	0.992701	
## Washington	3.738e+00	8.245e-01	4.533	5.81e-06	***
## Washington.State	1.443e+00	7.327e-01	1.970	0.048826	*
## Weber.State	-8.192e-01	7.256e-01	-1.129	0.258879	
## West.Georgia	-1.715e+00	7.533e-01	-2.276	0.022829	*
## West.Virginia	4.500e+00	8.484e-01	5.304	1.13e-07	***
## Westcliff	-1.929e+01	2.033e+03	-0.009	0.992426	
## Western.Carolina	-1.817e+00	7.707e-01	-2.357	0.018406	*
## Western.Illinois	-8.555e-01	7.489e-01	-1.142	0.253336	
## Western.Kentucky	1.085e+00	7.269e-01	1.493	0.135455	
## Western.Michigan	-6.786e-01	7.412e-01	-0.916	0.359928	
## Western.New.Mexico	-1.655e+01	2.794e+03	-0.006	0.995275	
## Wichita.State	-4.623e-01	7.360e-01	-0.628	0.529927	
## Wiley	-1.886e+01	1.795e+03	-0.011	0.991614	
## William...Mary	-1.272e+00	7.196e-01	-1.767	0.077231	.
## Winston.Salem	-1.791e+01	2.764e+03	-0.006	0.994830	

```
## Winthrop -2.530e+00 7.812e-01 -3.239 0.001201 **
## Wisconsin 2.384e+00 8.149e-01 2.925 0.003440 **
## Wofford -5.030e-01 7.920e-01 -0.635 0.525384
## Wright.State -2.230e+00 7.449e-01 -2.993 0.002760 **
## Wyoming 1.765e+00 7.123e-01 2.478 0.013207 *
## Xavier -5.885e-01 8.059e-01 -0.730 0.465210
## Yale -2.614e+00 8.365e-01 -3.125 0.001779 **
## Youngstown.State -2.246e+00 7.714e-01 -2.912 0.003594 **
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 7481.9 on 5623 degrees of freedom
## Residual deviance: 4172.4 on 5184 degrees of freedom
## AIC: 5052.4
##
## Number of Fisher Scoring iterations: 16
```

```
model_3_rank <- sort(coef(model_3), decreasing = TRUE)
model_3_rank
```

```
## (Intercept) UCLA
## 3.724452e+01 8.322140e+00
## South.Carolina Texas
## 8.114008e+00 7.883167e+00
## USC UConn
## 7.785470e+00 7.022398e+00
## TCU Notre.Dame
## 6.407829e+00 6.359737e+00
## LSU Duke
## 6.290366e+00 5.907306e+00
## NC.State Oklahoma
## 5.867358e+00 5.764776e+00
## Ohio.State Maryland
## 5.733791e+00 5.520233e+00
## North.Carolina Kentucky
## 5.301336e+00 5.284811e+00
## South.Dakota.State Creighton
## 5.208820e+00 5.127892e+00
## Michigan Tennessee
## 5.094159e+00 4.914276e+00
## Baylor Ole.Miss
## 4.891328e+00 4.873410e+00
## Louisville Alabama
## 4.788397e+00 4.760643e+00
## Michigan.State Iowa
## 4.745722e+00 4.720600e+00
## California Florida.State
## 4.537385e+00 4.533097e+00
## West.Virginia Kansas.State
## 4.500105e+00 4.441450e+00
## Illinois Vanderbilt
## 4.431741e+00 4.423721e+00
```

##	Oklahoma.State	Nebraska
##	4.420829e+00	4.416917e+00
##	Indiana	Oregon
##	4.266316e+00	4.247518e+00
##	Georgia.Tech	Utah
##	4.128571e+00	3.978664e+00
##	Harvard	Grand.Canyon
##	3.856656e+00	3.746845e+00
##	Washington	Mississippi.State
##	3.737622e+00	3.730560e+00
##	Iowa.State	Minnesota
##	3.646983e+00	3.514736e+00
##	Columbia	Seton.Hall
##	3.491034e+00	3.448623e+00
##	James.Madison	Richmond
##	3.408435e+00	3.307452e+00
##	Virginia.Tech	Princeton
##	3.167094e+00	3.162181e+00
##	Montana.State	Colorado
##	3.161032e+00	3.097545e+00
##	Stanford	Fairfield
##	2.894556e+00	2.816485e+00
##	Ball.State	Quinnipiac
##	2.788814e+00	2.710684e+00
##	Arizona	Norfolk.State
##	2.706673e+00	2.692226e+00
##	Villanova	Florida.Gulf.Coast
##	2.688699e+00	2.588289e+00
##	Florida	UTSA
##	2.558625e+00	2.550372e+00
##	George.Mason	Middle.Tennessee
##	2.481769e+00	2.456535e+00
##	Liberty	Marquette
##	2.417540e+00	2.409476e+00
##	South.Florida	UNLV
##	2.405980e+00	2.400086e+00
##	Wisconsin	Portland
##	2.383952e+00	2.377533e+00
##	Virginia	Kansas
##	2.356922e+00	2.351465e+00
##	Cincinnati	Oral.Roberts
##	2.278981e+00	2.266636e+00
##	Northern.Arizona	Texas.Tech
##	2.195024e+00	2.188773e+00
##	Green.Bay	Murray.State
##	2.142672e+00	2.124247e+00
##	Miami	Clemson
##	2.123129e+00	2.119368e+00
##	Belmont	Toledo
##	2.083278e+00	2.014255e+00
##	Missouri.State	Purdue
##	1.912537e+00	1.875472e+00
##	Boston.College	Saint.Joseph.s
##	1.872083e+00	1.854243e+00

##	Stephen.F..Austin	Auburn
##	1.814609e+00	1.790286e+00
##	Gonzaga	Wyoming
##	1.779951e+00	1.765137e+00
##	Drake	North.Texas
##	1.749411e+00	1.681004e+00
##	SE.Louisiana	San.Diego.State
##	1.550677e+00	1.549121e+00
##	Syracuse	St..John.s
##	1.516185e+00	1.511622e+00
##	Temple	Buffalo
##	1.511520e+00	1.479389e+00
##	Missouri	Washington.State
##	1.451948e+00	1.443498e+00
##	BYU	Colorado.State
##	1.391506e+00	1.375064e+00
##	Rutgers	Tennessee.Tech
##	1.335728e+00	1.315569e+00
##	Georgia	Northwestern
##	1.304638e+00	1.270053e+00
##	Davidson	DePaul
##	1.266838e+00	1.227940e+00
##	Butler	Texas.A.M
##	1.212535e+00	1.199363e+00
##	Lehigh	Fairleigh.Dickinson
##	1.192469e+00	1.183401e+00
##	Coastal.Carolina	Oregon.State
##	1.124809e+00	1.106266e+00
##	UCF	Western.Kentucky
##	1.103676e+00	1.085253e+00
##	Northern.Iowa	Georgetown
##	1.049196e+00	1.036748e+00
##	Kent.State	Penn.State
##	9.864927e-01	9.583979e-01
##	Pittsburgh	UNC.Greensboro
##	9.447138e-01	8.731952e-01
##	Lamar	Arkansas
##	8.463082e-01	8.459321e-01
##	SMU	UAlbany
##	8.348789e-01	8.212266e-01
##	Wake.Forest	Providence
##	7.985780e-01	7.861186e-01
##	Illinois.State	Arizona.State
##	7.647964e-01	7.058427e-01
##	Tulane	Army
##	6.838547e-01	6.526649e-01
##	East.Carolina	New.Mexico
##	6.274080e-01	6.267139e-01
##	Tulsa	Purdue.Fort.Wayne
##	6.128925e-01	5.929597e-01
##	Bowling.Green	North.Dakota.State
##	5.913006e-01	5.816234e-01
##	Rice	Colorado.Christian
##	5.754555e-01	5.734437e-01

##	Troy	Duquesne
##	5.676658e-01	5.617846e-01
##	Central.Arkansas	Miami..OH.
##	4.865544e-01	4.366435e-01
##	San.Francisco	Arkansas.State
##	4.283205e-01	3.916882e-01
##	New.Mexico.State	Vermont
##	3.902961e-01	3.656258e-01
##	Dayton	Boise.State
##	3.495692e-01	3.095318e-01
##	Fresno.State	Lindenwood
##	2.812771e-01	2.757565e-01
##	Rhode.Island	Charleston
##	2.252416e-01	1.794630e-01
##	Hawai.i	Holy.Cross
##	1.771484e-01	1.682893e-01
##	Colgate	Southern.Indiana
##	1.201767e-01	4.920517e-02
##	Howard	UC.Irvine
##	4.361902e-02	3.662183e-02
##	Cleveland.State	UAB
##	1.422639e-02	5.947365e-03
##	Pacific	date
##	-3.706961e-04	-1.832365e-03
##	Old.Dominion	Eastern.Illinois
##	-2.955293e-03	-5.716919e-03
##	Saint.Louis	Louisiana.Tech
##	-1.378368e-02	-3.485386e-02
##	Alaska.Anchorage	Air.Force
##	-3.987232e-02	-4.132814e-02
##	UIC	UT.Arlington
##	-4.790285e-02	-7.310270e-02
##	Pennsylvania	Idaho
##	-1.029357e-01	-1.123710e-01
##	Santa.Clara	Saint.Mary.s
##	-1.284963e-01	-1.716278e-01
##	Loyola.Marymount	St..Thomas.Minnesota
##	-1.870124e-01	-1.881535e-01
##	Fordham	Montana
##	-2.093525e-01	-2.178233e-01
##	Georgia.State	Lipscomb
##	-2.311823e-01	-2.408955e-01
##	UC.Davis	Massachusetts
##	-2.439676e-01	-2.495910e-01
##	Utah.Valley	Bucknell
##	-2.586131e-01	-2.653218e-01
##	Coppin.State	Tarleton.State
##	-2.656089e-01	-2.718003e-01
##	Navy	Brown
##	-2.843535e-01	-3.419198e-01
##	Campbell	North.Carolina.A.T
##	-3.699299e-01	-3.757355e-01
##	Central.Michigan	Eastern.Kentucky
##	-3.762690e-01	-4.182645e-01

##	Incarnate.Word	Wichita.State
##	-4.442077e-01	-4.623198e-01
##	VCU	Idaho.State
##	-4.946790e-01	-5.006840e-01
##	Wofford	Omaha
##	-5.029801e-01	-5.316283e-01
##	Little.Rock	Xavier
##	-5.765564e-01	-5.885121e-01
##	Marshall	Drexel
##	-5.981543e-01	-6.005997e-01
##	Southern	Nicholls
##	-6.134221e-01	-6.226642e-01
##	App.State	Chattanooga
##	-6.429212e-01	-6.480534e-01
##	Northwestern.State	Western.Michigan
##	-6.580411e-01	-6.785988e-01
##	Louisiana	UC.San.Diego
##	-7.037406e-01	-7.225802e-01
##	East.Tennessee.State	Alabama.A.M
##	-7.654927e-01	-7.870323e-01
##	Charlotte	Maine
##	-8.139619e-01	-8.186184e-01
##	Weber.State	Bellarmino
##	-8.192174e-01	-8.198409e-01
##	UT.Rio.Grande.Valley	Kennesaw.State
##	-8.316895e-01	-8.361562e-01
##	Western.Illinois	Northern.Illinois
##	-8.554929e-01	-8.578115e-01
##	Northern.Colorado	Siena
##	-8.687567e-01	-8.722142e-01
##	Bethel..TN.	Valparaiso
##	-8.799877e-01	-8.855788e-01
##	UC.Riverside	Georgia.Southern
##	-8.932800e-01	-9.053679e-01
##	Long.Beach.State	Jacksonville
##	-9.079653e-01	-9.196579e-01
##	North.Dakota	Loyola.Chicago
##	-9.237721e-01	-9.310136e-01
##	Memphis	Sacramento.State
##	-9.332982e-01	-9.523573e-01
##	Nevada	Bradley
##	-9.591154e-01	-9.711620e-01
##	South.Dakota	Texas.State
##	-9.717636e-01	-9.892278e-01
##	Bryant	UT.Martin
##	-1.000663e+00	-1.004321e+00
##	Houston	Sam.Houston
##	-1.006384e+00	-1.007680e+00
##	UC.Santa.Barbara	California.Baptist
##	-1.017725e+00	-1.019318e+00
##	George.Washington	Stetson
##	-1.025472e+00	-1.057486e+00
##	Mount.St..Mary.s	Florida.Atlantic
##	-1.058541e+00	-1.058971e+00

##	Elon	Furman
##	-1.110551e+00	-1.114646e+00
##	Eastern.Washington	Marist
##	-1.131057e+00	-1.149704e+00
##	High.Point	Kansas.City
##	-1.181839e+00	-1.183451e+00
##	UTEP	UL.Monroe
##	-1.199292e+00	-1.199516e+00
##	Florida.International	Detroit.Mercy
##	-1.210476e+00	-1.227469e+00
##	Maryland.Eastern.Shore	Austin.Peay
##	-1.234470e+00	-1.264522e+00
##	Manhattan	William...Mary
##	-1.268577e+00	-1.271509e+00
##	La.Salle	Merrimack
##	-1.288641e+00	-1.341475e+00
##	Monmouth	Delaware
##	-1.344881e+00	-1.345979e+00
##	Hofstra	Texas.A.M.Corporus.Christi
##	-1.359385e+00	-1.402174e+00
##	Pepperdine	Jacksonville.State
##	-1.403227e+00	-1.439507e+00
##	Robert.Morris	North.Alabama
##	-1.456426e+00	-1.477340e+00
##	San.José.State	Cal.Poly
##	-1.479894e+00	-1.505239e+00
##	Jackson.State	Binghamton
##	-1.505963e+00	-1.513661e+00
##	Samford	Southern.Miss
##	-1.580689e+00	-1.607111e+00
##	UMBC	Texas.Southern
##	-1.612196e+00	-1.662903e+00
##	Denver	Boston.University
##	-1.666100e+00	-1.700503e+00
##	West.Georgia	Longwood
##	-1.714771e+00	-1.731327e+00
##	Cornell	Akron
##	-1.739349e+00	-1.771047e+00
##	UNC.Wilmington	Stony.Brook
##	-1.779610e+00	-1.804589e+00
##	Northern.Kentucky	Western.Carolina
##	-1.804869e+00	-1.816901e+00
##	Tennessee.State	San.Diego
##	-1.846640e+00	-1.846903e+00
##	Grambling	Towson
##	-1.868748e+00	-1.909435e+00
##	Lafayette	Southern.Utah
##	-1.911546e+00	-1.967150e+00
##	New.Hampshire	Saint.Peter.s
##	-1.992038e+00	-2.058017e+00
##	Oakland	Mercer
##	-2.063641e+00	-2.081808e+00
##	Ohio	Iona
##	-2.107482e+00	-2.122473e+00

##	NJIT	Charleston.Southern
##	-2.128241e+00	-2.130233e+00
##	Alcorn.State	Morehead.State
##	-2.153149e+00	-2.196626e+00
##	St..Bonaventure	Morgan.State
##	-2.209890e+00	-2.225849e+00
##	Wright.State	Youngstown.State
##	-2.229636e+00	-2.246057e+00
##	IU.Indianapolis	Dartmouth
##	-2.252886e+00	-2.265354e+00
##	Sacred.Heart	Canisius
##	-2.285475e+00	-2.314702e+00
##	Loyola.Maryland	North.Carolina.Central
##	-2.373176e+00	-2.466685e+00
##	Queens.University	Winthrop
##	-2.525662e+00	-2.530011e+00
##	Milwaukee	Radford
##	-2.556415e+00	-2.559613e+00
##	South.Alabama	Yale
##	-2.603963e+00	-2.614015e+00
##	Utah.State	Hampton
##	-2.651002e+00	-2.664215e+00
##	Evansville	SIU.Edwardsville
##	-2.674812e+00	-2.708703e+00
##	Portland.State	McNeese
##	-2.713185e+00	-2.812331e+00
##	Southeast.Missouri.State	Indiana.State
##	-2.876199e+00	-2.911953e+00
##	Stonehill	Gardner.Webb
##	-2.935490e+00	-2.956415e+00
##	Rider	New.Orleans
##	-2.959489e+00	-2.991182e+00
##	East.Texas.A.M	Florida.A.M
##	-3.008357e+00	-3.159572e+00
##	Mississippi.Valley.State	Bethune.Cookman
##	-3.166812e+00	-3.169136e+00
##	Eastern.Michigan	Prairie.View.A.M
##	-3.221027e+00	-3.270548e+00
##	Southern.Illinois	Houston.Christian
##	-3.274916e+00	-3.297643e+00
##	Cal.State.Fullerton	Utah.Tech
##	-3.527842e+00	-3.551995e+00
##	UMass.Lowell	North.Florida
##	-3.635361e+00	-3.662521e+00
##	South.Carolina.Upstate	Central.Connecticut
##	-3.844976e+00	-3.906509e+00
##	St..Francis..PA.	Seattle.U
##	-3.943286e+00	-3.991806e+00
##	Niagara	Northeastern
##	-4.004118e+00	-4.145812e+00
##	Cal.State.Northridge	Alabama.State
##	-4.150795e+00	-4.341170e+00
##	Chicago.State	Le.Moyne
##	-4.468859e+00	-4.589278e+00

##	Mercyhurst	American.University
##	-4.653890e+00	-4.655547e+00
##	Presbyterian	Cal.State.Bakersfield
##	-4.722926e+00	-4.786141e+00
##	Wagner	Long.Island.University
##	-4.821868e+00	-5.155049e+00
##	UNC.Asheville	Arkansas.Pine.Bluff
##	-5.497236e+00	-5.772459e+00
##	South.Carolina.State	Delaware.State
##	-6.170314e+00	-6.762485e+00
##	Dakota.Wesleyan	Texas.A.M.San.Antonio
##	-1.552264e+01	-1.580281e+01
##	Defiance	Western.New.Mexico
##	-1.592757e+01	-1.654727e+01
##	Puerto.Rico.Mayaguez	Kentucky.State
##	-1.712686e+01	-1.720253e+01
##	Cal.Maritime	Nelson
##	-1.728573e+01	-1.731598e+01
##	St..Francis..IL.	Mount.Olive
##	-1.737900e+01	-1.745144e+01
##	Central.Baptist.College	Indiana.Southeast
##	-1.746172e+01	-1.748006e+01
##	Arlington.Baptist	Jessup.University
##	-1.754964e+01	-1.763361e+01
##	St..Mary.s..TX.	King..TN.
##	-1.766230e+01	-1.766888e+01
##	Eastern.New.Mexico	Southern.New.Orleans
##	-1.769997e+01	-1.770224e+01
##	Salem.University	Walla.Walla
##	-1.770237e+01	-1.772481e+01
##	Park.University.Gilbert	Bellevue.University
##	-1.776809e+01	-1.783098e+01
##	Cedarville	Erskine
##	-1.787487e+01	-1.787923e+01
##	Guilford	UC.Merced
##	-1.788878e+01	-1.789568e+01
##	Pittsburgh.Johnstown	Winston.Salem
##	-1.790625e+01	-1.790961e+01
##	Cal.State.San.Marcos	Life.Pacific
##	-1.795855e+01	-1.798659e+01
##	Sewanee	Edward.Waters
##	-1.800006e+01	-1.802619e+01
##	Our.Lady.Of.The.Lake	Schreiner
##	-1.808043e+01	-1.810907e+01
##	Berry	Bryn.Athyn
##	-1.816604e+01	-1.818246e+01
##	Sul.Ross.State	Life.University
##	-1.825016e+01	-1.825578e+01
##	Southern.Wesleyan	Ohio.Christian
##	-1.834485e+01	-1.836642e+01
##	Fisk	Cleary.University
##	-1.840217e+01	-1.848649e+01
##	Lincoln..PA.	Delta.State
##	-1.856236e+01	-1.864893e+01

```
##           Bowie.State           Cumberland..TN.
##           -1.868083e+01           -1.870149e+01
##           Johnson.C.Smith       Bethesda.University
##           -1.875358e+01           -1.878411e+01
##           Wiley                 Point.Park
##           -1.886167e+01           -1.897928e+01
##           UVA.Wise              Jarvis.Christian
##           -1.901877e+01           -1.915215e+01
##           LeTourneau           St..Thomas..TX.
##           -1.919744e+01           -1.924961e+01
##           Westcliff             UNT.Dallas
##           -1.929406e+01           -1.936110e+01
## College.Of.Biblical.Studies    Fort.Lauderdale
##           -1.937470e+01           -1.946620e+01
##           IU.Columbus           Johnson...Wales..NC.
##           -1.955824e+01           -1.959757e+01
##           Clinton.College       Coastal.Georgia
##           -1.974622e+01           -1.992030e+01
##           Evergreen.State       Lees.McRae
##           -2.003856e+01           -2.011512e+01
##           La.Sierra             Trinity.Baptist
##           -2.044792e+01           -2.047438e+01
##           Davis...Elkins        Newberry
##           -2.070537e+01           -2.073229e+01
##           Faulkner              Arkansas.Baptist
##           -2.074852e+01           -2.108099e+01
##           Virginia.Lynchburg    Warren.Wilson
##           -2.131197e+01           -2.156596e+01
##           Cheyney..PA.          Georgian.Court.University
##           -2.277031e+01           -2.280402e+01
```

3b

```
womens$numeric_date <- as.numeric(womens$date)

model_4 <- glm(home_win ~ (. - date - Abilene.Christian - 1) + numeric_date,
               data = womens, family = binomial)
summary(model_4)
```

```
##
## Call:
## glm(formula = home_win ~ (. - date - Abilene.Christian - 1) +
##      numeric_date, family = binomial, data = womens)
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## Air.Force        -1.591e-02  7.198e-01  -0.022  0.982367
## Akron            -1.760e+00  7.492e-01  -2.350  0.018798 *
## Alabama           4.785e+00  8.613e-01   5.556  2.76e-08 ***
## Alabama.A.M       -7.895e-01  7.615e-01  -1.037  0.299859
## Alabama.State     -4.365e+00  9.638e-01  -4.529  5.92e-06 ***
```

## Alaska.Anchorage	5.526e-02	1.554e+00	0.036	0.971627	
## Alcorn.State	-2.158e+00	8.116e-01	-2.659	0.007835	**
## American.University	-4.657e+00	1.193e+00	-3.904	9.48e-05	***
## App.State	-6.602e-01	7.260e-01	-0.909	0.363104	
## Arizona	2.745e+00	7.491e-01	3.664	0.000248	***
## Arizona.State	7.437e-01	7.393e-01	1.006	0.314426	
## Arkansas	8.987e-01	7.529e-01	1.194	0.232612	
## Arkansas.Baptist	-2.122e+01	1.606e+03	-0.013	0.989460	
## Arkansas.State	3.680e-01	7.087e-01	0.519	0.603541	
## Arkansas.Pine.Bluff	-5.808e+00	1.282e+00	-4.530	5.89e-06	***
## Arlington.Baptist	-1.766e+01	2.765e+03	-0.006	0.994905	
## Army	6.477e-01	7.766e-01	0.834	0.404268	
## Auburn	1.815e+00	8.039e-01	2.258	0.023930	*
## Austin.Peay	-1.272e+00	7.368e-01	-1.726	0.084346	.
## Ball.State	2.789e+00	8.421e-01	3.312	0.000926	***
## Baylor	4.931e+00	8.340e-01	5.913	3.37e-09	***
## Bellarmine	-8.197e-01	7.189e-01	-1.140	0.254183	
## Bellevue.University	-1.789e+01	2.773e+03	-0.006	0.994853	
## Belmont	2.106e+00	7.764e-01	2.712	0.006681	**
## Berry	-1.823e+01	2.707e+03	-0.007	0.994627	
## Bethel..TN.	-9.709e-01	1.569e+00	-0.619	0.535959	
## Bethesda.University	-1.884e+01	1.282e+03	-0.015	0.988274	
## Bethune.Cookman	-3.200e+00	8.114e-01	-3.944	8.00e-05	***
## Binghamton	-1.509e+00	7.555e-01	-1.997	0.045844	*
## Boise.State	3.541e-01	7.154e-01	0.495	0.620675	
## Boston.College	1.898e+00	7.741e-01	2.451	0.014228	*
## Boston.University	-1.698e+00	7.871e-01	-2.157	0.031023	*
## Bowie.State	-1.881e+01	2.085e+03	-0.009	0.992803	
## Bowling.Green	6.056e-01	7.397e-01	0.819	0.412944	
## Bradley	-9.606e-01	7.645e-01	-1.257	0.208925	
## Brown	-3.123e-01	8.167e-01	-0.382	0.702196	
## Bryant	-9.995e-01	7.510e-01	-1.331	0.183199	
## Bryn.Athyn	-1.823e+01	2.695e+03	-0.007	0.994603	
## Bucknell	-2.730e-01	7.428e-01	-0.368	0.713234	
## Buffalo	1.503e+00	7.971e-01	1.885	0.059364	.
## Butler	1.240e+00	7.897e-01	1.570	0.116468	
## BYU	1.422e+00	7.457e-01	1.908	0.056434	.
## Cal.Maritime	-1.733e+01	2.787e+03	-0.006	0.995038	
## Cal.Poly	-1.483e+00	7.600e-01	-1.952	0.050947	.
## Cal.State.Bakersfield	-4.784e+00	1.059e+00	-4.517	6.26e-06	***
## Cal.State.Fullerton	-3.544e+00	9.050e-01	-3.916	9.00e-05	***
## Cal.State.Northridge	-4.138e+00	9.837e-01	-4.207	2.59e-05	***
## Cal.State.San.Marcos	-1.787e+01	2.369e+03	-0.008	0.993982	
## California	4.569e+00	8.123e-01	5.625	1.86e-08	***
## California.Baptist	-9.774e-01	6.673e-01	-1.465	0.142998	
## Campbell	-3.699e-01	7.227e-01	-0.512	0.608747	
## Canisius	-2.311e+00	7.603e-01	-3.039	0.002370	**
## Cedarville	-1.796e+01	2.384e+03	-0.008	0.993990	
## Central.Arkansas	4.714e-01	7.630e-01	0.618	0.536707	
## Central.Baptist.College	-1.758e+01	1.876e+03	-0.009	0.992524	
## Central.Connecticut	-3.846e+00	8.634e-01	-4.454	8.42e-06	***
## Central.Michigan	-3.437e-01	7.471e-01	-0.460	0.645499	
## Charleston	1.906e-01	7.527e-01	0.253	0.800135	
## Charleston.Southern	-2.134e+00	7.870e-01	-2.711	0.006701	**

## Charlotte	-7.901e-01	7.516e-01	-1.051	0.293185	
## Chattanooga	-6.549e-01	7.452e-01	-0.879	0.379528	
## Cheyney..PA.	-2.285e+01	2.347e+03	-0.010	0.992231	
## Chicago.State	-4.411e+00	8.973e-01	-4.916	8.85e-07	***
## Cincinnati	2.311e+00	7.762e-01	2.977	0.002911	**
## Cleary.University	-1.856e+01	2.224e+03	-0.008	0.993339	
## Clemson	2.163e+00	7.829e-01	2.763	0.005733	**
## Cleveland.State	3.533e-02	7.889e-01	0.045	0.964282	
## Clinton.College	-1.983e+01	2.053e+03	-0.010	0.992293	
## Coastal.Carolina	1.108e+00	7.887e-01	1.405	0.160110	
## Coastal.Georgia	-2.000e+01	2.514e+03	-0.008	0.993655	
## Colgate	9.783e-02	7.907e-01	0.124	0.901530	
## College.Of.Biblical.Studies	-1.951e+01	2.713e+03	-0.007	0.994265	
## Colorado	3.146e+00	7.881e-01	3.991	6.57e-05	***
## Colorado.Christian	4.725e-01	2.062e+00	0.229	0.818707	
## Colorado.State	1.408e+00	7.012e-01	2.008	0.044660	*
## Columbia	3.465e+00	8.800e-01	3.937	8.25e-05	***
## Coppin.State	-2.733e-01	7.998e-01	-0.342	0.732602	
## Cornell	-1.734e+00	8.206e-01	-2.113	0.034583	*
## Creighton	5.129e+00	9.366e-01	5.476	4.35e-08	***
## Cumberland..TN.	-1.883e+01	2.772e+03	-0.007	0.994580	
## Dakota.Wesleyan	-1.554e+01	2.364e+03	-0.007	0.994757	
## Dartmouth	-2.244e+00	8.438e-01	-2.659	0.007835	**
## Davidson	1.274e+00	7.493e-01	1.700	0.089165	.
## Davis...Elkins	-2.078e+01	2.386e+03	-0.009	0.993050	
## Dayton	3.799e-01	7.342e-01	0.517	0.604891	
## Defiance	-1.602e+01	2.706e+03	-0.006	0.995276	
## Delaware	-1.351e+00	7.095e-01	-1.905	0.056800	.
## Delaware.State	-6.732e+00	1.502e+00	-4.483	7.35e-06	***
## Delta.State	-1.881e+01	2.357e+03	-0.008	0.993633	
## Denver	-1.642e+00	7.368e-01	-2.228	0.025855	*
## DePaul	1.244e+00	7.652e-01	1.626	0.103877	
## Detroit.Mercy	-1.191e+00	7.603e-01	-1.567	0.117170	
## Drake	1.770e+00	7.486e-01	2.364	0.018060	*
## Drexel	-5.855e-01	7.343e-01	-0.797	0.425248	
## Duke	5.941e+00	8.217e-01	7.230	4.82e-13	***
## Duquesne	5.839e-01	7.355e-01	0.794	0.427219	
## East.Carolina	6.433e-01	7.260e-01	0.886	0.375574	
## East.Tennessee.State	-7.853e-01	7.551e-01	-1.040	0.298342	
## East.Texas.A.M	-3.008e+00	8.530e-01	-3.526	0.000422	***
## Eastern.Illinois	-9.781e-03	7.829e-01	-0.012	0.990032	
## Eastern.Kentucky	-4.352e-01	7.443e-01	-0.585	0.558734	
## Eastern.Michigan	-3.174e+00	9.425e-01	-3.368	0.000758	***
## Eastern.New.Mexico	-1.772e+01	2.640e+03	-0.007	0.994643	
## Eastern.Washington	-1.129e+00	7.513e-01	-1.503	0.132770	
## Edward.Waters	-1.816e+01	2.796e+03	-0.006	0.994819	
## Elon	-1.109e+00	7.151e-01	-1.552	0.120777	
## Erskine	-1.798e+01	2.250e+03	-0.008	0.993623	
## Evansville	-2.663e+00	8.192e-01	-3.251	0.001152	**
## Evergreen.State	-2.013e+01	2.355e+03	-0.009	0.993181	
## Fairfield	2.824e+00	9.365e-01	3.016	0.002561	**
## Fairleigh.Dickinson	1.168e+00	1.143e+00	1.022	0.306771	
## Faulkner	-2.089e+01	2.657e+03	-0.008	0.993726	
## Fisk	-1.850e+01	2.780e+03	-0.007	0.994690	

## Florida	2.581e+00	8.073e-01	3.197	0.001387	**
## Florida.A.M	-3.185e+00	8.285e-01	-3.845	0.000121	***
## Florida.Atlantic	-1.029e+00	7.200e-01	-1.429	0.152976	
## Florida.Gulf.Coast	2.570e+00	9.386e-01	2.738	0.006179	**
## Florida.International	-1.166e+00	6.816e-01	-1.711	0.087096	.
## Florida.State	4.546e+00	8.104e-01	5.609	2.03e-08	***
## Fordham	-2.018e-01	7.411e-01	-0.272	0.785375	
## Fort.Lauderdale	-1.962e+01	2.583e+03	-0.008	0.993939	
## Fresno.State	3.162e-01	7.239e-01	0.437	0.662246	
## Furman	-1.121e+00	7.466e-01	-1.502	0.133097	
## Gardner.Webb	-2.938e+00	7.839e-01	-3.748	0.000178	***
## George.Mason	2.475e+00	8.419e-01	2.940	0.003284	**
## George.Washington	-1.003e+00	7.198e-01	-1.394	0.163373	
## Georgetown	1.052e+00	7.521e-01	1.399	0.161819	
## Georgia	1.338e+00	7.984e-01	1.676	0.093772	.
## Georgia.Southern	-9.137e-01	6.984e-01	-1.308	0.190765	
## Georgia.State	-2.291e-01	7.144e-01	-0.321	0.748434	
## Georgia.Tech	4.186e+00	7.927e-01	5.280	1.29e-07	***
## Georgian.Court.University	-2.290e+01	2.403e+03	-0.010	0.992396	
## Gonzaga	1.796e+00	7.247e-01	2.478	0.013214	*
## Grambling	-1.902e+00	8.204e-01	-2.318	0.020440	*
## Grand.Canyon	3.724e+00	1.055e+00	3.530	0.000415	***
## Green.Bay	2.162e+00	8.766e-01	2.466	0.013670	*
## Guilford	-1.799e+01	2.764e+03	-0.007	0.994806	
## Hampton	-2.651e+00	7.727e-01	-3.431	0.000601	***
## Harvard	3.840e+00	9.189e-01	4.179	2.93e-05	***
## Hawai.i	2.079e-01	7.595e-01	0.274	0.784296	
## High.Point	-1.184e+00	7.655e-01	-1.547	0.121859	
## Hofstra	-1.365e+00	7.134e-01	-1.914	0.055677	.
## Holy.Cross	1.539e-01	7.603e-01	0.202	0.839568	
## Houston	-9.591e-01	8.902e-01	-1.077	0.281296	
## Houston.Christian	-3.266e+00	8.718e-01	-3.746	0.000180	***
## Howard	5.913e-02	7.655e-01	0.077	0.938432	
## Idaho	-1.138e-01	7.288e-01	-0.156	0.875900	
## Idaho.State	-4.802e-01	7.234e-01	-0.664	0.506760	
## Illinois	4.487e+00	8.221e-01	5.458	4.82e-08	***
## Illinois.State	7.756e-01	7.506e-01	1.033	0.301477	
## Incarnate.Word	-4.355e-01	7.635e-01	-0.570	0.568408	
## Indiana	4.336e+00	7.872e-01	5.509	3.62e-08	***
## Indiana.State	-2.906e+00	8.758e-01	-3.318	0.000908	***
## Indiana.Southeast	-1.760e+01	2.756e+03	-0.006	0.994904	
## Iona	-2.104e+00	7.478e-01	-2.813	0.004907	**
## Iowa	4.797e+00	7.954e-01	6.031	1.63e-09	***
## Iowa.State	3.694e+00	8.031e-01	4.600	4.23e-06	***
## IU.Columbus	-1.961e+01	2.786e+03	-0.007	0.994384	
## IU.Indianapolis	-2.231e+00	7.700e-01	-2.897	0.003766	**
## Jackson.State	-1.537e+00	7.849e-01	-1.958	0.050270	.
## Jacksonville	-9.397e-01	7.402e-01	-1.270	0.204254	
## Jacksonville.State	-1.404e+00	7.389e-01	-1.900	0.057457	.
## James.Madison	3.379e+00	9.535e-01	3.544	0.000395	***
## Jarvis.Christian	-1.928e+01	2.038e+03	-0.009	0.992453	
## Jessup.University	-1.775e+01	2.764e+03	-0.006	0.994877	
## Johnson...Wales...NC.	-1.968e+01	2.788e+03	-0.007	0.994370	
## Johnson.C.Smith	-1.884e+01	2.100e+03	-0.009	0.992843	

## Kansas	2.394e+00	7.767e-01	3.082	0.002054	**
## Kansas.City	-1.181e+00	7.167e-01	-1.648	0.099421	.
## Kansas.State	4.502e+00	8.105e-01	5.554	2.79e-08	***
## Kennesaw.State	-8.318e-01	7.027e-01	-1.184	0.236520	
## Kent.State	1.012e+00	7.395e-01	1.368	0.171334	
## Kentucky	5.289e+00	8.620e-01	6.135	8.51e-10	***
## Kentucky.State	-1.731e+01	2.548e+03	-0.007	0.994579	
## King..TN.	-1.774e+01	2.794e+03	-0.006	0.994934	
## La.Salle	-1.283e+00	7.394e-01	-1.734	0.082836	.
## La.Sierra	-2.056e+01	2.607e+03	-0.008	0.993707	
## Lafayette	-1.923e+00	8.129e-01	-2.366	0.017997	*
## Lamar	8.402e-01	7.759e-01	1.083	0.278901	
## Le.Moyne	-4.542e+00	8.765e-01	-5.182	2.20e-07	***
## Lees.McRae	-2.015e+01	2.519e+03	-0.008	0.993618	
## Lehigh	1.165e+00	8.024e-01	1.452	0.146619	
## LeTourneau	-1.931e+01	2.499e+03	-0.008	0.993833	
## Liberty	2.413e+00	8.513e-01	2.835	0.004586	**
## Life.Pacific	-1.805e+01	2.234e+03	-0.008	0.993555	
## Life.University	-1.830e+01	2.773e+03	-0.007	0.994735	
## Lincoln..PA.	-1.865e+01	2.762e+03	-0.007	0.994614	
## Lindenwood	2.889e-01	7.813e-01	0.370	0.711591	
## Lipscomb	-2.376e-01	7.545e-01	-0.315	0.752804	
## Little.Rock	-5.723e-01	7.671e-01	-0.746	0.455656	
## Long.Beach.State	-9.055e-01	7.379e-01	-1.227	0.219796	
## Long.Island.University	-5.100e+00	8.707e-01	-5.857	4.70e-09	***
## Longwood	-1.721e+00	7.601e-01	-2.264	0.023565	*
## Louisiana	-7.096e-01	7.197e-01	-0.986	0.324160	
## Louisiana.Tech	4.561e-03	7.247e-01	0.006	0.994978	
## Louisville	4.814e+00	8.206e-01	5.866	4.46e-09	***
## Loyola.Chicago	-9.036e-01	7.368e-01	-1.226	0.220085	
## Loyola.Maryland	-2.377e+00	8.137e-01	-2.921	0.003484	**
## Loyola.Marymount	-1.817e-01	7.214e-01	-0.252	0.801156	
## LSU	6.308e+00	9.529e-01	6.620	3.60e-11	***
## Maine	-8.069e-01	7.591e-01	-1.063	0.287800	
## Manhattan	-1.262e+00	7.467e-01	-1.690	0.090975	.
## Marist	-1.143e+00	7.408e-01	-1.543	0.122760	
## Marquette	2.412e+00	7.957e-01	3.031	0.002437	**
## Marshall	-5.825e-01	7.063e-01	-0.825	0.409481	
## Maryland	5.571e+00	8.515e-01	6.542	6.07e-11	***
## Maryland.Eastern.Shore	-1.245e+00	8.536e-01	-1.459	0.144616	
## Massachusetts	-2.334e-01	7.344e-01	-0.318	0.750625	
## McNeese	-2.825e+00	8.321e-01	-3.395	0.000686	***
## Memphis	-9.276e-01	7.698e-01	-1.205	0.228224	
## Mercer	-2.088e+00	7.423e-01	-2.813	0.004912	**
## Mercyhurst	-4.612e+00	9.126e-01	-5.054	4.33e-07	***
## Merrimack	-1.328e+00	7.617e-01	-1.744	0.081214	.
## Miami	2.154e+00	7.927e-01	2.717	0.006584	**
## Miami..OH.	4.517e-01	7.294e-01	0.619	0.535699	
## Michigan	5.146e+00	8.315e-01	6.189	6.04e-10	***
## Michigan.State	4.790e+00	8.187e-01	5.850	4.90e-09	***
## Middle.Tennessee	2.481e+00	7.906e-01	3.138	0.001701	**
## Milwaukee	-2.525e+00	7.881e-01	-3.204	0.001355	**
## Minnesota	3.568e+00	8.448e-01	4.223	2.41e-05	***
## Mississippi.State	3.759e+00	8.435e-01	4.457	8.33e-06	***

## Mississippi.Valley.State	-3.189e+00	8.286e-01	-3.848	0.000119	***
## Missouri	1.492e+00	7.649e-01	1.950	0.051147	.
## Missouri.State	1.935e+00	7.572e-01	2.555	0.010615	*
## Monmouth	-1.336e+00	7.145e-01	-1.870	0.061512	.
## Montana	-2.023e-01	7.475e-01	-0.271	0.786699	
## Montana.State	3.129e+00	9.407e-01	3.327	0.000879	***
## Morehead.State	-2.197e+00	7.902e-01	-2.780	0.005436	**
## Morgan.State	-2.218e+00	8.146e-01	-2.723	0.006463	**
## Mount.Olive	-1.754e+01	2.797e+03	-0.006	0.994998	
## Mount.St..Mary.s	-1.039e+00	7.749e-01	-1.341	0.179898	
## Murray.State	2.110e+00	8.205e-01	2.571	0.010135	*
## Navy	-3.026e-01	7.670e-01	-0.395	0.693169	
## NC.State	5.884e+00	8.453e-01	6.961	3.38e-12	***
## Nebraska	4.470e+00	8.175e-01	5.467	4.57e-08	***
## Nelson	-1.739e+01	2.786e+03	-0.006	0.995019	
## Nevada	-9.233e-01	7.424e-01	-1.244	0.213574	
## New.Hampshire	-1.989e+00	7.677e-01	-2.591	0.009572	**
## New.Mexico	6.706e-01	6.868e-01	0.976	0.328844	
## New.Mexico.State	3.881e-01	7.026e-01	0.552	0.580742	
## New.Orleans	-2.986e+00	8.299e-01	-3.598	0.000320	***
## Newberry	-2.075e+01	2.247e+03	-0.009	0.992632	
## Niagara	-4.021e+00	9.934e-01	-4.048	5.17e-05	***
## Nicholls	-6.326e-01	7.209e-01	-0.877	0.380241	
## NJIT	-2.112e+00	7.517e-01	-2.809	0.004966	**
## Norfolk.State	2.689e+00	9.591e-01	2.804	0.005054	**
## North.Alabama	-1.482e+00	7.452e-01	-1.989	0.046716	*
## North.Carolina	5.359e+00	8.167e-01	6.562	5.32e-11	***
## North.Carolina.A.T	-3.837e-01	7.549e-01	-0.508	0.611236	
## North.Carolina.Central	-2.461e+00	8.778e-01	-2.804	0.005054	**
## North.Dakota	-8.915e-01	7.304e-01	-1.220	0.222296	
## North.Dakota.State	6.020e-01	7.309e-01	0.824	0.410126	
## North.Florida	-3.682e+00	9.371e-01	-3.929	8.52e-05	***
## North.Texas	1.689e+00	7.318e-01	2.309	0.020971	*
## Northeastern	-4.137e+00	9.168e-01	-4.512	6.42e-06	***
## Northern.Arizona	2.190e+00	7.787e-01	2.813	0.004915	**
## Northern.Colorado	-8.613e-01	7.381e-01	-1.167	0.243272	
## Northern.Illinois	-8.257e-01	7.341e-01	-1.125	0.260700	
## Northern.Iowa	1.072e+00	7.566e-01	1.416	0.156681	
## Northern.Kentucky	-1.774e+00	7.521e-01	-2.359	0.018335	*
## Northwestern	1.340e+00	8.052e-01	1.664	0.096100	.
## Northwestern.State	-6.735e-01	7.605e-01	-0.886	0.375838	
## Notre.Dame	6.390e+00	8.823e-01	7.242	4.41e-13	***
## Oakland	-2.037e+00	7.887e-01	-2.583	0.009804	**
## Ohio	-2.077e+00	8.011e-01	-2.592	0.009539	**
## Ohio.Christian	-1.841e+01	2.467e+03	-0.007	0.994047	
## Ohio.State	5.789e+00	9.094e-01	6.366	1.95e-10	***
## Oklahoma	5.780e+00	8.741e-01	6.613	3.76e-11	***
## Oklahoma.State	4.467e+00	8.288e-01	5.390	7.07e-08	***
## Old.Dominion	-5.424e-04	7.258e-01	-0.001	0.999404	
## Ole.Miss	4.891e+00	8.817e-01	5.547	2.90e-08	***
## Omaha	-5.142e-01	7.402e-01	-0.695	0.487290	
## Oral.Roberts	2.263e+00	8.594e-01	2.633	0.008459	**
## Oregon	4.326e+00	7.850e-01	5.511	3.58e-08	***
## Oregon.State	1.112e+00	7.112e-01	1.563	0.117956	

## Our.Lady.Of.The.Lake	-1.815e+01	2.738e+03	-0.007	0.994712	
## Pacific	2.295e-02	7.148e-01	0.032	0.974389	
## Park.University.Gilbert	-1.784e+01	1.703e+03	-0.010	0.991643	
## Penn.State	1.024e+00	8.164e-01	1.254	0.209721	
## Pennsylvania	-7.305e-02	8.022e-01	-0.091	0.927435	
## Pepperdine	-1.399e+00	7.567e-01	-1.849	0.064464	.
## Pittsburgh	1.005e+00	7.825e-01	1.284	0.199101	
## Pittsburgh.Johnstown	-1.803e+01	2.620e+03	-0.007	0.994510	
## Point.Park	-1.903e+01	2.752e+03	-0.007	0.994484	
## Portland	2.387e+00	8.210e-01	2.907	0.003645	**
## Portland.State	-2.700e+00	8.398e-01	-3.215	0.001303	**
## Prairie.View.A.M	-3.289e+00	8.645e-01	-3.804	0.000142	***
## Presbyterian	-4.710e+00	9.035e-01	-5.213	1.86e-07	***
## Princeton	3.127e+00	8.123e-01	3.850	0.000118	***
## Providence	8.052e-01	7.325e-01	1.099	0.271647	
## Puerto.Rico.Mayaguez	-1.706e+01	2.498e+03	-0.007	0.994551	
## Purdue	1.921e+00	8.564e-01	2.243	0.024886	*
## Purdue.Fort.Wayne	5.939e-01	8.046e-01	0.738	0.460427	
## Queens.University	-2.527e+00	7.850e-01	-3.219	0.001287	**
## Quinnipiac	2.726e+00	9.334e-01	2.920	0.003502	**
## Radford	-2.541e+00	7.814e-01	-3.252	0.001145	**
## Rhode.Island	2.457e-01	7.277e-01	0.338	0.735590	
## Rice	6.084e-01	7.099e-01	0.857	0.391460	
## Richmond	3.313e+00	8.508e-01	3.894	9.84e-05	***
## Rider	-2.954e+00	7.991e-01	-3.697	0.000218	***
## Robert.Morris	-1.437e+00	7.579e-01	-1.896	0.057963	.
## Rutgers	1.379e+00	8.706e-01	1.584	0.113108	
## Sacramento.State	-9.374e-01	6.792e-01	-1.380	0.167560	
## Sacred.Heart	-2.292e+00	7.735e-01	-2.963	0.003048	**
## Saint.Joseph.s	1.867e+00	7.822e-01	2.387	0.016983	*
## Saint.Louis	3.642e-03	7.013e-01	0.005	0.995856	
## Saint.Mary.s	-1.700e-01	7.076e-01	-0.240	0.810195	
## Saint.Peter.s	-2.055e+00	7.788e-01	-2.639	0.008317	**
## Salem.University	-1.776e+01	2.777e+03	-0.006	0.994896	
## Sam.Houston	-9.839e-01	7.537e-01	-1.305	0.191757	
## Samford	-1.607e+00	7.802e-01	-2.059	0.039454	*
## San.Diego	-1.833e+00	7.997e-01	-2.293	0.021873	*
## San.Diego.State	1.587e+00	7.179e-01	2.210	0.027110	*
## San.Francisco	4.422e-01	7.205e-01	0.614	0.539333	
## San.José.State	-1.457e+00	7.487e-01	-1.946	0.051675	.
## Santa.Clara	-1.187e-01	7.135e-01	-0.166	0.867919	
## Schreiner	-1.815e+01	2.738e+03	-0.007	0.994712	
## SE.Louisiana	1.515e+00	8.464e-01	1.790	0.073459	.
## Seattle.U	-3.983e+00	8.930e-01	-4.461	8.16e-06	***
## Seton.Hall	3.463e+00	8.729e-01	3.968	7.26e-05	***
## Sewanee	-1.806e+01	2.691e+03	-0.007	0.994645	
## Siena	-8.652e-01	7.557e-01	-1.145	0.252226	
## SIU.Edwardsville	-2.718e+00	8.445e-01	-3.219	0.001287	**
## SMU	8.776e-01	7.596e-01	1.155	0.247943	
## South.Alabama	-2.639e+00	8.078e-01	-3.267	0.001088	**
## South.Carolina	8.111e+00	1.009e+00	8.038	9.16e-16	***
## South.Carolina.State	-6.097e+00	1.291e+00	-4.725	2.30e-06	***
## South.Carolina.Upstate	-3.826e+00	8.410e-01	-4.549	5.39e-06	***
## South.Dakota	-9.318e-01	7.459e-01	-1.249	0.211604	

## South.Dakota.State	5.239e+00	1.053e+00	4.975	6.53e-07	***
## South.Florida	2.431e+00	8.125e-01	2.992	0.002769	**
## Southeast.Missouri.State	-2.868e+00	8.448e-01	-3.395	0.000687	***
## Southern	-6.498e-01	8.784e-01	-0.740	0.459440	
## Southern.Illinois	-3.294e+00	9.207e-01	-3.578	0.000346	***
## Southern.Indiana	6.765e-02	7.877e-01	0.086	0.931565	
## Southern.Miss	-1.612e+00	7.523e-01	-2.142	0.032184	*
## Southern.Utah	-1.956e+00	7.250e-01	-2.697	0.006989	**
## Southern.Wesleyan	-1.839e+01	2.218e+03	-0.008	0.993384	
## Southern.New.Orleans	-1.781e+01	2.786e+03	-0.006	0.994899	
## St..Bonaventure	-2.196e+00	7.821e-01	-2.808	0.004992	**
## St..Francis..IL.	-1.749e+01	2.657e+03	-0.007	0.994749	
## St..Francis..PA.	-3.896e+00	8.441e-01	-4.616	3.92e-06	***
## St..John.s	1.517e+00	7.723e-01	1.965	0.049449	*
## St..Mary.s..TX.	-1.774e+01	2.781e+03	-0.006	0.994911	
## St..Thomas..TX.	-1.931e+01	1.705e+03	-0.011	0.990965	
## St..Thomas.Minnesota	-1.793e-01	7.315e-01	-0.245	0.806384	
## Stanford	2.926e+00	7.918e-01	3.696	0.000219	***
## Stephen.F..Austin	1.807e+00	7.729e-01	2.337	0.019424	*
## Stetson	-1.053e+00	7.298e-01	-1.443	0.148964	
## Stonehill	-2.908e+00	8.211e-01	-3.542	0.000397	***
## Stony.Brook	-1.804e+00	7.449e-01	-2.422	0.015442	*
## Sul.Ross.State	-1.837e+01	2.781e+03	-0.007	0.994730	
## Syracuse	1.563e+00	7.813e-01	2.001	0.045425	*
## Tarleton.State	-2.729e-01	6.441e-01	-0.424	0.671789	
## TCU	6.447e+00	9.704e-01	6.644	3.06e-11	***
## Temple	1.516e+00	7.412e-01	2.046	0.040776	*
## Tennessee	4.943e+00	8.348e-01	5.921	3.20e-09	***
## Tennessee.State	-1.855e+00	7.822e-01	-2.371	0.017719	*
## Tennessee.Tech	1.282e+00	8.474e-01	1.513	0.130217	
## Texas	7.881e+00	1.026e+00	7.681	1.57e-14	***
## Texas.A.M	1.247e+00	8.267e-01	1.509	0.131305	
## Texas.A.M.Campus.Christi	-1.399e+00	7.471e-01	-1.873	0.061075	.
## Texas.A.M.San.Antonio	-1.591e+01	2.746e+03	-0.006	0.995377	
## Texas.Southern	-1.670e+00	8.030e-01	-2.079	0.037574	*
## Texas.State	-1.001e+00	7.127e-01	-1.405	0.159987	
## Texas.Tech	2.236e+00	7.227e-01	3.094	0.001974	**
## Toledo	2.024e+00	8.015e-01	2.525	0.011568	*
## Towson	-1.898e+00	7.381e-01	-2.571	0.010127	*
## Trinity.Baptist	-2.062e+01	2.783e+03	-0.007	0.994089	
## Troy	5.482e-01	7.235e-01	0.758	0.448638	
## Tulane	7.081e-01	7.243e-01	0.978	0.328247	
## Tulsa	6.285e-01	7.283e-01	0.863	0.388176	
## UAB	1.138e-02	7.274e-01	0.016	0.987519	
## UAlbany	8.254e-01	8.324e-01	0.992	0.321399	
## UC.Davis	-2.372e-01	7.280e-01	-0.326	0.744606	
## UC.Irvine	4.478e-02	7.199e-01	0.062	0.950396	
## UC.Merced	-1.799e+01	2.645e+03	-0.007	0.994572	
## UC.Riverside	-8.877e-01	7.271e-01	-1.221	0.222148	
## UC.San.Diego	-7.008e-01	7.007e-01	-1.000	0.317292	
## UC.Santa.Barbara	-9.951e-01	7.328e-01	-1.358	0.174467	
## UCF	1.155e+00	8.235e-01	1.402	0.160875	
## UCLA	8.385e+00	1.156e+00	7.255	4.02e-13	***
## UConn	7.027e+00	1.009e+00	6.966	3.27e-12	***

## UIC	-4.035e-02	7.731e-01	-0.052	0.958380	
## UL.Monroe	-1.212e+00	7.422e-01	-1.633	0.102382	
## UMass.Lowell	-3.630e+00	8.939e-01	-4.061	4.89e-05	***
## UMBC	-1.599e+00	7.666e-01	-2.086	0.036971	*
## UNC.Asheville	-5.482e+00	1.034e+00	-5.301	1.15e-07	***
## UNC.Greensboro	8.586e-01	8.414e-01	1.020	0.307516	
## UNC.Wilmington	-1.758e+00	7.333e-01	-2.397	0.016529	*
## UNLV	2.433e+00	7.646e-01	3.182	0.001462	**
## UNT.Dallas	-1.948e+01	2.639e+03	-0.007	0.994109	
## USC	7.819e+00	1.080e+00	7.237	4.60e-13	***
## UT.Arlington	-6.012e-02	6.690e-01	-0.090	0.928394	
## UT.Martin	-1.007e+00	7.569e-01	-1.330	0.183582	
## UT.Rio.Grande.Valley	-8.328e-01	7.215e-01	-1.154	0.248432	
## Utah	4.018e+00	7.867e-01	5.108	3.26e-07	***
## Utah.State	-2.628e+00	8.960e-01	-2.933	0.003352	**
## Utah.Tech	-3.538e+00	8.544e-01	-4.141	3.45e-05	***
## Utah.Valley	-2.523e-01	6.310e-01	-0.400	0.689304	
## UTEP	-1.185e+00	7.330e-01	-1.617	0.105967	
## UTSA	2.548e+00	8.172e-01	3.118	0.001821	**
## UVA.Wise	-1.906e+01	2.654e+03	-0.007	0.994269	
## Valparaiso	-8.877e-01	7.575e-01	-1.172	0.241239	
## Vanderbilt	4.438e+00	8.405e-01	5.281	1.29e-07	***
## VCU	-4.829e-01	7.353e-01	-0.657	0.511364	
## Vermont	3.740e-01	7.363e-01	0.508	0.611482	
## Villanova	2.700e+00	7.533e-01	3.584	0.000339	***
## Virginia	2.398e+00	7.709e-01	3.110	0.001868	**
## Virginia.Tech	3.198e+00	7.927e-01	4.035	5.47e-05	***
## Virginia.Lynchburg	-2.125e+01	1.053e+03	-0.020	0.983901	
## Wagner	-4.779e+00	8.876e-01	-5.384	7.27e-08	***
## Wake.Forest	8.305e-01	7.999e-01	1.038	0.299137	
## Walla.Walla	-1.785e+01	2.717e+03	-0.007	0.994759	
## Warren.Wilson	-2.163e+01	2.361e+03	-0.009	0.992688	
## Washington	3.794e+00	8.254e-01	4.597	4.30e-06	***
## Washington.State	1.450e+00	7.316e-01	1.982	0.047532	*
## Weber.State	-8.152e-01	7.259e-01	-1.123	0.261436	
## West.Georgia	-1.744e+00	7.540e-01	-2.312	0.020760	*
## West.Virginia	4.531e+00	8.501e-01	5.330	9.81e-08	***
## Westcliff	-1.937e+01	2.032e+03	-0.010	0.992397	
## Western.Carolina	-1.825e+00	7.723e-01	-2.363	0.018147	*
## Western.Illinois	-8.478e-01	7.488e-01	-1.132	0.257511	
## Western.Kentucky	1.106e+00	7.292e-01	1.516	0.129463	
## Western.Michigan	-6.618e-01	7.410e-01	-0.893	0.371808	
## Western.New.Mexico	-1.664e+01	2.793e+03	-0.006	0.995248	
## Wichita.State	-4.345e-01	7.382e-01	-0.589	0.556110	
## Wiley	-1.891e+01	1.793e+03	-0.011	0.991587	
## William...Mary	-1.259e+00	7.197e-01	-1.749	0.080243	.
## Winston.Salem	-1.800e+01	2.765e+03	-0.007	0.994807	
## Winthrop	-2.518e+00	7.806e-01	-3.225	0.001258	**
## Wisconsin	2.427e+00	8.162e-01	2.973	0.002946	**
## Wofford	-5.031e-01	7.929e-01	-0.635	0.525732	
## Wright.State	-2.212e+00	7.442e-01	-2.972	0.002958	**
## Wyoming	1.776e+00	7.124e-01	2.492	0.012692	*
## Xavier	-5.577e-01	8.033e-01	-0.694	0.487514	
## Yale	-2.588e+00	8.360e-01	-3.095	0.001965	**

```
## Youngstown.State      -2.213e+00  7.694e-01  -2.877  0.004017 **
## numeric_date          2.024e-05  1.975e-06  10.248  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
## Null deviance: 7796.5  on 5624  degrees of freedom
## Residual deviance: 4175.3  on 5185  degrees of freedom
## AIC: 5053.3
##
## Number of Fisher Scoring iterations: 16
```

```
model_4_rank <- sort(coef(model_4), decreasing = TRUE)
model_4_rank
```

```
##          UCLA          South.Carolina
## 8.385340e+00      8.110562e+00
##      Texas          USC
## 7.881288e+00      7.818637e+00
##      UConn          TCU
## 7.027013e+00      6.447432e+00
##      Notre.Dame      LSU
## 6.389574e+00      6.308027e+00
##      Duke          NC.State
## 5.941441e+00      5.884035e+00
##      Ohio.State      Oklahoma
## 5.788934e+00      5.780433e+00
##      Maryland      North.Carolina
## 5.570636e+00      5.358817e+00
##      Kentucky      South.Dakota.State
## 5.288715e+00      5.238572e+00
##      Michigan      Creighton
## 5.146284e+00      5.128882e+00
##      Tennessee      Baylor
## 4.942645e+00      4.931109e+00
##      Ole.Miss      Louisville
## 4.891372e+00      4.813637e+00
##      Iowa      Michigan.State
## 4.796691e+00      4.789565e+00
##      Alabama      California
## 4.785440e+00      4.568612e+00
##      Florida.State      West.Virginia
## 4.546116e+00      4.531155e+00
##      Kansas.State      Illinois
## 4.501703e+00      4.487075e+00
##      Nebraska      Oklahoma.State
## 4.469658e+00      4.466570e+00
##      Vanderbilt      Indiana
## 4.438165e+00      4.336329e+00
##      Oregon      Georgia.Tech
## 4.325730e+00      4.185574e+00
##      Utah      Harvard
## 4.018131e+00      3.839974e+00
```

##	Washington	Mississippi.State
##	3.794112e+00	3.758882e+00
##	Grand.Canyon	Iowa.State
##	3.724108e+00	3.694338e+00
##	Minnesota	Columbia
##	3.567816e+00	3.464658e+00
##	Seton.Hall	James.Madison
##	3.463432e+00	3.378976e+00
##	Richmond	Virginia.Tech
##	3.313371e+00	3.198142e+00
##	Colorado	Montana.State
##	3.145546e+00	3.129382e+00
##	Princeton	Stanford
##	3.127085e+00	2.926187e+00
##	Fairfield	Ball.State
##	2.824445e+00	2.789171e+00
##	Arizona	Quinnipiac
##	2.744836e+00	2.725541e+00
##	Villanova	Norfolk.State
##	2.699704e+00	2.688854e+00
##	Florida	Florida.Gulf.Coast
##	2.581034e+00	2.570024e+00
##	UTSA	Middle.Tennessee
##	2.547943e+00	2.480961e+00
##	George.Mason	UNLV
##	2.475150e+00	2.433159e+00
##	South.Florida	Wisconsin
##	2.431395e+00	2.426746e+00
##	Liberty	Marquette
##	2.413343e+00	2.411652e+00
##	Virginia	Kansas
##	2.397790e+00	2.393884e+00
##	Portland	Cincinnati
##	2.386834e+00	2.310658e+00
##	Oral.Roberts	Texas.Tech
##	2.262935e+00	2.236198e+00
##	Northern.Arizona	Clemson
##	2.190228e+00	2.162830e+00
##	Green.Bay	Miami
##	2.161600e+00	2.154035e+00
##	Murray.State	Belmont
##	2.109737e+00	2.105798e+00
##	Toledo	Missouri.State
##	2.023959e+00	1.934715e+00
##	Purdue	Boston.College
##	1.920991e+00	1.897644e+00
##	Saint.Joseph.s	Auburn
##	1.867251e+00	1.815379e+00
##	Stephen.F..Austin	Gonzaga
##	1.806543e+00	1.795840e+00
##	Wyoming	Drake
##	1.775518e+00	1.769946e+00
##	North.Texas	San.Diego.State
##	1.689429e+00	1.586540e+00

##	Syracuse	St..John.s
##	1.563058e+00	1.517264e+00
##	Temple	SE.Louisiana
##	1.516402e+00	1.514972e+00
##	Buffalo	Missouri
##	1.502987e+00	1.491751e+00
##	Washington.State	BYU
##	1.449746e+00	1.422453e+00
##	Colorado.State	Rutgers
##	1.407975e+00	1.379392e+00
##	Northwestern	Georgia
##	1.339821e+00	1.338036e+00
##	Tennessee.Tech	Davidson
##	1.282337e+00	1.273614e+00
##	Texas.A.M	DePaul
##	1.247432e+00	1.244405e+00
##	Butler	Fairleigh.Dickinson
##	1.239579e+00	1.167720e+00
##	Lehigh	UCF
##	1.164771e+00	1.154687e+00
##	Oregon.State	Coastal.Carolina
##	1.111907e+00	1.107901e+00
##	Western.Kentucky	Northern.Iowa
##	1.105642e+00	1.071628e+00
##	Georgetown	Penn.State
##	1.052124e+00	1.023993e+00
##	Kent.State	Pittsburgh
##	1.011550e+00	1.004783e+00
##	Arkansas	SMU
##	8.987220e-01	8.775820e-01
##	UNC.Greensboro	Lamar
##	8.586431e-01	8.401843e-01
##	Wake.Forest	UAlbany
##	8.304773e-01	8.254110e-01
##	Providence	Illinois.State
##	8.052323e-01	7.756154e-01
##	Arizona.State	Tulane
##	7.437104e-01	7.080860e-01
##	New.Mexico	Army
##	6.705824e-01	6.476954e-01
##	East.Carolina	Tulsa
##	6.432957e-01	6.284763e-01
##	Rice	Bowling.Green
##	6.084015e-01	6.056279e-01
##	North.Dakota.State	Purdue.Fort.Wayne
##	6.019850e-01	5.939274e-01
##	Duquesne	Troy
##	5.839464e-01	5.482219e-01
##	Colorado.Christian	Central.Arkansas
##	4.725239e-01	4.713892e-01
##	Miami..OH.	San.Francisco
##	4.517279e-01	4.422321e-01
##	New.Mexico.State	Dayton
##	3.880584e-01	3.798773e-01

##	Vermont	Arkansas.State
##	3.740006e-01	3.680301e-01
##	Boise.State	Fresno.State
##	3.540694e-01	3.162272e-01
##	Lindenwood	Rhode.Island
##	2.888670e-01	2.457427e-01
##	Hawai.i	Charleston
##	2.079002e-01	1.905576e-01
##	Holy.Cross	Colgate
##	1.539280e-01	9.782910e-02
##	Southern.Indiana	Howard
##	6.764880e-02	5.912910e-02
##	Alaska.Anchorage	UC.Irvine
##	5.525586e-02	4.478481e-02
##	Cleveland.State	Pacific
##	3.532759e-02	2.294706e-02
##	UAB	Louisiana.Tech
##	1.137865e-02	4.561326e-03
##	Saint.Louis	numeric_date
##	3.642404e-03	2.024267e-05
##	Old.Dominion	Eastern.Illinois
##	-5.423978e-04	-9.781411e-03
##	Air.Force	UIC
##	-1.590865e-02	-4.034575e-02
##	UT.Arlington	Pennsylvania
##	-6.011742e-02	-7.305446e-02
##	Idaho	Santa.Clara
##	-1.138104e-01	-1.186641e-01
##	Saint.Mary.s	St..Thomas.Minnesota
##	-1.699529e-01	-1.792885e-01
##	Loyola.Marymount	Fordham
##	-1.816747e-01	-2.018216e-01
##	Montana	Georgia.State
##	-2.022834e-01	-2.291252e-01
##	Massachusetts	UC.Davis
##	-2.333899e-01	-2.371562e-01
##	Lipscomb	Utah.Valley
##	-2.376214e-01	-2.522922e-01
##	Tarleton.State	Bucknell
##	-2.728952e-01	-2.730023e-01
##	Coppin.State	Navy
##	-2.732728e-01	-3.026293e-01
##	Brown	Central.Michigan
##	-3.122563e-01	-3.436731e-01
##	Campbell	North.Carolina.A.T
##	-3.699017e-01	-3.837100e-01
##	Wichita.State	Eastern.Kentucky
##	-4.345405e-01	-4.352329e-01
##	Incarnate.Word	Idaho.State
##	-4.355000e-01	-4.802331e-01
##	VCU	Wofford
##	-4.829045e-01	-5.031432e-01
##	Omaha	Xavier
##	-5.141938e-01	-5.577339e-01

##	Little.Rock	Marshall
##	-5.723063e-01	-5.825472e-01
##	Drexel	Nicholls
##	-5.854748e-01	-6.325577e-01
##	Southern	Chattanooga
##	-6.498152e-01	-6.548638e-01
##	App.State	Western.Michigan
##	-6.602452e-01	-6.617614e-01
##	Northwestern.State	UC.San.Diego
##	-6.735294e-01	-7.007513e-01
##	Louisiana	East.Tennessee.State
##	-7.095736e-01	-7.853377e-01
##	Alabama.A.M	Charlotte
##	-7.894667e-01	-7.900946e-01
##	Maine	Weber.State
##	-8.069049e-01	-8.151813e-01
##	Bellarmino	Northern.Illinois
##	-8.196972e-01	-8.256758e-01
##	Kennesaw.State	UT.Rio.Grande.Valley
##	-8.317875e-01	-8.327758e-01
##	Western.Illinois	Northern.Colorado
##	-8.478087e-01	-8.612659e-01
##	Siena	UC.Riverside
##	-8.652233e-01	-8.876658e-01
##	Valparaiso	North.Dakota
##	-8.876845e-01	-8.914704e-01
##	Loyola.Chicago	Long.Beach.State
##	-9.035798e-01	-9.054540e-01
##	Georgia.Southern	Nevada
##	-9.136970e-01	-9.233451e-01
##	Memphis	South.Dakota
##	-9.276173e-01	-9.317908e-01
##	Sacramento.State	Jacksonville
##	-9.373597e-01	-9.396829e-01
##	Houston	Bradley
##	-9.591331e-01	-9.606075e-01
##	Bethel..TN.	California.Baptist
##	-9.708689e-01	-9.774318e-01
##	Sam.Houston	UC.Santa.Barbara
##	-9.838625e-01	-9.950676e-01
##	Bryant	Texas.State
##	-9.995460e-01	-1.001481e+00
##	George.Washington	UT.Martin
##	-1.003208e+00	-1.006505e+00
##	Florida.Atlantic	Mount.St..Mary.s
##	-1.028981e+00	-1.039153e+00
##	Stetson	Elon
##	-1.053237e+00	-1.109427e+00
##	Furman	Eastern.Washington
##	-1.121395e+00	-1.129362e+00
##	Marist	Florida.International
##	-1.143200e+00	-1.166167e+00
##	Kansas.City	High.Point
##	-1.180927e+00	-1.184205e+00

##	UTEP	Detroit.Mercy
##	-1.184931e+00	-1.191270e+00
##	UL.Monroe	Maryland.Eastern.Shore
##	-1.212390e+00	-1.245309e+00
##	William...Mary	Manhattan
##	-1.259026e+00	-1.262119e+00
##	Austin.Peay	La.Salle
##	-1.271765e+00	-1.282503e+00
##	Merrimack	Monmouth
##	-1.328172e+00	-1.336046e+00
##	Delaware	Hofstra
##	-1.351473e+00	-1.365107e+00
##	Pepperdine	Texas.A.M.Corpus.Christi
##	-1.399073e+00	-1.399194e+00
##	Jacksonville.State	Robert.Morris
##	-1.403771e+00	-1.437019e+00
##	San.José.State	North.Alabama
##	-1.456933e+00	-1.482027e+00
##	Cal.Poly	Binghamton
##	-1.483459e+00	-1.508593e+00
##	Jackson.State	UMBC
##	-1.536578e+00	-1.599186e+00
##	Samford	Southern.Miss
##	-1.606812e+00	-1.611575e+00
##	Denver	Texas.Southern
##	-1.641797e+00	-1.669751e+00
##	Boston.University	Longwood
##	-1.697655e+00	-1.720981e+00
##	Cornell	West.Georgia
##	-1.734170e+00	-1.743532e+00
##	UNC.Wilmington	Akron
##	-1.757636e+00	-1.760193e+00
##	Northern.Kentucky	Stony.Brook
##	-1.774066e+00	-1.804063e+00
##	Western.Carolina	San.Diego
##	-1.824683e+00	-1.833422e+00
##	Tennessee.State	Towson
##	-1.854852e+00	-1.897945e+00
##	Grambling	Lafayette
##	-1.901736e+00	-1.923148e+00
##	Southern.Utah	New.Hampshire
##	-1.955506e+00	-1.989029e+00
##	Oakland	Saint.Peter.s
##	-2.036904e+00	-2.055264e+00
##	Ohio	Mercer
##	-2.076557e+00	-2.087966e+00
##	Iona	NJIT
##	-2.103667e+00	-2.111798e+00
##	Charleston.Southern	Alcorn.State
##	-2.133742e+00	-2.158198e+00
##	St..Bonaventure	Morehead.State
##	-2.195923e+00	-2.196808e+00
##	Wright.State	Youngstown.State
##	-2.211820e+00	-2.213479e+00

##	Morgan.State	IU.Indianapolis
##	-2.218287e+00	-2.230804e+00
##	Dartmouth	Sacred.Heart
##	-2.243858e+00	-2.291627e+00
##	Canisius	Loyola.Maryland
##	-2.311041e+00	-2.377275e+00
##	North.Carolina.Central	Winthrop
##	-2.460876e+00	-2.517646e+00
##	Milwaukee	Queens.University
##	-2.525275e+00	-2.526693e+00
##	Radford	Yale
##	-2.541154e+00	-2.587894e+00
##	Utah.State	South.Alabama
##	-2.628279e+00	-2.638737e+00
##	Hampton	Evansville
##	-2.651336e+00	-2.662848e+00
##	Portland.State	SIU.Edwardsville
##	-2.700120e+00	-2.718365e+00
##	McNeese	Southeast.Missouri.State
##	-2.825164e+00	-2.867777e+00
##	Indiana.State	Stonehill
##	-2.905515e+00	-2.908138e+00
##	Gardner.Webb	Rider
##	-2.938156e+00	-2.954421e+00
##	New.Orleans	East.Texas.A.M
##	-2.985998e+00	-3.007584e+00
##	Eastern.Michigan	Florida.A.M
##	-3.174153e+00	-3.185249e+00
##	Mississippi.Valley.State	Bethune.Cookman
##	-3.188631e+00	-3.200446e+00
##	Houston.Christian	Prairie.View.A.M
##	-3.265505e+00	-3.288912e+00
##	Southern.Illinois	Utah.Tech
##	-3.294256e+00	-3.538439e+00
##	Cal.State.Fullerton	UMass.Lowell
##	-3.543949e+00	-3.630063e+00
##	North.Florida	South.Carolina.Upstate
##	-3.681926e+00	-3.825762e+00
##	Central.Connecticut	St..Francis..PA.
##	-3.845733e+00	-3.896152e+00
##	Seattle.U	Niagara
##	-3.983460e+00	-4.021048e+00
##	Northeastern	Cal.State.Northridge
##	-4.136770e+00	-4.138056e+00
##	Alabama.State	Chicago.State
##	-4.365007e+00	-4.410886e+00
##	Le.Moyne	Mercyhurst
##	-4.541643e+00	-4.612258e+00
##	American.University	Presbyterian
##	-4.657215e+00	-4.710018e+00
##	Wagner	Cal.State.Bakersfield
##	-4.778974e+00	-4.784473e+00
##	Long.Island.University	UNC.Asheville
##	-5.099728e+00	-5.482016e+00

##	Arkansas.Pine.Bluff	South.Carolina.State
##	-5.807702e+00	-6.097429e+00
##	Delaware.State	Dakota.Wesleyan
##	-6.732440e+00	-1.553759e+01
##	Texas.A.M.San.Antonio	Defiance
##	-1.591233e+01	-1.602138e+01
##	Western.New.Mexico	Puerto.Rico.Mayaguez
##	-1.663801e+01	-1.706212e+01
##	Kentucky.State	Cal.Maritime
##	-1.730974e+01	-1.733164e+01
##	Nelson	St..Francis..IL.
##	-1.739306e+01	-1.748730e+01
##	Mount.Olive	Central.Baptist.College
##	-1.753681e+01	-1.757807e+01
##	Indiana.Southeast	Arlington.Baptist
##	-1.760217e+01	-1.765637e+01
##	Eastern.New.Mexico	King..TN.
##	-1.772363e+01	-1.773915e+01
##	St..Mary.s..TX.	Jessup.University
##	-1.774004e+01	-1.774573e+01
##	Salem.University	Southern.New.Orleans
##	-1.776456e+01	-1.781369e+01
##	Park.University.Gilbert	Walla.Walla
##	-1.783873e+01	-1.784762e+01
##	Cal.State.San.Marcos	Bellevue.University
##	-1.787112e+01	-1.788697e+01
##	Cedarville	Erskine
##	-1.795846e+01	-1.798010e+01
##	UC.Merced	Guilford
##	-1.799150e+01	-1.799431e+01
##	Winston.Salem	Pittsburgh.Johnstown
##	-1.799903e+01	-1.802747e+01
##	Life.Pacific	Sewanee
##	-1.804848e+01	-1.806262e+01
##	Schreiner	Our.Lady.Of.The.Lake
##	-1.814575e+01	-1.814602e+01
##	Edward.Waters	Berry
##	-1.815774e+01	-1.823259e+01
##	Bryn.Athyn	Life.University
##	-1.823324e+01	-1.830070e+01
##	Sul.Ross.State	Southern.Wesleyan
##	-1.836870e+01	-1.839334e+01
##	Ohio.Christian	Fisk
##	-1.840613e+01	-1.849842e+01
##	Cleary.University	Lincoln..PA.
##	-1.856496e+01	-1.864594e+01
##	Bowie.State	Delta.State
##	-1.880502e+01	-1.881197e+01
##	Cumberland..TN.	Johnson.C.Smith
##	-1.882764e+01	-1.883611e+01
##	Bethesda.University	Wiley
##	-1.884009e+01	-1.891076e+01
##	Point.Park	UVA.Wise
##	-1.902593e+01	-1.906182e+01

```
##          Jarvis.Christian          St..Thomas..TX.
##          -1.928108e+01          -1.930870e+01
##          LeTourneau          Westcliff
##          -1.931171e+01          -1.936712e+01
##          UNT.Dallas College.Of.Biblical.Studies
##          -1.948470e+01          -1.950529e+01
##          IU.Columbus          Fort.Lauderdale
##          -1.960813e+01          -1.961857e+01
##          Johnson...Wales..NC.          Clinton.College
##          -1.967565e+01          -1.982980e+01
##          Coastal.Georgia          Evergreen.State
##          -1.999610e+01          -2.012886e+01
##          Lees.McRae          La.Sierra
##          -2.014648e+01          -2.055947e+01
##          Trinity.Baptist          Newberry
##          -2.062010e+01          -2.075331e+01
##          Davis...Elkins          Faulkner
##          -2.077857e+01          -2.089316e+01
##          Arkansas.Baptist          Virginia.Lynchburg
##          -2.121553e+01          -2.125275e+01
##          Warren.Wilson          Cheyney..PA.
##          -2.163475e+01          -2.285264e+01
##          Georgian.Court.University
##          -2.290320e+01
```

4

I prefer to use the model that accounts for game location, as it has a lower AIC meaning that it assesses the goodness of fit of a model. For model 1, the AIC is 5053.3; for model 2, the AIC is 5109.7; for model 3, the AIC is 5052.4; for model 4, the AIC is 5053.3. As we can see, model 3 has the lower AIC.

5

```
model_3_rank <- sort(coef(model_3), decreasing = TRUE)
print(head(model_3_rank, 10))
```

```
##      (Intercept)      UCLA South.Carolina      Texas      USC
##      37.244520      8.322140      8.114008      7.883167      7.785470
##      UConn      TCU      Notre.Dame      LSU      Duke
##      7.022398      6.407829      6.359737      6.290366      5.907306
```

```
print(tail(model_3_rank, 5))
```

```
##      Arkansas.Baptist      Virginia.Lynchburg      Warren.Wilson
##      -21.08099      -21.31197      -21.56596
##      Cheyney..PA. Georgian.Court.University
##      -22.77031      -22.80402
```

```
teams <- c("LSU", "Michigan", "USC")
teams_coeff <- model_3_rank[teams]
teams_coeff
```

```
##      LSU Michigan      USC
## 6.290366 5.094159 7.785470
```

6

```
vcv <- vcov(model_3)[c("Michigan", "Georgia"), c("Michigan", "Georgia")]
```

```
x <- numeric(ncol(vcv))
names(x) <- colnames(vcv)
x["Michigan"] <- 1
x["Georgia"] <- -1

se <- sqrt(t(x) %*% vcv %*% x)
print(se)
```

```
##      [,1]
## [1,] 0.8631619
```

```
vcv <- vcov(model_3)[c("Michigan", "Ohio.State"), c("Michigan", "Ohio.State")]
```

```
x <- numeric(ncol(vcv))
names(x) <- colnames(vcv)
x["Michigan"] <- 1
x["Ohio.State"] <- -1

se <- sqrt(t(x) %*% vcv %*% x)
print(se)
```

```
##      [,1]
## [1,] 0.8128719
```

```
vcv <- vcov(model_3)[c("Michigan", "Michigan.State"), c("Michigan", "Michigan.State")]
```

```
x <- numeric(ncol(vcv))
names(x) <- colnames(vcv)
x["Michigan"] <- 1
x["Michigan.State"] <- -1

se <- sqrt(t(x) %*% vcv %*% x)
print(se)
```

```
##      [,1]
## [1,] 0.7214677
```

7a

```
# standard error for Michigan vs. Georgia
vcv_mg <- vcov(model_3)[c("Michigan", "Georgia"), c("Michigan", "Georgia")]
se_mg <- sqrt(c(1, -1) %*% vcv_mg %*% c(1, -1))
diff_mg <- coef(model_3)["Michigan"] - coef(model_3)["Georgia"]
z_mg <- diff_mg / se_mg
p_mg <- 1 - pnorm(z_mg)

# standard error for Michigan vs. Ohio State
vcv_mo <- vcov(model_3)[c("Michigan", "Ohio.State"), c("Michigan", "Ohio.State")]
se_mo <- sqrt(c(1, -1) %*% vcv_mo %*% c(1, -1))
diff_mo <- coef(model_3)["Michigan"] - coef(model_3)["Ohio.State"]
z_mo <- diff_mo / se_mo
p_mo <- 1 - pnorm(z_mo)

# standard error for Michigan vs. Michigan State
vcv_mm <- vcov(model_3)[c("Michigan", "Michigan.State"), c("Michigan", "Michigan.State")]
se_mm <- sqrt(c(1, -1) %*% vcv_mm %*% c(1, -1))
diff_mm <- coef(model_3)["Michigan"] - coef(model_3)["Michigan.State"]
z_mm <- diff_mm / se_mm
p_mm <- 1 - pnorm(z_mm)

# p-values for all rival schools
p <- c(p_mg, p_mo, p_mm)

# using a correction
p_adj <- p.adjust(p, method = "bonferroni")

# print results
cat("Michigan vs Georgia\n")
```

```
## Michigan vs Georgia
```

```
cat("Log Odds Difference:", diff_mg, "\n")
```

```
## Log Odds Difference: 3.789521
```

```
cat("Standard Error:", se_mg, "\n")
```

```
## Standard Error: 0.8631619
```

```
cat("Z-statistic:", z_mg, "\n")
```

```
## Z-statistic: 4.390279
```

```
cat("Raw p-value:", p_mg, "\n")
```

```
## Raw p-value: 5.660263e-06
```

```
cat("Adjusted p-value (Bonferroni):", p_adj[1], "\n\n")
```

```
## Adjusted p-value (Bonferroni): 1.698079e-05
```

```
cat("Michigan vs Ohio State\n")
```

```
## Michigan vs Ohio State
```

```
cat("Log Odds Difference:", diff_mo, "\n")
```

```
## Log Odds Difference: -0.6396319
```

```
cat("Standard Error:", se_mo, "\n")
```

```
## Standard Error: 0.8128719
```

```
cat("Z-statistic:", z_mo, "\n")
```

```
## Z-statistic: -0.7868792
```

```
cat("Raw p-value:", p_mo, "\n")
```

```
## Raw p-value: 0.7843237
```

```
cat("Adjusted p-value (Bonferroni):", p_adj[2], "\n\n")
```

```
## Adjusted p-value (Bonferroni): 1
```

```
cat("Michigan vs Michigan State\n")
```

```
## Michigan vs Michigan State
```

```
cat("Log Odds Difference:", diff_mm, "\n")
```

```
## Log Odds Difference: 0.3484379
```

```
cat("Standard Error:", se_mm, "\n")
```

```
## Standard Error: 0.7214677
```

```
cat("Z-statistic:", z_mm, "\n")
```

```
## Z-statistic: 0.482957
```

```
cat("Raw p-value:", p_mm, "\n")
```

```
## Raw p-value: 0.3145631
```

```
cat("Adjusted p-value (Bonferroni):", p_adj[3], "\n")
```

```
## Adjusted p-value (Bonferroni): 0.9436894
```