

# Data Analysis of Campaign Contributions and Voting Behavior

## LPM of all Representatives

The reason for using a LPM for this analysis despite popular opinion in academia that the model is not always accurate (see Ch.5 in my paper), is that the LPM is ideal for binary outcomes, i.e. pro environmental or anti environmental vote.

### with control variables

This is the most basic model, which includes all representatives (who can be associated with the R or D party, not I or Libertarian) in panel and who participated in at least 2 votes (to be able to track changes in voting behaviour). This means the dataset encompasses 574 (?) Representatives.

```
# remove ID type columns
df_long <- df_long %>% select(-c(GovtrackID, opensecrets_id, first_name, last_name, name, Vo
view(df_long)
## with control variables & no contrib, only dummy
full_ols_dummy <- lm(Vote ~ . - state - BioID - Vote_change, data = df_long)
summary(full_ols_dummy)
```

Call:

```
lm(formula = Vote ~ . - state - BioID - Vote_change, data = df_long)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-0.99060	-0.04051	-0.01116	0.02351	1.00095

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-4.159e-01	7.822e-01	-0.532	0.59495
district	7.882e-04	3.717e-04	2.120	0.03411 *
partyR	-9.010e-01	8.855e-03	-101.745	< 2e-16 ***
birthday	7.378e-04	3.982e-04	1.853	0.06409 .
genderM	-2.519e-02	9.241e-03	-2.726	0.00648 **
nominate_dim1	-1.407e-01	2.851e-02	-4.935	8.74e-07 ***
nominate_dim2	-6.994e-02	2.134e-02	-3.276	0.00107 **
GeographicalNE	7.307e-02	1.123e-02	6.507	9.82e-11 ***
GeographicalSO	8.803e-03	9.403e-03	0.936	0.34929
GeographicalWE	1.938e-02	1.124e-02	1.725	0.08475 .
Instance	4.826e-04	1.788e-04	2.698	0.00703 **
seniority	1.618e-03	1.038e-03	1.559	0.11921
Contribution_minus	-6.038e-07	1.476e-07	-4.090	4.49e-05 ***
Contribution_plus	7.214e-06	1.400e-06	5.152	2.85e-07 ***
Dmajority	2.406e-02	8.748e-03	2.750	0.00601 **
anti_env_dummy	-2.099e-02	1.317e-02	-1.593	0.11134
pro_env_dummy	-6.638e-03	9.169e-03	-0.724	0.46919

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1516 on 1884 degrees of freedom

(1417 observations deleted due to missingness)

Multiple R-squared: 0.9087, Adjusted R-squared: 0.908

F-statistic: 1172 on 16 and 1884 DF, p-value: < 2.2e-16

```
## with control variables and contribs
full_ols <- lm(Vote ~ . - state - BioID - Vote_change, data = df_long)
summary(full_ols)
```

Call:

```
lm(formula = Vote ~ . - state - BioID - Vote_change, data = df_long)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.99060	-0.04051	-0.01116	0.02351	1.00095

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-4.159e-01	7.822e-01	-0.532	0.59495

district	7.882e-04	3.717e-04	2.120	0.03411	*
partyR	-9.010e-01	8.855e-03	-101.745	< 2e-16	***
birthday	7.378e-04	3.982e-04	1.853	0.06409	.
genderM	-2.519e-02	9.241e-03	-2.726	0.00648	**
nominate_dim1	-1.407e-01	2.851e-02	-4.935	8.74e-07	***
nominate_dim2	-6.994e-02	2.134e-02	-3.276	0.00107	**
GeographicalNE	7.307e-02	1.123e-02	6.507	9.82e-11	***
GeographicalSO	8.803e-03	9.403e-03	0.936	0.34929	.
GeographicalWE	1.938e-02	1.124e-02	1.725	0.08475	.
Instance	4.826e-04	1.788e-04	2.698	0.00703	**
seniority	1.618e-03	1.038e-03	1.559	0.11921	.
Contribution_minus	-6.038e-07	1.476e-07	-4.090	4.49e-05	***
Contribution_plus	7.214e-06	1.400e-06	5.152	2.85e-07	***
Dmajority	2.406e-02	8.748e-03	2.750	0.00601	**
anti_env_dummy	-2.099e-02	1.317e-02	-1.593	0.11134	.
pro_env_dummy	-6.638e-03	9.169e-03	-0.724	0.46919	.

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1516 on 1884 degrees of freedom

(1417 observations deleted due to missingness)

Multiple R-squared: 0.9087, Adjusted R-squared: 0.908

F-statistic: 1172 on 16 and 1884 DF, p-value: < 2.2e-16

```
# same thing again with log transformed contributions
```

```
df_long_log <- df_long_log %>% select(-c(GovtrackID, opensecrets_id, first_name, last_name,
full_ols_log <- lm(Vote ~ . - state - BioID - Vote_change, data = df_long_log)
summary(full_ols_log)
```

Call:

```
lm(formula = Vote ~ . - state - BioID - Vote_change, data = df_long_log)
```

Residuals:

Min	1Q	Median	3Q	Max
-1.09309	-0.03431	-0.00684	0.02394	0.97306

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	0.1951467	0.7671589	0.254	0.799233
district	0.0001180	0.0003708	0.318	0.750326
partyR	-0.9109252	0.0090809	-100.312	< 2e-16 ***

Vote_change_dummy	0.1760734	0.0173161	10.168	< 2e-16	***
birthday	0.0004227	0.0003906	1.082	0.279375	
genderM	-0.0266096	0.0090810	-2.930	0.003428	**
nominate_dim1	-0.0751775	0.0287092	-2.619	0.008900	**
nominate_dim2	-0.1057884	0.0211617	-4.999	6.30e-07	***
GeographicalNE	0.0605128	0.0110885	5.457	5.47e-08	***
GeographicalSO	-0.0008319	0.0092087	-0.090	0.928025	
GeographicalWE	0.0190261	0.0110184	1.727	0.084375	.
Instance	0.0005591	0.0001747	3.201	0.001394	**
seniority	0.0002570	0.0010177	0.252	0.800688	
Dmajority	0.0284876	0.0085833	3.319	0.000921	***
anti_env_dummy	0.0788661	0.0317912	2.481	0.013197	*
pro_env_dummy	-0.0696149	0.0340943	-2.042	0.041307	*
Contribution_plus_log	0.0113726	0.0046009	2.472	0.013530	*
Contribution_minus_log	-0.0120736	0.0033220	-3.634	0.000286	***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1484 on 1883 degrees of freedom

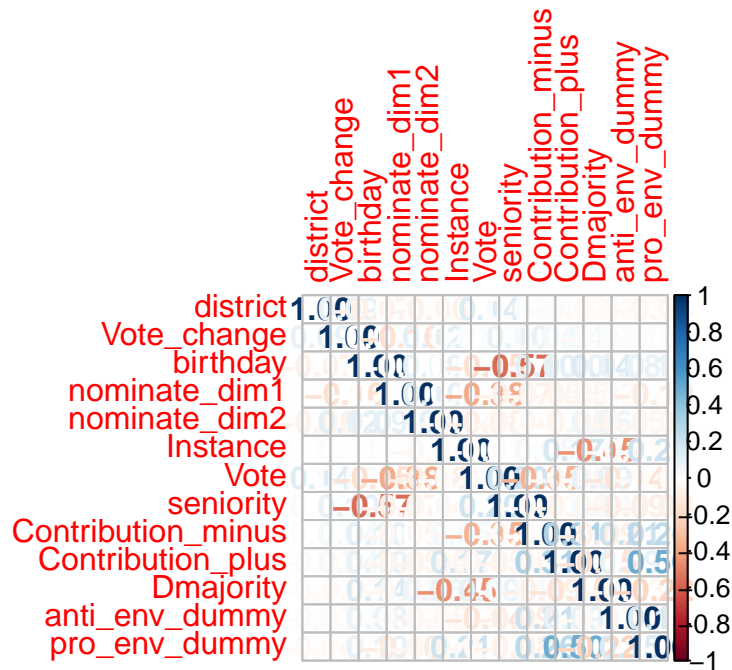
(1417 observations deleted due to missingness)

Multiple R-squared: 0.9126, Adjusted R-squared: 0.9118

F-statistic: 1157 on 17 and 1883 DF, p-value: < 2.2e-16

Why such high adjusted R-squared, use `corrtest` to see if multicollinearity is present.

```
# select only numeric variables
df_long_num <- df_long %>%
  select_if(is.numeric) %>%
  filter(complete.cases())
corrplot(cor(df_long_num), method = "number")
```



The ols regresses the pro and anti environmental contributions with the control variables used:

- party
- district
- birthday
- state (alt. to Geographical)
- Seniority (number of terms served prior to vote)
- DW-Nominate Scores from the 1st and second dimensions
- Geographical region (i.e. States categorised into regions (South, West, North-East and Midwest))
- majority party in the house at the time of the vote.

transforming the contribution variables logarithmically does not change the adjusted R-squared of the model by much. It also decreases the significance of the contribution coefficients, which is strange, given that the contribution variables are highly skewed and thus should be transformed logarithmically.

**check for multicollinearity in model**

```
vif(full_ols)
```

	GVIF	Df	GVIF <sup>1/(2*Df)</sup>
district	1.106005	1	1.051668
party	1.614196	1	1.270510
birthday	1.633170	1	1.277956
gender	1.173584	1	1.083321
nominate_dim1	1.286703	1	1.134329
nominate_dim2	1.044345	1	1.021932
Geographical	1.349322	3	1.051201
Instance	1.301281	1	1.140737
seniority	1.588564	1	1.260382
Contribution_minus	1.385466	1	1.177058
Contribution_plus	1.420459	1	1.191830
Dmajority	1.373583	1	1.171999
anti_env_dummy	1.081422	1	1.039914
pro_env_dummy	1.465752	1	1.210683

shows that multicollinearity is not of a real concern here, all VIF values are below 5, most of which between 1 and 1.25.

```
df_long <- df_long %>% filter(complete.cases(Contribution_plus))
skewness(df_long$Contribution_plus)
```

```
[1] 7.249464
```

```
df_long_log <- df_long_log %>% filter(complete.cases(Contribution_plus_log))
skewness(df_long_log$Contribution_plus_log)
```

```
[1] 0.9765213
```

The reason for transforming the contribution variables is to account for differences in contributions which representatives might receive, i.e. AOC vs. Kevin McCarthy.

### check for contribution ~ independent variable relationship

```
contrib_plus <- lm(Contribution_plus ~ . - BioID - Geographical - pro_env_dummy, data = df_1)
summary(contrib_plus)
```

Call:

```
lm(formula = Contribution_plus ~ . - BioID - Geographical - pro_env_dummy,  
    data = df_long)
```

Residuals:

Min	1Q	Median	3Q	Max
-7962	-983	-276	383	53669

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	-2.950e+04	1.397e+04	-2.111	0.03488	*
stateAL	-4.196e+02	1.174e+03	-0.357	0.72087	
stateAR	-6.232e+02	1.227e+03	-0.508	0.61167	
stateAZ	-7.414e+02	1.356e+03	-0.547	0.58453	
stateCA	-1.020e+02	1.151e+03	-0.089	0.92937	
stateCO	1.142e+03	1.171e+03	0.975	0.32961	
stateCT	-2.399e+02	1.198e+03	-0.200	0.84135	
stateDE	-2.451e+02	1.535e+03	-0.160	0.87313	
stateFL	-2.131e+02	1.128e+03	-0.189	0.85026	
stateGA	-7.236e+02	1.144e+03	-0.633	0.52709	
stateHI	7.949e+02	1.408e+03	0.565	0.57245	
stateIA	7.460e+03	1.251e+03	5.965	2.93e-09	***
stateID	-1.355e+03	1.368e+03	-0.991	0.32192	
stateIL	7.362e+02	1.128e+03	0.653	0.51397	
stateIN	8.634e+02	1.156e+03	0.747	0.45528	
stateKS	2.166e+03	1.266e+03	1.711	0.08716	.
stateKY	-1.577e+02	1.178e+03	-0.134	0.89346	
stateLA	-1.546e+03	1.210e+03	-1.277	0.20159	
stateMA	1.679e+02	1.161e+03	0.145	0.88505	
stateMD	-5.512e+02	1.169e+03	-0.472	0.63725	
stateME	1.559e+02	1.351e+03	0.115	0.90812	
stateMI	-5.357e+02	1.162e+03	-0.461	0.64488	
stateMN	7.828e+02	1.169e+03	0.670	0.50319	
stateMO	8.921e+01	1.164e+03	0.077	0.93894	
stateMS	-9.967e+02	1.237e+03	-0.806	0.42033	
stateMT	9.578e+02	1.864e+03	0.514	0.60749	
stateNC	-1.274e+02	1.157e+03	-0.110	0.91231	
stateND	-1.521e+03	2.148e+03	-0.708	0.47894	
stateNE	2.086e+03	1.264e+03	1.650	0.09914	.
stateNH	9.832e+02	1.378e+03	0.714	0.47552	
stateNJ	3.117e+02	1.139e+03	0.274	0.78431	
stateNM	-6.100e+02	1.472e+03	-0.414	0.67868	

stateNV	-5.783e+02	1.234e+03	-0.469	0.63944
stateNY	2.875e+02	1.122e+03	0.256	0.79771
stateOH	-7.262e+02	1.124e+03	-0.646	0.51837
stateOK	-7.623e+02	1.256e+03	-0.607	0.54383
stateOR	1.505e+02	1.190e+03	0.126	0.89942
statePA	-5.402e+02	1.158e+03	-0.467	0.64081
stateRI	5.941e+00	1.334e+03	0.004	0.99645
stateSC	-6.318e+02	1.177e+03	-0.537	0.59160
stateSD	-5.947e+02	1.603e+03	-0.371	0.71076
stateTN	-2.313e+02	1.155e+03	-0.200	0.84125
stateTX	-5.752e+02	1.125e+03	-0.511	0.60935
stateUT	-9.348e+02	1.253e+03	-0.746	0.45567
stateVA	-1.193e+02	1.150e+03	-0.104	0.91739
stateWA	-1.373e+02	1.150e+03	-0.119	0.90496
stateWI	-6.106e+02	1.183e+03	-0.516	0.60587
stateWV	-4.700e+02	1.292e+03	-0.364	0.71609
stateWY	-1.974e+03	1.734e+03	-1.138	0.25524
district	-2.640e+00	9.446e+00	-0.279	0.77990
partyR	1.661e+03	4.004e+02	4.150	3.48e-05 ***
Vote_change	2.578e+02	1.961e+02	1.315	0.18874
birthday	1.386e+01	7.141e+00	1.941	0.05241 .
genderM	2.807e+02	1.674e+02	1.677	0.09371 .
nominate_dim1	7.228e+02	5.511e+02	1.312	0.18982
nominate_dim2	-3.109e+02	4.061e+02	-0.766	0.44401
Instance	1.562e+01	3.057e+00	5.109	3.57e-07 ***
Vote	2.064e+03	4.044e+02	5.103	3.69e-07 ***
seniority	-1.725e+01	1.881e+01	-0.917	0.35909
Contribution_minus	3.514e-02	2.623e-03	13.399	< 2e-16 ***
Dmajority	-4.482e+02	1.505e+02	-2.979	0.00293 **
anti_env_dummy	2.697e+02	2.314e+02	1.165	0.24401

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2605 on 1839 degrees of freedom

(413 observations deleted due to missingness)

Multiple R-squared: 0.2506, Adjusted R-squared: 0.2257

F-statistic: 10.08 on 61 and 1839 DF, p-value: < 2.2e-16

```
contrib_plus_dummy <- lm(pro_env_dummy ~ . - BioID - Geographical - Contribution_plus, data =
summary(contrib_plus_dummy)
```



Call:

```
lm(formula = pro_env_dummy ~ . - BioID - Geographical - Contribution_plus,  
    data = df_long)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-1.1193	-0.2993	-0.1239	0.3341	1.0684

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	-4.304e+00	2.192e+00	-1.963	0.049772	*
stateAL	-4.046e-01	1.842e-01	-2.196	0.028203	*
stateAR	-3.977e-01	1.926e-01	-2.065	0.039034	*
stateAZ	-2.754e-01	2.127e-01	-1.294	0.195664	
stateCA	-2.583e-02	1.805e-01	-0.143	0.886233	
stateCO	-2.705e-01	1.837e-01	-1.472	0.141127	
stateCT	-3.519e-01	1.880e-01	-1.872	0.061395	.
stateDE	-4.127e-01	2.408e-01	-1.713	0.086792	.
stateFL	-3.338e-01	1.771e-01	-1.885	0.059554	.
stateGA	-3.973e-01	1.795e-01	-2.214	0.026983	*
stateHI	8.388e-02	2.209e-01	0.380	0.704243	
stateIA	2.425e-01	1.962e-01	1.235	0.216818	
stateID	-5.389e-01	2.146e-01	-2.511	0.012114	*
stateIL	-1.231e-01	1.770e-01	-0.695	0.486849	
stateIN	-5.357e-02	1.814e-01	-0.295	0.767788	
stateKS	-1.230e-01	1.986e-01	-0.619	0.535729	
stateKY	-3.552e-01	1.848e-01	-1.922	0.054729	.
stateLA	-3.982e-01	1.898e-01	-2.098	0.036071	*
stateMA	-1.700e-01	1.822e-01	-0.933	0.350841	
stateMD	-3.711e-01	1.834e-01	-2.023	0.043176	*
stateME	6.913e-02	2.119e-01	0.326	0.744319	
stateMI	-3.459e-01	1.824e-01	-1.897	0.058039	.
stateMN	-1.584e-01	1.834e-01	-0.863	0.388033	
stateMO	-1.219e-01	1.827e-01	-0.667	0.504675	
stateMS	-5.772e-01	1.940e-01	-2.975	0.002968	**
stateMT	-1.831e-01	2.925e-01	-0.626	0.531381	
stateNC	-1.883e-01	1.815e-01	-1.037	0.299823	
stateND	-5.965e-01	3.371e-01	-1.770	0.076963	.
stateNE	4.058e-03	1.984e-01	0.020	0.983683	
stateNH	-1.291e-01	2.162e-01	-0.597	0.550370	
stateNJ	-2.438e-01	1.786e-01	-1.364	0.172590	
stateNM	-4.631e-01	2.310e-01	-2.005	0.045135	*
stateNV	-3.068e-01	1.937e-01	-1.584	0.113267	

```

stateNY          -1.519e-01  1.760e-01  -0.863  0.388222
stateOH          -2.937e-01  1.764e-01  -1.665  0.096050 .
stateOK          -4.649e-01  1.970e-01  -2.360  0.018397 *
stateOR          -3.239e-01  1.868e-01  -1.734  0.083104 .
statePA          -2.994e-01  1.816e-01  -1.648  0.099496 .
stateRI          -3.152e-01  2.093e-01  -1.506  0.132231
stateSC          -3.244e-01  1.847e-01  -1.756  0.079285 .
stateSD          -3.707e-01  2.516e-01  -1.474  0.140783
stateTN          -4.070e-01  1.812e-01  -2.246  0.024803 *
stateTX          -2.903e-01  1.766e-01  -1.644  0.100419
stateUT          -3.252e-01  1.966e-01  -1.654  0.098231 .
stateVA          -2.085e-01  1.804e-01  -1.156  0.247947
stateWA          -2.154e-01  1.804e-01  -1.194  0.232618
stateWI          -2.816e-01  1.857e-01  -1.517  0.129533
stateWV          -1.807e-01  2.027e-01  -0.891  0.372903
stateWY          -7.933e-01  2.722e-01  -2.915  0.003603 **
district         -5.614e-03  1.482e-03  -3.787  0.000157 ***
partyR           5.111e-02  6.283e-02   0.813  0.416047
Vote_change      -1.775e-02  3.077e-02  -0.577  0.564056
birthday         2.356e-03  1.120e-03   2.103  0.035642 *
genderM          1.935e-02  2.626e-02   0.737  0.461272
nominate_dim1    -9.332e-02  8.647e-02  -1.079  0.280647
nominate_dim2     4.982e-02  6.372e-02   0.782  0.434444
Instance         2.664e-03  4.797e-04   5.553  3.21e-08 ***
Vote             1.138e-01  6.345e-02   1.794  0.072983 .
seniority        -3.866e-03  2.951e-03  -1.310  0.190292
Contribution_minus 4.342e-06  4.115e-07  10.553  < 2e-16 ***
Dmajority        -1.442e-01  2.361e-02  -6.107  1.24e-09 ***
anti_env_dummy   1.590e-01  3.631e-02   4.377  1.27e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Residual standard error: 0.4087 on 1839 degrees of freedom

(413 observations deleted due to missingness)

Multiple R-squared: 0.2333, Adjusted R-squared: 0.2079

F-statistic: 9.173 on 61 and 1839 DF, p-value: < 2.2e-16

```

contrib_minus <- lm(Contribution_minus ~ . - BioID - Geographical - anti_env_dummy, data = d)
summary(contrib_minus)

```

Call:

```
lm(formula = Contribution_minus ~ . - BioID - Geographical -
    anti_env_dummy, data = df_long)
```

Residuals:

Min	1Q	Median	3Q	Max
-64109	-11139	-2326	6225	179668

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	-3.710e+05	1.189e+05	-3.119	0.001844	**
stateAL	1.040e+04	1.002e+04	1.038	0.299236	
stateAR	7.650e+03	1.047e+04	0.731	0.465131	
stateAZ	1.920e+04	1.155e+04	1.662	0.096656	.
stateCA	1.324e+04	9.799e+03	1.351	0.176870	
stateCO	1.415e+04	9.984e+03	1.418	0.156486	
stateCT	1.031e+04	1.022e+04	1.008	0.313350	
stateDE	1.575e+04	1.308e+04	1.204	0.228882	
stateFL	6.782e+03	9.625e+03	0.705	0.481106	
stateGA	1.248e+04	9.757e+03	1.279	0.201044	
stateHI	2.438e+03	1.200e+04	0.203	0.838988	
stateIA	-7.735e+03	1.076e+04	-0.719	0.472422	
stateID	2.823e+04	1.165e+04	2.423	0.015494	*
stateIL	1.827e+04	9.604e+03	1.902	0.057350	.
stateIN	4.254e+03	9.854e+03	0.432	0.666030	
stateKS	2.911e+04	1.077e+04	2.702	0.006958	**
stateKY	1.780e+04	1.004e+04	1.774	0.076270	.
stateLA	5.159e+04	1.025e+04	5.032	5.32e-07	***
stateMA	1.208e+04	9.888e+03	1.222	0.222018	
stateMD	2.328e+04	9.952e+03	2.340	0.019412	*
stateME	6.195e+03	1.151e+04	0.538	0.590445	
stateMI	2.060e+04	9.898e+03	2.081	0.037560	*
stateMN	7.517e+03	9.965e+03	0.754	0.450742	
stateMO	8.633e+03	9.923e+03	0.870	0.384396	
stateMS	1.956e+04	1.055e+04	1.854	0.063963	.
stateMT	4.801e+04	1.585e+04	3.029	0.002490	**
stateNC	1.145e+04	9.860e+03	1.161	0.245854	
stateND	3.332e+04	1.831e+04	1.820	0.068926	.
stateNE	-1.005e+04	1.078e+04	-0.932	0.351268	
stateNH	4.165e+03	1.174e+04	0.355	0.722796	
stateNJ	1.133e+04	9.706e+03	1.168	0.243099	
stateNM	1.721e+04	1.254e+04	1.372	0.170094	
stateNV	1.878e+04	1.051e+04	1.787	0.074141	.
stateNY	1.060e+04	9.556e+03	1.109	0.267480	

stateOH	2.388e+04	9.572e+03	2.495	0.012689	*
stateOK	1.960e+04	1.071e+04	1.831	0.067281	.
stateOR	2.771e+04	1.013e+04	2.734	0.006319	**
statePA	1.629e+04	9.855e+03	1.653	0.098550	.
stateRI	6.539e+03	1.138e+04	0.575	0.565498	
stateSC	1.971e+04	1.003e+04	1.964	0.049627	*
stateSD	4.591e+03	1.367e+04	0.336	0.736927	
stateTN	4.115e+03	9.852e+03	0.418	0.676194	
stateTX	3.237e+04	9.564e+03	3.384	0.000728	***
stateUT	1.519e+04	1.068e+04	1.423	0.154960	
stateVA	1.449e+04	9.797e+03	1.479	0.139240	
stateWA	1.283e+04	9.797e+03	1.309	0.190618	
stateWI	1.357e+04	1.009e+04	1.346	0.178540	
stateWV	2.190e+04	1.100e+04	1.991	0.046665	*
stateWY	5.203e+04	1.477e+04	3.524	0.000436	***
district	1.177e+02	8.080e+01	1.457	0.145377	
partyR	8.775e+03	3.421e+03	2.565	0.010400	*
Vote_change	-1.584e+03	1.672e+03	-0.947	0.343696	
birthday	1.983e+02	6.077e+01	3.262	0.001126	**
genderM	8.990e+02	1.427e+03	0.630	0.528786	
nominate_dim1	-4.417e+04	4.588e+03	-9.628	< 2e-16	***
nominate_dim2	-2.350e+03	3.455e+03	-0.680	0.496490	
Instance	-5.647e+01	2.626e+01	-2.150	0.031666	*
Vote	-1.288e+04	3.454e+03	-3.728	0.000199	***
seniority	6.554e+02	1.593e+02	4.114	4.05e-05	***
Contribution_plus	2.064e+00	2.107e-01	9.798	< 2e-16	***
Dmajority	-1.692e+03	1.295e+03	-1.307	0.191281	
pro_env_dummy	8.515e+03	1.356e+03	6.280	4.22e-10	***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 22200 on 1839 degrees of freedom

(413 observations deleted due to missingness)

Multiple R-squared: 0.3797, Adjusted R-squared: 0.3592

F-statistic: 18.46 on 61 and 1839 DF, p-value: < 2.2e-16

```
contrib_minus_dummy <- lm(anti_env_dummy ~ . - BioID - Geographical - Contribution_minus, data = anti_env_data)
summary(contrib_minus_dummy)
```

Call:

```
lm(formula = anti_env_dummy ~ . - BioID - Geographical - Contribution_minus,
```

```
data = df_long)
```

```
Residuals:
```

	Min	1Q	Median	3Q	Max
	-1.03292	-0.00522	0.05891	0.12534	0.35700

```
Coefficients:
```

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-3.704e-01	1.416e+00	-0.262	0.79373
stateAL	4.877e-02	1.193e-01	0.409	0.68269
stateAR	1.783e-02	1.247e-01	0.143	0.88628
stateAZ	4.373e-02	1.375e-01	0.318	0.75054
stateCA	-8.000e-02	1.167e-01	-0.686	0.49301
stateCO	-9.290e-02	1.189e-01	-0.782	0.43460
stateCT	-1.323e-02	1.217e-01	-0.109	0.91344
stateDE	-1.195e-01	1.558e-01	-0.767	0.44315
stateFL	-6.681e-02	1.146e-01	-0.583	0.55998
stateGA	-3.263e-02	1.162e-01	-0.281	0.77887
stateHI	-1.112e-01	1.429e-01	-0.779	0.43637
stateIA	-9.755e-02	1.282e-01	-0.761	0.44662
stateID	-1.477e-01	1.387e-01	-1.064	0.28730
stateIL	-6.333e-02	1.144e-01	-0.554	0.57977
stateIN	-7.642e-02	1.173e-01	-0.651	0.51487
stateKS	-1.459e-01	1.283e-01	-1.138	0.25541
stateKY	-5.886e-02	1.195e-01	-0.493	0.62242
stateLA	-4.344e-02	1.221e-01	-0.356	0.72196
stateMA	-1.606e-01	1.177e-01	-1.364	0.17280
stateMD	-1.058e-01	1.185e-01	-0.893	0.37193
stateME	-7.319e-02	1.370e-01	-0.534	0.59334
stateMI	-1.184e-01	1.179e-01	-1.005	0.31526
stateMN	-7.220e-02	1.187e-01	-0.608	0.54296
stateMO	-2.846e-02	1.181e-01	-0.241	0.80969
stateMS	2.318e-02	1.257e-01	0.184	0.85367
stateMT	-6.251e-02	1.887e-01	-0.331	0.74056
stateNC	2.694e-02	1.174e-01	0.230	0.81850
stateND	-2.415e-02	2.180e-01	-0.111	0.91181
stateNE	-5.050e-02	1.284e-01	-0.393	0.69415
stateNH	-1.772e-01	1.398e-01	-1.267	0.20516
stateNJ	1.814e-02	1.156e-01	0.157	0.87530
stateNM	-2.516e-01	1.493e-01	-1.685	0.09223
stateNV	-1.296e-01	1.252e-01	-1.036	0.30041
stateNY	-8.321e-02	1.138e-01	-0.731	0.46466
stateOH	-1.123e-02	1.140e-01	-0.099	0.92153

stateOK	2.619e-02	1.275e-01	0.205	0.83725
stateOR	6.159e-02	1.207e-01	0.510	0.60984
statePA	-2.031e-01	1.173e-01	-1.730	0.08372 .
stateRI	5.526e-02	1.354e-01	0.408	0.68331
stateSC	4.130e-02	1.195e-01	0.346	0.72955
stateSD	-1.973e-01	1.627e-01	-1.213	0.22545
stateTN	-1.361e-01	1.173e-01	-1.160	0.24603
stateTX	-9.542e-02	1.139e-01	-0.838	0.40218
stateUT	-5.250e-03	1.272e-01	-0.041	0.96707
stateVA	-2.416e-02	1.166e-01	-0.207	0.83595
stateWA	-5.115e-02	1.166e-01	-0.439	0.66105
stateWI	2.986e-02	1.201e-01	0.249	0.80365
stateWV	-3.393e-02	1.310e-01	-0.259	0.79568
stateWY	1.009e-01	1.758e-01	0.574	0.56625
district	1.007e-03	9.620e-04	1.046	0.29557
partyR	-3.926e-02	4.073e-02	-0.964	0.33532
Vote_change	1.683e-02	1.991e-02	0.845	0.39797
birthday	7.635e-04	7.236e-04	1.055	0.29153
genderM	1.929e-02	1.699e-02	1.135	0.25640
nominate_dim1	-1.321e-01	5.462e-02	-2.419	0.01567 *
nominate_dim2	-1.214e-01	4.113e-02	-2.952	0.00320 **
Instance	-9.219e-04	3.127e-04	-2.948	0.00324 **
Vote	-1.041e-01	4.113e-02	-2.530	0.01147 *
seniority	-4.141e-03	1.897e-03	-2.183	0.02915 *
Contribution_plus	2.309e-06	2.508e-06	0.921	0.35743
Dmajority	-1.035e-02	1.541e-02	-0.672	0.50187
pro_env_dummy	8.448e-02	1.615e-02	5.232	1.87e-07 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.2643 on 1839 degrees of freedom  
(413 observations deleted due to missingness)

Multiple R-squared: 0.1027, Adjusted R-squared: 0.07298

F-statistic: 3.452 on 61 and 1839 DF, p-value: < 2.2e-16

### checking differences in party

```
df_long_D <- df_long %>%
  filter(party == "D") %>%
  select(-c(state, party, BioID, Vote_change))
```

```
full_ols_D <- lm(Vote ~ ., data = df_long_D)
summary(full_ols_D)
```

Call:

```
lm(formula = Vote ~ ., data = df_long_D)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-0.89386	-0.02095	0.00584	0.03769	0.22466

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	2.405e-01	8.120e-01	0.296	0.76716
district	-1.681e-03	3.550e-04	-4.736	2.55e-06 ***
birthday	3.645e-04	4.135e-04	0.882	0.37824
genderM	-6.949e-03	7.936e-03	-0.876	0.38144
nominate_dim1	2.450e-01	3.561e-02	6.881	1.14e-11 ***
nominate_dim2	-1.905e-01	2.166e-02	-8.796	< 2e-16 ***
GeographicalNE	5.931e-03	1.060e-02	0.559	0.57603
GeographicalSO	-9.807e-03	1.092e-02	-0.898	0.36939
GeographicalWE	2.952e-02	1.158e-02	2.548	0.01100 *
Instance	2.535e-04	1.876e-04	1.352	0.17687
seniority	-2.062e-03	1.034e-03	-1.994	0.04650 *
Contribution_minus	-7.981e-07	2.657e-07	-3.004	0.00274 **
Contribution_plus	4.249e-06	1.947e-06	2.182	0.02936 *
Dmajority	3.633e-02	8.869e-03	4.096	4.59e-05 ***
anti_env_dummy	-6.912e-03	1.145e-02	-0.604	0.54615
pro_env_dummy	-5.442e-03	9.344e-03	-0.582	0.56048

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.106 on 870 degrees of freedom

(250 observations deleted due to missingness)

Multiple R-squared: 0.1741, Adjusted R-squared: 0.1599

F-statistic: 12.23 on 15 and 870 DF, p-value: < 2.2e-16

```
df_long_R <- df_long %>%
  filter(party == "R") %>%
  select(-c(state, party, BioID, Vote_change))
```

```
full_ols_R <- lm(Vote ~ ., data = df_long_R)
summary(full_ols_R)
```

Call:

```
lm(formula = Vote ~ ., data = df_long_R)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-0.38817	-0.05319	-0.01624	0.01787	0.97551

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	-3.073e+00	1.228e+00	-2.502	0.012493	*
district	2.411e-03	6.669e-04	3.615	0.000315	***
birthday	1.625e-03	6.244e-04	2.603	0.009377	**
genderM	-2.610e-02	1.989e-02	-1.312	0.189714	
nominate_dim1	-2.366e-01	4.606e-02	-5.137	3.35e-07	***
nominate_dim2	3.748e-02	3.445e-02	1.088	0.276918	
GeographicalNE	1.663e-01	2.198e-02	7.568	8.60e-14	***
GeographicalSO	3.280e-02	1.387e-02	2.365	0.018238	*
GeographicalWE	1.681e-02	1.813e-02	0.927	0.354258	
Instance	6.549e-04	2.738e-04	2.392	0.016935	*
seniority	2.712e-03	1.773e-03	1.529	0.126486	
Contribution_minus	-5.609e-07	1.881e-07	-2.982	0.002931	**
Contribution_plus	9.480e-06	1.870e-06	5.069	4.76e-07	***
Dmajority	2.589e-02	1.390e-02	1.863	0.062697	.
anti_env_dummy	-2.739e-02	2.623e-02	-1.044	0.296549	
pro_env_dummy	-9.943e-03	1.463e-02	-0.680	0.496788	

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1713 on 999 degrees of freedom

(163 observations deleted due to missingness)

Multiple R-squared: 0.178, Adjusted R-squared: 0.1657

F-statistic: 14.43 on 15 and 999 DF, p-value: < 2.2e-16

Not much difference in the coefficients between the two parties. Why NA in anti\_env\_dummy ? because all received contributions? lets see...



```
table(df_long_R$anti_env_dummy)
```

```

0      1
68 1110

```

Since only 96 instances of non-anti environmental contributions exist, this means that only  $96/6 = 16$  representatives never received contributions from anti environmental groups. hence why there are probably NAs for this variable.

### with party & year fixed effects

```
ols_party <- lm(Vote ~ district + birthday + nominate_dim1 + nominate_dim2 + Geographical + 
summary(ols_party)
```

Call:

```
lm(formula = Vote ~ district + birthday + nominate_dim1 + nominate_dim2 + 
    Geographical + as.factor(party) + as.factor(Instance) + seniority + 
    Contribution_minus + Contribution_plus + gender + pro_env_dummy + 
    anti_env_dummy, data = df_long)
```

Residuals:

```

      Min       1Q   Median       3Q      Max 
-0.98664 -0.04059 -0.01140  0.02301  1.00436

```

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-4.263e-01	7.842e-01	-0.544	0.58680
district	7.851e-04	3.719e-04	2.111	0.03489 *
birthday	7.414e-04	3.994e-04	1.856	0.06355 .
nominate_dim1	-1.412e-01	2.852e-02	-4.950	8.10e-07 ***
nominate_dim2	-6.979e-02	2.135e-02	-3.269	0.00110 **
GeographicalNE	7.292e-02	1.123e-02	6.490	1.09e-10 ***
GeographicalSO	8.676e-03	9.407e-03	0.922	0.35645
GeographicalWE	1.943e-02	1.124e-02	1.729	0.08400 .
as.factor(party)R	-9.011e-01	8.864e-03	-101.662	< 2e-16 ***
as.factor(Instance)4	1.007e-02	1.206e-02	0.835	0.40400
as.factor(Instance)6	3.505e-02	1.237e-02	2.833	0.00465 **

```

as.factor(Instance)7    2.546e-02  1.309e-02    1.945  0.05196 .
as.factor(Instance)51  2.387e-02  1.223e-02    1.952  0.05107 .
as.factor(Instance)52  3.305e-02  1.232e-02    2.683  0.00737 **
seniority               1.643e-03  1.042e-03    1.578  0.11484
Contribution_minus     -6.107e-07  1.479e-07   -4.130  3.79e-05 ***
Contribution_plus       7.200e-06  1.402e-06    5.137  3.08e-07 ***
genderM                -2.513e-02  9.246e-03   -2.718  0.00663 **
pro_env_dummy          -6.747e-03  9.173e-03   -0.736  0.46206
anti_env_dummy         -2.101e-02  1.318e-02   -1.594  0.11119

```

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1516 on 1881 degrees of freedom

(413 observations deleted due to missingness)

Multiple R-squared: 0.9088, Adjusted R-squared: 0.9079

F-statistic: 986.8 on 19 and 1881 DF, p-value: < 2.2e-16

## with state & year fixed effects

### once with geographical

```

ols_geo <- lm(Vote ~ district + party + birthday + nominate_dim1 + nominate_dim2 + as.factor(
summary(ols_geo)

```

Call:

```

lm(formula = Vote ~ district + party + birthday + nominate_dim1 +
    nominate_dim2 + as.factor(Geographical) + as.factor(Instance) +
    seniority + Contribution_minus + Contribution_plus + gender +
    pro_env_dummy + anti_env_dummy, data = df_long)

```

Residuals:

Min	1Q	Median	3Q	Max
-0.98664	-0.04059	-0.01140	0.02301	1.00436

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-4.263e-01	7.842e-01	-0.544	0.58680
district	7.851e-04	3.719e-04	2.111	0.03489 *
partyR	-9.011e-01	8.864e-03	-101.662	< 2e-16 ***

birthday	7.414e-04	3.994e-04	1.856	0.06355	.
nominate_dim1	-1.412e-01	2.852e-02	-4.950	8.10e-07	***
nominate_dim2	-6.979e-02	2.135e-02	-3.269	0.00110	**
as.factor(Geographical)NE	7.292e-02	1.123e-02	6.490	1.09e-10	***
as.factor(Geographical)SO	8.676e-03	9.407e-03	0.922	0.35645	
as.factor(Geographical)WE	1.943e-02	1.124e-02	1.729	0.08400	.
as.factor(Instance)4	1.007e-02	1.206e-02	0.835	0.40400	
as.factor(Instance)6	3.505e-02	1.237e-02	2.833	0.00465	**
as.factor(Instance)7	2.546e-02	1.309e-02	1.945	0.05196	.
as.factor(Instance)51	2.387e-02	1.223e-02	1.952	0.05107	.
as.factor(Instance)52	3.305e-02	1.232e-02	2.683	0.00737	**
seniority	1.643e-03	1.042e-03	1.578	0.11484	
Contribution_minus	-6.107e-07	1.479e-07	-4.130	3.79e-05	***
Contribution_plus	7.200e-06	1.402e-06	5.137	3.08e-07	***
genderM	-2.513e-02	9.246e-03	-2.718	0.00663	**
pro_env_dummy	-6.747e-03	9.173e-03	-0.736	0.46206	
anti_env_dummy	-2.101e-02	1.318e-02	-1.594	0.11119	

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1516 on 1881 degrees of freedom

(413 observations deleted due to missingness)

Multiple R-squared: 0.9088, Adjusted R-squared: 0.9079

F-statistic: 986.8 on 19 and 1881 DF, p-value: < 2.2e-16

# same thing with log

```
ols_geo_log <- lm(Vote ~ district + party + birthday + nominate_dim1 + nominate_dim2 + as.factor(Geographical) + as.factor(Instance) + seniority + Contribution_minus_log + Contribution_plus_log + gender + pro_env_dummy + anti_env_dummy, data = df_long_log)
summary(ols_geo_log)
```

Call:

```
lm(formula = Vote ~ district + party + birthday + nominate_dim1 +
    nominate_dim2 + as.factor(Geographical) + as.factor(Instance) +
    seniority + Contribution_minus_log + Contribution_plus_log +
    gender + pro_env_dummy + anti_env_dummy, data = df_long_log)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.96550	-0.04226	-0.01131	0.02241	1.00041

Coefficients:

Estimate	Std. Error	t value	Pr(> t )
----------	------------	---------	----------

```

(Intercept)          -0.4591089  0.7869615  -0.583  0.559698
district              0.0008103  0.0003743   2.165  0.030541 *
partyR                -0.8996493  0.0092617 -97.137  < 2e-16 ***
birthday              0.0007581  0.0004008   1.892  0.058707 .
nominate_dim1         -0.1389326  0.0287939  -4.825  1.51e-06 ***
nominate_dim2         -0.0726271  0.0214780  -3.381  0.000736 ***
as.factor(Geographical)NE 0.0704985  0.0113434   6.215  6.31e-10 ***
as.factor(Geographical)SO 0.0056663  0.0094350   0.601  0.548207
as.factor(Geographical)WE 0.0177440  0.0113159   1.568  0.117036
as.factor(Instance)4    0.0111050  0.0121206   0.916  0.359673
as.factor(Instance)6    0.0350433  0.0124298   2.819  0.004863 **
as.factor(Instance)7    0.0253127  0.0131640   1.923  0.054646 .
as.factor(Instance)51   0.0263085  0.0122730   2.144  0.032192 *
as.factor(Instance)52   0.0364922  0.0123535   2.954  0.003176 **
seniority              0.0014049  0.0010425   1.348  0.177926
Contribution_minus_log -0.0119403  0.0034188  -3.492  0.000490 ***
Contribution_plus_log   0.0132229  0.0047233   2.799  0.005171 **
genderM                -0.0226172  0.0093202  -2.427  0.015331 *
pro_env_dummy           -0.0826574  0.0350031  -2.361  0.018306 *
anti_env_dummy           0.0760222  0.0326888   2.326  0.020144 *
---

```

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1524 on 1881 degrees of freedom

(413 observations deleted due to missingness)

Multiple R-squared: 0.9079, Adjusted R-squared: 0.907

F-statistic: 976.3 on 19 and 1881 DF, p-value: < 2.2e-16

Explain the following in the paper:

- why bill fixed effects (environmental occurrences/perception may influence voting)
- why state fixed effects (D-CA != D-TX or so. avg. rep from states different)

for `ols_geo_1` since I am being stricter than in the model before, since I am using fixed effects for the geographical region and the (year). This means that the model is more robust, but also more specific.

**once with state**

```

ols_state_fe <- lm(Vote ~ party + birthday + nominate_dim1 + nominate_dim2 + as.factor(state)
summary(ols_state_fe)

```

Call:

```
lm(formula = Vote ~ party + birthday + nominate_dim1 + nominate_dim2 +  
    as.factor(state) + as.factor(Instance) + seniority + Contribution_minus +  
    Contribution_plus + gender + pro_env_dummy + anti_env_dummy,  
    data = df_long)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.98076	-0.04303	-0.00641	0.02722	0.93072

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-1.288e+00	7.668e-01	-1.680	0.093152 .
partyR	-8.947e-01	9.179e-03	-97.476	< 2e-16 ***
birthday	1.157e-03	3.915e-04	2.955	0.003165 **
nominate_dim1	-1.437e-01	2.930e-02	-4.904	1.01e-06 ***
nominate_dim2	-5.672e-02	2.137e-02	-2.654	0.008013 **
as.factor(state)AL	4.188e-02	6.914e-02	0.606	0.544709
as.factor(state)AR	3.049e-02	7.231e-02	0.422	0.673306
as.factor(state)AZ	7.449e-02	7.018e-02	1.061	0.288595
as.factor(state)CA	8.262e-02	6.501e-02	1.271	0.203947
as.factor(state)CO	8.175e-02	6.890e-02	1.186	0.235584
as.factor(state)CT	8.710e-02	7.054e-02	1.235	0.217075
as.factor(state)DE	8.102e-02	9.042e-02	0.896	0.370333
as.factor(state)FL	1.311e-01	6.564e-02	1.997	0.046000 *
as.factor(state)GA	4.124e-02	6.694e-02	0.616	0.537915
as.factor(state)HI	5.695e-02	8.285e-02	0.687	0.491915
as.factor(state)IA	3.441e-03	7.435e-02	0.046	0.963089
as.factor(state>ID	4.323e-02	8.066e-02	0.536	0.592054
as.factor(state)IL	7.013e-02	6.610e-02	1.061	0.288795
as.factor(state)IN	2.196e-02	6.801e-02	0.323	0.746752
as.factor(state)KS	1.766e-02	7.450e-02	0.237	0.812685
as.factor(state)KY	4.369e-02	6.937e-02	0.630	0.528832
as.factor(state)LA	5.868e-02	7.109e-02	0.825	0.409242
as.factor(state)MA	9.440e-02	6.819e-02	1.384	0.166413
as.factor(state)MD	1.031e-01	6.873e-02	1.501	0.133599
as.factor(state)ME	6.580e-02	7.951e-02	0.828	0.408007
as.factor(state)MI	1.000e-01	6.666e-02	1.500	0.133723
as.factor(state)MN	-2.670e-03	6.878e-02	-0.039	0.969037
as.factor(state)MO	2.866e-02	6.854e-02	0.418	0.675819
as.factor(state)MS	7.021e-02	7.288e-02	0.963	0.335446
as.factor(state)MT	7.421e-03	1.099e-01	0.068	0.946167

as.factor(state)NC	5.635e-02	6.764e-02	0.833	0.404894
as.factor(state)ND	7.392e-03	1.267e-01	0.058	0.953499
as.factor(state)NE	-1.931e-02	7.458e-02	-0.259	0.795769
as.factor(state)NH	5.945e-02	8.110e-02	0.733	0.463577
as.factor(state)NJ	1.470e-01	6.685e-02	2.199	0.027964 *
as.factor(state)NM	5.074e-02	8.682e-02	0.584	0.558965
as.factor(state)NV	5.768e-02	7.267e-02	0.794	0.427438
as.factor(state)NY	1.559e-01	6.543e-02	2.383	0.017253 *
as.factor(state)OH	4.687e-02	6.607e-02	0.709	0.478158
as.factor(state)OK	2.753e-02	7.404e-02	0.372	0.710113
as.factor(state)OR	9.039e-02	7.011e-02	1.289	0.197462
as.factor(state)PA	1.152e-01	6.606e-02	1.744	0.081288 .
as.factor(state)RI	1.000e-01	7.848e-02	1.274	0.202729
as.factor(state)SC	1.169e-01	6.915e-02	1.690	0.091091 .
as.factor(state)SD	-1.753e-02	9.455e-02	-0.185	0.852946
as.factor(state)TN	4.596e-02	6.804e-02	0.676	0.499384
as.factor(state)TX	2.807e-02	6.532e-02	0.430	0.667423
as.factor(state)UT	2.848e-02	7.381e-02	0.386	0.699616
as.factor(state)VA	5.810e-02	6.762e-02	0.859	0.390314
as.factor(state)WA	7.401e-02	6.759e-02	1.095	0.273649
as.factor(state)WI	6.681e-02	6.958e-02	0.960	0.337058
as.factor(state)WV	2.044e-02	7.475e-02	0.273	0.784540
as.factor(state)WY	3.338e-02	1.021e-01	0.327	0.743763
as.factor(Instance)4	1.212e-02	1.149e-02	1.055	0.291509
as.factor(Instance)6	3.526e-02	1.175e-02	3.001	0.002718 **
as.factor(Instance)7	2.842e-02	1.233e-02	2.306	0.021222 *
as.factor(Instance)51	2.468e-02	1.160e-02	2.127	0.033515 *
as.factor(Instance)52	3.328e-02	1.169e-02	2.847	0.004453 **
seniority	1.822e-03	1.033e-03	1.763	0.078062 .
Contribution_minus	-4.776e-07	1.351e-07	-3.536	0.000415 ***
Contribution_plus	6.984e-06	1.417e-06	4.930	8.87e-07 ***
genderM	-2.857e-02	9.030e-03	-3.164	0.001578 **
pro_env_dummy	-4.585e-04	8.815e-03	-0.052	0.958518
anti_env_dummy	-2.567e-02	1.292e-02	-1.987	0.047065 *

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1538 on 2153 degrees of freedom

(97 observations deleted due to missingness)

Multiple R-squared: 0.9081, Adjusted R-squared: 0.9054

F-statistic: 337.6 on 63 and 2153 DF, p-value: < 2.2e-16

```
# same thing again with plm
ols_state_fe_plm <- plm(Vote ~ party + birthday + nominate_dim1 + nominate_dim2 + seniority
```

Warning in pdata.frame(data, index): duplicate couples (id-time) in resulting pdata.frame  
to find out which, use, e.g., table(index(your\_pdataframe), useNA = "ifany")

```
summary(ols_state_fe_plm)
```

Oneway (individual) effect Within Model

Call:

```
plm(formula = Vote ~ party + birthday + nominate_dim1 + nominate_dim2 +
     seniority + Contribution_minus + Contribution_plus + gender +
     pro_env_dummy + anti_env_dummy, data = df_long, model = "within",
     index = c("state", "Instance"))
```

Unbalanced Panel: n = 49, T = 2-283, N = 2217

Residuals:

Min.	1st Qu.	Median	3rd Qu.	Max.
-0.9675578	-0.0435903	-0.0052962	0.0257190	0.9332252

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t )
partyR	-8.9567e-01	9.1785e-03	-97.5835	< 2.2e-16 ***
birthday	1.4407e-03	3.7839e-04	3.8074	0.0001444 ***
nominate_dim1	-1.4360e-01	2.9345e-02	-4.8935	1.064e-06 ***
nominate_dim2	-5.5328e-02	2.1378e-02	-2.5881	0.0097156 **
seniority	2.3691e-03	1.0148e-03	2.3345	0.0196632 *
Contribution_minus	-4.8760e-07	1.3502e-07	-3.6114	0.0003115 ***
Contribution_plus	7.1870e-06	1.4107e-06	5.0945	3.800e-07 ***
genderM	-2.9704e-02	9.0355e-03	-3.2875	0.0010271 **
pro_env_dummy	-1.6461e-03	8.6430e-03	-0.1905	0.8489679
anti_env_dummy	-2.6618e-02	1.2928e-02	-2.0590	0.0396185 *

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 394.57

Residual Sum of Squares: 51.254

R-Squared: 0.8701

Adj. R-Squared: 0.86661

F-statistic: 1445.5 on 10 and 2158 DF, p-value: < 2.22e-16

```
# same thing again with log
ols_state_fe_log <- lm(Vote ~ party + birthday + nominate_dim1 + nominate_dim2 + as.factor(s
summary(ols_state_fe_log)
```

Call:

```
lm(formula = Vote ~ party + birthday + nominate_dim1 + nominate_dim2 +
    as.factor(state) + as.factor(Instance) + seniority + Contribution_minus_log +
    Contribution_plus_log + gender + pro_env_dummy + anti_env_dummy,
    data = df_long_log)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.96950	-0.04431	-0.00684	0.02780	0.92596

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-1.4131558	0.7687040	-1.838	0.06615 .
partyR	-0.8934106	0.0094783	-94.258	< 2e-16 ***
birthday	0.0012239	0.0003926	3.118	0.00185 **
nominate_dim1	-0.1458261	0.0297420	-4.903	1.01e-06 ***
nominate_dim2	-0.0608293	0.0214780	-2.832	0.00467 **
as.factor(state)AL	0.0419216	0.0694180	0.604	0.54597
as.factor(state)AR	0.0282338	0.0726003	0.389	0.69739
as.factor(state)AZ	0.0728869	0.0704719	1.034	0.30113
as.factor(state)CA	0.0764943	0.0652153	1.173	0.24095
as.factor(state)CO	0.0835448	0.0691082	1.209	0.22683
as.factor(state)CT	0.0784138	0.0708326	1.107	0.26840
as.factor(state)DE	0.0773796	0.0907723	0.852	0.39405
as.factor(state)FL	0.1250684	0.0659216	1.897	0.05793 .
as.factor(state)GA	0.0365091	0.0671892	0.543	0.58693
as.factor(state)HI	0.0433561	0.0832550	0.521	0.60259
as.factor(state)IA	0.0256047	0.0744066	0.344	0.73079
as.factor(state>ID	0.0366105	0.0809088	0.452	0.65096
as.factor(state)IL	0.0659180	0.0663566	0.993	0.32063
as.factor(state)IN	0.0210719	0.0682979	0.309	0.75771
as.factor(state)KS	0.0182655	0.0747227	0.244	0.80691
as.factor(state)KY	0.0368347	0.0696307	0.529	0.59686
as.factor(state)LA	0.0477975	0.0711664	0.672	0.50189
as.factor(state)MA	0.0870165	0.0684438	1.271	0.20374



as.factor(state)MD	0.0933834	0.0689310	1.355	0.17564
as.factor(state)ME	0.0640444	0.0799157	0.801	0.42299
as.factor(state)MI	0.0971507	0.0668916	1.452	0.14655
as.factor(state)MN	-0.0054061	0.0690344	-0.078	0.93759
as.factor(state)MO	0.0243813	0.0688178	0.354	0.72316
as.factor(state)MS	0.0698431	0.0731654	0.955	0.33989
as.factor(state)MT	-0.0013241	0.1102809	-0.012	0.99042
as.factor(state)NC	0.0528712	0.0678787	0.779	0.43612
as.factor(state)ND	0.0054669	0.1272275	0.043	0.96573
as.factor(state)NE	-0.0202777	0.0749573	-0.271	0.78678
as.factor(state)NH	0.0494536	0.0814894	0.607	0.54400
as.factor(state)NJ	0.1478090	0.0670874	2.203	0.02768 *
as.factor(state)NM	0.0412632	0.0871305	0.474	0.63585
as.factor(state)NV	0.0516852	0.0728998	0.709	0.47841
as.factor(state)NY	0.1507442	0.0656891	2.295	0.02184 *
as.factor(state)OH	0.0429944	0.0662783	0.649	0.51661
as.factor(state)OK	0.0243711	0.0743343	0.328	0.74305
as.factor(state)OR	0.0821647	0.0703099	1.169	0.24269
as.factor(state)PA	0.1090435	0.0663100	1.644	0.10023
as.factor(state)RI	0.0799745	0.0790184	1.012	0.31160
as.factor(state)SC	0.1136158	0.0694321	1.636	0.10191
as.factor(state)SD	-0.0225157	0.0949221	-0.237	0.81252
as.factor(state)TN	0.0389729	0.0683393	0.570	0.56854
as.factor(state)TX	0.0242671	0.0654871	0.371	0.71100
as.factor(state)UT	0.0270868	0.0740842	0.366	0.71468
as.factor(state)VA	0.0530005	0.0678840	0.781	0.43503
as.factor(state)WA	0.0672618	0.0678498	0.991	0.32163
as.factor(state)WI	0.0630914	0.0698421	0.903	0.36644
as.factor(state)WV	0.0136554	0.0750156	0.182	0.85557
as.factor(state)WY	0.0275054	0.1024208	0.269	0.78830
as.factor(Instance)4	0.0128152	0.0115329	1.111	0.26661
as.factor(Instance)6	0.0346753	0.0117927	2.940	0.00331 **
as.factor(Instance)7	0.0271531	0.0124003	2.190	0.02865 *
as.factor(Instance)51	0.0266620	0.0116362	2.291	0.02204 *
as.factor(Instance)52	0.0364435	0.0117058	3.113	0.00187 **
seniority	0.0016735	0.0010332	1.620	0.10545
Contribution_minus_log	-0.0105324	0.0034430	-3.059	0.00225 **
Contribution_plus_log	0.0124879	0.0046028	2.713	0.00672 **
genderM	-0.0271517	0.0090819	-2.990	0.00282 **
pro_env_dummy	-0.0718579	0.0340709	-2.109	0.03505 *
anti_env_dummy	0.0602036	0.0326595	1.843	0.06541 .
---				

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1544 on 2153 degrees of freedom  
(97 observations deleted due to missingness)  
Multiple R-squared: 0.9074, Adjusted R-squared: 0.9047  
F-statistic: 334.8 on 63 and 2153 DF, p-value: < 2.2e-16

using state instead of geographical region means that we can more accurately determine the differences in voting behavior between representatives from different states, not just regions. this makes sense, when we look at the states which are significant in the model, i.e. NY, SC, NJ, NH, FL, CT, AZ, they are not all from the same region, manye from the north east and the south and west, but no real patterns...

```
kable(head(state_makeup), format = "html")
```

State	Number
Alabama	7
Alaska	1
Arizona	9
Arkansas	4
California	52
Colorado	8

```
# mean(state_makeup$Number)  
# boxplot(state_makeup$Number)
```

Discuss... maybe makeup of states also important for the coefficient. If you have only

The average amount of representatives for each state is 8.7 , with the highest number of representatives from California (52) and the lowest from Wyoming, Vermont, Alaska, etc. (1).

here, the model is getting stricter than before, since I am not only fixing for state and year (instance) but also for party, also i cannot include the dummy variables for anti and pro environmental contributions

### with individual & year fixed effects

```
ols_ind_fe <- lm(Vote ~ nominate_dim1 + nominate_dim2 + as.factor(Instance) + as.factor(BioI  
summary(ols_ind_fe)
```

Call:

```
lm(formula = Vote ~ nominate_dim1 + nominate_dim2 + as.factor(Instance) +  
    as.factor(BioID) + seniority + Contribution_minus + Contribution_plus,  
    data = df_long)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.82265	-0.01015	-0.00226	0.01038	0.82707

Coefficients: (2 not defined because of singularities)

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	8.719e-01	1.311e+00	0.665	0.506071
nominate_dim1	-2.131e+00	2.957e+00	-0.721	0.471276
nominate_dim2	-3.873e-01	1.117e+00	-0.347	0.728785
as.factor(Instance)4	-5.540e-03	4.479e-02	-0.124	0.901582
as.factor(Instance)6	-1.454e-02	1.328e-01	-0.109	0.912847
as.factor(Instance)7	-3.294e-02	1.769e-01	-0.186	0.852292
as.factor(Instance)51	-8.354e-03	8.869e-02	-0.094	0.924968
as.factor(Instance)52	-8.445e-04	8.873e-02	-0.010	0.992407
as.factor(BioID)A000367	7.613e-01	1.287e+00	0.592	0.554205
as.factor(BioID)A000369	-2.420e-02	8.095e-02	-0.299	0.765037
as.factor(BioID)A000370	1.088e+00	1.197e-01	9.090	< 2e-16 ***
as.factor(BioID)A000371	8.186e-01	2.781e-01	2.943	0.003292 **
as.factor(BioID)A000372	6.875e-01	1.003e+00	0.685	0.493277
as.factor(BioID)A000374	3.555e-01	5.318e-01	0.668	0.503955
as.factor(BioID)A000375	4.779e-01	6.300e-01	0.759	0.448211
as.factor(BioID)A000376	1.322e+00	8.113e-01	1.630	0.103298
as.factor(BioID)A000377	1.322e-01	2.046e-01	0.646	0.518307
as.factor(BioID)A000378	8.595e-01	3.663e-01	2.346	0.019085 *
as.factor(BioID)B000213	4.482e-02	4.824e-01	0.093	0.925991
as.factor(BioID)B000287	1.135e+00	2.288e-01	4.960	7.77e-07 ***
as.factor(BioID)B000490	3.702e-01	4.451e-01	0.832	0.405708
as.factor(BioID)B000574	1.073e+00	2.134e-01	5.027	5.52e-07 ***
as.factor(BioID)B000755	1.638e-01	2.237e-01	0.732	0.464255
as.factor(BioID)B000911	9.293e-01	3.672e-01	2.531	0.011460 *
as.factor(BioID)B001227	1.077e+00	1.870e-01	5.758	1.01e-08 ***
as.factor(BioID)B001248	2.857e-01	3.538e-01	0.807	0.419552
as.factor(BioID)B001250	1.999e-01	2.492e-01	0.802	0.422573
as.factor(BioID)B001251	9.349e-01	1.984e-01	4.712	2.66e-06 ***
as.factor(BioID)B001255	1.725e-02	9.591e-02	0.180	0.857312
as.factor(BioID)B001257	-6.867e-02	2.605e-01	-0.264	0.792113
as.factor(BioID)B001260	-1.540e-01	3.161e-01	-0.487	0.626244

as.factor(BioID)B001269	-1.678e-01	2.613e-01	-0.642	0.520758	
as.factor(BioID)B001270	1.355e+00	4.452e-01	3.044	0.002370	**
as.factor(BioID)B001271	2.002e-01	2.257e-01	0.887	0.375217	
as.factor(BioID)B001273	4.149e-01	5.392e-01	0.770	0.441698	
as.factor(BioID)B001274	6.221e-01	9.341e-01	0.666	0.505460	
as.factor(BioID)B001275	3.440e-02	1.650e-01	0.209	0.834857	
as.factor(BioID)B001278	1.074e+00	2.270e-01	4.729	2.45e-06	***
as.factor(BioID)B001281	1.043e+00	8.982e-02	11.616	< 2e-16	***
as.factor(BioID)B001282	2.439e-01	3.677e-01	0.663	0.507275	
as.factor(BioID)B001283	6.375e-01	8.376e-01	0.761	0.446657	
as.factor(BioID)B001284	-8.780e-02	1.369e-01	-0.641	0.521345	
as.factor(BioID)B001285	7.332e-01	4.363e-01	1.680	0.093066	.
as.factor(BioID)B001286	6.132e-01	5.941e-01	1.032	0.302164	
as.factor(BioID)B001287	5.997e-01	6.272e-01	0.956	0.339183	
as.factor(BioID)B001289	4.760e-01	6.878e-01	0.692	0.488964	
as.factor(BioID)B001290	9.766e-01	1.402e+00	0.697	0.486088	
as.factor(BioID)B001291	6.467e-01	8.609e-01	0.751	0.452592	
as.factor(BioID)B001292	9.506e-01	1.074e-01	8.854	< 2e-16	***
as.factor(BioID)B001293	9.762e-02	1.306e-01	0.747	0.454885	
as.factor(BioID)B001294	3.979e-01	7.320e-01	0.544	0.586838	
as.factor(BioID)B001295	-7.761e-02	1.662e-01	-0.467	0.640633	
as.factor(BioID)B001296	9.878e-01	7.442e-02	13.273	< 2e-16	***
as.factor(BioID)B001297	6.566e-01	1.036e+00	0.634	0.526328	
as.factor(BioID)B001298	-2.137e-01	2.870e-01	-0.745	0.456654	
as.factor(BioID)B001299	5.247e-01	7.037e-01	0.746	0.455966	
as.factor(BioID)B001300	1.232e+00	3.219e-01	3.827	0.000135	***
as.factor(BioID)B001301	7.741e-02	1.093e-01	0.708	0.478809	
as.factor(BioID)B001302	1.096e+00	1.700e+00	0.645	0.519207	
as.factor(BioID)B001303	9.115e-01	1.495e-01	6.096	1.35e-09	***
as.factor(BioID)B001304	8.628e-01	2.151e-01	4.011	6.31e-05	***
as.factor(BioID)B001306	1.690e-01	2.924e-01	0.578	0.563454	
as.factor(BioID)B001307	3.194e-01	7.486e-01	0.427	0.669619	
as.factor(BioID)B001309	6.926e-01	1.090e+00	0.635	0.525381	
as.factor(BioID)C000059	-2.489e-01	4.859e-01	-0.512	0.608526	
as.factor(BioID)C000266	1.609e-01	2.671e-01	0.602	0.546992	
as.factor(BioID)C000537	1.018e+00	2.385e-01	4.268	2.08e-05	***
as.factor(BioID)C000714	1.478e+00	6.385e-01	2.315	0.020723	*
as.factor(BioID)C000754	2.983e-01	1.178e+00	0.253	0.800092	
as.factor(BioID)C000984	9.303e-01	3.409e-01	2.729	0.006414	**
as.factor(BioID)C001036	8.866e-01	3.224e-01	2.750	0.006017	**
as.factor(BioID)C001037	1.234e+00	3.282e-01	3.761	0.000175	***
as.factor(BioID)C001038	8.764e-01	3.928e-01	2.231	0.025813	*
as.factor(BioID)C001045	-1.558e-01	2.771e-01	-0.562	0.573994	

as.factor(BioID)C001048	2.141e-01	2.752e-01	0.778	0.436807	
as.factor(BioID)C001051	2.591e-01	4.503e-01	0.575	0.565127	
as.factor(BioID)C001053	-1.466e-01	2.099e-01	-0.698	0.484973	
as.factor(BioID)C001055	5.298e-01	6.905e-01	0.767	0.442984	
as.factor(BioID)C001059	2.236e-01	5.076e-01	0.440	0.659640	
as.factor(BioID)C001061	9.836e-01	2.488e-01	3.954	8.01e-05	***
as.factor(BioID)C001063	9.104e-02	3.411e-01	0.267	0.789600	
as.factor(BioID)C001066	9.899e-01	1.818e-01	5.444	5.97e-08	***
as.factor(BioID)C001067	1.431e+00	5.774e-01	2.479	0.013282	*
as.factor(BioID)C001068	9.979e-01	6.732e-02	14.824	< 2e-16	***
as.factor(BioID)C001069	7.738e-01	4.448e-01	1.739	0.082147	.
as.factor(BioID)C001072	9.694e-01	2.146e-01	4.517	6.72e-06	***
as.factor(BioID)C001076	5.610e-01	7.541e-01	0.744	0.457020	
as.factor(BioID)C001077	4.009e-01	2.396e-01	1.673	0.094546	.
as.factor(BioID)C001078	7.230e-01	4.880e-01	1.481	0.138691	
as.factor(BioID)C001080	1.242e+00	3.885e-01	3.197	0.001415	**
as.factor(BioID)C001083	6.894e-01	5.014e-01	1.375	0.169352	
as.factor(BioID)C001084	9.962e-01	7.725e-02	12.896	< 2e-16	***
as.factor(BioID)C001087	1.692e-01	2.789e-01	0.607	0.544104	
as.factor(BioID)C001090	8.328e-01	3.251e-01	2.562	0.010506	*
as.factor(BioID)C001091	9.797e-01	1.153e-01	8.498	< 2e-16	***
as.factor(BioID)C001092	-5.578e-02	1.187e-01	-0.470	0.638551	
as.factor(BioID)C001093	4.446e-01	5.825e-01	0.763	0.445383	
as.factor(BioID)C001094	-4.001e-02	9.621e-02	-0.416	0.677522	
as.factor(BioID)C001097	9.352e-01	2.056e-01	4.549	5.77e-06	***
as.factor(BioID)C001101	1.233e+00	3.845e-01	3.206	0.001370	**
as.factor(BioID)C001103	4.257e-01	6.520e-01	0.653	0.513888	
as.factor(BioID)C001105	-1.460e-01	2.606e-01	-0.560	0.575356	
as.factor(BioID)C001106	2.487e-01	6.243e-01	0.398	0.690415	
as.factor(BioID)C001107	6.283e-01	5.329e-01	1.179	0.238592	
as.factor(BioID)C001108	3.717e-01	4.907e-01	0.757	0.448877	
as.factor(BioID)C001109	3.068e-01	8.322e-01	0.369	0.712428	
as.factor(BioID)C001110	8.249e-01	2.542e-01	3.245	0.001199	**
as.factor(BioID)C001111	6.277e-01	5.398e-01	1.163	0.245025	
as.factor(BioID)C001112	8.138e-01	2.807e-01	2.900	0.003784	**
as.factor(BioID)C001114	1.272e-01	2.118e-01	0.600	0.548347	
as.factor(BioID)C001117	1.700e+00	1.173e+00	1.450	0.147377	
as.factor(BioID)C001118	7.408e-01	1.075e+00	0.689	0.490889	
as.factor(BioID)C001119	9.525e-01	4.589e-01	2.076	0.038083	*
as.factor(BioID)C001120	1.705e-01	3.315e-01	0.514	0.607062	
as.factor(BioID)C001121	8.885e-01	1.978e-01	4.493	7.51e-06	***
as.factor(BioID)D000096	1.085e+00	1.703e-01	6.373	2.39e-10	***
as.factor(BioID)D000191	7.777e-01	6.986e-01	1.113	0.265797	

as.factor(BioID)D000197	9.870e-01	1.502e-01	6.570	6.67e-11	***
as.factor(BioID)D000216	8.229e-01	5.138e-01	1.602	0.109430	
as.factor(BioID)D000399	9.146e-01	2.266e-01	4.036	5.69e-05	***
as.factor(BioID)D000482	6.789e-01	6.473e-01	1.049	0.294414	
as.factor(BioID)D000533	3.423e-01	4.608e-01	0.743	0.457670	
as.factor(BioID)D000598	7.580e-01	4.841e-01	1.566	0.117539	
as.factor(BioID)D000600	-3.345e-01	5.667e-01	-0.590	0.555155	
as.factor(BioID)D000604	-4.104e-01	6.996e-01	-0.587	0.557587	
as.factor(BioID)D000610	9.271e-01	1.925e-01	4.815	1.61e-06	***
as.factor(BioID)D000612	-1.840e-01	2.926e-01	-0.629	0.529413	
as.factor(BioID)D000614	2.085e-01	2.442e-01	0.854	0.393187	
as.factor(BioID)D000615	6.060e-01	7.892e-01	0.768	0.442632	
as.factor(BioID)D000616	3.292e-01	3.990e-01	0.825	0.409381	
as.factor(BioID)D000617	7.671e-01	3.495e-01	2.195	0.028324	*
as.factor(BioID)D000619	-2.580e-01	3.733e-01	-0.691	0.489573	
as.factor(BioID)D000620	6.975e-01	4.991e-01	1.398	0.162427	
as.factor(BioID)D000621	5.564e-01	7.148e-01	0.778	0.436453	
as.factor(BioID)D000623	1.357e+00	5.975e-01	2.270	0.023311	*
as.factor(BioID)D000624	1.024e+00	7.714e-02	13.277	< 2e-16	***
as.factor(BioID)D000625	-3.736e-01	5.592e-01	-0.668	0.504170	
as.factor(BioID)D000626	6.418e-01	9.693e-01	0.662	0.507972	
as.factor(BioID)D000627	8.015e-01	3.279e-01	2.445	0.014604	*
as.factor(BioID)D000628	3.289e-01	5.829e-01	0.564	0.572629	
as.factor(BioID)D000629	8.016e-01	2.885e-01	2.779	0.005514	**
as.factor(BioID)D000630	7.251e-01	3.700e-01	1.960	0.050210	.
as.factor(BioID)D000631	1.104e+00	1.543e-01	7.154	1.25e-12	***
as.factor(BioID)E000179	7.901e-01	5.958e-01	1.326	0.185036	
as.factor(BioID)E000215	8.663e-01	2.437e-01	3.554	0.000389	***
as.factor(BioID)E000288	1.411e+00	6.926e-01	2.037	0.041811	*
as.factor(BioID)E000290	1.364e+00	4.854e-01	2.809	0.005026	**
as.factor(BioID)E000291	8.557e-02	1.824e-01	0.469	0.638955	
as.factor(BioID)E000293	7.936e-01	3.510e-01	2.261	0.023898	*
as.factor(BioID)E000294	1.168e-01	1.672e-01	0.698	0.484990	
as.factor(BioID)E000296	1.150e+00	2.116e-01	5.434	6.33e-08	***
as.factor(BioID)E000297	1.436e+00	6.448e-01	2.228	0.026037	*
as.factor(BioID)E000298	4.970e-01	6.795e-01	0.731	0.464587	
as.factor(BioID)E000299	1.242e+00	4.701e-01	2.642	0.008318	**
as.factor(BioID)F000030	9.886e-01	2.867e-01	3.448	0.000578	***
as.factor(BioID)F000372	-3.319e-01	5.801e-01	-0.572	0.567219	
as.factor(BioID)F000448	6.514e-01	8.078e-01	0.806	0.420171	
as.factor(BioID)F000449	-3.093e-01	5.526e-01	-0.560	0.575795	
as.factor(BioID)F000450	4.186e-01	5.350e-01	0.782	0.434066	
as.factor(BioID)F000451	-4.286e-01	6.539e-01	-0.655	0.512265	

as.factor(BioID)F000454	6.277e-01	5.340e-01	1.175	0.239968	
as.factor(BioID)F000455	1.333e+00	4.124e-01	3.232	0.001252	**
as.factor(BioID)F000456	3.481e-01	3.911e-01	0.890	0.373537	
as.factor(BioID)F000458	2.807e-01	3.492e-01	0.804	0.421580	
as.factor(BioID)F000459	1.518e-01	3.104e-01	0.489	0.624869	
as.factor(BioID)F000460	2.601e-01	2.926e-01	0.889	0.374166	
as.factor(BioID)F000461	4.140e-01	5.811e-01	0.712	0.476303	
as.factor(BioID)F000462	9.547e-01	1.467e-01	6.506	1.02e-10	***
as.factor(BioID)F000464	5.837e-01	5.859e-01	0.996	0.319259	
as.factor(BioID)F000465	4.739e-01	6.952e-01	0.682	0.495532	
as.factor(BioID)F000466	4.614e-01	7.534e-01	0.612	0.540311	
as.factor(BioID)F000468	1.456e+00	1.072e+00	1.358	0.174580	
as.factor(BioID)G000289	-1.572e-02	4.422e-01	-0.036	0.971640	
as.factor(BioID)G000377	-9.012e-02	2.725e-01	-0.331	0.740941	
as.factor(BioID)G000410	5.453e-01	3.361e-01	1.622	0.104903	
as.factor(BioID)G000535	1.062e+00	2.194e-01	4.839	1.42e-06	***
as.factor(BioID)G000546	4.766e-04	1.815e-01	0.003	0.997905	
as.factor(BioID)G000548	5.651e-01	7.468e-01	0.757	0.449280	
as.factor(BioID)G000551	1.391e+00	5.079e-01	2.739	0.006224	**
as.factor(BioID)G000552	5.511e-01	7.901e-01	0.698	0.485555	
as.factor(BioID)G000553	1.076e+00	1.050e-01	10.248	< 2e-16	***
as.factor(BioID)G000556	1.038e+00	2.292e-01	4.531	6.30e-06	***
as.factor(BioID)G000558	7.308e-02	1.122e-01	0.651	0.515021	
as.factor(BioID)G000559	7.477e-01	4.238e-01	1.764	0.077846	.
as.factor(BioID)G000560	5.860e-01	7.291e-01	0.804	0.421731	
as.factor(BioID)G000563	2.146e-01	3.175e-01	0.676	0.499276	
as.factor(BioID)G000565	7.561e-01	1.152e+00	0.657	0.511552	
as.factor(BioID)G000566	4.747e-01	5.806e-01	0.818	0.413715	
as.factor(BioID)G000568	3.276e-01	5.016e-01	0.653	0.513779	
as.factor(BioID)G000571	7.766e-01	3.066e-01	2.533	0.011401	*
as.factor(BioID)G000574	1.009e+00	6.694e-02	15.077	< 2e-16	***
as.factor(BioID)G000576	4.656e-01	6.682e-01	0.697	0.486050	
as.factor(BioID)G000577	3.445e-02	8.413e-02	0.409	0.682240	
as.factor(BioID)G000578	9.713e-01	1.137e+00	0.854	0.393001	
as.factor(BioID)G000579	5.276e-02	8.286e-02	0.637	0.524381	
as.factor(BioID)G000581	9.890e-01	7.218e-01	1.370	0.170834	
as.factor(BioID)G000583	5.296e-01	6.274e-01	0.844	0.398776	
as.factor(BioID)G000584	6.651e-02	1.076e-01	0.618	0.536398	
as.factor(BioID)G000585	1.386e+00	6.192e-01	2.238	0.025341	*
as.factor(BioID)G000586	1.389e+00	1.017e+00	1.366	0.172201	
as.factor(BioID)G000587	2.003e+00	1.545e+00	1.297	0.194968	
as.factor(BioID)G000588	-2.344e-01	3.407e-01	-0.688	0.491421	
as.factor(BioID)G000589	7.469e-01	1.026e+00	0.728	0.466672	

as.factor(BioID)G000590	5.633e-01	7.602e-01	0.741	0.458836	
as.factor(BioID)G000591	2.923e-01	4.204e-01	0.695	0.486986	
as.factor(BioID)G000592	5.063e-01	6.447e-01	0.785	0.432352	
as.factor(BioID)H000324	1.184e+00	3.170e-01	3.736	0.000193	***
as.factor(BioID)H000636	7.849e-01	4.386e-01	1.789	0.073728	.
as.factor(BioID)H000874	7.461e-01	6.716e-01	1.111	0.266815	
as.factor(BioID)H001034	1.317e+00	4.579e-01	2.875	0.004087	**
as.factor(BioID)H001036	5.246e-01	6.453e-01	0.813	0.416378	
as.factor(BioID)H001038	7.742e-01	4.627e-01	1.673	0.094488	.
as.factor(BioID)H001045	7.804e-02	2.405e-01	0.324	0.745618	
as.factor(BioID)H001047	6.531e-01	5.035e-01	1.297	0.194738	
as.factor(BioID)H001048	2.388e-01	2.831e-01	0.843	0.399103	
as.factor(BioID)H001050	8.691e-01	3.153e-01	2.756	0.005911	**
as.factor(BioID)H001051	1.030e-01	6.184e-01	0.167	0.867765	
as.factor(BioID)H001052	6.475e-01	9.477e-01	0.683	0.494545	
as.factor(BioID)H001053	1.790e-01	2.472e-01	0.724	0.468990	
as.factor(BioID)H001055	-1.892e-01	4.296e-01	-0.440	0.659706	
as.factor(BioID)H001056	-1.637e-01	2.786e-01	-0.588	0.556794	
as.factor(BioID)H001057	8.569e-01	1.252e+00	0.685	0.493715	
as.factor(BioID)H001058	2.273e-01	2.625e-01	0.866	0.386672	
as.factor(BioID)H001059	1.388e-01	1.594e-01	0.871	0.384025	
as.factor(BioID)H001063	1.065e+00	1.906e-01	5.590	2.65e-08	***
as.factor(BioID)H001064	8.047e-01	3.131e-01	2.570	0.010256	*
as.factor(BioID)H001066	8.925e-01	1.870e-01	4.774	1.96e-06	***
as.factor(BioID)H001067	2.873e-01	3.747e-01	0.767	0.443353	
as.factor(BioID)H001068	1.203e+00	4.719e-01	2.549	0.010885	*
as.factor(BioID)H001071	8.905e-01	1.265e+00	0.704	0.481657	
as.factor(BioID)H001072	1.400e-01	2.570e-01	0.545	0.586149	
as.factor(BioID)H001073	-1.773e-01	2.835e-01	-0.625	0.531817	
as.factor(BioID)H001074	8.323e-02	2.237e-01	0.372	0.709925	
as.factor(BioID)H001077	5.720e-01	8.706e-01	0.657	0.511281	
as.factor(BioID)H001078	2.935e-01	4.891e-01	0.600	0.548553	
as.factor(BioID)H001081	8.507e-01	2.269e-01	3.750	0.000183	***
as.factor(BioID)H001085	8.381e-01	2.718e-01	3.083	0.002082	**
as.factor(BioID)H001088	2.790e-01	5.299e-01	0.527	0.598593	
as.factor(BioID)H001090	1.093e+00	4.949e-01	2.208	0.027346	*
as.factor(BioID)I000056	2.941e-02	2.995e-01	0.098	0.921790	
as.factor(BioID)I000057	7.197e-01	5.673e-01	1.269	0.204693	
as.factor(BioID)J000032	9.635e-01	3.268e-01	2.949	0.003235	**
as.factor(BioID)J000126	1.030e+00	2.673e-01	3.854	0.000121	***
as.factor(BioID)J000174	3.139e-01	4.132e-01	0.760	0.447585	
as.factor(BioID)J000288	1.054e+00	1.767e-01	5.968	2.93e-09	***
as.factor(BioID)J000289	6.433e-01	8.549e-01	0.752	0.451908	



as.factor(BioID)J000290	1.827e-01	2.173e-01	0.841	0.400674	
as.factor(BioID)J000292	1.026e-01	1.373e-01	0.748	0.454823	
as.factor(BioID)J000294	1.151e+00	1.748e-01	6.584	6.11e-11	***
as.factor(BioID)J000295	-2.433e-01	3.438e-01	-0.708	0.479212	
as.factor(BioID)J000297	-1.003e-01	1.936e-01	-0.518	0.604664	
as.factor(BioID)J000298	1.668e+00	1.083e+00	1.540	0.123691	
as.factor(BioID)J000299	3.319e-01	4.155e-01	0.799	0.424557	
as.factor(BioID)J000301	1.705e-01	2.779e-01	0.614	0.539571	
as.factor(BioID)J000302	3.401e-01	4.495e-01	0.757	0.449329	
as.factor(BioID)K000009	6.540e-01	7.568e-01	0.864	0.387636	
as.factor(BioID)K000188	5.346e-01	8.185e-01	0.653	0.513730	
as.factor(BioID)K000210	-5.163e-01	9.576e-01	-0.539	0.589860	
as.factor(BioID)K000362	3.434e-01	4.724e-01	0.727	0.467448	
as.factor(BioID)K000363	1.252e-01	1.760e-01	0.712	0.476811	
as.factor(BioID)K000368	4.463e-01	8.659e-01	0.515	0.606331	
as.factor(BioID)K000375	8.183e-01	3.102e-01	2.638	0.008421	**
as.factor(BioID)K000376	2.703e-02	1.874e-01	0.144	0.885335	
as.factor(BioID)K000378	-2.805e-01	3.788e-01	-0.741	0.459072	
as.factor(BioID)K000379	1.061e+00	1.119e-01	9.480	< 2e-16	***
as.factor(BioID)K000380	9.394e-01	1.206e-01	7.790	1.17e-14	***
as.factor(BioID)K000381	7.569e-01	4.256e-01	1.778	0.075514	.
as.factor(BioID)K000382	6.727e-01	4.918e-01	1.368	0.171504	
as.factor(BioID)K000385	1.092e+00	1.161e-01	9.409	< 2e-16	***
as.factor(BioID)K000386	5.039e-01	7.555e-01	0.667	0.504817	
as.factor(BioID)K000387	3.545e-01	1.003e-01	3.533	0.000422	***
as.factor(BioID)K000388	5.664e-01	8.257e-01	0.686	0.492842	
as.factor(BioID)K000389	1.285e+00	4.640e-01	2.768	0.005696	**
as.factor(BioID)K000390	1.049e+00	1.745e-01	6.012	2.25e-09	***
as.factor(BioID)K000391	8.099e-01	2.892e-01	2.800	0.005162	**
as.factor(BioID)K000392	3.987e-01	6.722e-01	0.593	0.553193	
as.factor(BioID)K000394	9.987e-01	2.177e-01	4.587	4.83e-06	***
as.factor(BioID)K000395	2.566e-01	4.049e-01	0.634	0.526284	
as.factor(BioID)L000263	7.145e-01	7.100e-01	1.006	0.314364	
as.factor(BioID)L000287	1.210e+00	3.670e-01	3.296	0.001002	**
as.factor(BioID)L000397	9.338e-01	1.332e-01	7.009	3.47e-12	***
as.factor(BioID)L000480	7.741e-01	5.744e-01	1.348	0.177945	
as.factor(BioID)L000491	-1.364e-01	2.395e-01	-0.570	0.568956	
as.factor(BioID)L000551	1.614e+00	8.974e-01	1.799	0.072187	.
as.factor(BioID)L000554	-5.104e-01	8.502e-01	-0.600	0.548364	
as.factor(BioID)L000557	8.291e-01	4.541e-01	1.826	0.068055	.
as.factor(BioID)L000559	8.290e-01	3.883e-01	2.135	0.032894	*
as.factor(BioID)L000560	8.346e-01	3.446e-01	2.422	0.015544	*
as.factor(BioID)L000562	7.399e-01	5.420e-01	1.365	0.172440	

as.factor(BioID)L000563	5.759e-01	6.583e-01	0.875	0.381799	
as.factor(BioID)L000564	5.508e-01	7.363e-01	0.748	0.454480	
as.factor(BioID)L000565	6.245e-01	6.273e-01	0.996	0.319563	
as.factor(BioID)L000566	2.357e-01	3.163e-01	0.745	0.456359	
as.factor(BioID)L000567	1.073e-01	2.361e-01	0.454	0.649722	
as.factor(BioID)L000569	1.050e-01	1.404e-01	0.748	0.454654	
as.factor(BioID)L000573	8.644e-01	1.328e+00	0.651	0.515155	
as.factor(BioID)L000576	3.327e-01	4.531e-01	0.734	0.462905	
as.factor(BioID)L000578	2.466e-01	2.888e-01	0.854	0.393314	
as.factor(BioID)L000579	1.195e+00	3.676e-01	3.252	0.001168	**
as.factor(BioID)L000580	7.770e-01	3.864e-01	2.011	0.044523	*
as.factor(BioID)L000581	1.072e+00	9.077e-02	11.805	< 2e-16	***
as.factor(BioID)L000582	9.867e-01	1.083e-01	9.112	< 2e-16	***
as.factor(BioID)L000583	5.552e-01	7.167e-01	0.775	0.438642	
as.factor(BioID)L000584	2.868e-01	3.523e-01	0.814	0.415723	
as.factor(BioID)L000585	1.487e-01	2.565e-01	0.580	0.562201	
as.factor(BioID)L000586	6.942e-01	4.469e-01	1.553	0.120522	
as.factor(BioID)L000587	2.630e-01	4.141e-01	0.635	0.525455	
as.factor(BioID)L000588	4.858e-01	6.800e-01	0.714	0.475039	
as.factor(BioID)L000590	7.496e-01	3.534e-01	2.121	0.034079	*
as.factor(BioID)L000591	7.213e-01	3.944e-01	1.829	0.067622	.
as.factor(BioID)L000592	1.356e+00	7.593e-01	1.786	0.074342	.
as.factor(BioID)L000593	8.874e-01	1.705e-01	5.205	2.17e-07	***
as.factor(BioID)M000087	8.536e-01	3.450e-01	2.474	0.013442	*
as.factor(BioID)M000312	1.216e+00	2.922e-01	4.164	3.29e-05	***
as.factor(BioID)M000404	1.397e+00	5.144e-01	2.715	0.006700	**
as.factor(BioID)M000689	-4.311e-02	3.732e-01	-0.116	0.908041	
as.factor(BioID)M001137	8.611e-01	4.269e-01	2.017	0.043843	*
as.factor(BioID)M001143	9.512e-01	2.045e-01	4.651	3.56e-06	***
as.factor(BioID)M001144	4.198e-01	5.071e-01	0.828	0.407866	
as.factor(BioID)M001150	-2.466e-01	5.551e-01	-0.444	0.656872	
as.factor(BioID)M001151	-3.511e-01	5.854e-01	-0.600	0.548703	
as.factor(BioID)M001156	1.953e-01	2.433e-01	0.803	0.422255	
as.factor(BioID)M001157	-2.837e-02	1.728e-01	-0.164	0.869629	
as.factor(BioID)M001158	3.677e-01	4.508e-01	0.816	0.414871	
as.factor(BioID)M001159	-8.448e-03	1.785e-01	-0.047	0.962258	
as.factor(BioID)M001160	1.241e+00	3.132e-01	3.962	7.76e-05	***
as.factor(BioID)M001163	9.961e-01	1.380e-01	7.218	7.98e-13	***
as.factor(BioID)M001165	1.390e-01	1.248e-01	1.113	0.265704	
as.factor(BioID)M001166	6.524e-01	5.329e-01	1.224	0.221051	
as.factor(BioID)M001177	6.634e-01	9.690e-01	0.685	0.493647	
as.factor(BioID)M001180	-2.142e-01	3.366e-01	-0.636	0.524730	
as.factor(BioID)M001181	-9.695e-02	6.663e-01	-0.145	0.884340	

as.factor(BioID)M001182	9.187e-01	1.393e+00	0.659	0.509771	
as.factor(BioID)M001184	8.005e-01	1.331e+00	0.601	0.547683	
as.factor(BioID)M001187	4.582e-01	6.275e-01	0.730	0.465368	
as.factor(BioID)M001188	9.715e-01	8.646e-02	11.237	< 2e-16	***
as.factor(BioID)M001189	3.293e-01	4.054e-01	0.812	0.416688	
as.factor(BioID)M001191	4.900e-01	7.786e-01	0.629	0.529245	
as.factor(BioID)M001193	-3.456e-01	4.801e-01	-0.720	0.471761	
as.factor(BioID)M001194	1.276e-01	1.872e-01	0.681	0.495689	
as.factor(BioID)M001195	3.893e-01	5.633e-01	0.691	0.489653	
as.factor(BioID)M001196	7.175e-01	4.426e-01	1.621	0.105195	
as.factor(BioID)M001199	1.233e+00	4.605e-01	2.677	0.007499	**
as.factor(BioID)M001200	9.306e-01	1.572e-01	5.919	3.92e-09	***
as.factor(BioID)M001201	1.245e-01	3.101e-01	0.401	0.688144	
as.factor(BioID)M001202	5.035e-01	6.966e-01	0.723	0.469891	
as.factor(BioID)M001203	7.544e-01	3.516e-01	2.146	0.032049	*
as.factor(BioID)M001204	2.771e-01	4.727e-01	0.586	0.557871	
as.factor(BioID)M001205	2.741e-01	3.967e-01	0.691	0.489635	
as.factor(BioID)M001206	8.726e-01	1.991e-01	4.382	1.25e-05	***
as.factor(BioID)M001208	9.129e-01	1.996e-01	4.573	5.17e-06	***
as.factor(BioID)N000002	1.170e+00	2.444e-01	4.788	1.83e-06	***
as.factor(BioID)N000015	8.150e-01	5.623e-01	1.449	0.147410	
as.factor(BioID)N000127	1.032e+00	1.911e-01	5.398	7.71e-08	***
as.factor(BioID)N000179	1.020e+00	1.464e-01	6.970	4.54e-12	***
as.factor(BioID)N000181	5.610e-02	1.049e-01	0.535	0.592782	
as.factor(BioID)N000182	4.855e-01	6.370e-01	0.762	0.446055	
as.factor(BioID)N000184	4.694e-02	1.494e-01	0.314	0.753399	
as.factor(BioID)N000185	1.489e-01	1.641e-01	0.907	0.364447	
as.factor(BioID)N000188	1.113e+00	2.387e-01	4.663	3.37e-06	***
as.factor(BioID)N000189	-9.107e-02	1.943e-01	-0.469	0.639347	
as.factor(BioID)N000190	1.063e+00	1.570e+00	0.677	0.498514	
as.factor(BioID)N000191	1.053e+00	2.013e-01	5.234	1.87e-07	***
as.factor(BioID)O000168	3.666e-01	4.894e-01	0.749	0.453945	
as.factor(BioID)O000170	8.373e-01	2.147e-01	3.900	0.000100	***
as.factor(BioID)O000171	6.068e-01	5.431e-01	1.117	0.264046	
as.factor(BioID)O000172	1.133e+00	8.095e-01	1.400	0.161723	
as.factor(BioID)O000173	1.132e+00	8.088e-01	1.399	0.162007	
as.factor(BioID)P000034	7.725e-01	5.657e-01	1.366	0.172240	
as.factor(BioID)P000096	7.353e-01	6.113e-01	1.203	0.229167	
as.factor(BioID)P000197	9.905e-01	3.788e-01	2.615	0.009004	**
as.factor(BioID)P000258	-2.565e-01	6.557e-01	-0.391	0.695664	
as.factor(BioID)P000373	1.242e-01	3.313e-01	0.375	0.707856	
as.factor(BioID)P000523	6.263e-01	8.217e-01	0.762	0.446098	
as.factor(BioID)P000588	6.153e-02	1.841e-01	0.334	0.738239	

as.factor(BioID)P000591	4.422e-01	5.259e-01	0.841	0.400602	
as.factor(BioID)P000592	3.085e-01	3.718e-01	0.830	0.406880	
as.factor(BioID)P000593	6.648e-01	5.638e-01	1.179	0.238540	
as.factor(BioID)P000594	-7.451e-03	9.019e-02	-0.083	0.934169	
as.factor(BioID)P000597	1.089e+00	1.862e-01	5.850	5.90e-09	***
as.factor(BioID)P000598	9.198e-01	3.289e-01	2.796	0.005229	**
as.factor(BioID)P000599	3.227e-01	4.809e-01	0.671	0.502302	
as.factor(BioID)P000601	3.902e-01	6.314e-01	0.618	0.536690	
as.factor(BioID)P000602	5.661e-01	7.249e-01	0.781	0.434918	
as.factor(BioID)P000604	1.218e+00	2.604e-01	4.679	3.11e-06	***
as.factor(BioID)P000605	7.104e-01	1.088e+00	0.653	0.514000	
as.factor(BioID)P000606	4.213e-01	6.266e-01	0.672	0.501471	
as.factor(BioID)P000607	1.437e+00	7.783e-01	1.847	0.064912	.
as.factor(BioID)P000608	5.064e-01	7.643e-01	0.663	0.507682	
as.factor(BioID)P000609	5.876e-01	7.908e-01	0.743	0.457565	
as.factor(BioID)P000611	-5.958e-02	1.259e-01	-0.473	0.636071	
as.factor(BioID)P000613	7.746e-01	3.245e-01	2.387	0.017095	*
as.factor(BioID)P000614	7.642e-01	3.415e-01	2.238	0.025352	*
as.factor(BioID)P000615	2.663e-01	4.073e-01	0.654	0.513307	
as.factor(BioID)P000616	7.926e-01	2.939e-01	2.697	0.007075	**
as.factor(BioID)P000617	1.233e+00	8.861e-01	1.391	0.164307	
as.factor(BioID)P000618	7.112e-01	3.919e-01	1.815	0.069721	.
as.factor(BioID)Q000023	8.438e-01	2.309e-01	3.655	0.000265	***
as.factor(BioID)R000053	1.112e+00	2.616e-01	4.250	2.25e-05	***
as.factor(BioID)R000395	-3.627e-01	7.648e-01	-0.474	0.635360	
as.factor(BioID)R000409	3.855e-01	5.072e-01	0.760	0.447393	
as.factor(BioID)R000435	1.658e-01	8.756e-01	0.189	0.849822	
as.factor(BioID)R000486	9.836e-01	3.086e-01	3.187	0.001462	**
as.factor(BioID)R000487	4.672e-01	6.005e-01	0.778	0.436663	
as.factor(BioID)R000515	1.016e+00	2.678e-01	3.794	0.000153	***
as.factor(BioID)R000575	-4.176e-02	8.241e-02	-0.507	0.612454	
as.factor(BioID)R000576	6.842e-01	5.440e-01	1.258	0.208612	
as.factor(BioID)R000577	9.442e-01	1.784e-01	5.293	1.36e-07	***
as.factor(BioID)R000578	-1.100e-01	6.974e-01	-0.158	0.874714	
as.factor(BioID)R000580	2.158e-01	2.409e-01	0.896	0.370568	
as.factor(BioID)R000582	1.011e-01	1.583e-01	0.638	0.523269	
as.factor(BioID)R000583	5.437e-02	1.735e-01	0.313	0.754083	
as.factor(BioID)R000585	-1.624e-01	5.162e-01	-0.315	0.753124	
as.factor(BioID)R000586	-2.336e-02	1.268e-01	-0.184	0.853806	
as.factor(BioID)R000587	5.127e-01	7.169e-01	0.715	0.474619	
as.factor(BioID)R000588	1.248e+00	3.732e-01	3.343	0.000846	***
as.factor(BioID)R000591	1.039e-01	4.301e-01	0.242	0.809066	
as.factor(BioID)R000592	4.174e-01	5.488e-01	0.761	0.447051	

as.factor(BioID)R000593	2.504e-01	2.964e-01	0.845	0.398242	
as.factor(BioID)R000597	3.643e-01	5.042e-01	0.723	0.470083	
as.factor(BioID)R000598	1.871e-01	1.938e-01	0.966	0.334428	
as.factor(BioID)R000599	6.407e-01	5.607e-01	1.143	0.253266	
as.factor(BioID)R000601	6.249e-01	8.422e-01	0.742	0.458181	
as.factor(BioID)R000602	7.122e-01	4.538e-01	1.569	0.116750	
as.factor(BioID)R000603	3.983e-01	5.876e-01	0.678	0.498025	
as.factor(BioID)R000604	1.932e-01	2.674e-01	0.722	0.470225	
as.factor(BioID)R000606	1.318e+00	5.016e-01	2.627	0.008699	**
as.factor(BioID)R000607	1.367e+00	7.159e-01	1.910	0.056292	.
as.factor(BioID)R000609	4.731e-02	8.260e-02	0.573	0.566909	
as.factor(BioID)R000610	8.893e-02	1.425e-01	0.624	0.532643	
as.factor(BioID)R000612	5.890e-01	8.319e-01	0.708	0.479033	
as.factor(BioID)R000614	1.079e+00	1.700e+00	0.635	0.525632	
as.factor(BioID)S000018	6.015e-01	7.951e-01	0.757	0.449437	
as.factor(BioID)S000030	7.628e-01	5.958e-01	1.280	0.200617	
as.factor(BioID)S000051	1.280e+00	1.268e+00	1.010	0.312721	
as.factor(BioID)S000185	8.816e-01	5.081e-01	1.735	0.082937	.
as.factor(BioID)S000248	1.078e+00	2.038e-01	5.289	1.39e-07	***
as.factor(BioID)S000250	2.650e-01	3.511e-01	0.755	0.450517	
as.factor(BioID)S000344	7.372e-01	5.274e-01	1.398	0.162371	
as.factor(BioID)S000364	-1.831e-01	4.312e-01	-0.425	0.671116	
as.factor(BioID)S000480	9.062e-01	5.131e-01	1.766	0.077561	.
as.factor(BioID)S000510	6.266e-01	6.512e-01	0.962	0.336070	
as.factor(BioID)S000522	-8.859e-02	1.155e+00	-0.077	0.938857	
as.factor(BioID)S000583	-1.892e-01	6.391e-01	-0.296	0.767249	
as.factor(BioID)S001145	1.354e+00	4.665e-01	2.903	0.003744	**
as.factor(BioID)S001148	-2.664e-01	4.401e-01	-0.605	0.545070	
as.factor(BioID)S001150	7.808e-01	4.328e-01	1.804	0.071385	.
as.factor(BioID)S001154	-7.223e-02	1.807e-01	-0.400	0.689407	
as.factor(BioID)S001156	1.141e+00	1.950e-01	5.852	5.84e-09	***
as.factor(BioID)S001157	7.160e-01	4.820e-01	1.485	0.137636	
as.factor(BioID)S001165	9.160e-01	2.496e-01	3.670	0.000250	***
as.factor(BioID)S001168	1.055e+00	1.455e-01	7.248	6.42e-13	***
as.factor(BioID)S001170	7.947e-01	3.589e-01	2.214	0.026941	*
as.factor(BioID)S001172	2.096e-01	2.848e-01	0.736	0.461859	
as.factor(BioID)S001175	1.009e+00	1.225e-01	8.238	3.47e-16	***
as.factor(BioID)S001176	3.089e-01	3.570e-01	0.865	0.387140	
as.factor(BioID)S001180	4.694e-01	8.332e-01	0.563	0.573261	
as.factor(BioID)S001183	3.579e-01	5.090e-01	0.703	0.482107	
as.factor(BioID)S001185	1.077e+00	2.204e-01	4.888	1.12e-06	***
as.factor(BioID)S001187	-1.683e-01	2.653e-01	-0.634	0.525932	
as.factor(BioID)S001188	6.720e-01	8.953e-01	0.751	0.452983	

as.factor(BioID)S001189	3.510e-01	5.337e-01	0.658	0.510835	
as.factor(BioID)S001190	5.525e-01	6.430e-01	0.859	0.390263	
as.factor(BioID)S001192	2.195e-01	2.862e-01	0.767	0.443256	
as.factor(BioID)S001193	8.900e-01	2.175e-01	4.092	4.48e-05	***
as.factor(BioID)S001195	4.243e-01	6.062e-01	0.700	0.484130	
as.factor(BioID)S001196	5.684e-01	3.168e-01	1.794	0.073009	.
as.factor(BioID)S001199	1.118e-01	1.720e-01	0.650	0.515827	
as.factor(BioID)S001200	9.480e-01	1.191e-01	7.962	3.10e-15	***
as.factor(BioID)S001201	6.134e-01	5.564e-01	1.102	0.270430	
as.factor(BioID)S001205	1.153e+00	2.199e-01	5.244	1.77e-07	***
as.factor(BioID)S001207	7.107e-01	3.961e-01	1.794	0.072931	.
as.factor(BioID)S001208	1.097e+00	6.173e-01	1.777	0.075715	.
as.factor(BioID)S001209	6.544e-01	4.577e-01	1.430	0.152952	
as.factor(BioID)S001211	8.294e-01	2.605e-01	3.183	0.001482	**
as.factor(BioID)S001212	-6.100e-03	1.125e-01	-0.054	0.956763	
as.factor(BioID)S001213	3.872e-02	1.059e-01	0.366	0.714596	
as.factor(BioID)S001214	7.047e-01	1.064e+00	0.662	0.507827	
as.factor(BioID)S001215	1.045e+00	2.399e-01	4.357	1.40e-05	***
as.factor(BioID)S001216	9.073e-01	3.117e-01	2.911	0.003649	**
as.factor(BioID)T000193	1.175e+00	2.403e-01	4.891	1.10e-06	***
as.factor(BioID)T000238	1.774e-01	2.422e-01	0.733	0.463889	
as.factor(BioID)T000460	8.339e-01	4.379e-01	1.904	0.057056	.
as.factor(BioID)T000462	-1.526e-01	4.616e-01	-0.330	0.741070	
as.factor(BioID)T000463	-3.271e-01	5.063e-01	-0.646	0.518318	
as.factor(BioID)T000465	9.633e-01	1.237e-01	7.789	1.17e-14	***
as.factor(BioID)T000467	-9.625e-02	1.572e-01	-0.612	0.540522	
as.factor(BioID)T000468	7.791e-01	3.267e-01	2.385	0.017203	*
as.factor(BioID)T000469	1.038e+00	8.135e-02	12.757	< 2e-16	***
as.factor(BioID)T000470	4.819e-02	1.270e-01	0.379	0.704496	
as.factor(BioID)T000472	1.192e+00	3.133e-01	3.805	0.000147	***
as.factor(BioID)T000474	8.917e-01	2.084e-01	4.279	1.98e-05	***
as.factor(BioID)T000475	-8.933e-03	1.311e-01	-0.068	0.945680	
as.factor(BioID)T000477	9.166e-02	1.293e-01	0.709	0.478391	
as.factor(BioID)T000478	9.932e-02	1.359e-01	0.731	0.465047	
as.factor(BioID)T000479	4.537e-01	6.918e-01	0.656	0.512022	
as.factor(BioID)T000480	4.692e-01	6.768e-01	0.693	0.488280	
as.factor(BioID)T000481	1.118e+00	7.989e-01	1.400	0.161819	
as.factor(BioID)T000482	1.090e+00	2.096e-01	5.202	2.21e-07	***
as.factor(BioID)U000031	2.040e-01	5.703e-01	0.358	0.720521	
as.factor(BioID)U000040	1.535e+00	9.207e-01	1.667	0.095608	.
as.factor(BioID)V000081	1.219e+00	2.968e-01	4.107	4.20e-05	***
as.factor(BioID)V000108	8.202e-01	4.870e-01	1.684	0.092328	.
as.factor(BioID)V000130	9.673e-01	1.362e-01	7.102	1.81e-12	***

as.factor(BioID)V000131	9.198e-01	2.113e-01	4.354	1.42e-05	***
as.factor(BioID)V000132	7.432e-01	2.022e-01	3.675	0.000245	***
as.factor(BioID)V000133	6.904e-01	5.099e-01	1.354	0.175945	
as.factor(BioID)W000187	1.329e+00	4.744e-01	2.802	0.005139	**
as.factor(BioID)W000413	-3.119e-01	6.407e-01	-0.487	0.626414	
as.factor(BioID)W000791	-2.921e-01	6.525e-01	-0.448	0.654441	
as.factor(BioID)W000795	1.735e-01	2.374e-01	0.731	0.465099	
as.factor(BioID)W000796	5.428e-01	6.878e-01	0.789	0.430156	
as.factor(BioID)W000797	9.343e-01	2.338e-01	3.997	6.71e-05	***
as.factor(BioID)W000798	1.882e-01	2.127e-01	0.885	0.376511	
as.factor(BioID)W000799	6.816e-01	5.268e-01	1.294	0.195950	
as.factor(BioID)W000804	7.051e-04	2.193e-01	0.003	0.997435	
as.factor(BioID)W000806	2.262e-01	2.724e-01	0.831	0.406374	
as.factor(BioID)W000808	1.092e+00	1.385e-01	7.884	5.66e-15	***
as.factor(BioID)W000809	5.523e-02	3.655e-01	0.151	0.879913	
as.factor(BioID)W000810	4.058e-01	5.332e-01	0.761	0.446783	
as.factor(BioID)W000812	4.084e-02	1.326e-01	0.308	0.758174	
as.factor(BioID)W000813	1.375e-01	2.596e-01	0.530	0.596341	
as.factor(BioID)W000814	6.554e-01	8.378e-01	0.782	0.434143	
as.factor(BioID)W000815	3.186e-01	4.660e-01	0.684	0.494340	
as.factor(BioID)W000816	3.880e-01	4.792e-01	0.810	0.418187	
as.factor(BioID)W000820	1.024e-01	1.562e-01	0.656	0.512042	
as.factor(BioID)W000821	3.950e-01	6.051e-01	0.653	0.514003	
as.factor(BioID)W000822	1.469e+00	6.647e-01	2.210	0.027265	*
as.factor(BioID)W000823	6.152e-01	2.022e-01	3.042	0.002387	**
as.factor(BioID)W000825	1.034e+00	2.549e-01	4.058	5.18e-05	***
as.factor(BioID)W000826	7.930e-01	2.969e-01	2.671	0.007644	**
as.factor(BioID)Y000033	-5.183e-01	1.029e+00	-0.504	0.614502	
as.factor(BioID)Y000062	9.470e-01	9.880e-02	9.585	< 2e-16	***
as.factor(BioID)Y000063	2.520e-01	3.235e-01	0.779	0.435998	
as.factor(BioID)Y000065	7.320e-01	1.073e+00	0.682	0.495104	
as.factor(BioID)Y000066	NA	NA	NA	NA	
as.factor(BioID)Z000017	NA	NA	NA	NA	
seniority	1.702e-02	4.440e-02	0.383	0.701600	
Contribution_minus	-2.363e-07	1.713e-07	-1.380	0.167819	
Contribution_plus	3.608e-06	1.128e-06	3.199	0.001407	**

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1089 on 1679 degrees of freedom

(97 observations deleted due to missingness)

Multiple R-squared: 0.9641, Adjusted R-squared: 0.9526

F-statistic: 83.85 on 537 and 1679 DF, p-value: < 2.2e-16

```
# same thing again with plm
ols_ind_fe_plm <- plm(Vote ~ nominate_dim1 + nominate_dim2 + seniority + Contribution_minus + Contribution_plus + Dmajority, data = df_long,
summary(ols_ind_fe_plm)
```

Oneway (individual) effect Within Model

Call:

```
plm(formula = Vote ~ nominate_dim1 + nominate_dim2 + seniority +
      Contribution_minus + Contribution_plus + Dmajority, data = df_long,
      model = "within", index = c("BioID", "Instance"))
```

Unbalanced Panel: n = 530, T = 1-6, N = 2217

Residuals:

Min.	1st Qu.	Median	3rd Qu.	Max.
-0.8253608	-0.0074503	-0.0018293	0.0085984	0.8217370

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t )
seniority	1.2188e-02	3.4223e-03	3.5614	0.0003792 ***
Contribution_minus	-2.0478e-07	1.7051e-07	-1.2010	0.2299331
Contribution_plus	3.7709e-06	1.1229e-06	3.3581	0.0008022 ***
Dmajority	-8.7401e-03	9.1687e-03	-0.9533	0.3405986

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 20.367

Residual Sum of Squares: 19.975

R-Squared: 0.019211

Adj. R-Squared: -0.2914

F-statistic: 8.24141 on 4 and 1683 DF, p-value: 1.3979e-06

```
# same thing again with log
ols_ind_fe_log <- lm(Vote ~ district + party + birthday + nominate_dim1 + nominate_dim2 + as.factor(Instance) + as.factor(BioID) +
summary(ols_ind_fe_log)
```

Call:

```
lm(formula = Vote ~ district + party + birthday + nominate_dim1 +
      nominate_dim2 + as.factor(Instance) + as.factor(BioID) +
      seniority + Contribution_minus_log + Contribution_plus_log +
```



```
Dmajority, data = df_long_log)
```

```
Residuals:
```

	Min	1Q	Median	3Q	Max
	-0.81706	-0.01092	-0.00389	0.01325	0.82121

```
Coefficients: (6 not defined because of singularities)
```

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	14.4416138	35.5235913	0.407	0.684410
district	-0.0565309	0.1488284	-0.380	0.704121
partyR	-0.8613168	0.3922392	-2.196	0.028260 *
birthday	-0.0068359	0.0180078	-0.380	0.704294
nominate_dim1	0.0785876	0.3534751	0.222	0.824090
nominate_dim2	-0.4218651	0.9584230	-0.440	0.659884
as.factor(Instance)4	-0.0147396	0.0569280	-0.259	0.795737
as.factor(Instance)6	-0.0343328	0.1696859	-0.202	0.839686
as.factor(Instance)7	-0.0621551	0.2263281	-0.275	0.783645
as.factor(Instance)51	-0.0155064	0.1131406	-0.137	0.891007
as.factor(Instance)52	-0.0098209	0.1132238	-0.087	0.930891
as.factor(BioID)A000367	0.3182258	0.7679453	0.414	0.678654
as.factor(BioID)A000369	-0.1092827	0.3032725	-0.360	0.718642
as.factor(BioID)A000370	0.4504502	1.2490541	0.361	0.718427
as.factor(BioID)A000372	0.4695025	1.2597357	0.373	0.709428
as.factor(BioID)A000374	0.0923041	0.2674560	0.345	0.730056
as.factor(BioID)A000375	0.9134540	2.4558526	0.372	0.709985
as.factor(BioID)A000376	2.1948037	5.6625435	0.388	0.698370
as.factor(BioID)A000377	-0.0585667	0.1714106	-0.342	0.732646
as.factor(BioID)A000378	0.3774894	0.9068673	0.416	0.677285
as.factor(BioID)B000213	-0.2893319	0.6989965	-0.414	0.678991
as.factor(BioID)B000287	1.6717329	4.4114512	0.379	0.704779
as.factor(BioID)B000490	-0.4803467	0.3745537	-1.282	0.199892
as.factor(BioID)B000574	0.0151667	0.1185292	0.128	0.898200
as.factor(BioID)B000755	0.0475954	0.2346333	0.203	0.839281
as.factor(BioID)B000911	-0.0758141	0.2485361	-0.305	0.760378
as.factor(BioID)B001227	-0.2728361	0.6735992	-0.405	0.685507
as.factor(BioID)B001248	1.0771235	2.9090449	0.370	0.711238
as.factor(BioID)B001250	-0.3544054	0.8813000	-0.402	0.687642
as.factor(BioID)B001251	-0.2032592	0.5003164	-0.406	0.684611
as.factor(BioID)B001255	-0.0689870	0.2618565	-0.263	0.792239
as.factor(BioID)B001257	0.3662366	1.0227301	0.358	0.720324
as.factor(BioID)B001260	0.5464708	1.4929604	0.366	0.714396
as.factor(BioID)B001269	0.4855297	1.2212817	0.398	0.691016
as.factor(BioID)B001270	1.9221550	5.0947384	0.377	0.706020

as.factor(BioID)B001271	-0.2113750	0.6006881	-0.352	0.724974
as.factor(BioID)B001273	0.0843363	0.2322517	0.363	0.716565
as.factor(BioID)B001274	0.1076984	0.2819797	0.382	0.702565
as.factor(BioID)B001275	0.3351353	0.8455164	0.396	0.691893
as.factor(BioID)B001278	0.0360729	0.1226477	0.294	0.768711
as.factor(BioID)B001281	-0.0135390	0.0759772	-0.178	0.858593
as.factor(BioID)B001282	0.2815925	0.7091598	0.397	0.691368
as.factor(BioID)B001283	-0.0444410	0.1882905	-0.236	0.813448
as.factor(BioID)B001284	0.1164403	0.2995694	0.389	0.697562
as.factor(BioID)B001285	1.3198170	3.4793691	0.379	0.704502
as.factor(BioID)B001286	0.8796855	2.3012741	0.382	0.702325
as.factor(BioID)B001289	-0.1572668	0.4052790	-0.388	0.698040
as.factor(BioID)B001290	0.2636999	0.7076674	0.373	0.709477
as.factor(BioID)B001291	1.7132340	4.5805552	0.374	0.708443
as.factor(BioID)B001292	0.3216807	0.8557718	0.376	0.707050
as.factor(BioID)B001293	0.2979280	0.7827714	0.381	0.703552
as.factor(BioID)B001294	-0.0196591	0.1611520	-0.122	0.902923
as.factor(BioID)B001295	0.4467094	1.2092599	0.369	0.711879
as.factor(BioID)B001297	0.1367762	0.3441118	0.397	0.691076
as.factor(BioID)B001298	-0.0168745	0.1457429	-0.116	0.907841
as.factor(BioID)B001299	0.0743241	0.2610902	0.285	0.775940
as.factor(BioID)B001300	2.5440503	6.7095477	0.379	0.704619
as.factor(BioID)B001301	-0.2320094	0.5913217	-0.392	0.694853
as.factor(BioID)B001302	0.2424928	0.6399403	0.379	0.704796
as.factor(BioID)B001303	-0.0070642	0.1071653	-0.066	0.947452
as.factor(BioID)B001304	0.1779650	0.4830318	0.368	0.712605
as.factor(BioID)B001306	0.5472189	1.4553405	0.376	0.706967
as.factor(BioID)B001307	0.1736901	0.4267619	0.407	0.684072
as.factor(BioID)B001309	0.0750906	0.2216177	0.339	0.734788
as.factor(BioID)C000266	-0.4047039	0.9837040	-0.411	0.680835
as.factor(BioID)C000537	-0.0669642	0.1568981	-0.427	0.669589
as.factor(BioID)C000714	0.2877756	0.8317747	0.346	0.729410
as.factor(BioID)C000754	-0.0730629	0.1787379	-0.409	0.682769
as.factor(BioID)C000984	0.0480583	0.2450262	0.196	0.844532
as.factor(BioID)C001036	1.0031589	2.6538441	0.378	0.705485
as.factor(BioID)C001037	0.0730022	0.3028628	0.241	0.809558
as.factor(BioID)C001038	0.5454544	1.4870116	0.367	0.713813
as.factor(BioID)C001045	-0.1276885	0.4128479	-0.309	0.757148
as.factor(BioID)C001048	0.1124511	0.3075252	0.366	0.714670
as.factor(BioID)C001051	1.4658016	3.8518813	0.381	0.703600
as.factor(BioID)C001053	-0.0604891	0.2211587	-0.274	0.784501
as.factor(BioID)C001055	-0.0865223	0.2349478	-0.368	0.712733
as.factor(BioID)C001061	-0.0485767	0.1307277	-0.372	0.710256

as.factor(BioID)C001063	0.9326016	4.1330955	0.226	0.821512
as.factor(BioID)C001066	0.6564826	1.7640854	0.372	0.709846
as.factor(BioID)C001067	0.4223743	1.1484103	0.368	0.713084
as.factor(BioID)C001068	0.3726524	0.9747448	0.382	0.702290
as.factor(BioID)C001069	-0.1189733	0.2796194	-0.425	0.670549
as.factor(BioID)C001072	0.3113858	0.8507770	0.366	0.714418
as.factor(BioID)C001076	0.0197496	0.0970843	0.203	0.838830
as.factor(BioID)C001077	0.3324316	0.2378954	1.397	0.162515
as.factor(BioID)C001078	0.4004394	1.0917025	0.367	0.713820
as.factor(BioID)C001083	-0.0861672	0.3078103	-0.280	0.779567
as.factor(BioID)C001084	0.0258522	0.1148694	0.225	0.821967
as.factor(BioID)C001087	-0.0628475	0.1976302	-0.318	0.750527
as.factor(BioID)C001091	1.1310579	2.9721405	0.381	0.703591
as.factor(BioID)C001092	1.2990744	3.4012982	0.382	0.702566
as.factor(BioID)C001093	0.3236641	0.8778498	0.369	0.712405
as.factor(BioID)C001094	0.1650710	0.4670777	0.353	0.723832
as.factor(BioID)C001097	1.5349468	4.0605866	0.378	0.705478
as.factor(BioID)C001101	0.2969655	0.7790395	0.381	0.703116
as.factor(BioID)C001103	-0.0894824	0.2555579	-0.350	0.726281
as.factor(BioID)C001105	0.4882856	1.2315392	0.396	0.691807
as.factor(BioID)C001106	0.9143173	0.6290381	1.454	0.146300
as.factor(BioID)C001107	2.4634145	3.7838961	0.651	0.515134
as.factor(BioID)C001108	-0.1090874	0.2530743	-0.431	0.666498
as.factor(BioID)C001109	0.1559838	0.3582958	0.435	0.663375
as.factor(BioID)C001110	2.6027129	6.8356419	0.381	0.703441
as.factor(BioID)C001111	0.6650261	1.7567086	0.379	0.705068
as.factor(BioID)C001112	1.3448347	3.5414340	0.380	0.704193
as.factor(BioID)C001114	0.0045547	0.1124000	0.041	0.967682
as.factor(BioID)C001117	0.5427849	1.3950874	0.389	0.697283
as.factor(BioID)C001118	0.2753148	0.7586307	0.363	0.716726
as.factor(BioID)C001119	0.4123744	0.9947410	0.415	0.678530
as.factor(BioID)C001120	0.1864862	0.4662381	0.400	0.689231
as.factor(BioID)C001121	0.4965071	1.2853494	0.386	0.699345
as.factor(BioID)D000096	0.0480378	0.2193666	0.219	0.826694
as.factor(BioID)D000191	-0.3069450	0.6880912	-0.446	0.655606
as.factor(BioID)D000197	-0.1595279	0.4008408	-0.398	0.690702
as.factor(BioID)D000216	-0.2987886	0.6790547	-0.440	0.659999
as.factor(BioID)D000533	-0.3646365	0.9102452	-0.401	0.688781
as.factor(BioID)D000598	2.6645211	7.0716934	0.377	0.706388
as.factor(BioID)D000604	0.5438759	1.4431894	0.377	0.706336
as.factor(BioID)D000612	0.4279666	1.0889334	0.393	0.694367
as.factor(BioID)D000614	0.2175457	0.5969749	0.364	0.715603
as.factor(BioID)D000615	-0.0611535	0.1388668	-0.440	0.659732

as.factor(BioID)D000616	-0.0295268	0.0937222	-0.315	0.752773
as.factor(BioID)D000617	0.0067079	0.0878593	0.076	0.939153
as.factor(BioID)D000619	0.6209672	1.6045353	0.387	0.698808
as.factor(BioID)D000620	0.2659032	0.6872044	0.387	0.698862
as.factor(BioID)D000621	0.2295494	0.6121203	0.375	0.707711
as.factor(BioID)D000625	0.4073248	1.0747234	0.379	0.704741
as.factor(BioID)D000626	0.4026392	1.0517570	0.383	0.701906
as.factor(BioID)D000627	0.4640522	1.2524365	0.371	0.711050
as.factor(BioID)D000628	-0.0157829	0.1225757	-0.129	0.897565
as.factor(BioID)D000629	0.3657427	0.9223224	0.397	0.691762
as.factor(BioID)D000630	1.2578740	3.2458337	0.388	0.698418
as.factor(BioID)D000631	0.1618315	0.4700161	0.344	0.730663
as.factor(BioID)E000179	0.4398041	1.2784282	0.344	0.730882
as.factor(BioID)E000288	0.3450627	0.8604445	0.401	0.688459
as.factor(BioID)E000290	0.1472380	0.3694856	0.398	0.690325
as.factor(BioID)E000291	0.0144539	0.1124490	0.129	0.897742
as.factor(BioID)E000293	0.1938387	0.5015652	0.386	0.699208
as.factor(BioID)E000294	0.1358291	0.3856211	0.352	0.724714
as.factor(BioID)E000297	0.6794342	1.8108682	0.375	0.707569
as.factor(BioID)E000298	-0.0224221	0.1009039	-0.222	0.824180
as.factor(BioID)E000299	1.0277712	2.6788447	0.384	0.701286
as.factor(BioID)F000030	0.7434262	1.9873955	0.374	0.708407
as.factor(BioID)F000372	0.1666501	0.5205687	0.320	0.748916
as.factor(BioID)F000448	0.0730880	0.2829915	0.258	0.796236
as.factor(BioID)F000449	-0.2726820	0.6950036	-0.392	0.694861
as.factor(BioID)F000450	-0.1361977	0.3313252	-0.411	0.681083
as.factor(BioID)F000451	0.2769284	0.6677129	0.415	0.678393
as.factor(BioID)F000454	0.5194698	1.3429400	0.387	0.698951
as.factor(BioID)F000455	0.4120097	1.1400731	0.361	0.717862
as.factor(BioID)F000456	-0.1344636	0.3723267	-0.361	0.718045
as.factor(BioID)F000458	0.3386100	0.8456142	0.400	0.688899
as.factor(BioID)F000459	0.0608740	0.1455214	0.418	0.675779
as.factor(BioID)F000460	1.2488933	3.3142267	0.377	0.706357
as.factor(BioID)F000461	0.7414724	1.9559669	0.379	0.704683
as.factor(BioID)F000462	1.0568091	2.8095282	0.376	0.706860
as.factor(BioID)F000464	1.8137957	2.1676909	0.837	0.402878
as.factor(BioID)F000465	0.0578178	0.1864798	0.310	0.756569
as.factor(BioID)F000468	0.8040487	1.9942127	0.403	0.686868
as.factor(BioID)G000289	-0.2251434	0.5220372	-0.431	0.666331
as.factor(BioID)G000377	0.1996919	0.6286947	0.318	0.750813
as.factor(BioID)G000410	1.1348613	3.6493676	0.311	0.755865
as.factor(BioID)G000535	-0.0817002	0.2111751	-0.387	0.698900
as.factor(BioID)G000546	0.0195771	0.1355705	0.144	0.885201

as.factor(BioID)G000548	-0.0085571	0.1143138	-0.075	0.940340
as.factor(BioID)G000552	-0.2033889	0.5186153	-0.392	0.694986
as.factor(BioID)G000553	0.3159474	0.8483063	0.372	0.709617
as.factor(BioID)G000556	0.5655615	1.3667235	0.414	0.679077
as.factor(BioID)G000558	-0.0623675	0.1793929	-0.348	0.728148
as.factor(BioID)G000560	0.5210424	1.4514877	0.359	0.719670
as.factor(BioID)G000563	0.1801057	0.4756147	0.379	0.704982
as.factor(BioID)G000566	-0.0521619	0.1304244	-0.400	0.689261
as.factor(BioID)G000568	0.3480850	0.9046188	0.385	0.700453
as.factor(BioID)G000571	0.2651096	0.6440962	0.412	0.680695
as.factor(BioID)G000576	0.1386351	0.3894125	0.356	0.721885
as.factor(BioID)G000577	0.1879166	0.5130618	0.366	0.714222
as.factor(BioID)G000578	0.5686873	0.5836051	0.974	0.330004
as.factor(BioID)G000579	0.3875854	1.0442129	0.371	0.710562
as.factor(BioID)G000583	0.4105817	1.0364991	0.396	0.692073
as.factor(BioID)G000584	-0.1858563	0.4811223	-0.386	0.699334
as.factor(BioID)G000585	2.0431401	5.3652077	0.381	0.703399
as.factor(BioID)G000586	0.5069466	1.2270444	0.413	0.679563
as.factor(BioID)G000587	1.6640163	4.3828789	0.380	0.704252
as.factor(BioID)G000588	1.0075880	2.5927983	0.389	0.697622
as.factor(BioID)G000589	0.2273225	0.6613500	0.344	0.731104
as.factor(BioID)G000590	0.2024682	0.6042407	0.335	0.737615
as.factor(BioID)G000591	0.0661487	0.2133245	0.310	0.756542
as.factor(BioID)G000592	0.3794776	0.9248104	0.410	0.681625
as.factor(BioID)H000324	0.6508716	1.8382098	0.354	0.723332
as.factor(BioID)H000636	0.5155225	1.3628682	0.378	0.705291
as.factor(BioID)H000874	-0.2488378	0.5651104	-0.440	0.659761
as.factor(BioID)H001034	0.7759259	1.9928576	0.389	0.697073
as.factor(BioID)H001036	-0.1264390	0.2837556	-0.446	0.655960
as.factor(BioID)H001038	1.2548996	3.3549773	0.374	0.708429
as.factor(BioID)H001045	0.0409118	0.1182131	0.346	0.729330
as.factor(BioID)H001047	0.1982201	0.5060994	0.392	0.695366
as.factor(BioID)H001048	2.6468714	6.9992147	0.378	0.705363
as.factor(BioID)H001050	-0.1396389	0.3792567	-0.368	0.712785
as.factor(BioID)H001051	1.4892421	2.5545969	0.583	0.560008
as.factor(BioID)H001052	-0.1191725	0.3176235	-0.375	0.707567
as.factor(BioID)H001053	0.0256192	0.1054932	0.243	0.808155
as.factor(BioID)H001055	-0.0836087	0.2897293	-0.289	0.772948
as.factor(BioID)H001056	0.0567186	0.1676280	0.338	0.735142
as.factor(BioID)H001057	0.0121846	0.1506641	0.081	0.935555
as.factor(BioID)H001059	0.5538842	1.4870416	0.372	0.709595
as.factor(BioID)H001063	2.4621216	6.3901906	0.385	0.700075
as.factor(BioID)H001064	0.4466513	1.1680771	0.382	0.702235

as.factor(BioID)H001066	0.2846833	0.7233562	0.394	0.693965
as.factor(BioID)H001068	0.2352661	0.5666537	0.415	0.678069
as.factor(BioID)H001071	0.3912334	1.0620827	0.368	0.712656
as.factor(BioID)H001072	-0.0511713	0.1788555	-0.286	0.774840
as.factor(BioID)H001073	1.2791939	3.3179371	0.386	0.699896
as.factor(BioID)H001074	0.5411342	1.3968277	0.387	0.698516
as.factor(BioID)H001077	0.0617384	0.1838281	0.336	0.737035
as.factor(BioID)H001078	0.2465130	0.6463012	0.381	0.702947
as.factor(BioID)H001081	0.3709467	0.9617472	0.386	0.699776
as.factor(BioID)H001085	0.4657753	1.1843059	0.393	0.694164
as.factor(BioID)H001088	0.0038046	0.1185575	0.032	0.974404
as.factor(BioID)I000057	-0.0666369	0.2148843	-0.310	0.756526
as.factor(BioID)J000032	0.6503887	1.8117910	0.359	0.719666
as.factor(BioID)J000126	1.2342818	3.3495342	0.368	0.712560
as.factor(BioID)J000174	-0.4605803	1.1365280	-0.405	0.685353
as.factor(BioID)J000288	-0.0105928	0.1029131	-0.103	0.918033
as.factor(BioID)J000289	-0.0277259	0.0897260	-0.309	0.757361
as.factor(BioID)J000290	-0.1818875	0.4526743	-0.402	0.687886
as.factor(BioID)J000292	0.1050170	0.2994529	0.351	0.725868
as.factor(BioID)J000294	0.4174903	1.1172378	0.374	0.708697
as.factor(BioID)J000295	0.6435990	1.6569332	0.388	0.697757
as.factor(BioID)J000297	0.0651006	0.1792046	0.363	0.716453
as.factor(BioID)J000298	0.5228965	1.3497857	0.387	0.698524
as.factor(BioID)J000299	0.0683929	0.2479840	0.276	0.782745
as.factor(BioID)J000301	-0.0419190	0.1448250	-0.289	0.772282
as.factor(BioID)J000302	0.4957951	1.3716288	0.361	0.717806
as.factor(BioID)K000009	0.0257165	0.2470134	0.104	0.917097
as.factor(BioID)K000188	-0.0842157	0.2030696	-0.415	0.678414
as.factor(BioID)K000210	-0.4796339	1.1920895	-0.402	0.687489
as.factor(BioID)K000362	-0.1743835	0.4248599	-0.410	0.681538
as.factor(BioID)K000363	-0.2854780	0.7590858	-0.376	0.706912
as.factor(BioID)K000375	0.3543725	0.9477718	0.374	0.708534
as.factor(BioID)K000378	0.9146776	2.3283735	0.393	0.694496
as.factor(BioID)K000379	0.3238480	0.8363012	0.387	0.698637
as.factor(BioID)K000381	0.3175905	0.8451270	0.376	0.707129
as.factor(BioID)K000382	0.0138067	0.0780076	0.177	0.859540
as.factor(BioID)K000385	-0.0376955	0.1066268	-0.354	0.723745
as.factor(BioID)K000386	2.1459014	3.0290166	0.708	0.478783
as.factor(BioID)K000387	1.6265667	3.3818269	0.481	0.630609
as.factor(BioID)K000388	-0.0536044	0.1551144	-0.346	0.729709
as.factor(BioID)K000389	1.0842685	2.8335463	0.383	0.702033
as.factor(BioID)K000390	0.3721016	0.9670536	0.385	0.700459
as.factor(BioID)K000391	0.4734938	1.2522418	0.378	0.705400

as.factor(BioID)K000392	0.4100067	1.0648448	0.385	0.700266
as.factor(BioID)K000394	0.3829962	0.9726612	0.394	0.693816
as.factor(BioID)K000395	0.5712004	1.5181325	0.376	0.706785
as.factor(BioID)L000263	-0.0830967	0.2439353	-0.341	0.733417
as.factor(BioID)L000287	-0.2159205	0.4791951	-0.451	0.652353
as.factor(BioID)L000480	0.4517397	1.3130584	0.344	0.730870
as.factor(BioID)L000491	-0.1485414	0.3759971	-0.395	0.692858
as.factor(BioID)L000554	-0.3357378	0.9192052	-0.365	0.714980
as.factor(BioID)L000557	-0.2999837	0.7220870	-0.415	0.677882
as.factor(BioID)L000559	-0.0833231	0.2059234	-0.405	0.685809
as.factor(BioID)L000560	-0.0495901	0.1500796	-0.330	0.741127
as.factor(BioID)L000562	0.1670109	0.5112445	0.327	0.743961
as.factor(BioID)L000563	0.0753077	0.2130540	0.353	0.723790
as.factor(BioID)L000564	-0.0221168	0.0870824	-0.254	0.799551
as.factor(BioID)L000565	-0.1146118	0.2954406	-0.388	0.698122
as.factor(BioID)L000566	0.0259166	0.1184950	0.219	0.826904
as.factor(BioID)L000567	0.3854015	0.3811406	1.011	0.312102
as.factor(BioID)L000569	-0.1052360	0.2918101	-0.361	0.718428
as.factor(BioID)L000573	0.0346572	0.1518581	0.228	0.819507
as.factor(BioID)L000576	0.1636483	0.4495500	0.364	0.715892
as.factor(BioID)L000578	-0.2084113	0.5194010	-0.401	0.688294
as.factor(BioID)L000579	2.5560054	6.7058095	0.381	0.703139
as.factor(BioID)L000580	-0.0433657	0.1512023	-0.287	0.774302
as.factor(BioID)L000581	0.6531043	1.7588280	0.371	0.710447
as.factor(BioID)L000583	0.3743259	1.0557795	0.355	0.722980
as.factor(BioID)L000584	0.0991192	0.2854122	0.347	0.728429
as.factor(BioID)L000586	0.1521175	0.4358757	0.349	0.727146
as.factor(BioID)L000587	-0.0690198	0.2144674	-0.322	0.747637
as.factor(BioID)L000590	0.2917932	0.7200887	0.405	0.685378
as.factor(BioID)L000591	0.3474272	0.8442443	0.412	0.680750
as.factor(BioID)L000592	0.6734346	1.7144873	0.393	0.694533
as.factor(BioID)L000593	2.9040906	7.6043386	0.382	0.702593
as.factor(BioID)M000087	0.3339672	0.9484753	0.352	0.724808
as.factor(BioID)M000312	-0.0865372	0.2459814	-0.352	0.725037
as.factor(BioID)M000404	-0.1026072	0.2727724	-0.376	0.706851
as.factor(BioID)M000689	-0.1563145	0.4223486	-0.370	0.711357
as.factor(BioID)M001137	-0.0566084	0.1408189	-0.402	0.687749
as.factor(BioID)M001143	-0.0040986	0.0976577	-0.042	0.966529
as.factor(BioID)M001144	-0.2907950	0.7648884	-0.380	0.703869
as.factor(BioID)M001150	0.1631838	0.4913740	0.332	0.739865
as.factor(BioID)M001151	0.6829391	1.7990922	0.380	0.704297
as.factor(BioID)M001156	0.3502618	0.9634470	0.364	0.716247
as.factor(BioID)M001157	0.2755191	0.7677466	0.359	0.719747

as.factor(BioID)M001158	0.9808722	2.6528081	0.370	0.711625
as.factor(BioID)M001159	0.0270884	0.1307653	0.207	0.835920
as.factor(BioID)M001160	0.0380577	0.1642732	0.232	0.816825
as.factor(BioID)M001166	0.3286464	0.8692343	0.378	0.705422
as.factor(BioID)M001180	-0.2396781	0.6566684	-0.365	0.715172
as.factor(BioID)M001181	0.4654345	0.3753673	1.240	0.215200
as.factor(BioID)M001182	0.2814825	0.6669574	0.422	0.673060
as.factor(BioID)M001184	0.2991416	0.7282608	0.411	0.681309
as.factor(BioID)M001187	0.4189428	1.1174961	0.375	0.707795
as.factor(BioID)M001188	0.4113301	1.0510545	0.391	0.695597
as.factor(BioID)M001189	0.1643312	0.4460494	0.368	0.712619
as.factor(BioID)M001191	1.0987847	2.8076685	0.391	0.695596
as.factor(BioID)M001193	0.0551889	0.1925301	0.287	0.774421
as.factor(BioID)M001195	0.0236209	0.0895132	0.264	0.791909
as.factor(BioID)M001196	0.3842347	1.0046868	0.382	0.702190
as.factor(BioID)M001200	0.1529889	0.4396905	0.348	0.727931
as.factor(BioID)M001201	0.4737992	1.2327868	0.384	0.700790
as.factor(BioID)M001202	0.5028753	1.2904810	0.390	0.696831
as.factor(BioID)M001203	0.4265471	1.1110325	0.384	0.701095
as.factor(BioID)M001204	0.4274911	1.1266073	0.379	0.704410
as.factor(BioID)M001206	1.3732454	3.6203377	0.379	0.704511
as.factor(BioID)N000015	-0.3912020	0.9349344	-0.418	0.675698
as.factor(BioID)N000127	0.3727991	0.9357680	0.398	0.690403
as.factor(BioID)N000181	1.0388731	2.7483162	0.378	0.705484
as.factor(BioID)N000182	0.7507325	1.9701989	0.381	0.703227
as.factor(BioID)N000184	-0.0770839	0.2547637	-0.303	0.762261
as.factor(BioID)N000185	0.3173052	0.8382733	0.379	0.705099
as.factor(BioID)N000188	0.0483379	0.1576092	0.307	0.759120
as.factor(BioID)N000189	0.1007199	0.2627300	0.383	0.701511
as.factor(BioID)N000190	0.1261599	0.3724473	0.339	0.734861
as.factor(BioID)N000191	0.3036041	0.7950733	0.382	0.702624
as.factor(BioID)O000168	1.0600119	2.7957369	0.379	0.704631
as.factor(BioID)O000170	1.0148839	2.5903615	0.392	0.695270
as.factor(BioID)O000171	-0.0360592	0.1637357	-0.220	0.825725
as.factor(BioID)O000172	1.3337426	3.3392713	0.399	0.689650
as.factor(BioID)O000173	0.7722700	1.8792109	0.411	0.681168
as.factor(BioID)P000034	-0.0905193	0.2104545	-0.430	0.667178
as.factor(BioID)P000096	0.0359246	0.2686754	0.134	0.893651
as.factor(BioID)P000258	-0.5321022	0.5295722	-1.005	0.315174
as.factor(BioID)P000373	0.3162134	0.9467817	0.334	0.738438
as.factor(BioID)P000523	-0.3114197	0.7167238	-0.435	0.663988
as.factor(BioID)P000588	-0.3173850	0.7867496	-0.403	0.686705
as.factor(BioID)P000591	-0.0343788	0.1572282	-0.219	0.826950



as.factor(BioID)P000592	-0.3285720	0.8099999	-0.406	0.685065
as.factor(BioID)P000593	0.1879678	0.5278549	0.356	0.721820
as.factor(BioID)P000594	-0.0167995	0.1166085	-0.144	0.885468
as.factor(BioID)P000597	-0.0021381	0.1074367	-0.020	0.984125
as.factor(BioID)P000598	0.3486321	0.8159395	0.427	0.669242
as.factor(BioID)P000599	0.1865766	0.5092439	0.366	0.714136
as.factor(BioID)P000601	0.1812026	0.4483347	0.404	0.686150
as.factor(BioID)P000602	0.0273035	0.1052010	0.260	0.795259
as.factor(BioID)P000604	0.4296998	1.1699426	0.367	0.713462
as.factor(BioID)P000606	0.2933997	0.7622790	0.385	0.700370
as.factor(BioID)P000607	0.2388593	0.5963032	0.401	0.688799
as.factor(BioID)P000609	0.0717459	0.2630413	0.273	0.785081
as.factor(BioID)P000611	-0.0935752	0.3094394	-0.302	0.762389
as.factor(BioID)P000614	0.2862957	0.7094190	0.404	0.686594
as.factor(BioID)P000615	0.1611376	0.4668385	0.345	0.730019
as.factor(BioID)P000616	0.2551374	0.6480056	0.394	0.693841
as.factor(BioID)P000617	0.8262365	2.0271027	0.408	0.683632
as.factor(BioID)Q000023	0.2090157	0.5374131	0.389	0.697386
as.factor(BioID)R000053	0.2437950	0.7131753	0.342	0.732518
as.factor(BioID)R000395	-0.3926181	0.9484111	-0.414	0.678955
as.factor(BioID)R000409	2.2337696	5.9484701	0.376	0.707329
as.factor(BioID)R000435	1.6995818	2.7746211	0.613	0.540274
as.factor(BioID)R000486	1.8269486	4.9155027	0.372	0.710193
as.factor(BioID)R000487	1.7752223	4.7272795	0.376	0.707324
as.factor(BioID)R000515	-0.3356647	0.7888965	-0.425	0.670546
as.factor(BioID)R000575	-0.0696211	0.2030241	-0.343	0.731709
as.factor(BioID)R000576	-0.1699685	0.4157917	-0.409	0.682760
as.factor(BioID)R000577	0.6645616	1.7647378	0.377	0.706543
as.factor(BioID)R000578	0.4455338	0.3510278	1.269	0.204567
as.factor(BioID)R000580	0.2691457	0.1604224	1.678	0.093618
as.factor(BioID)R000582	-0.3563307	0.8947729	-0.398	0.690516
as.factor(BioID)R000583	0.7350190	1.9303579	0.381	0.703432
as.factor(BioID)R000585	1.2895152	2.9530099	0.437	0.662411
as.factor(BioID)R000586	0.6707320	1.7584536	0.381	0.702939
as.factor(BioID)R000587	0.2827110	0.6937220	0.408	0.683681
as.factor(BioID)R000588	0.1867628	0.4925463	0.379	0.704612
as.factor(BioID)R000591	0.2136179	0.4775363	0.447	0.654702
as.factor(BioID)R000592	0.0642672	0.1826107	0.352	0.724939
as.factor(BioID)R000593	0.5904697	1.5728781	0.375	0.707413
as.factor(BioID)R000597	0.1872538	0.5105961	0.367	0.713871
as.factor(BioID)R000598	0.4426261	1.1865242	0.373	0.709171
as.factor(BioID)R000601	0.0370951	0.1622184	0.229	0.819155
as.factor(BioID)R000602	0.1814260	0.4800838	0.378	0.705557

as.factor(BioID)R000603	0.3227833	0.8455929	0.382	0.702723
as.factor(BioID)R000604	0.1290106	0.3527087	0.366	0.714590
as.factor(BioID)R000606	0.4713825	1.2453723	0.379	0.705110
as.factor(BioID)R000607	1.9991189	2.5950329	0.770	0.441212
as.factor(BioID)R000610	0.7663606	2.0289892	0.378	0.705705
as.factor(BioID)R000612	0.1943535	0.5540939	0.351	0.725821
as.factor(BioID)R000614	1.2839329	3.3434781	0.384	0.701027
as.factor(BioID)S000018	0.0528758	0.1587130	0.333	0.739067
as.factor(BioID)S000030	2.3134422	6.1194265	0.378	0.705450
as.factor(BioID)S000051	0.5099643	0.1489931	3.423	0.000637 ***
as.factor(BioID)S000185	-0.2891891	0.6555925	-0.441	0.659199
as.factor(BioID)S000248	0.4690702	1.3077133	0.359	0.719876
as.factor(BioID)S000364	0.4463546	1.2368687	0.361	0.718246
as.factor(BioID)S000480	0.8101749	2.2610560	0.358	0.720159
as.factor(BioID)S000510	0.2997453	0.8378307	0.358	0.720573
as.factor(BioID)S000522	0.2834465	0.7721490	0.367	0.713608
as.factor(BioID)S000583	0.5496402	1.5884520	0.346	0.729377
as.factor(BioID)S001145	0.2080694	0.6118176	0.340	0.733843
as.factor(BioID)S001148	-0.2551203	0.6618887	-0.385	0.699967
as.factor(BioID)S001154	0.2447240	0.6597408	0.371	0.710738
as.factor(BioID)S001156	2.0109114	5.3363565	0.377	0.706354
as.factor(BioID)S001157	0.4615985	1.2561258	0.367	0.713317
as.factor(BioID)S001165	0.2032871	0.5999332	0.339	0.734773
as.factor(BioID)S001168	0.0096331	0.1277232	0.075	0.939890
as.factor(BioID)S001170	-0.0895680	0.2716887	-0.330	0.741697
as.factor(BioID)S001172	-0.0083798	0.0577225	-0.145	0.884594
as.factor(BioID)S001175	0.7014044	1.8128710	0.387	0.698886
as.factor(BioID)S001176	-0.1948263	0.4851080	-0.402	0.688028
as.factor(BioID)S001180	0.0839071	0.2598231	0.323	0.746788
as.factor(BioID)S001185	0.4451559	1.1358750	0.392	0.695186
as.factor(BioID)S001187	0.7123076	1.8496980	0.385	0.700225
as.factor(BioID)S001188	0.0140561	0.1390465	0.101	0.919494
as.factor(BioID)S001189	0.3625597	0.9320705	0.389	0.697347
as.factor(BioID)S001190	0.5352646	1.3886778	0.385	0.699962
as.factor(BioID)S001192	-0.0922254	0.2427344	-0.380	0.704044
as.factor(BioID)S001195	0.4170557	1.0822082	0.385	0.700017
as.factor(BioID)S001196	1.9703842	3.0442801	0.647	0.517580
as.factor(BioID)S001200	0.6144273	1.6117628	0.381	0.703101
as.factor(BioID)S001201	0.1437608	0.3882418	0.370	0.711224
as.factor(BioID)S001205	0.2156629	0.6058033	0.356	0.721897
as.factor(BioID)S001207	0.7612429	1.9597379	0.388	0.697747
as.factor(BioID)S001209	0.6211598	1.5628287	0.397	0.691089
as.factor(BioID)S001212	0.3352708	0.9012753	0.372	0.709951

as.factor(BioID)S001213	0.0214589	0.1174015	0.183	0.854995
as.factor(BioID)S001214	0.9776517	2.5704293	0.380	0.703745
as.factor(BioID)S001215	0.8378754	2.1588427	0.388	0.697990
as.factor(BioID)S001216	0.6452515	1.6142486	0.400	0.689421
as.factor(BioID)T000193	-0.1833608	0.4406911	-0.416	0.677417
as.factor(BioID)T000238	0.3634183	1.0114427	0.359	0.719419
as.factor(BioID)T000462	0.3109654	0.8587884	0.362	0.717332
as.factor(BioID)T000463	0.2899196	0.7870467	0.368	0.712656
as.factor(BioID)T000465	-0.0347343	0.1170513	-0.297	0.766705
as.factor(BioID)T000468	-0.0724956	0.2154880	-0.336	0.736600
as.factor(BioID)T000469	0.9962714	2.6107254	0.382	0.702810
as.factor(BioID)T000470	-0.1401698	0.3596609	-0.390	0.696796
as.factor(BioID)T000474	1.9256603	5.0848440	0.379	0.704963
as.factor(BioID)T000475	0.4907626	1.2657195	0.388	0.698271
as.factor(BioID)T000477	0.0245891	0.1180975	0.208	0.835095
as.factor(BioID)T000479	0.1318588	0.3502679	0.376	0.706637
as.factor(BioID)T000480	0.2268988	0.6239791	0.364	0.716187
as.factor(BioID)T000482	0.2663434	0.7034035	0.379	0.705004
as.factor(BioID)U000031	0.3643643	0.3289475	1.108	0.268192
as.factor(BioID)U000040	1.0826289	2.7948893	0.387	0.698547
as.factor(BioID)V000081	0.1147830	0.3912750	0.293	0.769292
as.factor(BioID)V000108	-0.3549190	0.8608482	-0.412	0.680189
as.factor(BioID)V000131	1.7875819	5.1000189	0.351	0.726011
as.factor(BioID)V000132	1.8273031	5.1807402	0.353	0.724357
as.factor(BioID)V000133	1.1490421	0.3791110	3.031	0.002482 **
as.factor(BioID)W000187	1.8995695	5.1565713	0.368	0.712646
as.factor(BioID)W000413	-0.4293044	1.1625098	-0.369	0.711966
as.factor(BioID)W000791	-0.3317672	0.8170437	-0.406	0.684761
as.factor(BioID)W000795	-0.3351678	0.8208191	-0.408	0.683090
as.factor(BioID)W000796	-0.1818638	0.4860233	-0.374	0.708320
as.factor(BioID)W000799	-0.0355199	0.1613577	-0.220	0.825800
as.factor(BioID)W000804	-0.2935574	0.7211576	-0.407	0.684022
as.factor(BioID)W000808	1.0806557	2.9048136	0.372	0.709931
as.factor(BioID)W000809	0.1229967	0.2741722	0.449	0.653780
as.factor(BioID)W000810	0.2316614	0.6308765	0.367	0.713520
as.factor(BioID)W000812	-0.0194654	0.1189486	-0.164	0.870034
as.factor(BioID)W000813	-0.0001427	0.0853835	-0.002	0.998667
as.factor(BioID)W000814	0.4585303	1.2865273	0.356	0.721587
as.factor(BioID)W000815	-0.0632676	0.1882847	-0.336	0.736905
as.factor(BioID)W000816	1.0809367	2.9073264	0.372	0.710099
as.factor(BioID)W000820	2.3863115	6.2765059	0.380	0.703855
as.factor(BioID)W000821	0.1440592	0.3716232	0.388	0.698334
as.factor(BioID)W000822	0.5335239	1.4346103	0.372	0.710026

```

as.factor(BioID)W000823  0.7750664  0.7374075   1.051  0.293404
as.factor(BioID)W000825  0.6877688  1.7766880   0.387  0.698734
as.factor(BioID)W000826  0.4356259  1.1061989   0.394  0.693784
as.factor(BioID)Y000033 -0.7466633  1.8530727  -0.403  0.687058
as.factor(BioID)Y000062          NA          NA          NA          NA
as.factor(BioID)Y000063          NA          NA          NA          NA
as.factor(BioID)Y000065          NA          NA          NA          NA
as.factor(BioID)Y000066          NA          NA          NA          NA
as.factor(BioID)Z000017          NA          NA          NA          NA
seniority                0.0242505  0.0567309   0.427  0.669105
Contribution_minus_log    0.0004834  0.0014424   0.335  0.737574
Contribution_plus_log    -0.0008799  0.0011041  -0.797  0.425597
Dmajority                NA          NA          NA          NA
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Residual standard error: 0.1125 on 1429 degrees of freedom

(413 observations deleted due to missingness)

Multiple R-squared: 0.9619, Adjusted R-squared: 0.9494

F-statistic: 76.61 on 471 and 1429 DF, p-value: < 2.2e-16

Using actual contributions instead of pro\_env and anti\_env dummy makes the coefficients more significant!

The difference between the ols before and this ols is the individual fixed effects instead of state effects. so we are fixing for individuals so we dont include person specific changes in the analysis and for the same person can see how their voting changes.

this is very useful since this way we account for changes that previously we could not account for, since they are either immesurable or just endogenous in this analysis that change the amount of contributions representatives receive, such as:

- difference in eloquence between representatives
- difference in connections to special interest groups
- difference in the amount of time spent on the campaign trail
- difference in the amount of time spent in office
- professional history with contributions (i.e. previous profession, previous income, etc. before history in office)
- high explanation of the model (multiple  $R^2 = 0.96$ )

Downsides of this model are however that the model is incredibly strict, so:

- cannot include 2 FEs that are strict, i.e. state (50 states) and individuals (about 570 individuals)

- cannot include time fixed effects, since the model is already too strict
- not much significance

Interpretation:

We are fixing for individuals to determine whether changes in contributions can be associated with changes in voting behavior for each representative. Only few representatives are significant, i.e. V000133, S000051, P00025, G000578... out of these 4 representatives with significant coefficients, two changed their voting behavior once.

- Marshall (Mark) Sanford from anti -> pro environment (which means that when you hold constant for this representative, then a change in from anti to pro env means 0.49 units more likely to change their vote?)
- Mark Gaetz from anti to pro environmental vote. (for Gaetz, this is 0.2880450 units more likely to change their vote from anti to pro environmental vote)

## LPM per Vote

This LPM is more specific since it only includes the each separate vote, but all contributions of the votes leading up to it. E.g. In `ols_4_2` I include not only the vote 4, but also the contributions of the vote 3 which is on the same topic. this way it is easier to analyse whether the contributions from the previous relevant votes have an effect on the voting behavior of the representatives. -> **remove recency bias** attached to the 6mo prior vote

Does this change the coefficients? Since in the previous model we were fixing for instances, this shouldnt change anything, we could not see how the coefficients change over time. Why use this format - if we could fix year in model before ?

We do this because we want to see how prior contributions in similar votes could affect the voting. ### vote and all contributions leading up to the vote with state FEs

can fix for states here, but not for instances, since this is already just that, and not for year and individuals, since these are all the same too.

```
# Vote 4_2
view(df_vote_4_2)
ols_4_2 <- plm(Vote4_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_minus
```

Warning in `pdata.frame(data, index)`: duplicate couples (id-time) in resulting `pdata.frame` to find out which, use, e.g., `table(index(your_pdataframe), useNA = "ifany")`

```
summary(ols_4_2)
```

Oneway (individual) effect Within Model

Call:

```
plm(formula = Vote4_minus ~ Contribution_3_minus + Contribution_3_plus +  
      Contribution_4_minus + Contribution_4_plus + seniority_114 +  
      nominate_dim1 + nominate_dim2 + gender + pro_env_dummy +  
      anti_env_dummy, data = df_vote_4_2, model = "within", index = c("state",  
      "party"))
```

Unbalanced Panel: n = 46, T = 1-45, N = 332

Residuals:

	Min.	1st Qu.	Median	3rd Qu.	Max.
	-0.79396	-0.21720	0.00000	0.21463	1.06153

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t )	
Contribution_3_minus	4.3495e-06	1.2592e-06	3.4543	0.0006384	***
Contribution_3_plus	-1.5177e-05	1.0816e-05	-1.4033	0.1616474	
Contribution_4_minus	2.8648e-06	1.0955e-06	2.6150	0.0094128	**
Contribution_4_plus	2.7911e-06	1.2965e-05	0.2153	0.8297018	
seniority_114	-1.8833e-02	5.5709e-03	-3.3806	0.0008277	***
nominate_dim1	1.0195e+00	1.7938e-01	5.6832	3.356e-08	***
nominate_dim2	1.1693e-01	1.4339e-01	0.8155	0.4154812	
genderM	2.1898e-01	5.7297e-02	3.8218	0.0001638	***
pro_env_dummy	1.1338e-02	6.2500e-02	0.1814	0.8561815	
anti_env_dummy	3.1421e-02	8.2448e-02	0.3811	0.7034204	
---					

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 57.118

Residual Sum of Squares: 38.594

R-Squared: 0.32431

Adj. R-Squared: 0.18966

F-statistic: 13.2471 on 10 and 276 DF, p-value: < 2.22e-16

```
# Vote 51_2
```

```
ols_51_2 <- plm(Vote51_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_m  
summary(ols_51_2)
```

Oneway (individual) effect Within Model

Call:

```
plm(formula = Vote51_minus ~ Contribution_3_minus + Contribution_3_plus +  
      Contribution_4_minus + Contribution_4_plus + Contribution_51_minus +  
      Contribution_51_plus + seniority_1151 + party + nominate_dim1 +  
      nominate_dim2 + gender + pro_env_dummy + anti_env_dummy,  
      data = df_vote_51_2, model = "within", index = c("state"))
```

Unbalanced Panel: n = 45, T = 1-39, N = 281

Residuals:

Min.	1st Qu.	Median	3rd Qu.	Max.
-0.848277	-0.026441	0.000000	0.030687	0.808670

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t )
Contribution_3_minus	9.2140e-07	5.9396e-07	1.5513	0.122250
Contribution_3_plus	-8.1021e-06	5.0527e-06	-1.6035	0.110234
Contribution_4_minus	-1.1362e-07	5.4758e-07	-0.2075	0.835809
Contribution_4_plus	-1.2166e-05	4.5386e-06	-2.6806	0.007898 **
Contribution_51_minus	3.8857e-07	4.4354e-07	0.8761	0.381926
Contribution_51_plus	-9.3277e-07	3.4160e-06	-0.2731	0.785062
seniority_1151	1.0673e-03	2.2859e-03	0.4669	0.641023
partyR	9.4772e-01	2.4208e-02	39.1493	< 2.2e-16 ***
nominate_dim1	-4.4587e-02	7.9063e-02	-0.5639	0.573361
nominate_dim2	9.4747e-02	5.7819e-02	1.6387	0.102692
genderM	3.2406e-03	2.3106e-02	0.1402	0.888592
pro_env_dummy	2.6298e-02	2.2236e-02	1.1827	0.238197
anti_env_dummy	4.1973e-02	3.1590e-02	1.3286	0.185321

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 50.56

Residual Sum of Squares: 3.9051

R-Squared: 0.92276

Adj. R-Squared: 0.90302

F-statistic: 204.936 on 13 and 223 DF, p-value: < 2.22e-16

```
# Vote 52_2
```

```
ols_52_2 <- plm(Vote52_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_m  
summary(ols_52_2)
```

Oneway (individual) effect Within Model

Call:

```
plm(formula = Vote52_minus ~ Contribution_3_minus + Contribution_3_plus +  
      Contribution_4_minus + Contribution_4_plus + Contribution_51_minus +  
      Contribution_51_plus + Contribution_52_minus + Contribution_52_plus +  
      seniority_1152 + party + nominate_dim1 + nominate_dim2 +  
      gender + pro_env_dummy + anti_env_dummy, data = df_vote_52_2,  
      model = "within", index = c("state"))
```

Unbalanced Panel: n = 45, T = 1-34, N = 268

Residuals:

	Min.	1st Qu.	Median	3rd Qu.	Max.
	-0.89843798	-0.03361441	0.00096878	0.04373188	0.84351121

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t )
Contribution_3_minus	-2.4067e-07	8.3605e-07	-0.2879	0.77373
Contribution_3_plus	-4.3165e-06	6.4806e-06	-0.6661	0.50611
Contribution_4_minus	-1.0036e-07	7.3751e-07	-0.1361	0.89189
Contribution_4_plus	6.6762e-06	5.9969e-06	1.1133	0.26687
Contribution_51_minus	4.0724e-06	1.7775e-06	2.2910	0.02296 *
Contribution_51_plus	8.5020e-06	5.0695e-06	1.6771	0.09502 .
Contribution_52_minus	-2.7300e-06	1.4941e-06	-1.8272	0.06910 .
Contribution_52_plus	-1.4157e-05	3.0291e-06	-4.6736	5.314e-06 ***
seniority_1152	-2.1121e-03	2.8913e-03	-0.7305	0.46592
partyR	8.8526e-01	3.0613e-02	28.9177	< 2.2e-16 ***
nominate_dim1	3.9892e-02	1.0256e-01	0.3889	0.69771
nominate_dim2	3.9675e-02	7.7107e-02	0.5145	0.60741
genderM	4.1150e-02	2.8994e-02	1.4193	0.15731
pro_env_dummy	1.7033e-02	2.7304e-02	0.6238	0.53342
anti_env_dummy	5.0035e-02	4.3327e-02	1.1548	0.24949

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 46.843

Residual Sum of Squares: 5.6483

R-Squared: 0.87942

Adj. R-Squared: 0.84522

F-statistic: 101.134 on 15 and 208 DF, p-value: < 2.22e-16



```
# Vote 6_2
ols_6_2 <- plm(Vote6_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_minus + Contribution_4_plus + Contribution_51_minus + Contribution_51_plus + Contribution_52_minus + Contribution_52_plus + Contribution_6_minus + Contribution_6_plus + seniority_116 + party + nominate_dim1 + nominate_dim2 + gender + pro_env_dummy + anti_env_dummy, data = df_vote_6_2, model = "within", index = c("state"))
summary(ols_6_2)
```

Oneway (individual) effect Within Model

Call:

```
plm(formula = Vote6_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_minus + Contribution_4_plus + Contribution_51_minus + Contribution_51_plus + Contribution_52_minus + Contribution_52_plus + Contribution_6_minus + Contribution_6_plus + seniority_116 + party + nominate_dim1 + nominate_dim2 + gender + pro_env_dummy + anti_env_dummy, data = df_vote_6_2, model = "within", index = c("state"))
```

Unbalanced Panel: n = 42, T = 1-34, N = 224

Residuals:

	Min.	1st Qu.	Median	3rd Qu.	Max.
	-0.4727858	-0.0214771	-0.0027863	0.0124646	0.9372705

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t )
Contribution_3_minus	-2.0502e-06	5.7393e-07	-3.5722	0.0004642 ***
Contribution_3_plus	-2.5997e-06	4.3407e-06	-0.5989	0.5500497
Contribution_4_minus	3.7107e-09	4.7783e-07	0.0078	0.9938133
Contribution_4_plus	6.1685e-06	3.7126e-06	1.6615	0.0985140 .
Contribution_51_minus	3.6897e-06	1.2149e-06	3.0370	0.0027778 **
Contribution_51_plus	-3.8942e-07	5.2048e-06	-0.0748	0.9404492
Contribution_52_minus	-1.7538e-06	1.0518e-06	-1.6674	0.0973291 .
Contribution_52_plus	-1.4213e-06	4.8284e-06	-0.2944	0.7688473
Contribution_6_minus	1.2000e-08	4.5678e-07	0.0263	0.9790728
Contribution_6_plus	-2.2133e-06	9.8655e-06	-0.2244	0.8227606
seniority_116	-2.1524e-03	1.8804e-03	-1.1446	0.2540154
partyR	9.7702e-01	2.0573e-02	47.4904	< 2.2e-16 ***
nominate_dim1	-3.7533e-02	6.6732e-02	-0.5625	0.5745727
nominate_dim2	7.0570e-02	5.0176e-02	1.4064	0.1614755
genderM	2.3008e-02	1.8072e-02	1.2731	0.2047665
pro_env_dummy	5.5802e-03	2.9821e-02	0.1871	0.8517931
anti_env_dummy	1.2590e-02	2.6285e-02	0.4790	0.6325723

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 38.836  
 Residual Sum of Squares: 1.4101  
 R-Squared: 0.96369  
 Adj. R-Squared: 0.95093  
 F-statistic: 257.614 on 17 and 165 DF, p-value: < 2.22e-16

```
# Vote 7_2
view(df_vote_7_2)
ols_7_2 <- plm(Vote7_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_minus + Contribution_4_plus, data = df_vote_7_2, model = "within", index = c("state"))
summary(ols_7_2)
```

Oneway (individual) effect Within Model

Call:

```
plm(formula = Vote7_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_minus + Contribution_4_plus + Contribution_51_minus + Contribution_51_plus + Contribution_52_minus + Contribution_52_plus + Contribution_6_minus + Contribution_6_plus + Contribution_7_minus + Contribution_7_plus + seniority_117 + party + gender + pro_env_dummy + anti_env_dummy + nominate_dim1 + nominate_dim2, data = df_vote_7_2, model = "within", index = c("state"))
```

Unbalanced Panel: n = 38, T = 1-30, N = 179

Residuals:

Min.	1st Qu.	Median	3rd Qu.	Max.
-4.3224e-01	-2.5864e-02	-2.4144e-15	2.6120e-02	2.6912e-01

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t )
Contribution_3_minus	-1.9145e-06	5.9773e-07	-3.2030	0.001735 **
Contribution_3_plus	-2.4562e-06	4.2255e-06	-0.5813	0.562121
Contribution_4_minus	-2.4510e-06	5.5125e-07	-4.4463	1.939e-05 ***
Contribution_4_plus	-1.7205e-05	3.5986e-06	-4.7811	4.921e-06 ***
Contribution_51_minus	5.8359e-06	1.1615e-06	5.0244	1.749e-06 ***
Contribution_51_plus	-1.5560e-06	5.0671e-06	-0.3071	0.759302
Contribution_52_minus	-2.2717e-06	1.0841e-06	-2.0954	0.038201 *
Contribution_52_plus	2.7410e-06	4.2222e-06	0.6492	0.517443
Contribution_6_minus	1.3637e-06	5.4545e-07	2.5001	0.013743 *
Contribution_6_plus	-9.6421e-06	7.2868e-06	-1.3232	0.188235
Contribution_7_minus	-5.6068e-07	4.9777e-07	-1.1264	0.262216
Contribution_7_plus	9.9513e-06	8.0779e-06	1.2319	0.220349

seniority_117	3.4662e-04	1.7875e-03	0.1939	0.846565
partyR	9.5806e-01	2.0127e-02	47.6016	< 2.2e-16 ***
genderM	5.0855e-03	1.6847e-02	0.3019	0.763267
pro_env_dummy	-9.6070e-03	2.8221e-02	-0.3404	0.734126
anti_env_dummy	1.3249e-02	2.1717e-02	0.6101	0.542951
nominate_dim1	7.6090e-02	6.5826e-02	1.1559	0.249972
nominate_dim2	8.4126e-02	4.7185e-02	1.7829	0.077088 .

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 26.033

Residual Sum of Squares: 0.68962

R-Squared: 0.97351

Adj. R-Squared: 0.96135

F-statistic: 235.968 on 19 and 122 DF, p-value: < 2.22e-16

Why dont the anti\_env\_dummy coefficients show up? Are they singularities?

## LPM with consistent Representatives

with control variables

```
df_long_no_change <- df_long %>%
  filter(Vote_change == 0) %>%
  select(-Vote_change)

ols_no_change <- lm(Vote ~ . - state - BioID, data = df_long_no_change)
summary(ols_no_change)
```

Call:

```
lm(formula = Vote ~ . - state - BioID, data = df_long_no_change)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.97173	-0.01672	-0.00456	0.00837	0.96082

Coefficients:

Estimate	Std. Error	t value	Pr(> t )
----------	------------	---------	----------

```

(Intercept)      1.373e+00  4.488e-01   3.060 0.002244 **
district         1.056e-03  2.204e-04   4.791 1.80e-06 ***
partyR           -9.684e-01  5.293e-03 -182.978 < 2e-16 ***
birthday         -1.799e-04  2.285e-04  -0.787 0.431120
genderM          1.008e-03  5.298e-03   0.190 0.849178
nominate_dim1    -7.613e-02  1.676e-02  -4.542 5.94e-06 ***
nominate_dim2    -3.746e-02  1.251e-02  -2.995 0.002783 **
GeographicalNE   3.872e-02  6.527e-03   5.932 3.57e-09 ***
GeographicalSO   1.341e-02  5.381e-03   2.492 0.012790 *
GeographicalWE   6.452e-03  6.438e-03   1.002 0.316359
Instance         1.112e-04  1.030e-04   1.079 0.280516
seniority        -2.143e-03  6.046e-04  -3.545 0.000403 ***
Contribution_minus -8.040e-08  8.633e-08  -0.931 0.351790
Contribution_plus 1.334e-06  9.545e-07   1.398 0.162324
Dmajority        1.133e-02  5.001e-03   2.266 0.023577 *
anti_env_dummy   -1.096e-02  7.555e-03  -1.451 0.146880
pro_env_dummy     4.386e-03  5.389e-03   0.814 0.415847
---

```

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.08503 on 1796 degrees of freedom

(401 observations deleted due to missingness)

Multiple R-squared: 0.9713, Adjusted R-squared: 0.971

F-statistic: 3798 on 16 and 1796 DF, p-value: < 2.2e-16

## party & year FE

```

ols_party_no_change <- lm(Vote ~ district + birthday + nominate_dim1 + nominate_dim2 + Geogr
summary(ols_party_no_change)

```

Call:

```

lm(formula = Vote ~ district + birthday + nominate_dim1 + nominate_dim2 +
    Geographical + as.factor(party) + as.factor(Instance) + seniority +
    Contribution_minus + Contribution_plus + gender + pro_env_dummy +
    anti_env_dummy, data = df_long)

```

Residuals:

```

      Min       1Q   Median       3Q      Max
-0.98664 -0.04059 -0.01140  0.02301  1.00436

```

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-4.263e-01	7.842e-01	-0.544	0.58680
district	7.851e-04	3.719e-04	2.111	0.03489 *
birthday	7.414e-04	3.994e-04	1.856	0.06355 .
nominate_dim1	-1.412e-01	2.852e-02	-4.950	8.10e-07 ***
nominate_dim2	-6.979e-02	2.135e-02	-3.269	0.00110 **
GeographicalNE	7.292e-02	1.123e-02	6.490	1.09e-10 ***
GeographicalSO	8.676e-03	9.407e-03	0.922	0.35645
GeographicalWE	1.943e-02	1.124e-02	1.729	0.08400 .
as.factor(party)R	-9.011e-01	8.864e-03	-101.662	< 2e-16 ***
as.factor(Instance)4	1.007e-02	1.206e-02	0.835	0.40400
as.factor(Instance)6	3.505e-02	1.237e-02	2.833	0.00465 **
as.factor(Instance)7	2.546e-02	1.309e-02	1.945	0.05196 .
as.factor(Instance)51	2.387e-02	1.223e-02	1.952	0.05107 .
as.factor(Instance)52	3.305e-02	1.232e-02	2.683	0.00737 **
seniority	1.643e-03	1.042e-03	1.578	0.11484
Contribution_minus	-6.107e-07	1.479e-07	-4.130	3.79e-05 ***
Contribution_plus	7.200e-06	1.402e-06	5.137	3.08e-07 ***
genderM	-2.513e-02	9.246e-03	-2.718	0.00663 **
pro_env_dummy	-6.747e-03	9.173e-03	-0.736	0.46206
anti_env_dummy	-2.101e-02	1.318e-02	-1.594	0.11119

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1516 on 1881 degrees of freedom

(413 observations deleted due to missingness)

Multiple R-squared: 0.9088, Adjusted R-squared: 0.9079

F-statistic: 986.8 on 19 and 1881 DF, p-value: < 2.2e-16

## with state & year FE

```
ols_no_change_2 <- lm(Vote ~ as.factor(Geographical) + as.factor(Instance) + district + party +  
summary(ols_no_change_2)
```

Call:

```
lm(formula = Vote ~ as.factor(Geographical) + as.factor(Instance) +  
    district + party + birthday + nominate_dim1 + nominate_dim2 +
```

```
seniority + Contribution_minus + Contribution_plus + gender +
pro_env_dummy + anti_env_dummy, data = df_long_no_change)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-0.96882	-0.01703	-0.00472	0.00885	0.95921

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	1.374e+00	4.499e-01	3.053	0.002301	**
as.factor(Geographical)NE	3.864e-02	6.530e-03	5.918	3.91e-09	***
as.factor(Geographical)SO	1.333e-02	5.383e-03	2.477	0.013352	*
as.factor(Geographical)WE	6.489e-03	6.440e-03	1.008	0.313821	
as.factor(Instance)4	5.668e-03	6.954e-03	0.815	0.415118	
as.factor(Instance)6	1.619e-02	7.084e-03	2.286	0.022398	*
as.factor(Instance)7	1.267e-02	7.499e-03	1.690	0.091241	.
as.factor(Instance)51	5.138e-03	7.049e-03	0.729	0.466117	
as.factor(Instance)52	1.146e-02	7.086e-03	1.617	0.106064	
district	1.055e-03	2.205e-04	4.784	1.86e-06	***
partyR	-9.685e-01	5.298e-03	-182.794	< 2e-16	***
birthday	-1.812e-04	2.292e-04	-0.791	0.429233	
nominate_dim1	-7.634e-02	1.677e-02	-4.553	5.65e-06	***
nominate_dim2	-3.739e-02	1.251e-02	-2.988	0.002849	**
seniority	-2.140e-03	6.070e-04	-3.526	0.000433	***
Contribution_minus	-8.368e-08	8.647e-08	-0.968	0.333321	
Contribution_plus	1.341e-06	9.551e-07	1.405	0.160324	
genderM	1.039e-03	5.301e-03	0.196	0.844713	
pro_env_dummy	4.250e-03	5.392e-03	0.788	0.430654	
anti_env_dummy	-1.093e-02	7.562e-03	-1.445	0.148700	

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.08506 on 1793 degrees of freedom

(401 observations deleted due to missingness)

Multiple R-squared: 0.9713, Adjusted R-squared: 0.971

F-statistic: 3196 on 19 and 1793 DF, p-value: < 2.2e-16

Here, using geographical regions instead of state fixed effects creates more significant results. Also, need to remove Majority because too specific?

## with individual FEs

```
ols_no_change_3 <- lm(Vote ~ nominate_dim1 + nominate_dim2 + as.factor(Instance) + as.factor  
summary(ols_no_change_3)
```

Call:

```
lm(formula = Vote ~ nominate_dim1 + nominate_dim2 + as.factor(Instance) +  
    as.factor(BioID) + seniority + Contribution_minus + Contribution_plus +  
    Dmajority, data = df_long_no_change)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-0.24950	-0.00040	0.00022	0.00089	0.74727

Coefficients: (3 not defined because of singularities)

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-9.196e-03	2.606e-01	-0.035	0.97185
nominate_dim1	3.157e-02	5.884e-01	0.054	0.95723
nominate_dim2	-3.517e-02	2.213e-01	-0.159	0.87377
as.factor(Instance)4	-1.234e-03	8.880e-03	-0.139	0.88946
as.factor(Instance)6	-7.955e-04	2.632e-02	-0.030	0.97589
as.factor(Instance)7	-4.133e-03	3.504e-02	-0.118	0.90612
as.factor(Instance)51	-2.307e-03	1.757e-02	-0.131	0.89558
as.factor(Instance)52	-1.512e-03	1.758e-02	-0.086	0.93146
as.factor(BioID)A000367	1.128e-02	2.552e-01	0.044	0.96475
as.factor(BioID)A000369	1.410e-04	1.605e-02	0.009	0.99299
as.factor(BioID)A000370	9.924e-01	2.413e-02	41.121	< 2e-16 ***
as.factor(BioID)A000371	1.003e+00	5.532e-02	18.132	< 2e-16 ***
as.factor(BioID)A000372	-3.674e-03	1.994e-01	-0.018	0.98530
as.factor(BioID)A000374	-8.806e-05	1.056e-01	-0.001	0.99933
as.factor(BioID)A000375	-1.043e-02	1.255e-01	-0.083	0.93380
as.factor(BioID)A000376	1.021e+00	1.608e-01	6.351	2.77e-10 ***
as.factor(BioID)A000377	-8.506e-04	4.063e-02	-0.021	0.98330
as.factor(BioID)A000378	1.021e+00	7.334e-02	13.918	< 2e-16 ***
as.factor(BioID)B000213	-2.476e-02	9.607e-02	-0.258	0.79662
as.factor(BioID)B000287	9.880e-01	4.587e-02	21.538	< 2e-16 ***
as.factor(BioID)B000574	1.005e+00	4.228e-02	23.764	< 2e-16 ***
as.factor(BioID)B000755	-1.149e-02	4.496e-02	-0.256	0.79824
as.factor(BioID)B000911	9.873e-01	7.280e-02	13.562	< 2e-16 ***
as.factor(BioID)B001227	9.891e-01	3.747e-02	26.394	< 2e-16 ***

as.factor(BioID)B001248	-1.142e-02	7.080e-02	-0.161	0.87184	
as.factor(BioID)B001250	-1.260e-02	5.013e-02	-0.251	0.80158	
as.factor(BioID)B001251	9.937e-01	3.932e-02	25.270	< 2e-16	***
as.factor(BioID)B001255	1.347e-03	1.902e-02	0.071	0.94356	
as.factor(BioID)B001257	-9.291e-03	5.165e-02	-0.180	0.85725	
as.factor(BioID)B001260	-5.162e-03	6.265e-02	-0.082	0.93435	
as.factor(BioID)B001269	1.135e-02	5.229e-02	0.217	0.82815	
as.factor(BioID)B001270	9.905e-01	8.885e-02	11.148	< 2e-16	***
as.factor(BioID)B001271	-3.709e-03	4.505e-02	-0.082	0.93440	
as.factor(BioID)B001273	-4.119e-03	1.073e-01	-0.038	0.96939	
as.factor(BioID)B001274	-4.716e-04	1.855e-01	-0.003	0.99797	
as.factor(BioID)B001275	6.575e-03	3.273e-02	0.201	0.84081	
as.factor(BioID)B001278	1.007e+00	4.499e-02	22.387	< 2e-16	***
as.factor(BioID)B001281	9.944e-01	1.802e-02	55.186	< 2e-16	***
as.factor(BioID)B001282	2.793e-03	7.298e-02	0.038	0.96948	
as.factor(BioID)B001283	-8.412e-03	1.667e-01	-0.050	0.95977	
as.factor(BioID)B001284	4.242e-03	2.733e-02	0.155	0.87667	
as.factor(BioID)B001285	9.994e-01	8.662e-02	11.538	< 2e-16	***
as.factor(BioID)B001286	1.002e+00	1.180e-01	8.487	< 2e-16	***
as.factor(BioID)B001287	1.000e+00	1.246e-01	8.029	1.89e-15	***
as.factor(BioID)B001289	-3.304e-03	1.367e-01	-0.024	0.98072	
as.factor(BioID)B001290	-7.111e-03	2.787e-01	-0.026	0.97965	
as.factor(BioID)B001291	-1.177e-02	1.715e-01	-0.069	0.94526	
as.factor(BioID)B001292	9.996e-01	2.129e-02	46.953	< 2e-16	***
as.factor(BioID)B001293	-1.148e-03	2.601e-02	-0.044	0.96479	
as.factor(BioID)B001294	1.075e-02	1.451e-01	0.074	0.94094	
as.factor(BioID)B001295	-2.045e-03	3.294e-02	-0.062	0.95051	
as.factor(BioID)B001296	1.000e+00	1.475e-02	67.834	< 2e-16	***
as.factor(BioID)B001297	3.017e-03	2.057e-01	0.015	0.98830	
as.factor(BioID)B001298	6.365e-03	5.726e-02	0.111	0.91150	
as.factor(BioID)B001299	-9.477e-03	1.401e-01	-0.068	0.94609	
as.factor(BioID)B001300	9.967e-01	6.406e-02	15.559	< 2e-16	***
as.factor(BioID)B001301	-1.910e-03	2.177e-02	-0.088	0.93010	
as.factor(BioID)B001302	2.710e-03	3.376e-01	0.008	0.99359	
as.factor(BioID)B001303	1.004e+00	2.979e-02	33.694	< 2e-16	***
as.factor(BioID)B001304	1.001e+00	4.274e-02	23.421	< 2e-16	***
as.factor(BioID)B001306	1.521e-03	5.800e-02	0.026	0.97908	
as.factor(BioID)B001307	1.689e-02	1.483e-01	0.114	0.90935	
as.factor(BioID)B001309	2.169e-03	2.165e-01	0.010	0.99201	
as.factor(BioID)C000059	-8.320e-03	9.630e-02	-0.086	0.93117	
as.factor(BioID)C000266	-1.643e-02	5.370e-02	-0.306	0.75966	
as.factor(BioID)C000537	9.873e-01	4.751e-02	20.784	< 2e-16	***
as.factor(BioID)C000714	9.871e-01	1.273e-01	7.752	1.60e-14	***



as.factor(BioID)C000754	9.904e-01	2.336e-01	4.239	2.37e-05	***
as.factor(BioID)C000984	9.859e-01	6.763e-02	14.578	< 2e-16	***
as.factor(BioID)C001036	9.925e-01	6.387e-02	15.539	< 2e-16	***
as.factor(BioID)C001037	9.830e-01	6.593e-02	14.910	< 2e-16	***
as.factor(BioID)C001038	9.879e-01	7.785e-02	12.689	< 2e-16	***
as.factor(BioID)C001045	9.011e-04	5.503e-02	0.016	0.98694	
as.factor(BioID)C001048	-2.896e-03	5.483e-02	-0.053	0.95788	
as.factor(BioID)C001051	4.585e-03	8.929e-02	0.051	0.95905	
as.factor(BioID)C001053	4.259e-03	4.183e-02	0.102	0.91893	
as.factor(BioID)C001055	1.002e+00	1.372e-01	7.303	4.42e-13	***
as.factor(BioID)C001061	9.876e-01	4.946e-02	19.969	< 2e-16	***
as.factor(BioID)C001066	9.909e-01	3.614e-02	27.418	< 2e-16	***
as.factor(BioID)C001067	9.921e-01	1.150e-01	8.628	< 2e-16	***
as.factor(BioID)C001068	1.002e+00	1.335e-02	75.017	< 2e-16	***
as.factor(BioID)C001069	9.930e-01	8.817e-02	11.262	< 2e-16	***
as.factor(BioID)C001072	9.906e-01	4.261e-02	23.250	< 2e-16	***
as.factor(BioID)C001076	-5.567e-03	1.500e-01	-0.037	0.97040	
as.factor(BioID)C001078	9.957e-01	9.679e-02	10.287	< 2e-16	***
as.factor(BioID)C001080	1.002e+00	7.710e-02	12.996	< 2e-16	***
as.factor(BioID)C001083	1.003e+00	9.964e-02	10.070	< 2e-16	***
as.factor(BioID)C001084	1.003e+00	1.534e-02	65.360	< 2e-16	***
as.factor(BioID)C001087	2.274e-03	5.532e-02	0.041	0.96722	
as.factor(BioID)C001090	9.960e-01	6.445e-02	15.454	< 2e-16	***
as.factor(BioID)C001091	9.970e-01	2.285e-02	43.626	< 2e-16	***
as.factor(BioID)C001092	3.990e-03	2.366e-02	0.169	0.86610	
as.factor(BioID)C001093	-7.682e-03	1.160e-01	-0.066	0.94721	
as.factor(BioID)C001094	2.778e-03	1.915e-02	0.145	0.88465	
as.factor(BioID)C001097	9.945e-01	4.073e-02	24.413	< 2e-16	***
as.factor(BioID)C001101	1.002e+00	7.629e-02	13.141	< 2e-16	***
as.factor(BioID)C001103	1.524e-03	1.295e-01	0.012	0.99061	
as.factor(BioID)C001105	1.376e-02	5.220e-02	0.264	0.79214	
as.factor(BioID)C001107	1.009e+00	1.061e-01	9.506	< 2e-16	***
as.factor(BioID)C001108	-9.257e-03	9.784e-02	-0.095	0.92463	
as.factor(BioID)C001109	2.526e-02	1.649e-01	0.153	0.87826	
as.factor(BioID)C001110	1.008e+00	5.078e-02	19.852	< 2e-16	***
as.factor(BioID)C001111	1.005e+00	1.073e-01	9.359	< 2e-16	***
as.factor(BioID)C001112	1.003e+00	5.582e-02	17.966	< 2e-16	***
as.factor(BioID)C001114	2.394e-04	4.203e-02	0.006	0.99546	
as.factor(BioID)C001117	1.007e+00	2.326e-01	4.329	1.59e-05	***
as.factor(BioID)C001118	-5.980e-03	2.137e-01	-0.028	0.97768	
as.factor(BioID)C001119	1.024e+00	9.144e-02	11.196	< 2e-16	***
as.factor(BioID)C001120	6.176e-03	6.571e-02	0.094	0.92513	
as.factor(BioID)C001121	1.007e+00	3.950e-02	25.491	< 2e-16	***

as.factor(BioID)D000096	9.898e-01	3.417e-02	28.972	< 2e-16	***
as.factor(BioID)D000191	9.756e-01	1.385e-01	7.045	2.75e-12	***
as.factor(BioID)D000197	9.929e-01	2.985e-02	33.264	< 2e-16	***
as.factor(BioID)D000216	9.823e-01	1.018e-01	9.645	< 2e-16	***
as.factor(BioID)D000399	9.931e-01	4.491e-02	22.115	< 2e-16	***
as.factor(BioID)D000482	9.878e-01	1.283e-01	7.701	2.35e-14	***
as.factor(BioID)D000533	-1.263e-02	9.204e-02	-0.137	0.89085	
as.factor(BioID)D000598	9.914e-01	9.593e-02	10.335	< 2e-16	***
as.factor(BioID)D000600	-4.176e-03	1.124e-01	-0.037	0.97037	
as.factor(BioID)D000604	-2.449e-03	1.388e-01	-0.018	0.98593	
as.factor(BioID)D000610	9.948e-01	3.815e-02	26.074	< 2e-16	***
as.factor(BioID)D000612	5.078e-03	5.822e-02	0.087	0.93051	
as.factor(BioID)D000614	-6.780e-03	4.884e-02	-0.139	0.88960	
as.factor(BioID)D000615	-1.304e-02	1.573e-01	-0.083	0.93392	
as.factor(BioID)D000616	-1.127e-02	7.977e-02	-0.141	0.88767	
as.factor(BioID)D000617	1.003e+00	6.950e-02	14.429	< 2e-16	***
as.factor(BioID)D000619	4.944e-03	7.429e-02	0.067	0.94695	
as.factor(BioID)D000620	1.000e+00	9.907e-02	10.095	< 2e-16	***
as.factor(BioID)D000621	-9.525e-03	1.424e-01	-0.067	0.94668	
as.factor(BioID)D000623	1.005e+00	1.185e-01	8.476	< 2e-16	***
as.factor(BioID)D000624	1.001e+00	1.528e-02	65.479	< 2e-16	***
as.factor(BioID)D000625	5.138e-03	1.112e-01	0.046	0.96315	
as.factor(BioID)D000626	-4.016e-04	1.925e-01	-0.002	0.99834	
as.factor(BioID)D000627	9.991e-01	6.508e-02	15.353	< 2e-16	***
as.factor(BioID)D000628	6.174e-03	1.156e-01	0.053	0.95741	
as.factor(BioID)D000629	1.011e+00	5.773e-02	17.507	< 2e-16	***
as.factor(BioID)D000630	1.012e+00	7.403e-02	13.674	< 2e-16	***
as.factor(BioID)D000631	9.964e-01	3.073e-02	32.429	< 2e-16	***
as.factor(BioID)E000179	9.810e-01	1.181e-01	8.308	< 2e-16	***
as.factor(BioID)E000215	9.957e-01	4.831e-02	20.610	< 2e-16	***
as.factor(BioID)E000288	1.007e+00	1.374e-01	7.329	3.66e-13	***
as.factor(BioID)E000290	9.964e-01	9.657e-02	10.318	< 2e-16	***
as.factor(BioID)E000291	5.739e-03	3.614e-02	0.159	0.87383	
as.factor(BioID)E000293	1.000e+00	6.968e-02	14.356	< 2e-16	***
as.factor(BioID)E000294	-2.071e-03	3.328e-02	-0.062	0.95037	
as.factor(BioID)E000296	9.975e-01	4.211e-02	23.689	< 2e-16	***
as.factor(BioID)E000297	9.980e-01	1.281e-01	7.789	1.20e-14	***
as.factor(BioID)E000298	-8.039e-03	1.353e-01	-0.059	0.95261	
as.factor(BioID)E000299	1.006e+00	9.317e-02	10.798	< 2e-16	***
as.factor(BioID)F000030	9.875e-01	5.695e-02	17.340	< 2e-16	***
as.factor(BioID)F000372	-4.839e-03	1.150e-01	-0.042	0.96645	
as.factor(BioID)F000448	-1.964e-02	1.613e-01	-0.122	0.90312	
as.factor(BioID)F000449	-6.087e-03	1.096e-01	-0.056	0.95571	

as.factor(BioID)F000450	-1.192e-02	1.068e-01	-0.112	0.91116	
as.factor(BioID)F000451	5.534e-03	1.300e-01	0.043	0.96605	
as.factor(BioID)F000454	1.005e+00	1.062e-01	9.459	< 2e-16	***
as.factor(BioID)F000455	9.893e-01	8.240e-02	12.006	< 2e-16	***
as.factor(BioID)F000456	-1.258e-02	7.835e-02	-0.161	0.87244	
as.factor(BioID)F000458	-3.822e-03	6.954e-02	-0.055	0.95618	
as.factor(BioID)F000459	6.240e-03	6.151e-02	0.101	0.91921	
as.factor(BioID)F000460	-1.039e-02	5.869e-02	-0.177	0.85949	
as.factor(BioID)F000461	-1.620e-03	1.155e-01	-0.014	0.98881	
as.factor(BioID)F000462	9.961e-01	2.908e-02	34.256	< 2e-16	***
as.factor(BioID)F000464	1.005e+00	1.165e-01	8.627	< 2e-16	***
as.factor(BioID)F000465	-2.052e-03	1.381e-01	-0.015	0.98815	
as.factor(BioID)F000466	1.009e+00	1.500e-01	6.731	2.34e-11	***
as.factor(BioID)F000468	1.027e+00	2.125e-01	4.833	1.47e-06	***
as.factor(BioID)G000289	-2.184e-02	8.795e-02	-0.248	0.80391	
as.factor(BioID)G000377	-8.533e-03	5.401e-02	-0.158	0.87449	
as.factor(BioID)G000535	9.875e-01	4.387e-02	22.510	< 2e-16	***
as.factor(BioID)G000546	-9.350e-03	3.610e-02	-0.259	0.79564	
as.factor(BioID)G000548	-1.117e-02	1.488e-01	-0.075	0.94018	
as.factor(BioID)G000551	9.913e-01	1.012e-01	9.790	< 2e-16	***
as.factor(BioID)G000552	-4.734e-03	1.571e-01	-0.030	0.97596	
as.factor(BioID)G000553	9.975e-01	2.094e-02	47.641	< 2e-16	***
as.factor(BioID)G000556	1.011e+00	4.552e-02	22.212	< 2e-16	***
as.factor(BioID)G000558	3.291e-04	2.228e-02	0.015	0.98822	
as.factor(BioID)G000559	9.978e-01	8.408e-02	11.867	< 2e-16	***
as.factor(BioID)G000560	-1.840e-02	1.457e-01	-0.126	0.89951	
as.factor(BioID)G000563	2.699e-04	6.306e-02	0.004	0.99659	
as.factor(BioID)G000565	1.167e-03	2.287e-01	0.005	0.99593	
as.factor(BioID)G000566	-1.456e-02	1.160e-01	-0.126	0.90011	
as.factor(BioID)G000568	2.019e-03	9.957e-02	0.020	0.98382	
as.factor(BioID)G000571	1.008e+00	6.123e-02	16.471	< 2e-16	***
as.factor(BioID)G000574	9.978e-01	1.329e-02	75.056	< 2e-16	***
as.factor(BioID)G000576	-2.958e-03	1.328e-01	-0.022	0.98224	
as.factor(BioID)G000577	-3.548e-03	1.679e-02	-0.211	0.83267	
as.factor(BioID)G000579	-4.506e-03	1.663e-02	-0.271	0.78650	
as.factor(BioID)G000583	1.013e+00	1.251e-01	8.093	1.14e-15	***
as.factor(BioID)G000584	-6.662e-04	2.137e-02	-0.031	0.97514	
as.factor(BioID)G000585	1.003e+00	1.229e-01	8.158	6.81e-16	***
as.factor(BioID)G000586	1.027e+00	2.015e-01	5.100	3.80e-07	***
as.factor(BioID)G000587	1.000e+00	3.068e-01	3.261	0.00113	**
as.factor(BioID)G000588	1.320e-02	6.820e-02	0.194	0.84650	
as.factor(BioID)G000589	-1.153e-02	2.042e-01	-0.056	0.95498	
as.factor(BioID)G000590	-1.102e-02	1.514e-01	-0.073	0.94197	

as.factor(BioID)G000591	-3.506e-03	8.359e-02	-0.042	0.96655	
as.factor(BioID)G000592	1.019e+00	1.289e-01	7.908	4.84e-15	***
as.factor(BioID)H000324	9.813e-01	6.369e-02	15.409	< 2e-16	***
as.factor(BioID)H000636	9.943e-01	8.694e-02	11.437	< 2e-16	***
as.factor(BioID)H000874	9.818e-01	1.331e-01	7.377	2.58e-13	***
as.factor(BioID)H001034	1.000e+00	9.096e-02	10.994	< 2e-16	***
as.factor(BioID)H001036	-2.020e-02	1.291e-01	-0.156	0.87569	
as.factor(BioID)H001038	9.914e-01	9.170e-02	10.811	< 2e-16	***
as.factor(BioID)H001045	9.810e-03	4.769e-02	0.206	0.83705	
as.factor(BioID)H001047	1.004e+00	1.001e-01	10.030	< 2e-16	***
as.factor(BioID)H001048	-9.926e-03	5.672e-02	-0.175	0.86111	
as.factor(BioID)H001050	9.950e-01	6.248e-02	15.925	< 2e-16	***
as.factor(BioID)H001052	-2.602e-03	1.883e-01	-0.014	0.98898	
as.factor(BioID)H001053	-1.520e-03	4.915e-02	-0.031	0.97533	
as.factor(BioID)H001055	-2.911e-03	8.515e-02	-0.034	0.97273	
as.factor(BioID)H001056	-3.505e-04	5.528e-02	-0.006	0.99494	
as.factor(BioID)H001057	-5.940e-04	2.487e-01	-0.002	0.99809	
as.factor(BioID)H001058	-1.054e-02	5.268e-02	-0.200	0.84142	
as.factor(BioID)H001059	-8.161e-03	3.213e-02	-0.254	0.79951	
as.factor(BioID)H001063	1.007e+00	3.778e-02	26.660	< 2e-16	***
as.factor(BioID)H001064	1.001e+00	6.220e-02	16.100	< 2e-16	***
as.factor(BioID)H001066	1.002e+00	3.718e-02	26.956	< 2e-16	***
as.factor(BioID)H001067	-3.401e-03	7.459e-02	-0.046	0.96364	
as.factor(BioID)H001068	1.012e+00	9.351e-02	10.821	< 2e-16	***
as.factor(BioID)H001071	-8.628e-03	2.516e-01	-0.034	0.97265	
as.factor(BioID)H001072	3.759e-03	5.095e-02	0.074	0.94119	
as.factor(BioID)H001073	8.133e-03	5.655e-02	0.144	0.88567	
as.factor(BioID)H001074	5.268e-03	4.433e-02	0.119	0.90542	
as.factor(BioID)H001077	1.869e-04	1.729e-01	0.001	0.99914	
as.factor(BioID)H001078	5.083e-03	9.701e-02	0.052	0.95822	
as.factor(BioID)H001081	1.004e+00	4.522e-02	22.210	< 2e-16	***
as.factor(BioID)H001085	1.012e+00	5.444e-02	18.593	< 2e-16	***
as.factor(BioID)H001088	6.728e-03	1.050e-01	0.064	0.94894	
as.factor(BioID)H001090	1.019e+00	9.819e-02	10.377	< 2e-16	***
as.factor(BioID)I000056	-1.544e-02	5.965e-02	-0.259	0.79581	
as.factor(BioID)I000057	9.917e-01	1.124e-01	8.820	< 2e-16	***
as.factor(BioID)J000032	9.843e-01	6.492e-02	15.162	< 2e-16	***
as.factor(BioID)J000126	9.848e-01	5.329e-02	18.480	< 2e-16	***
as.factor(BioID)J000174	-1.712e-02	8.283e-02	-0.207	0.83630	
as.factor(BioID)J000288	9.886e-01	3.538e-02	27.945	< 2e-16	***
as.factor(BioID)J000289	-1.297e-02	1.703e-01	-0.076	0.93932	
as.factor(BioID)J000290	-1.146e-02	4.378e-02	-0.262	0.79348	
as.factor(BioID)J000292	8.896e-04	2.727e-02	0.033	0.97398	

as.factor(BioID)J000294	9.941e-01	3.502e-02	28.389	< 2e-16	***
as.factor(BioID)J000295	9.505e-03	6.863e-02	0.138	0.88988	
as.factor(BioID)J000297	9.904e-03	3.874e-02	0.256	0.79824	
as.factor(BioID)J000298	1.005e+00	2.149e-01	4.678	3.14e-06	***
as.factor(BioID)J000299	-8.463e-03	8.292e-02	-0.102	0.91871	
as.factor(BioID)J000301	9.663e-05	5.516e-02	0.002	0.99860	
as.factor(BioID)J000302	-8.330e-03	8.958e-02	-0.093	0.92592	
as.factor(BioID)K000009	9.823e-01	1.500e-01	6.550	7.70e-11	***
as.factor(BioID)K000188	9.907e-01	1.623e-01	6.104	1.30e-09	***
as.factor(BioID)K000210	-1.389e-02	1.898e-01	-0.073	0.94169	
as.factor(BioID)K000362	-1.150e-02	9.424e-02	-0.122	0.90292	
as.factor(BioID)K000363	-9.114e-03	3.534e-02	-0.258	0.79649	
as.factor(BioID)K000368	1.002e+00	1.720e-01	5.824	6.91e-09	***
as.factor(BioID)K000375	9.989e-01	6.156e-02	16.227	< 2e-16	***
as.factor(BioID)K000376	8.540e-03	3.722e-02	0.229	0.81855	
as.factor(BioID)K000378	1.241e-02	7.573e-02	0.164	0.86986	
as.factor(BioID)K000379	1.001e+00	2.218e-02	45.147	< 2e-16	***
as.factor(BioID)K000380	1.001e+00	2.395e-02	41.802	< 2e-16	***
as.factor(BioID)K000381	9.973e-01	8.442e-02	11.813	< 2e-16	***
as.factor(BioID)K000382	1.002e+00	9.774e-02	10.257	< 2e-16	***
as.factor(BioID)K000385	9.929e-01	2.342e-02	42.399	< 2e-16	***
as.factor(BioID)K000386	1.003e+00	1.501e-01	6.681	3.25e-11	***
as.factor(BioID)K000388	-2.553e-03	1.641e-01	-0.016	0.98759	
as.factor(BioID)K000389	1.002e+00	9.208e-02	10.884	< 2e-16	***
as.factor(BioID)K000390	1.005e+00	3.458e-02	29.069	< 2e-16	***
as.factor(BioID)K000391	1.001e+00	5.746e-02	17.417	< 2e-16	***
as.factor(BioID)K000392	5.218e-03	1.333e-01	0.039	0.96879	
as.factor(BioID)K000394	1.009e+00	4.327e-02	23.311	< 2e-16	***
as.factor(BioID)K000395	-4.977e-05	8.038e-02	-0.001	0.99951	
as.factor(BioID)L000263	9.810e-01	1.407e-01	6.973	4.51e-12	***
as.factor(BioID)L000287	9.782e-01	7.370e-02	13.273	< 2e-16	***
as.factor(BioID)L000397	9.974e-01	2.641e-02	37.771	< 2e-16	***
as.factor(BioID)L000480	9.835e-01	1.138e-01	8.640	< 2e-16	***
as.factor(BioID)L000491	-2.422e-03	4.749e-02	-0.051	0.95933	
as.factor(BioID)L000551	9.945e-01	1.784e-01	5.574	2.91e-08	***
as.factor(BioID)L000554	-3.293e-03	1.687e-01	-0.020	0.98443	
as.factor(BioID)L000557	9.865e-01	8.998e-02	10.964	< 2e-16	***
as.factor(BioID)L000559	9.907e-01	7.693e-02	12.878	< 2e-16	***
as.factor(BioID)L000560	9.933e-01	6.829e-02	14.547	< 2e-16	***
as.factor(BioID)L000562	9.890e-01	1.074e-01	9.207	< 2e-16	***
as.factor(BioID)L000563	1.000e+00	1.307e-01	7.652	3.39e-14	***
as.factor(BioID)L000564	-1.019e-02	1.466e-01	-0.070	0.94460	
as.factor(BioID)L000565	9.958e-01	1.244e-01	8.002	2.33e-15	***

as.factor(BioID)L000566	-2.983e-03	6.296e-02	-0.047	0.96222	
as.factor(BioID)L000569	-2.023e-03	2.795e-02	-0.072	0.94232	
as.factor(BioID)L000573	2.903e-03	2.636e-01	0.011	0.99122	
as.factor(BioID)L000576	-2.946e-03	9.013e-02	-0.033	0.97393	
as.factor(BioID)L000578	-9.233e-03	5.782e-02	-0.160	0.87316	
as.factor(BioID)L000579	1.006e+00	7.286e-02	13.810	< 2e-16	***
as.factor(BioID)L000580	9.993e-01	7.669e-02	13.031	< 2e-16	***
as.factor(BioID)L000581	9.952e-01	1.826e-02	54.496	< 2e-16	***
as.factor(BioID)L000582	1.004e+00	2.152e-02	46.654	< 2e-16	***
as.factor(BioID)L000583	-1.370e-02	1.429e-01	-0.096	0.92366	
as.factor(BioID)L000584	-6.345e-03	7.031e-02	-0.090	0.92811	
as.factor(BioID)L000585	2.422e-03	5.086e-02	0.048	0.96202	
as.factor(BioID)L000586	1.003e+00	8.887e-02	11.287	< 2e-16	***
as.factor(BioID)L000587	1.934e-03	8.221e-02	0.024	0.98124	
as.factor(BioID)L000588	1.012e+00	1.356e-01	7.467	1.34e-13	***
as.factor(BioID)L000590	1.013e+00	7.075e-02	14.321	< 2e-16	***
as.factor(BioID)L000591	1.019e+00	7.917e-02	12.867	< 2e-16	***
as.factor(BioID)L000592	1.014e+00	1.505e-01	6.743	2.16e-11	***
as.factor(BioID)L000593	1.006e+00	3.410e-02	29.495	< 2e-16	***
as.factor(BioID)M000087	9.909e-01	6.835e-02	14.497	< 2e-16	***
as.factor(BioID)M000312	9.906e-01	5.840e-02	16.961	< 2e-16	***
as.factor(BioID)M000404	9.772e-01	1.032e-01	9.469	< 2e-16	***
as.factor(BioID)M000689	-1.535e-02	7.408e-02	-0.207	0.83583	
as.factor(BioID)M001137	9.855e-01	8.461e-02	11.647	< 2e-16	***
as.factor(BioID)M001143	9.926e-01	4.056e-02	24.475	< 2e-16	***
as.factor(BioID)M001144	-1.488e-02	1.014e-01	-0.147	0.88336	
as.factor(BioID)M001150	-9.845e-03	1.100e-01	-0.090	0.92869	
as.factor(BioID)M001151	-1.577e-04	1.162e-01	-0.001	0.99892	
as.factor(BioID)M001156	-1.019e-02	4.881e-02	-0.209	0.83472	
as.factor(BioID)M001157	-6.561e-03	3.428e-02	-0.191	0.84826	
as.factor(BioID)M001158	-1.206e-02	9.010e-02	-0.134	0.89352	
as.factor(BioID)M001159	-7.540e-03	3.545e-02	-0.213	0.83160	
as.factor(BioID)M001160	9.938e-01	6.246e-02	15.911	< 2e-16	***
as.factor(BioID)M001163	9.933e-01	2.743e-02	36.207	< 2e-16	***
as.factor(BioID)M001165	-1.481e-03	2.510e-02	-0.059	0.95295	
as.factor(BioID)M001166	1.001e+00	1.058e-01	9.453	< 2e-16	***
as.factor(BioID)M001177	-3.339e-03	1.926e-01	-0.017	0.98617	
as.factor(BioID)M001180	2.651e-03	6.691e-02	0.040	0.96840	
as.factor(BioID)M001182	3.587e-03	2.767e-01	0.013	0.98966	
as.factor(BioID)M001184	9.844e-03	2.641e-01	0.037	0.97027	
as.factor(BioID)M001187	-5.170e-03	1.248e-01	-0.041	0.96697	
as.factor(BioID)M001188	1.003e+00	1.720e-02	58.301	< 2e-16	***
as.factor(BioID)M001189	-7.255e-03	8.087e-02	-0.090	0.92853	

as.factor(BioID)M001191	1.004e+00	1.547e-01	6.489	1.15e-10	***
as.factor(BioID)M001193	1.181e-02	9.577e-02	0.123	0.90189	
as.factor(BioID)M001194	-2.956e-04	3.719e-02	-0.008	0.99366	
as.factor(BioID)M001195	-1.878e-03	1.120e-01	-0.017	0.98662	
as.factor(BioID)M001196	1.001e+00	8.790e-02	11.382	< 2e-16	***
as.factor(BioID)M001199	1.008e+00	9.127e-02	11.042	< 2e-16	***
as.factor(BioID)M001200	9.974e-01	3.116e-02	32.015	< 2e-16	***
as.factor(BioID)M001201	7.244e-03	6.145e-02	0.118	0.90617	
as.factor(BioID)M001202	1.008e+00	1.386e-01	7.274	5.45e-13	***
as.factor(BioID)M001203	1.005e+00	7.004e-02	14.354	< 2e-16	***
as.factor(BioID)M001204	2.770e-03	9.377e-02	0.030	0.97643	
as.factor(BioID)M001205	-2.842e-03	7.885e-02	-0.036	0.97125	
as.factor(BioID)M001206	1.003e+00	3.967e-02	25.295	< 2e-16	***
as.factor(BioID)M001208	1.009e+00	3.988e-02	25.290	< 2e-16	***
as.factor(BioID)N000002	9.927e-01	4.880e-02	20.341	< 2e-16	***
as.factor(BioID)N000015	9.812e-01	1.115e-01	8.804	< 2e-16	***
as.factor(BioID)N000127	1.009e+00	3.794e-02	26.589	< 2e-16	***
as.factor(BioID)N000179	9.917e-01	2.919e-02	33.971	< 2e-16	***
as.factor(BioID)N000181	-5.961e-03	2.103e-02	-0.283	0.77690	
as.factor(BioID)N000182	-7.543e-03	1.269e-01	-0.059	0.95259	
as.factor(BioID)N000184	4.881e-03	2.960e-02	0.165	0.86904	
as.factor(BioID)N000185	-6.121e-03	3.293e-02	-0.186	0.85255	
as.factor(BioID)N000188	1.005e+00	4.731e-02	21.242	< 2e-16	***
as.factor(BioID)N000189	1.044e-02	3.890e-02	0.269	0.78834	
as.factor(BioID)N000190	-4.788e-03	3.119e-01	-0.015	0.98776	
as.factor(BioID)N000191	1.005e+00	3.989e-02	25.187	< 2e-16	***
as.factor(BioID)O000168	-2.009e-03	9.733e-02	-0.021	0.98354	
as.factor(BioID)O000170	1.013e+00	4.325e-02	23.412	< 2e-16	***
as.factor(BioID)O000171	1.009e+00	1.082e-01	9.326	< 2e-16	***
as.factor(BioID)O000172	1.034e+00	1.607e-01	6.434	1.64e-10	***
as.factor(BioID)O000173	1.034e+00	1.605e-01	6.439	1.58e-10	***
as.factor(BioID)P000034	9.838e-01	1.121e-01	8.776	< 2e-16	***
as.factor(BioID)P000096	9.847e-01	1.211e-01	8.130	8.52e-16	***
as.factor(BioID)P000197	9.813e-01	7.533e-02	13.026	< 2e-16	***
as.factor(BioID)P000258	2.626e-01	1.308e-01	2.008	0.04480	*
as.factor(BioID)P000373	-1.969e-02	6.632e-02	-0.297	0.76663	
as.factor(BioID)P000523	9.806e-01	1.628e-01	6.022	2.13e-09	***
as.factor(BioID)P000588	-1.072e-02	3.684e-02	-0.291	0.77103	
as.factor(BioID)P000591	-1.540e-02	1.052e-01	-0.146	0.88362	
as.factor(BioID)P000592	-1.591e-02	7.465e-02	-0.213	0.83129	
as.factor(BioID)P000593	9.964e-01	1.119e-01	8.908	< 2e-16	***
as.factor(BioID)P000594	-3.930e-04	1.787e-02	-0.022	0.98245	
as.factor(BioID)P000597	1.003e+00	3.690e-02	27.192	< 2e-16	***

as.factor(BioID)P000598	1.020e+00	6.575e-02	15.516	< 2e-16	***
as.factor(BioID)P000599	-5.053e-04	9.552e-02	-0.005	0.99578	
as.factor(BioID)P000601	4.412e-03	1.253e-01	0.035	0.97191	
as.factor(BioID)P000602	-6.954e-03	1.443e-01	-0.048	0.96158	
as.factor(BioID)P000604	9.924e-01	5.208e-02	19.054	< 2e-16	***
as.factor(BioID)P000605	1.777e-03	2.161e-01	0.008	0.99344	
as.factor(BioID)P000606	1.503e-03	1.244e-01	0.012	0.99037	
as.factor(BioID)P000607	1.010e+00	1.543e-01	6.544	8.03e-11	***
as.factor(BioID)P000608	1.002e+00	1.518e-01	6.601	5.54e-11	***
as.factor(BioID)P000609	-9.860e-03	1.575e-01	-0.063	0.95008	
as.factor(BioID)P000611	4.179e-03	2.507e-02	0.167	0.86760	
as.factor(BioID)P000613	1.005e+00	6.460e-02	15.551	< 2e-16	***
as.factor(BioID)P000614	1.014e+00	6.841e-02	14.824	< 2e-16	***
as.factor(BioID)P000615	-9.995e-04	8.089e-02	-0.012	0.99014	
as.factor(BioID)P000616	1.007e+00	5.866e-02	17.168	< 2e-16	***
as.factor(BioID)P000617	1.032e+00	1.757e-01	5.871	5.25e-09	***
as.factor(BioID)P000618	1.012e+00	7.837e-02	12.918	< 2e-16	***
as.factor(BioID)Q000023	1.003e+00	4.594e-02	21.829	< 2e-16	***
as.factor(BioID)R000053	9.857e-01	5.233e-02	18.835	< 2e-16	***
as.factor(BioID)R000395	-1.652e-02	1.516e-01	-0.109	0.91322	
as.factor(BioID)R000409	-1.400e-02	1.013e-01	-0.138	0.89014	
as.factor(BioID)R000486	9.843e-01	6.137e-02	16.040	< 2e-16	***
as.factor(BioID)R000487	-1.425e-02	1.199e-01	-0.119	0.90536	
as.factor(BioID)R000515	9.850e-01	5.337e-02	18.455	< 2e-16	***
as.factor(BioID)R000575	1.576e-03	1.639e-02	0.096	0.92338	
as.factor(BioID)R000576	9.951e-01	1.079e-01	9.224	< 2e-16	***
as.factor(BioID)R000577	9.952e-01	3.535e-02	28.152	< 2e-16	***
as.factor(BioID)R000582	-1.042e-02	3.189e-02	-0.327	0.74393	
as.factor(BioID)R000583	-8.942e-03	3.464e-02	-0.258	0.79634	
as.factor(BioID)R000586	-4.389e-04	2.513e-02	-0.017	0.98607	
as.factor(BioID)R000587	-7.857e-04	1.425e-01	-0.006	0.99560	
as.factor(BioID)R000588	1.002e+00	7.407e-02	13.528	< 2e-16	***
as.factor(BioID)R000591	1.727e-02	8.531e-02	0.202	0.83961	
as.factor(BioID)R000592	-6.855e-03	1.093e-01	-0.063	0.95001	
as.factor(BioID)R000593	-7.250e-03	5.923e-02	-0.122	0.90260	
as.factor(BioID)R000597	-3.080e-03	1.003e-01	-0.031	0.97549	
as.factor(BioID)R000598	-6.397e-03	3.892e-02	-0.164	0.86946	
as.factor(BioID)R000599	1.001e+00	1.114e-01	8.988	< 2e-16	***
as.factor(BioID)R000601	-9.927e-03	1.677e-01	-0.059	0.95280	
as.factor(BioID)R000602	1.001e+00	9.013e-02	11.101	< 2e-16	***
as.factor(BioID)R000603	-9.847e-04	1.167e-01	-0.008	0.99327	
as.factor(BioID)R000604	2.636e-04	5.315e-02	0.005	0.99604	
as.factor(BioID)R000606	1.001e+00	9.957e-02	10.055	< 2e-16	***



as.factor(BioID)R000607	1.009e+00	1.419e-01	7.110	1.74e-12	***
as.factor(BioID)R000609	-2.055e-03	1.645e-02	-0.125	0.90062	
as.factor(BioID)R000610	-1.856e-03	2.832e-02	-0.066	0.94775	
as.factor(BioID)R000612	-7.677e-03	1.655e-01	-0.046	0.96300	
as.factor(BioID)R000614	5.718e-03	3.375e-01	0.017	0.98648	
as.factor(BioID)S000018	-7.729e-03	1.583e-01	-0.049	0.96106	
as.factor(BioID)S000030	9.861e-01	1.181e-01	8.353	< 2e-16	***
as.factor(BioID)S000185	9.793e-01	1.008e-01	9.715	< 2e-16	***
as.factor(BioID)S000248	9.881e-01	4.078e-02	24.230	< 2e-16	***
as.factor(BioID)S000250	-1.583e-02	7.045e-02	-0.225	0.82223	
as.factor(BioID)S000344	9.899e-01	1.045e-01	9.471	< 2e-16	***
as.factor(BioID)S000364	-8.703e-03	8.545e-02	-0.102	0.91888	
as.factor(BioID)S000480	9.790e-01	1.018e-01	9.615	< 2e-16	***
as.factor(BioID)S000510	9.927e-01	1.291e-01	7.688	2.60e-14	***
as.factor(BioID)S000583	-2.158e-02	1.267e-01	-0.170	0.86474	
as.factor(BioID)S001145	9.882e-01	9.314e-02	10.610	< 2e-16	***
as.factor(BioID)S001148	-1.144e-03	8.734e-02	-0.013	0.98955	
as.factor(BioID)S001150	9.924e-01	8.577e-02	11.570	< 2e-16	***
as.factor(BioID)S001154	-8.658e-04	3.581e-02	-0.024	0.98071	
as.factor(BioID)S001156	9.887e-01	3.923e-02	25.204	< 2e-16	***
as.factor(BioID)S001157	9.962e-01	9.562e-02	10.419	< 2e-16	***
as.factor(BioID)S001165	9.918e-01	4.947e-02	20.050	< 2e-16	***
as.factor(BioID)S001168	9.905e-01	2.918e-02	33.948	< 2e-16	***
as.factor(BioID)S001170	1.000e+00	7.123e-02	14.042	< 2e-16	***
as.factor(BioID)S001172	-4.596e-03	5.674e-02	-0.081	0.93546	
as.factor(BioID)S001175	1.005e+00	2.432e-02	41.325	< 2e-16	***
as.factor(BioID)S001176	-9.012e-03	7.139e-02	-0.126	0.89957	
as.factor(BioID)S001180	1.000e+00	1.654e-01	6.046	1.84e-09	***
as.factor(BioID)S001183	-3.347e-03	1.012e-01	-0.033	0.97362	
as.factor(BioID)S001185	1.007e+00	4.367e-02	23.058	< 2e-16	***
as.factor(BioID)S001187	5.681e-03	5.285e-02	0.107	0.91441	
as.factor(BioID)S001188	-1.213e-02	1.783e-01	-0.068	0.94578	
as.factor(BioID)S001189	1.021e-03	1.060e-01	0.010	0.99232	
as.factor(BioID)S001190	1.007e+00	1.279e-01	7.870	6.49e-15	***
as.factor(BioID)S001192	-3.057e-03	5.698e-02	-0.054	0.95722	
as.factor(BioID)S001193	9.988e-01	4.313e-02	23.159	< 2e-16	***
as.factor(BioID)S001195	-2.217e-03	1.205e-01	-0.018	0.98532	
as.factor(BioID)S001199	-6.466e-04	3.418e-02	-0.019	0.98491	
as.factor(BioID)S001200	1.003e+00	2.370e-02	42.337	< 2e-16	***
as.factor(BioID)S001201	1.005e+00	1.107e-01	9.082	< 2e-16	***
as.factor(BioID)S001205	9.961e-01	4.377e-02	22.756	< 2e-16	***
as.factor(BioID)S001207	1.012e+00	7.916e-02	12.782	< 2e-16	***
as.factor(BioID)S001208	1.026e+00	1.225e-01	8.370	< 2e-16	***

as.factor(BioID)S001209	1.016e+00	9.162e-02	11.088	< 2e-16	***
as.factor(BioID)S001211	1.009e+00	5.211e-02	19.372	< 2e-16	***
as.factor(BioID)S001212	1.589e-03	2.231e-02	0.071	0.94324	
as.factor(BioID)S001213	-1.005e-03	2.099e-02	-0.048	0.96181	
as.factor(BioID)S001214	-2.148e-03	2.113e-01	-0.010	0.99189	
as.factor(BioID)S001215	1.008e+00	4.757e-02	21.186	< 2e-16	***
as.factor(BioID)S001216	1.017e+00	6.228e-02	16.325	< 2e-16	***
as.factor(BioID)T000193	9.907e-01	4.811e-02	20.593	< 2e-16	***
as.factor(BioID)T000238	-1.056e-02	4.854e-02	-0.217	0.82789	
as.factor(BioID)T000460	9.875e-01	8.678e-02	11.380	< 2e-16	***
as.factor(BioID)T000462	-1.153e-02	9.146e-02	-0.126	0.89966	
as.factor(BioID)T000463	7.488e-05	1.005e-01	0.001	0.99941	
as.factor(BioID)T000465	9.978e-01	2.450e-02	40.718	< 2e-16	***
as.factor(BioID)T000467	6.233e-03	3.143e-02	0.198	0.84283	
as.factor(BioID)T000468	1.003e+00	6.498e-02	15.436	< 2e-16	***
as.factor(BioID)T000469	1.001e+00	1.612e-02	62.099	< 2e-16	***
as.factor(BioID)T000470	-7.597e-03	2.543e-02	-0.299	0.76518	
as.factor(BioID)T000472	1.002e+00	6.215e-02	16.129	< 2e-16	***
as.factor(BioID)T000474	9.981e-01	4.132e-02	24.156	< 2e-16	***
as.factor(BioID)T000475	6.000e-03	2.606e-02	0.230	0.81792	
as.factor(BioID)T000477	-2.623e-03	2.580e-02	-0.102	0.91902	
as.factor(BioID)T000478	-2.390e-03	2.710e-02	-0.088	0.92974	
as.factor(BioID)T000479	5.703e-04	1.374e-01	0.004	0.99669	
as.factor(BioID)T000480	-4.536e-03	1.345e-01	-0.034	0.97311	
as.factor(BioID)T000481	1.034e+00	1.586e-01	6.520	9.40e-11	***
as.factor(BioID)T000482	1.002e+00	4.154e-02	24.136	< 2e-16	***
as.factor(BioID)U000040	1.007e+00	1.826e-01	5.516	4.05e-08	***
as.factor(BioID)V000081	9.881e-01	5.944e-02	16.625	< 2e-16	***
as.factor(BioID)V000108	9.851e-01	9.651e-02	10.208	< 2e-16	***
as.factor(BioID)V000130	9.958e-01	2.700e-02	36.886	< 2e-16	***
as.factor(BioID)V000133	1.027e+00	1.024e-01	10.031	< 2e-16	***
as.factor(BioID)W000187	9.738e-01	9.535e-02	10.213	< 2e-16	***
as.factor(BioID)W000413	-5.891e-03	1.270e-01	-0.046	0.96302	
as.factor(BioID)W000791	-1.231e-02	1.293e-01	-0.095	0.92414	
as.factor(BioID)W000795	-1.282e-02	4.773e-02	-0.269	0.78825	
as.factor(BioID)W000796	-1.227e-02	1.372e-01	-0.089	0.92872	
as.factor(BioID)W000797	9.912e-01	4.635e-02	21.384	< 2e-16	***
as.factor(BioID)W000798	-6.605e-03	4.261e-02	-0.155	0.87684	
as.factor(BioID)W000799	9.998e-01	1.046e-01	9.560	< 2e-16	***
as.factor(BioID)W000804	-1.146e-02	4.364e-02	-0.263	0.79284	
as.factor(BioID)W000806	-7.860e-03	5.448e-02	-0.144	0.88530	
as.factor(BioID)W000808	9.908e-01	2.791e-02	35.492	< 2e-16	***
as.factor(BioID)W000809	1.628e-02	7.257e-02	0.224	0.82248	

```

as.factor(BioID)W000810 -7.154e-03  1.062e-01  -0.067  0.94631
as.factor(BioID)W000812  4.468e-03  2.629e-02   0.170  0.86506
as.factor(BioID)W000813  4.550e-03  5.146e-02   0.088  0.92955
as.factor(BioID)W000814 -1.555e-02  1.671e-01  -0.093  0.92586
as.factor(BioID)W000815 -4.289e-04  9.258e-02  -0.005  0.99630
as.factor(BioID)W000816 -9.675e-03  9.563e-02  -0.101  0.91943
as.factor(BioID)W000820  1.434e-03  3.100e-02   0.046  0.96310
as.factor(BioID)W000821  1.460e-03  1.201e-01   0.012  0.99030
as.factor(BioID)W000822  9.954e-01  1.322e-01   7.531  8.34e-14 ***
as.factor(BioID)W000825  1.009e+00  5.058e-02  19.948  < 2e-16 ***
as.factor(BioID)W000826  1.011e+00  5.945e-02  17.011  < 2e-16 ***
as.factor(BioID)Y000033 -1.903e-02  2.039e-01  -0.093  0.92565
as.factor(BioID)Y000062  1.000e+00  1.962e-02  50.998  < 2e-16 ***
as.factor(BioID)Y000063 -8.587e-03  6.462e-02  -0.133  0.89430
as.factor(BioID)Y000065 -2.564e-03  2.131e-01  -0.012  0.99040
as.factor(BioID)Y000066      NA      NA      NA      NA
as.factor(BioID)Z000017      NA      NA      NA      NA
seniority                1.369e-03  8.799e-03   0.156  0.87640
Contribution_minus       -3.826e-09  3.552e-08  -0.108  0.91422
Contribution_plus        -1.980e-07  2.728e-07  -0.726  0.46804
Dmajority                NA      NA      NA      NA
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

```

Residual standard error: 0.02158 on 1605 degrees of freedom
(94 observations deleted due to missingness)
Multiple R-squared:  0.9986,    Adjusted R-squared:  0.9981
F-statistic:  2211 on 514 and 1605 DF,  p-value: < 2.2e-16

```

For this, since fixing individuals is so specific, we need to remove the anti and pro env. dummy, since they are already included in the individual fixed effects. (if a rep receives contribution once, this is automatically 1, i.e. never changes for an individual).

## LPM with vote changing Representatives

Here is what this dataframe looks like

```
kable(df_vote_change[1:10, ], format = "html")
```

BioID	GovtrackID	opensecrets_id	first_name	last_name	state	district	party	name	Vote
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	

```
kable(df_vote_change_wide[1:10, ], format = "html")
```

BioID	GovtrackID	opensecrets_id	first_name	last_name	state	district	party
C001059	400618	N00026341	Jim	Costa	CA	NA	D
C001059	400618	N00026341	Jim	Costa	CA	NA	D
C001059	400618	N00026341	Jim	Costa	CA	NA	D
B000490	400030	N00002674	Sanford D.,Sanford	Bishop	GA	2	D
B000490	400030	N00002674	Sanford D.,Sanford	Bishop	GA	2	D
B000490	400030	N00002674	Sanford D.,Sanford	Bishop	GA	2	D
B000490	400030	N00002674	Sanford D.,Sanford	Bishop	GA	2	D
U000031	400414	N00004133	Fred	Upton	MI	6	R
S000522	400380	N00009816	Christopher H.,Christopher	Smith	NJ	4	R
S000522	400380	N00009816	Christopher H.,Christopher	Smith	NJ	4	R

### with control variables

Using the same model as above with the same specifications (control varaibels, then generous FE (state, year), then strict FE (individuals)) but using only those representatives that changed their voting behavior over time.

```
df_vote_change <- df_vote_change %>% select(-c(GovtrackID, opensecrets_id, Vote_change_dummy)
view(df_vote_change)
ols_change <- lm(Vote ~ . - state - anti_env_dummy - BioID, data = df_vote_change)
summary(ols_change)
```

Call:

```
lm(formula = Vote ~ . - state - anti_env_dummy - BioID, data = df_vote_change)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-1.00649	-0.30235	0.07587	0.29972	0.75138

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	7.682e+00	1.559e+01	0.493	0.623178
district	5.401e-03	5.001e-03	1.080	0.282589
partyR	-3.183e-01	2.029e-01	-1.568	0.119814
birthday	-3.649e-03	7.935e-03	-0.460	0.646620
genderM	-2.670e-01	2.155e-01	-1.239	0.218139
nominate_dim1	6.525e-01	7.308e-01	0.893	0.374008
nominate_dim2	-3.408e-01	4.406e-01	-0.773	0.441032
GeographicalNE	-1.227e-03	2.135e-01	-0.006	0.995424
GeographicalSO	-7.972e-02	2.828e-01	-0.282	0.778609
GeographicalWE	-1.248e-01	2.223e-01	-0.561	0.575740
Instance	8.193e-03	2.148e-03	3.814	0.000232 ***
seniority	9.759e-03	1.703e-02	0.573	0.567804
Contribution_minus	-2.458e-06	2.092e-06	-1.175	0.242836
Contribution_plus	8.536e-06	7.756e-06	1.101	0.273638
Dmajority	4.639e-01	1.275e-01	3.637	0.000430 ***
pro_env_dummy	-1.551e-02	1.276e-01	-0.122	0.903513

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.4378 on 104 degrees of freedom

(66 observations deleted due to missingness)

Multiple R-squared: 0.3288, Adjusted R-squared: 0.232

F-statistic: 3.397 on 15 and 104 DF, p-value: 0.0001125

Compared to before we see multiple things, on the one hand the Adjusted  $R^2$  is lower than in the other models where it averages to about 0.91, here only 0.25. This is because the model is more specific, i.e. only includes those representatives who changed their voting behavior, which are only 23 in total out of 574 (?), whereas there are 31 changes in votes to be seen in total.

So, we need to take all these results with caution, since 23 out of 547 (?) is not an incredibly small sample size, and thus makes the model less robust.

Here, we need to remove the anti\_env\_dummy and district because of singularities, because

all have received anti\_env contributions, so the coefficient is not defined. -> remove district too, too few obs.

### with geography & year FEs

```
ols_change_fe <- lm(Vote ~ as.factor(Geographical) + as.factor(Instance) + party + birthday +  
summary(ols_change_fe)
```

Call:

```
lm(formula = Vote ~ as.factor(Geographical) + as.factor(Instance) +  
    party + birthday + district + nominate_dim1 + nominate_dim2 +  
    seniority + Contribution_minus + Contribution_plus + gender +  
    pro_env_dummy, data = df_vote_change)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-0.93366	-0.27796	0.04251	0.32263	0.80871

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	6.041e+00	1.573e+01	0.384	0.70181
as.factor(Geographical)NE	5.853e-04	2.140e-01	0.003	0.99782
as.factor(Geographical)SO	-7.255e-02	2.840e-01	-0.255	0.79887
as.factor(Geographical)WE	-1.184e-01	2.233e-01	-0.530	0.59708
as.factor(Instance)4	-7.420e-02	1.340e-01	-0.554	0.58112
as.factor(Instance)6	5.216e-01	1.678e-01	3.109	0.00244 **
as.factor(Instance)7	3.545e-01	1.764e-01	2.009	0.04717 *
as.factor(Instance)51	4.107e-01	1.419e-01	2.894	0.00466 **
as.factor(Instance)52	2.803e-01	1.454e-01	1.928	0.05669 .
partyR	-3.201e-01	2.036e-01	-1.572	0.11898
birthday	-2.798e-03	8.011e-03	-0.349	0.72760
district	5.972e-03	5.025e-03	1.189	0.23742
nominate_dim1	6.893e-01	7.326e-01	0.941	0.34904
nominate_dim2	-3.607e-01	4.421e-01	-0.816	0.41652
seniority	1.310e-02	1.722e-02	0.761	0.44847
Contribution_minus	-2.526e-06	2.114e-06	-1.195	0.23498
Contribution_plus	1.036e-05	7.892e-06	1.313	0.19214
genderM	-2.629e-01	2.163e-01	-1.216	0.22696
pro_env_dummy	-1.741e-02	1.282e-01	-0.136	0.89229

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.4386 on 101 degrees of freedom

(66 observations deleted due to missingness)

Multiple R-squared: 0.3457, Adjusted R-squared: 0.2291

F-statistic: 2.965 on 18 and 101 DF, p-value: 0.0002896

Here remove majority because it is a singularity...

### with party & year FEs

```
ols_party_change <- lm(Vote ~ district + birthday + nominate_dim1 + nominate_dim2 + Geographi  
summary(ols_party_change)
```

Call:

```
lm(formula = Vote ~ district + birthday + nominate_dim1 + nominate_dim2 +  
    Geographical + as.factor(party) + as.factor(Instance) + seniority +  
    Contribution_minus + Contribution_plus + gender + pro_env_dummy +  
    anti_env_dummy, data = df_long)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-0.98664	-0.04059	-0.01140	0.02301	1.00436

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-4.263e-01	7.842e-01	-0.544	0.58680
district	7.851e-04	3.719e-04	2.111	0.03489 *
birthday	7.414e-04	3.994e-04	1.856	0.06355 .
nominate_dim1	-1.412e-01	2.852e-02	-4.950	8.10e-07 ***
nominate_dim2	-6.979e-02	2.135e-02	-3.269	0.00110 **
GeographicalNE	7.292e-02	1.123e-02	6.490	1.09e-10 ***
GeographicalSO	8.676e-03	9.407e-03	0.922	0.35645
GeographicalWE	1.943e-02	1.124e-02	1.729	0.08400 .
as.factor(party)R	-9.011e-01	8.864e-03	-101.662	< 2e-16 ***
as.factor(Instance)4	1.007e-02	1.206e-02	0.835	0.40400
as.factor(Instance)6	3.505e-02	1.237e-02	2.833	0.00465 **

```

as.factor(Instance)7    2.546e-02  1.309e-02    1.945  0.05196 .
as.factor(Instance)51  2.387e-02  1.223e-02    1.952  0.05107 .
as.factor(Instance)52  3.305e-02  1.232e-02    2.683  0.00737 **
seniority               1.643e-03  1.042e-03    1.578  0.11484
Contribution_minus     -6.107e-07  1.479e-07   -4.130  3.79e-05 ***
Contribution_plus       7.200e-06  1.402e-06    5.137  3.08e-07 ***
genderM                -2.513e-02  9.246e-03   -2.718  0.00663 **
pro_env_dummy          -6.747e-03  9.173e-03   -0.736  0.46206
anti_env_dummy         -2.101e-02  1.318e-02   -1.594  0.11119

```

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1516 on 1881 degrees of freedom

(413 observations deleted due to missingness)

Multiple R-squared: 0.9088, Adjusted R-squared: 0.9079

F-statistic: 986.8 on 19 and 1881 DF, p-value: < 2.2e-16

## with state & year FEs

```
ols_change_state <- lm(Vote ~ as.factor(state) + as.factor(Instance) + party + birthday + di
```

## checking differences in party

```

ols_change_D <- lm(Vote ~ . - party - Geographical - anti_env_dummy - BioID, data = df_vote_c
summary(ols_change_D)

```

Call:

```
lm(formula = Vote ~ . - party - Geographical - anti_env_dummy -
    BioID, data = df_vote_change)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-1.0164	-0.3278	0.0429	0.2995	0.8962

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	1.072e+01	1.949e+01	0.550	0.583673



stateCO	-2.034e-01	5.308e-01	-0.383	0.702346
stateFL	-7.737e-02	3.869e-01	-0.200	0.841917
stateGA	3.749e-01	5.107e-01	0.734	0.464620
stateIL	-2.830e-01	5.646e-01	-0.501	0.617421
stateMI	2.293e-01	4.951e-01	0.463	0.644365
stateNJ	2.613e-02	5.379e-01	0.049	0.961360
stateNY	-3.661e-02	3.053e-01	-0.120	0.904795
statePA	2.047e-01	5.702e-01	0.359	0.720457
stateSC	3.698e-01	6.041e-01	0.612	0.541840
stateTX	5.822e-01	3.472e-01	1.677	0.096807 .
stateWA	5.284e-02	5.589e-01	0.095	0.924865
district	-1.193e-03	2.060e-02	-0.058	0.953920
birthday	-5.217e-03	9.841e-03	-0.530	0.597221
genderM	-4.623e-01	2.729e-01	-1.694	0.093453 .
nominate_dim1	8.089e-01	1.223e+00	0.661	0.509949
nominate_dim2	-9.481e-01	6.998e-01	-1.355	0.178647
Instance	8.516e-03	2.192e-03	3.885	0.000187 ***
seniority	5.952e-03	2.124e-02	0.280	0.779924
Contribution_minus	-1.686e-06	2.394e-06	-0.704	0.483012
Contribution_plus	9.598e-06	8.021e-06	1.197	0.234354
Dmajority	4.976e-01	1.311e-01	3.794	0.000258 ***
pro_env_dummy	-7.757e-02	1.451e-01	-0.534	0.594236

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.44 on 97 degrees of freedom

(66 observations deleted due to missingness)

Multiple R-squared: 0.3678, Adjusted R-squared: 0.2244

F-statistic: 2.565 on 22 and 97 DF, p-value: 0.0008507

```
ols_change_R <- lm(Vote ~ . - party - Geographical - anti_env_dummy - BioID, data = df_vote_change)
summary(ols_change_R)
```

Call:

```
lm(formula = Vote ~ . - party - Geographical - anti_env_dummy - BioID, data = df_vote_change)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-1.0164	-0.3278	0.0429	0.2995	0.8962

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	1.072e+01	1.949e+01	0.550	0.583673	
stateCO	-2.034e-01	5.308e-01	-0.383	0.702346	
stateFL	-7.737e-02	3.869e-01	-0.200	0.841917	
stateGA	3.749e-01	5.107e-01	0.734	0.464620	
stateIL	-2.830e-01	5.646e-01	-0.501	0.617421	
stateMI	2.293e-01	4.951e-01	0.463	0.644365	
stateNJ	2.613e-02	5.379e-01	0.049	0.961360	
stateNY	-3.661e-02	3.053e-01	-0.120	0.904795	
statePA	2.047e-01	5.702e-01	0.359	0.720457	
stateSC	3.698e-01	6.041e-01	0.612	0.541840	
stateTX	5.822e-01	3.472e-01	1.677	0.096807	.
stateWA	5.284e-02	5.589e-01	0.095	0.924865	
district	-1.193e-03	2.060e-02	-0.058	0.953920	
birthday	-5.217e-03	9.841e-03	-0.530	0.597221	
genderM	-4.623e-01	2.729e-01	-1.694	0.093453	.
nominate_dim1	8.089e-01	1.223e+00	0.661	0.509949	
nominate_dim2	-9.481e-01	6.998e-01	-1.355	0.178647	
Instance	8.516e-03	2.192e-03	3.885	0.000187	***
seniority	5.952e-03	2.124e-02	0.280	0.779924	
Contribution_minus	-1.686e-06	2.394e-06	-0.704	0.483012	
Contribution_plus	9.598e-06	8.021e-06	1.197	0.234354	
Dmajority	4.976e-01	1.311e-01	3.794	0.000258	***
pro_env_dummy	-7.757e-02	1.451e-01	-0.534	0.594236	
---					

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.44 on 97 degrees of freedom

(66 observations deleted due to missingness)

Multiple R-squared: 0.3678, Adjusted R-squared: 0.2244

F-statistic: 2.565 on 22 and 97 DF, p-value: 0.0008507

We remove anti\_env\_dummy because of singularities, since all representatives have received contributions from anti environmental groups.

Already here we can see that the coefficients are less significant on average with only instance being significant, with 0.01 units more likely to change their vote from anti to pro environmental vote, further during the years. Moreover, we see that for a change in vote from anti-environmental to pro-environmental

## with individual & year FEs

```
# view(df_vote_change)
ols_change_ind_fe <- lm(Vote ~ as.factor(BioID) + as.factor(Instance) + Contribution_minus +
summary(ols_change_ind_fe)
```

Call:

```
lm(formula = Vote ~ as.factor(BioID) + as.factor(Instance) +
    Contribution_minus + Contribution_plus, data = df_vote_change)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-0.90323	-0.30274	0.06274	0.27000	0.75892

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	2.751e-01	1.336e-01	2.058	0.041963 *
as.factor(BioID)C001059	-1.358e-01	1.646e-01	-0.825	0.411406
as.factor(BioID)C001063	-4.842e-01	2.340e-01	-2.069	0.040874 *
as.factor(BioID)C001077	-6.688e-01	3.062e-01	-2.184	0.031087 *
as.factor(BioID)C001106	-2.758e-02	2.787e-01	-0.099	0.921354
as.factor(BioID)G000410	1.068e-01	2.494e-01	0.428	0.669141
as.factor(BioID)G000578	-4.918e-01	2.782e-01	-1.768	0.079934 .
as.factor(BioID)G000581	-1.371e-01	2.491e-01	-0.550	0.583112
as.factor(BioID)H001051	1.978e-01	3.378e-01	0.585	0.559502
as.factor(BioID)K000387	-4.493e-01	2.220e-01	-2.024	0.045428 *
as.factor(BioID)L000567	-3.397e-01	2.448e-01	-1.388	0.168003
as.factor(BioID)M001181	-2.214e-01	2.802e-01	-0.790	0.431080
as.factor(BioID)R000435	2.320e-01	2.811e-01	0.825	0.411023
as.factor(BioID)R000578	-1.671e-01	2.803e-01	-0.596	0.552302
as.factor(BioID)R000580	-3.985e-01	2.488e-01	-1.601	0.112174
as.factor(BioID)R000585	-6.527e-01	2.236e-01	-2.919	0.004268 **
as.factor(BioID)S000051	-6.307e-02	2.459e-01	-0.256	0.798101
as.factor(BioID)S000522	-1.018e-01	1.704e-01	-0.597	0.551533
as.factor(BioID)S001196	-3.576e-02	2.294e-01	-0.156	0.876430
as.factor(BioID)U000031	-3.879e-01	2.634e-01	-1.473	0.143671
as.factor(BioID)V000131	1.206e-01	1.624e-01	0.743	0.459131
as.factor(BioID)V000132	1.662e-01	2.048e-01	0.812	0.418825
as.factor(BioID)W000823	-3.516e-01	3.363e-01	-1.045	0.298112
as.factor(Instance)4	4.377e-02	1.296e-01	0.338	0.736141

```

as.factor(Instance)6      5.264e-01  1.464e-01  3.594 0.000490 ***
as.factor(Instance)7      5.754e-01  1.465e-01  3.928 0.000151 ***
as.factor(Instance)51     5.083e-01  1.344e-01  3.782 0.000254 ***
as.factor(Instance)52     4.302e-01  1.328e-01  3.240 0.001583 **
Contribution_minus        3.259e-06  2.460e-06  1.325 0.187973
Contribution_plus         9.693e-06  8.174e-06  1.186 0.238275

```

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.4486 on 109 degrees of freedom

(47 observations deleted due to missingness)

Multiple R-squared: 0.3591, Adjusted R-squared: 0.1885

F-statistic: 2.106 on 29 and 109 DF, p-value: 0.003118

To make this work, we have to remove the control variables from before, i.e. party, district, Geographical and state, gender, nominate\_dim1&2, and pro- and anti\_env\_dummy and birth-day since these are already included in the individual fixed effects, i.e. these don't change over time in an individual. Also, seniority and Dmajority are just NAs since this sample size is too small.

What is interesting to see here, is the fact that instances are highly significant. Meaning that for a change in vote, the instance of change is most likely with 0.74 units for vote7 and then 0.72 units for vote 6, and then 53. This is interesting since it shows that the instance of change is more likely to happen in the later votes.

## Logit of all Representatives

**all representatives**

**with control variables**

```

full_logit <- glm(Vote ~ . - state - BioID, family = binomial(link = "logit"), data = df_long)
summary(full_logit)

```

Call:

```

glm(formula = Vote ~ . - state - BioID, family = binomial(link = "logit"),
    data = df_long)

```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-3.2281	-0.1457	-0.0417	0.0833	3.3671

Coefficients:

	Estimate	Std. Error	z value	Pr(> z )
(Intercept)	-2.869e+01	3.666e+01	-0.783	0.433789
district	7.340e-03	1.823e-02	0.403	0.687230
partyR	-8.436e+00	5.262e-01	-16.031	< 2e-16 ***
Vote_change	4.008e-01	3.916e-01	1.024	0.306011
birthday	1.799e-02	1.863e-02	0.966	0.334286
genderM	-1.208e+00	4.968e-01	-2.431	0.015065 *
nominate_dim1	-2.705e+00	1.496e+00	-1.808	0.070639 .
nominate_dim2	-3.449e+00	1.102e+00	-3.131	0.001744 **
GeographicalNE	2.351e+00	5.597e-01	4.201	2.65e-05 ***
GeographicalSO	6.326e-02	4.891e-01	0.129	0.897089
GeographicalWE	6.749e-01	5.613e-01	1.202	0.229175
Instance	2.821e-02	9.371e-03	3.011	0.002607 **
seniority	2.866e-02	5.020e-02	0.571	0.568110
Contribution_minus	-2.135e-05	8.481e-06	-2.517	0.011824 *
Contribution_plus	9.944e-05	3.621e-05	2.746	0.006026 **
Dmajority	1.622e+00	4.796e-01	3.381	0.000722 ***
anti_env_dummy	-7.252e-01	6.113e-01	-1.186	0.235503
pro_env_dummy	2.651e-01	4.345e-01	0.610	0.541753

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 2632.06 on 1900 degrees of freedom  
 Residual deviance: 311.58 on 1883 degrees of freedom  
 (413 observations deleted due to missingness)  
 AIC: 347.58

Number of Fisher Scoring iterations: 8

**with log transformed contributions**

```
cols <- c("Contribution_plus", "Contribution_minus")
df_long[cols] <- lapply(df_long[cols], function(x) log(x + 1))
```

```
full_logit_log <- glm(Vote ~ . - state - BioID, family = binomial(link = "logit"), data = df)
summary(full_logit_log)
```

Call:

```
glm(formula = Vote ~ . - state - BioID, family = binomial(link = "logit"),
    data = df_long)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-3.2909	-0.1428	-0.0420	0.0828	3.1929

Coefficients:

	Estimate	Std. Error	z value	Pr(> z )
(Intercept)	-24.147741	36.062100	-0.670	0.503103
district	0.003638	0.017619	0.206	0.836419
partyR	-8.470502	0.538712	-15.724	< 2e-16 ***
Vote_change	0.515223	0.378765	1.360	0.173745
birthday	0.015688	0.018340	0.855	0.392354
genderM	-1.135114	0.494849	-2.294	0.021799 *
nominate_dim1	-2.680033	1.509152	-1.776	0.075757 .
nominate_dim2	-3.378781	1.124512	-3.005	0.002659 **
GeographicalNE	2.306056	0.560957	4.111	3.94e-05 ***
GeographicalSO	-0.020477	0.480132	-0.043	0.965981
GeographicalWE	0.753004	0.552919	1.362	0.173239
Instance	0.030388	0.009379	3.240	0.001196 **
seniority	0.016360	0.049416	0.331	0.740601
Contribution_minus	-0.425574	0.158521	-2.685	0.007261 **
Contribution_plus	0.467132	0.207103	2.256	0.024099 *
Dmajority	1.638044	0.485525	3.374	0.000741 ***
anti_env_dummy	2.776675	1.577183	1.761	0.078318 .
pro_env_dummy	-2.840655	1.576006	-1.802	0.071476 .

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 2632.06 on 1900 degrees of freedom  
Residual deviance: 313.57 on 1883 degrees of freedom  
(413 observations deleted due to missingness)  
AIC: 349.57

Number of Fisher Scoring iterations: 8

### with geographical & year FEs

use the package {bife} to use fixed effects in a logit model, since the glm function does not allow for fixed effects in a logit model, it is only for linear models.

```
full_logit_geo <- bife(Vote ~ district + party + birthday + nominate_dim1 + nominate_dim2 +  
  data = df_long,  
  model = "logit"  
)  
summary(full_logit_geo)
```

binomial - logit link

```
Vote ~ district + party + birthday + nominate_dim1 + nominate_dim2 +  
  seniority + Contribution_minus + Contribution_plus + gender +  
  pro_env_dummy + anti_env_dummy + as.factor(Instance) | Geographical
```

Estimates:

	Estimate	Std. error	z value	Pr(>  z )
district	0.006154	0.016764	0.367	0.713534
partyR	-8.542809	0.552073	-15.474	< 2e-16 ***
birthday	0.023251	0.017743	1.310	0.190042
nominate_dim1	-3.326268	1.458830	-2.280	0.022602 *
nominate_dim2	-3.151010	1.114133	-2.828	0.004681 **
seniority	0.040313	0.046539	0.866	0.386373
Contribution_minus	-0.481313	0.160668	-2.996	0.002738 **
Contribution_plus	0.499922	0.210771	2.372	0.017698 *
genderM	-1.104824	0.494948	-2.232	0.025602 *
pro_env_dummy	-3.057877	1.604364	-1.906	0.056654 .
anti_env_dummy	3.290619	1.592082	2.067	0.038747 *
as.factor(Instance)4	0.666081	0.596310	1.117	0.263992
as.factor(Instance)6	2.366722	0.666295	3.552	0.000382 ***
as.factor(Instance)7	1.619147	0.692177	2.339	0.019325 *
as.factor(Instance)51	1.558957	0.628168	2.482	0.013074 *
as.factor(Instance)52	2.074271	0.630273	3.291	0.000998 ***

---

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

residual deviance= 312.02,

null deviance= 2632.06,  
n= 1901, N= 4

( 413 observation(s) deleted due to missingness )

Number of Fisher Scoring Iterations: 8

Average individual fixed effect= -38.264

### with state & year fixed effects

```
full_logit_state <- bife(Vote ~ district + party + birthday + nominate_dim1 + nominate_dim2 +  
  data = df_long,  
  model = "logit"  
)  
summary(full_logit_state)
```

binomial - logit link

Vote ~ district + party + birthday + nominate\_dim1 + nominate\_dim2 +  
 seniority + Contribution\_minus + Contribution\_plus + gender +  
 pro\_env\_dummy + anti\_env\_dummy + factor(Instance) | state

Estimates:

	Estimate	Std. error	z value	Pr(>  z )
district	1.483e-02	2.530e-02	0.586	0.557815
partyR	-3.967e+01	1.568e+03	-0.025	0.979809
birthday	2.995e-02	1.958e-02	1.529	0.126211
nominate_dim1	-4.280e+00	1.899e+00	-2.254	0.024190 *
nominate_dim2	-1.988e+00	1.233e+00	-1.613	0.106776
seniority	3.920e-05	5.387e-02	0.001	0.999419
Contribution_minus	-4.726e-01	2.088e-01	-2.263	0.023652 *
Contribution_plus	5.025e-01	2.569e-01	1.956	0.050431 .
genderM	-1.340e+00	6.775e-01	-1.978	0.047973 *
pro_env_dummy	-2.926e+00	1.956e+00	-1.496	0.134734
anti_env_dummy	3.246e+00	2.040e+00	1.592	0.111494
factor(Instance)4	7.365e-01	6.433e-01	1.145	0.252267
factor(Instance)6	2.731e+00	7.430e-01	3.676	0.000237 ***
factor(Instance)7	2.006e+00	7.769e-01	2.582	0.009824 **
factor(Instance)51	1.978e+00	6.942e-01	2.850	0.004375 **



```

factor(Instance)52  2.243e+00  6.849e-01   3.275  0.001057 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

residual deviance= 222.37,
null deviance= 2308.69,
n= 1668, N= 32

( 413 observation(s) deleted due to missingness )
( 233 observation(s) deleted due to perfect classification )

Number of Fisher Scoring Iterations: 21

Average individual fixed effect= -32.671

```

## Logit per Vote

doesnt work yet, why?

```

# # Vote 4_2
# view(df_vote_4_2)
# logit_4_2 <- bife(gender ~ Contribution_3_minus + Contribution_4_minus + Contribution_4_plus
#   data = df_vote_4_2,
#   model = "logit"
# )
# summary(logit_4_2)
# # + seniority_114 + gender + pro_env_dummy
# # Vote4_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_minus + Contribution_4_plus
# # nominate_dim1 + nominate_dim2

# # Vote 51_2
# logit_51_2 <- bife(Vote51_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_minus + Contribution_4_plus
#   data = df_vote_51_2,
#   model = "logit"
# )

```

need to remove dw-nominate scores, since they create a glm.fit error - too accurate 0 or 1 values.

need to remove anti\_env\_dummy and district because of singularities, since all have received anti\_env contributions, so the coefficient is not defined.

## individual and year fixed effects

```
logit_ind_fe <- bife(Vote ~ nominate_dim1 + nominate_dim2 + Contribution_minus + Contribution_plus | BioID, data = df_no_change, family = binomial, link = "logit")
summary(logit_ind_fe)
```

binomial - logit link

Vote ~ nominate\_dim1 + nominate\_dim2 + Contribution\_minus + Contribution\_plus | BioID

Estimates:

	Estimate	Std. error	z value	Pr(>  z )
nominate_dim1	-4.359e+15	6.683e+15	-0.652	0.514
nominate_dim2	1.418e+15	3.901e+15	0.364	0.716
Contribution_minus	-5.771e-02	1.261e-01	-0.458	0.647
Contribution_plus	-4.445e-02	8.807e-02	-0.505	0.614

residual deviance= 118.29,  
null deviance= 139.93,  
n= 101, N= 24

( 97 observation(s) deleted due to missingness )  
( 2116 observation(s) deleted due to perfect classification )

Number of Fisher Scoring Iterations: 25

Average individual fixed effect= 9.655394e+14

## all representatives who did not change their opinion

```
# missmap(df_no_change, main = "Missing values vs observed")
# # all_votes_minus ~ . - all_votes_plus, data = df_no_change)

# logit <- glm(all_votes_minus ~ . - all_votes_plus, family = binomial(link = "logit"), data = df_no_change)
# summary(logit)

# probit <- glm(all_votes_minus ~ . - all_votes_plus, family = binomial(link = "probit"), data = df_no_change)
# summary(probit)
```

Here Probit better than Logit, Akaike lower, so Probit is more parsimonious.

Sessionized Models:

Sessionizing not useful, as the p values are super high. ->