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 academa 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
```

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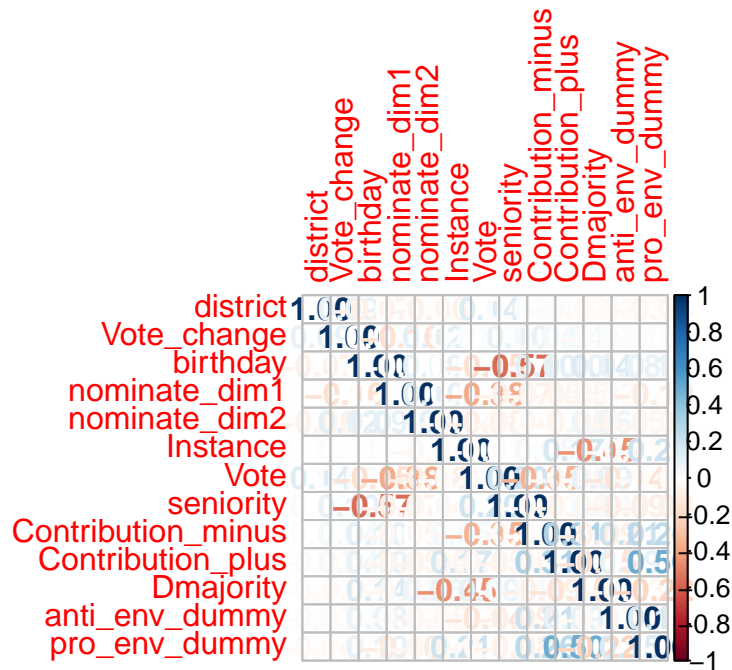
Why such high adjusted R-squared, use corrtest to see if multicollinearity is present.

```
# 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 multicolinarity in model

```
vif(full_ols)
```

```
                     GVIF Df GVIF^(1/(2*Df))
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 multicolinearity 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 contri-
butions which representatives might receive, i.e. AOC vs. Kevin McCarthy.

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
```

```r
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 + a
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
```

```r
# same thing with log
ols_geo_log <- lm(Vote ~ district + party + birthday + nominate_dim1 + nominate_dim2 + as.fa
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 occurances/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 are 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
```

```r
# 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(st
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
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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
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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
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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 **
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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
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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
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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
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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
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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
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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
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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
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
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
```

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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
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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
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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
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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
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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 individiuals 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) Sanfordfrom anti -> pro environment (which means that when you hold constant for this reperesentative, 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 envrionmental 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 seperate 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_min
```

```
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_minu
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_minu
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
```

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 ~ district + party + birthday + nominate_dim1 + nominate_dim2 + I
summary(ols_no_change_3)
```

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

Residuals:
```

```
      Min       1Q   Median       3Q      Max
-0.24998 -0.00067  0.00030  0.00070  0.74730


Coefficients: (5 not defined because of singularities)
                        Estimate Std. Error t value Pr(>|t|)
(Intercept)                7.709e-01  2.866e+00   0.269    0.788
district                   3.905e-03  7.520e-03   0.519    0.604
partyR                    -1.000e+00  3.817e-02 -26.208  < 2e-16 ***
birthday                   1.158e-04  1.451e-03   0.080    0.936
nominate_dim1             -1.167e-02  7.069e-02  -0.165    0.869
nominate_dim2              5.472e-04  5.465e-02   0.010    0.992
Instance                   5.149e-05  5.302e-05   0.971    0.332
as.factor(BioID)A000367   -2.631e-03  5.220e-02  -0.050    0.960
as.factor(BioID)A000369    8.192e-04  2.870e-02   0.029    0.977
as.factor(BioID)A000370   -3.743e-02  7.066e-02  -0.530    0.596
as.factor(BioID)A000372   -3.620e-02  6.408e-02  -0.565    0.572
as.factor(BioID)A000374   -1.077e-02  2.214e-02  -0.486    0.627
as.factor(BioID)A000375   -6.725e-02  1.282e-01  -0.524    0.600
as.factor(BioID)A000376   -1.254e-01  2.625e-01  -0.478    0.633
as.factor(BioID)A000377    1.295e-03  2.319e-02   0.056    0.955
as.factor(BioID)A000378   -1.161e-02  4.089e-02  -0.284    0.776
as.factor(BioID)B000213    2.336e-03  4.136e-02   0.056    0.955
as.factor(BioID)B000287   -1.118e-01  2.403e-01  -0.465    0.642
as.factor(BioID)B000574    8.280e-03  2.604e-02   0.318    0.751
as.factor(BioID)B000755   -1.283e-02  3.356e-02  -0.382    0.702
as.factor(BioID)B000911    1.235e-03  2.941e-02   0.042    0.967
as.factor(BioID)B001227    1.549e-02  2.604e-02   0.595    0.552
as.factor(BioID)B001248   -8.541e-02  1.616e-01  -0.528    0.597
as.factor(BioID)B001250    1.254e-02  4.183e-02   0.300    0.764
as.factor(BioID)B001251    1.033e-02  2.234e-02   0.462    0.644
as.factor(BioID)B001255    1.615e-03  2.848e-02   0.057    0.955
as.factor(BioID)B001257   -3.538e-02  6.623e-02  -0.534    0.593
as.factor(BioID)B001260   -5.081e-02  9.098e-02  -0.558    0.577
as.factor(BioID)B001269   -3.466e-02  5.824e-02  -0.595    0.552
as.factor(BioID)B001270   -1.333e-01  2.640e-01  -0.505    0.614
as.factor(BioID)B001271    7.806e-03  4.007e-02   0.195    0.846
as.factor(BioID)B001273   -1.059e-02  2.893e-02  -0.366    0.714
as.factor(BioID)B001274   -7.386e-03  1.704e-02  -0.434    0.665
as.factor(BioID)B001275   -2.311e-02  3.797e-02  -0.609    0.543
as.factor(BioID)B001278    4.788e-03  2.267e-02   0.211    0.833
as.factor(BioID)B001281   -2.998e-03  1.595e-02  -0.188    0.851
as.factor(BioID)B001282   -1.574e-02  3.215e-02  -0.490    0.625
as.factor(BioID)B001283    6.381e-03  2.480e-02   0.257    0.797
```

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as.factor(BioID)B001284 -1.135e-02  2.549e-02  -0.445    0.656
as.factor(BioID)B001285 -9.458e-02  1.764e-01  -0.536    0.592
as.factor(BioID)B001286 -6.064e-02  1.147e-01  -0.529    0.597
as.factor(BioID)B001289  7.308e-03  2.656e-02   0.275    0.783
as.factor(BioID)B001290 -1.415e-02  4.320e-02  -0.328    0.743
as.factor(BioID)B001291 -1.292e-01  2.401e-01  -0.538    0.591
as.factor(BioID)B001292 -2.376e-02  4.384e-02  -0.542    0.588
as.factor(BioID)B001293 -2.311e-02  4.212e-02  -0.549    0.583
as.factor(BioID)B001294  7.017e-03  2.667e-02   0.263    0.792
as.factor(BioID)B001295 -3.960e-02  6.790e-02  -0.583    0.560
as.factor(BioID)B001297 -5.649e-03  1.735e-02  -0.326    0.745
as.factor(BioID)B001298 -3.381e-03  2.911e-02  -0.116    0.908
as.factor(BioID)B001299 -6.254e-03  2.409e-02  -0.260    0.795
as.factor(BioID)B001300 -1.681e-01  3.358e-01  -0.501    0.617
as.factor(BioID)B001301  2.715e-03  4.909e-02   0.055    0.956
as.factor(BioID)B001302 -9.865e-03  3.342e-02  -0.295    0.768
as.factor(BioID)B001303  3.561e-03  2.247e-02   0.158    0.874
as.factor(BioID)B001304 -1.143e-02  2.602e-02  -0.439    0.660
as.factor(BioID)B001306 -4.280e-02  6.971e-02  -0.614    0.539
as.factor(BioID)B001307 -1.092e-02  2.958e-02  -0.369    0.712
as.factor(BioID)B001309 -2.705e-03  2.196e-02  -0.123    0.902
as.factor(BioID)C000266  1.497e-02  3.970e-02   0.377    0.706
as.factor(BioID)C000537 -2.366e-03  2.356e-02  -0.100    0.920
as.factor(BioID)C000714 -2.195e-02  6.599e-02  -0.333    0.739
as.factor(BioID)C000754 -4.469e-03  2.586e-02  -0.173    0.863
as.factor(BioID)C000984 -8.607e-03  3.426e-02  -0.251    0.802
as.factor(BioID)C001036 -7.421e-02  1.498e-01  -0.496    0.620
as.factor(BioID)C001037 -7.956e-03  3.994e-02  -0.199    0.842
as.factor(BioID)C001038 -3.846e-02  9.234e-02  -0.416    0.677
as.factor(BioID)C001045  6.818e-04  4.283e-02   0.016    0.987
as.factor(BioID)C001048 -1.025e-02  2.693e-02  -0.381    0.703
as.factor(BioID)C001051 -1.050e-01  1.941e-01  -0.541    0.589
as.factor(BioID)C001053 -2.009e-03  3.206e-02  -0.063    0.950
as.factor(BioID)C001055  2.401e-04  2.763e-02   0.009    0.993
as.factor(BioID)C001061 -5.104e-03  2.345e-02  -0.218    0.828
as.factor(BioID)C001066 -4.442e-02  9.873e-02  -0.450    0.653
as.factor(BioID)C001067 -2.283e-02  7.093e-02  -0.322    0.748
as.factor(BioID)C001068 -2.365e-02  4.942e-02  -0.479    0.632
as.factor(BioID)C001069  2.766e-03  1.741e-02   0.159    0.874
as.factor(BioID)C001072 -1.784e-02  5.798e-02  -0.308    0.758
as.factor(BioID)C001076  1.159e-03  2.001e-02   0.058    0.954
as.factor(BioID)C001078 -3.349e-02  6.285e-02  -0.533    0.594
as.factor(BioID)C001083  8.148e-03  2.669e-02   0.305    0.760
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as.factor(BioID)C001084  4.312e-03  2.275e-02   0.190    0.850
as.factor(BioID)C001087  4.619e-03  1.882e-02   0.245    0.806
as.factor(BioID)C001091 -7.214e-02  1.514e-01  -0.476    0.634
as.factor(BioID)C001092 -9.703e-02  1.713e-01  -0.567    0.571
as.factor(BioID)C001093 -2.570e-02  4.889e-02  -0.526    0.599
as.factor(BioID)C001094 -2.150e-02  4.682e-02  -0.459    0.646
as.factor(BioID)C001097 -1.066e-01  2.082e-01  -0.512    0.609
as.factor(BioID)C001101 -1.206e-02  4.381e-02  -0.275    0.783
as.factor(BioID)C001103  4.806e-03  2.418e-02   0.199    0.842
as.factor(BioID)C001105 -3.338e-02  5.415e-02  -0.616    0.538
as.factor(BioID)C001107  9.018e-01  1.812e-01   4.976 7.32e-07 ***
as.factor(BioID)C001108  3.471e-03  1.733e-02   0.200    0.841
as.factor(BioID)C001109  3.572e-03  3.583e-02   0.100    0.921
as.factor(BioID)C001110 -1.765e-01  3.337e-01  -0.529    0.597
as.factor(BioID)C001111 -4.800e-02  8.343e-02  -0.575    0.565
as.factor(BioID)C001112 -9.093e-02  1.724e-01  -0.527    0.598
as.factor(BioID)C001114 -6.577e-03  2.311e-02  -0.285    0.776
as.factor(BioID)C001117 -1.901e-02  7.791e-02  -0.244    0.807
as.factor(BioID)C001118 -1.849e-02  4.112e-02  -0.450    0.653
as.factor(BioID)C001119 -8.772e-03  5.241e-02  -0.167    0.867
as.factor(BioID)C001120 -7.521e-03  2.691e-02  -0.280    0.780
as.factor(BioID)C001121 -2.440e-02  6.300e-02  -0.387    0.699
as.factor(BioID)D000096 -7.992e-03  2.901e-02  -0.276    0.783
as.factor(BioID)D000191  7.798e-03  2.610e-02   0.299    0.765
as.factor(BioID)D000197  1.272e-02  2.447e-02   0.520    0.603
as.factor(BioID)D000216  9.454e-03  2.516e-02   0.376    0.707
as.factor(BioID)D000533  1.872e-02  3.392e-02   0.552    0.581
as.factor(BioID)D000598 -1.918e-01  3.706e-01  -0.517    0.605
as.factor(BioID)D000604 -4.755e-02  8.710e-02  -0.546    0.585
as.factor(BioID)D000612 -3.063e-02  5.440e-02  -0.563    0.573
as.factor(BioID)D000614 -1.851e-02  3.558e-02  -0.520    0.603
as.factor(BioID)D000615 -1.690e-04  1.533e-02  -0.011    0.991
as.factor(BioID)D000616 -5.097e-03  1.811e-02  -0.281    0.778
as.factor(BioID)D000617  2.783e-03  1.847e-02   0.151    0.880
as.factor(BioID)D000619 -4.482e-02  7.758e-02  -0.578    0.564
as.factor(BioID)D000620 -1.726e-02  3.729e-02  -0.463    0.644
as.factor(BioID)D000621 -1.404e-02  4.046e-02  -0.347    0.729
as.factor(BioID)D000625 -3.698e-02  6.427e-02  -0.575    0.565
as.factor(BioID)D000626 -2.322e-02  4.993e-02  -0.465    0.642
as.factor(BioID)D000627 -3.523e-02  6.277e-02  -0.561    0.575
as.factor(BioID)D000628 -1.222e-03  2.438e-02  -0.050    0.960
as.factor(BioID)D000629 -1.328e-02  4.930e-02  -0.269    0.788
as.factor(BioID)D000630 -7.559e-02  1.488e-01  -0.508    0.612
```

```
as.factor(BioID)D000631 -1.261e-02  2.984e-02  -0.422     0.673
as.factor(BioID)E000179 -4.002e-02  9.333e-02  -0.429     0.668
as.factor(BioID)E000288 -7.268e-03  5.532e-02  -0.131     0.896
as.factor(BioID)E000290 -1.836e-03  3.700e-02  -0.050     0.960
as.factor(BioID)E000291  1.697e-03  2.170e-02   0.078     0.938
as.factor(BioID)E000293 -1.235e-02  2.864e-02  -0.431     0.666
as.factor(BioID)E000294 -1.460e-02  2.866e-02  -0.509     0.611
as.factor(BioID)E000297 -4.369e-02  8.975e-02  -0.487     0.626
as.factor(BioID)E000298 -6.322e-03  2.172e-02  -0.291     0.771
as.factor(BioID)E000299 -6.063e-02  1.260e-01  -0.481     0.631
as.factor(BioID)F000030 -5.582e-02  1.216e-01  -0.459     0.646
as.factor(BioID)F000372 -2.439e-02  5.668e-02  -0.430     0.667
as.factor(BioID)F000448 -1.257e-02  3.979e-02  -0.316     0.752
as.factor(BioID)F000449  7.045e-03  4.133e-02   0.170     0.865
as.factor(BioID)F000450 -2.949e-03  3.140e-02  -0.094     0.925
as.factor(BioID)F000451 -2.266e-02  4.483e-02  -0.505     0.613
as.factor(BioID)F000454 -3.452e-02  6.565e-02  -0.526     0.599
as.factor(BioID)F000455 -2.932e-02  6.919e-02  -0.424     0.672
as.factor(BioID)F000456 -1.437e-03  3.350e-02  -0.043     0.966
as.factor(BioID)F000458 -2.151e-02  4.663e-02  -0.461     0.645
as.factor(BioID)F000459 -2.818e-03  1.409e-02  -0.200     0.842
as.factor(BioID)F000460 -9.425e-02  1.778e-01  -0.530     0.596
as.factor(BioID)F000461 -5.455e-02  9.990e-02  -0.546     0.585
as.factor(BioID)F000462 -7.742e-02  1.452e-01  -0.533     0.594
as.factor(BioID)F000464  9.337e-01  1.170e-01   7.982 3.04e-15 ***
as.factor(BioID)F000465 -5.482e-03  1.422e-02  -0.385     0.700
as.factor(BioID)F000468 -2.677e-02  9.452e-02  -0.283     0.777
as.factor(BioID)G000289 -1.958e-03  3.821e-02  -0.051     0.959
as.factor(BioID)G000377 -2.853e-02  6.043e-02  -0.472     0.637
as.factor(BioID)G000535  5.091e-03  2.424e-02   0.210     0.834
as.factor(BioID)G000546 -8.685e-03  2.452e-02  -0.354     0.723
as.factor(BioID)G000548 -5.783e-04  2.256e-02  -0.026     0.980
as.factor(BioID)G000552  1.154e-02  2.661e-02   0.434     0.665
as.factor(BioID)G000553 -2.169e-02  4.779e-02  -0.454     0.650
as.factor(BioID)G000556 -2.610e-02  6.300e-02  -0.414     0.679
as.factor(BioID)G000558  1.640e-03  1.739e-02   0.094     0.925
as.factor(BioID)G000560 -4.216e-02  8.871e-02  -0.475     0.635
as.factor(BioID)G000563 -1.703e-02  3.003e-02  -0.567     0.571
as.factor(BioID)G000566 -3.652e-03  1.991e-02  -0.183     0.854
as.factor(BioID)G000568 -2.501e-02  4.316e-02  -0.579     0.562
as.factor(BioID)G000571 -4.003e-03  4.460e-02  -0.090     0.928
as.factor(BioID)G000576 -1.424e-02  2.484e-02  -0.573     0.566
as.factor(BioID)G000577 -1.711e-02  3.063e-02  -0.559     0.577
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as.factor(BioID)G000579 -2.875e-02  5.273e-02  -0.545    0.586
as.factor(BioID)G000583 -1.906e-02  4.551e-02  -0.419    0.675
as.factor(BioID)G000584  5.976e-03  3.614e-02   0.165    0.869
as.factor(BioID)G000585 -1.285e-01  2.631e-01  -0.489    0.625
as.factor(BioID)G000586 -1.300e-02  5.670e-02  -0.229    0.819
as.factor(BioID)G000587 -1.054e-01  2.139e-01  -0.493    0.622
as.factor(BioID)G000588 -6.462e-02  1.134e-01  -0.570    0.569
as.factor(BioID)G000589 -1.540e-02  4.455e-02  -0.346    0.730
as.factor(BioID)G000590 -2.193e-02  3.861e-02  -0.568    0.570
as.factor(BioID)G000591 -8.728e-03  1.902e-02  -0.459    0.646
as.factor(BioID)G000592 -1.164e-02  4.680e-02  -0.249    0.804
as.factor(BioID)H000324 -5.477e-02  1.197e-01  -0.458    0.647
as.factor(BioID)H000636 -3.987e-02  8.435e-02  -0.473    0.636
as.factor(BioID)H000874  4.165e-03  2.784e-02   0.150    0.881
as.factor(BioID)H001034 -4.778e-02  1.053e-01  -0.454    0.650
as.factor(BioID)H001036 -1.778e-03  2.458e-02  -0.072    0.942
as.factor(BioID)H001038 -9.044e-02  1.794e-01  -0.504    0.614
as.factor(BioID)H001045 -1.064e-03  2.267e-02  -0.047    0.963
as.factor(BioID)H001047 -8.928e-03  2.845e-02  -0.314    0.754
as.factor(BioID)H001048 -1.855e-01  3.601e-01  -0.515    0.607
as.factor(BioID)H001050  5.873e-03  2.521e-02   0.233    0.816
as.factor(BioID)H001052  8.079e-03  2.193e-02   0.368    0.713
as.factor(BioID)H001053 -6.053e-03  1.687e-02  -0.359    0.720
as.factor(BioID)H001055 -3.102e-03  3.605e-02  -0.086    0.931
as.factor(BioID)H001056 -5.583e-03  1.584e-02  -0.352    0.725
as.factor(BioID)H001057  8.833e-03  3.108e-02   0.284    0.776
as.factor(BioID)H001059 -4.489e-02  8.357e-02  -0.537    0.591
as.factor(BioID)H001063 -1.618e-01  3.152e-01  -0.513    0.608
as.factor(BioID)H001064 -3.183e-02  5.836e-02  -0.545    0.586
as.factor(BioID)H001066 -1.291e-02  4.127e-02  -0.313    0.755
as.factor(BioID)H001068 -9.325e-04  4.006e-02  -0.023    0.981
as.factor(BioID)H001071 -2.807e-02  5.721e-02  -0.491    0.624
as.factor(BioID)H001072 -6.844e-04  2.604e-02  -0.026    0.979
as.factor(BioID)H001073 -8.607e-02  1.575e-01  -0.546    0.585
as.factor(BioID)H001074 -3.190e-02  6.192e-02  -0.515    0.606
as.factor(BioID)H001077 -4.568e-03  1.443e-02  -0.317    0.752
as.factor(BioID)H001078 -1.706e-02  2.970e-02  -0.574    0.566
as.factor(BioID)H001081 -1.978e-02  4.764e-02  -0.415    0.678
as.factor(BioID)H001085 -2.359e-02  5.064e-02  -0.466    0.641
as.factor(BioID)H001088 -7.266e-04  2.463e-02  -0.029    0.976
as.factor(BioID)I000057  3.841e-03  2.170e-02   0.177    0.860
as.factor(BioID)J000032 -5.135e-02  1.125e-01  -0.457    0.648
as.factor(BioID)J000126 -9.491e-02  1.920e-01  -0.494    0.621
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as.factor(BioID)J000174   1.467e-02   5.491e-02    0.267    0.789
as.factor(BioID)J000288  -3.595e-03   2.110e-02   -0.170    0.865
as.factor(BioID)J000289  -1.582e-03   1.757e-02   -0.090    0.928
as.factor(BioID)J000290   3.913e-03   2.502e-02    0.156    0.876
as.factor(BioID)J000292  -1.316e-02   2.811e-02   -0.468    0.640
as.factor(BioID)J000294  -2.416e-02   6.409e-02   -0.377    0.706
as.factor(BioID)J000295  -4.853e-02   7.990e-02   -0.607    0.544
as.factor(BioID)J000297  -5.330e-03   2.583e-02   -0.206    0.837
as.factor(BioID)J000298  -2.081e-02   7.195e-02   -0.289    0.772
as.factor(BioID)J000299  -1.023e-02   2.128e-02   -0.481    0.631
as.factor(BioID)J000301   1.473e-03   2.296e-02    0.064    0.949
as.factor(BioID)J000302  -4.573e-02   7.631e-02   -0.599    0.549
as.factor(BioID)K000009  -1.245e-02   4.258e-02   -0.292    0.770
as.factor(BioID)K000188   2.588e-03   1.861e-02    0.139    0.889
as.factor(BioID)K000210   1.135e-02   6.636e-02    0.171    0.864
as.factor(BioID)K000362   3.785e-03   2.620e-02    0.144    0.885
as.factor(BioID)K000363   8.963e-03   4.399e-02    0.204    0.839
as.factor(BioID)K000375  -2.683e-02   5.033e-02   -0.533    0.594
as.factor(BioID)K000378  -5.723e-02   1.053e-01   -0.543    0.587
as.factor(BioID)K000379  -9.880e-03   5.511e-02   -0.179    0.858
as.factor(BioID)K000381  -1.889e-02   4.800e-02   -0.394    0.694
as.factor(BioID)K000382  -1.323e-03   1.548e-02   -0.085    0.932
as.factor(BioID)K000385   6.172e-04   1.687e-02    0.037    0.971
as.factor(BioID)K000386   9.101e-01   1.552e-01    5.863 5.68e-09 ***
as.factor(BioID)K000388   4.574e-03   1.863e-02    0.246    0.806
as.factor(BioID)K000389  -6.273e-02   1.392e-01   -0.451    0.652
as.factor(BioID)K000390  -1.278e-02   5.710e-02   -0.224    0.823
as.factor(BioID)K000391  -2.802e-02   6.277e-02   -0.446    0.655
as.factor(BioID)K000392  -2.579e-02   4.438e-02   -0.581    0.561
as.factor(BioID)K000394  -1.257e-02   5.659e-02   -0.222    0.824
as.factor(BioID)K000395  -4.369e-02   7.217e-02   -0.605    0.545
as.factor(BioID)L000263  -9.553e-03   4.423e-02   -0.216    0.829
as.factor(BioID)L000287   6.680e-03   2.434e-02    0.274    0.784
as.factor(BioID)L000480  -4.326e-02   9.496e-02   -0.456    0.649
as.factor(BioID)L000491   6.209e-03   2.030e-02    0.306    0.760
as.factor(BioID)L000554   1.025e-02   5.912e-02    0.173    0.862
as.factor(BioID)L000557   1.254e-02   2.686e-02    0.467    0.641
as.factor(BioID)L000559   5.191e-03   2.124e-02    0.244    0.807
as.factor(BioID)L000560   4.903e-03   2.311e-02    0.212    0.832
as.factor(BioID)L000562  -1.735e-02   4.258e-02   -0.408    0.684
as.factor(BioID)L000563  -2.698e-03   2.184e-02   -0.124    0.902
as.factor(BioID)L000564  -4.951e-03   1.843e-02   -0.269    0.788
as.factor(BioID)L000565   3.351e-03   2.028e-02    0.165    0.869
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as.factor(BioID)L000566 -6.574e-03  1.891e-02  -0.348   0.728
as.factor(BioID)L000569 -3.610e-04  2.865e-02  -0.013   0.990
as.factor(BioID)L000573  8.348e-03  3.157e-02   0.264   0.792
as.factor(BioID)L000576 -1.628e-02  2.987e-02  -0.545   0.586
as.factor(BioID)L000578  5.290e-03  2.934e-02   0.180   0.857
as.factor(BioID)L000579 -1.738e-01  3.309e-01  -0.525   0.599
as.factor(BioID)L000580  3.286e-03  1.807e-02   0.182   0.856
as.factor(BioID)L000581 -4.753e-02  9.115e-02  -0.521   0.602
as.factor(BioID)L000583 -3.380e-02  6.327e-02  -0.534   0.593
as.factor(BioID)L000584 -8.399e-03  2.169e-02  -0.387   0.699
as.factor(BioID)L000586 -1.578e-02  2.774e-02  -0.569   0.570
as.factor(BioID)L000587  8.699e-04  2.877e-02   0.030   0.976
as.factor(BioID)L000590 -1.217e-02  3.298e-02  -0.369   0.712
as.factor(BioID)L000591 -9.045e-03  4.391e-02  -0.206   0.837
as.factor(BioID)L000592 -3.230e-02  7.495e-02  -0.431   0.667
as.factor(BioID)L000593 -1.904e-01  3.727e-01  -0.511   0.609
as.factor(BioID)M000087 -2.729e-02  6.439e-02  -0.424   0.672
as.factor(BioID)M000312  1.025e-02  3.064e-02   0.335   0.738
as.factor(BioID)M000404  9.311e-05  3.459e-02   0.003   0.998
as.factor(BioID)M000689 -4.994e-03  4.533e-02  -0.110   0.912
as.factor(BioID)M001137 -2.258e-03  2.352e-02  -0.096   0.924
as.factor(BioID)M001143 -5.741e-04  2.015e-02  -0.028   0.977
as.factor(BioID)M001144  1.372e-02  3.492e-02   0.393   0.694
as.factor(BioID)M001150 -2.472e-02  5.656e-02  -0.437   0.662
as.factor(BioID)M001151 -5.708e-02  1.043e-01  -0.547   0.584
as.factor(BioID)M001156 -2.674e-02  5.849e-02  -0.457   0.648
as.factor(BioID)M001157 -2.718e-02  5.059e-02  -0.537   0.591
as.factor(BioID)M001158 -7.826e-02  1.484e-01  -0.528   0.598
as.factor(BioID)M001159 -7.621e-03  2.036e-02  -0.374   0.708
as.factor(BioID)M001160 -1.650e-03  2.286e-02  -0.072   0.942
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as.factor(BioID)M001182 -6.727e-03  4.120e-02  -0.163   0.870
as.factor(BioID)M001184 -5.355e-03  4.292e-02  -0.125   0.901
as.factor(BioID)M001187 -3.275e-02  5.939e-02  -0.551   0.581
as.factor(BioID)M001188 -1.831e-02  5.696e-02  -0.321   0.748
as.factor(BioID)M001189 -1.422e-02  2.923e-02  -0.487   0.627
as.factor(BioID)M001191 -6.548e-02  1.399e-01  -0.468   0.640
as.factor(BioID)M001193 -6.878e-03  3.326e-02  -0.207   0.836
as.factor(BioID)M001195 -7.992e-04  1.348e-02  -0.059   0.953
as.factor(BioID)M001196 -2.097e-02  5.313e-02  -0.395   0.693
as.factor(BioID)M001200 -1.175e-02  2.723e-02  -0.431   0.666
as.factor(BioID)M001201 -3.333e-02  5.449e-02  -0.612   0.541
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as.factor(BioID)M001202 -2.773e-02  5.885e-02   -0.471      0.638
as.factor(BioID)M001203 -2.708e-02  5.025e-02   -0.539      0.590
as.factor(BioID)M001204 -3.194e-02  5.054e-02   -0.632      0.528
as.factor(BioID)M001206 -9.479e-02  1.757e-01   -0.540      0.590
as.factor(BioID)N000015  1.820e-02  2.954e-02    0.616      0.538
as.factor(BioID)N000127 -2.188e-02  4.092e-02   -0.535      0.593
as.factor(BioID)N000181 -7.359e-02  1.451e-01   -0.507      0.612
as.factor(BioID)N000182 -5.614e-02  1.108e-01   -0.507      0.612
as.factor(BioID)N000184  8.093e-03  2.508e-02    0.323      0.747
as.factor(BioID)N000185 -3.112e-02  5.954e-02   -0.523      0.601
as.factor(BioID)N000188  3.633e-03  2.464e-02    0.147      0.883
as.factor(BioID)N000189 -9.627e-03  2.773e-02   -0.347      0.729
as.factor(BioID)N000190 -8.854e-03  2.431e-02   -0.364      0.716
as.factor(BioID)N000191 -8.455e-03  5.472e-02   -0.155      0.877
as.factor(BioID)O000168 -7.479e-02  1.415e-01   -0.529      0.597
as.factor(BioID)O000170 -5.372e-02  1.219e-01   -0.441      0.660
as.factor(BioID)O000171 -3.611e-04  2.834e-02   -0.013      0.990
as.factor(BioID)O000172 -5.743e-02  1.483e-01   -0.387      0.699
as.factor(BioID)O000173 -2.137e-02  8.985e-02   -0.238      0.812
as.factor(BioID)P000034  1.037e-03  2.712e-02    0.038      0.970
as.factor(BioID)P000096 -1.654e-02  4.482e-02   -0.369      0.712
as.factor(BioID)P000258 -7.588e-01  3.136e-02  -24.198   < 2e-16 ***
as.factor(BioID)P000373 -4.084e-02  8.844e-02   -0.462      0.644
as.factor(BioID)P000523  6.506e-03  3.121e-02    0.208      0.835
as.factor(BioID)P000588  6.918e-03  4.693e-02    0.147      0.883
as.factor(BioID)P000591 -6.764e-03  3.033e-02   -0.223      0.824
as.factor(BioID)P000592  8.302e-03  4.265e-02    0.195      0.846
as.factor(BioID)P000593 -1.733e-02  3.544e-02   -0.489      0.625
as.factor(BioID)P000594 -1.006e-03  1.931e-02   -0.052      0.958
as.factor(BioID)P000597  6.148e-03  2.244e-02    0.274      0.784
as.factor(BioID)P000598 -1.195e-03  5.467e-02   -0.022      0.983
as.factor(BioID)P000599 -1.868e-02  3.464e-02   -0.539      0.590
as.factor(BioID)P000601 -6.798e-03  2.213e-02   -0.307      0.759
as.factor(BioID)P000602 -1.858e-03  2.072e-02   -0.090      0.929
as.factor(BioID)P000604 -2.922e-02  6.623e-02   -0.441      0.659
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as.factor(BioID)P000607  1.202e-04  4.696e-02    0.003      0.998
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as.factor(BioID)P000611  2.377e-04  3.805e-02    0.006      0.995
as.factor(BioID)P000614 -6.013e-03  4.507e-02   -0.133      0.894
as.factor(BioID)P000615 -1.912e-02  3.172e-02   -0.603      0.547
as.factor(BioID)P000616 -1.193e-02  3.330e-02   -0.358      0.720
as.factor(BioID)P000617 -2.776e-02  9.081e-02   -0.306      0.760
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as.factor(BioID)Q000023 -1.090e-02  2.855e-02  -0.382     0.703
as.factor(BioID)R000053 -2.339e-02  6.440e-02  -0.363     0.717
as.factor(BioID)R000395  4.264e-03  5.927e-02   0.072     0.943
as.factor(BioID)R000409 -1.617e-01  3.215e-01  -0.503     0.615
as.factor(BioID)R000486 -1.350e-01  2.704e-01  -0.499     0.618
as.factor(BioID)R000487 -1.288e-01  2.581e-01  -0.499     0.618
as.factor(BioID)R000515  1.666e-02  2.746e-02   0.607     0.544
as.factor(BioID)R000575  1.142e-03  2.089e-02   0.055     0.956
as.factor(BioID)R000576  5.356e-03  2.266e-02   0.236     0.813
as.factor(BioID)R000577 -3.907e-02  9.861e-02  -0.396     0.692
as.factor(BioID)R000582  8.831e-03  5.305e-02   0.166     0.868
as.factor(BioID)R000583 -5.590e-02  1.077e-01  -0.519     0.604
as.factor(BioID)R000586 -5.284e-02  9.390e-02  -0.563     0.574
as.factor(BioID)R000587 -1.929e-02  4.184e-02  -0.461     0.645
as.factor(BioID)R000588 -1.245e-04  4.636e-02  -0.003     0.998
as.factor(BioID)R000591 -1.579e-03  2.844e-02  -0.056     0.956
as.factor(BioID)R000592 -4.509e-03  1.845e-02  -0.244     0.807
as.factor(BioID)R000593 -4.740e-02  8.785e-02  -0.540     0.590
as.factor(BioID)R000597 -1.763e-02  3.031e-02  -0.582     0.561
as.factor(BioID)R000598 -3.763e-02  6.791e-02  -0.554     0.580
as.factor(BioID)R000601 -6.295e-03  1.884e-02  -0.334     0.738
as.factor(BioID)R000602 -1.172e-02  2.721e-02  -0.431     0.667
as.factor(BioID)R000603 -2.042e-02  3.987e-02  -0.512     0.609
as.factor(BioID)R000604 -1.192e-02  2.298e-02  -0.519     0.604
as.factor(BioID)R000606 -2.583e-02  6.186e-02  -0.418     0.676
as.factor(BioID)R000607  9.308e-01  1.191e-01   7.819 1.06e-14 ***
as.factor(BioID)R000610 -5.427e-02  9.785e-02  -0.555     0.579
as.factor(BioID)R000612 -1.809e-02  3.260e-02  -0.555     0.579
as.factor(BioID)R000614 -7.648e-02  1.562e-01  -0.490     0.624
as.factor(BioID)S000018 -4.545e-03  2.770e-02  -0.164     0.870
as.factor(BioID)S000030 -1.628e-01  3.281e-01  -0.496     0.620
as.factor(BioID)S000185  8.619e-03  2.375e-02   0.363     0.717
as.factor(BioID)S000248 -3.507e-02  8.591e-02  -0.408     0.683
as.factor(BioID)S000364 -4.056e-02  8.213e-02  -0.494     0.622
as.factor(BioID)S000480 -7.062e-02  1.498e-01  -0.472     0.637
as.factor(BioID)S000510 -2.084e-02  5.630e-02  -0.370     0.711
as.factor(BioID)S000583 -5.739e-02  1.201e-01  -0.478     0.633
as.factor(BioID)S001145 -1.573e-02  4.796e-02  -0.328     0.743
as.factor(BioID)S001148  7.245e-03  4.320e-02   0.168     0.867
as.factor(BioID)S001154 -2.059e-02  4.339e-02  -0.474     0.635
as.factor(BioID)S001156 -1.353e-01  2.807e-01  -0.482     0.630
as.factor(BioID)S001157 -3.753e-02  7.278e-02  -0.516     0.606
as.factor(BioID)S001165 -1.894e-02  4.202e-02  -0.451     0.652
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as.factor(BioID)S001168 -7.321e-04  2.430e-02  -0.030    0.976
as.factor(BioID)S001170  5.305e-03  2.338e-02   0.227    0.821
as.factor(BioID)S001172  1.241e-04  1.129e-02   0.011    0.991
as.factor(BioID)S001175 -4.353e-02  8.782e-02  -0.496    0.620
as.factor(BioID)S001176  8.317e-03  2.234e-02   0.372    0.710
as.factor(BioID)S001180 -1.170e-02  2.635e-02  -0.444    0.657
as.factor(BioID)S001185 -1.992e-02  5.618e-02  -0.354    0.723
as.factor(BioID)S001187 -5.171e-02  8.957e-02  -0.577    0.564
as.factor(BioID)S001188  3.751e-03  2.920e-02   0.128    0.898
as.factor(BioID)S001189 -2.201e-02  4.403e-02  -0.500    0.617
as.factor(BioID)S001190 -3.580e-02  6.397e-02  -0.560    0.576
as.factor(BioID)S001192  8.085e-04  2.117e-02   0.038    0.970
as.factor(BioID)S001195 -2.363e-02  5.486e-02  -0.431    0.667
as.factor(BioID)S001200 -3.343e-02  7.929e-02  -0.422    0.673
as.factor(BioID)S001201 -9.751e-03  2.086e-02  -0.467    0.640
as.factor(BioID)S001205 -1.517e-02  3.608e-02  -0.420    0.674
as.factor(BioID)S001207 -4.426e-02  8.616e-02  -0.514    0.608
as.factor(BioID)S001209 -2.954e-02  6.844e-02  -0.432    0.666
as.factor(BioID)S001212 -2.954e-02  4.496e-02  -0.657    0.511
as.factor(BioID)S001213 -3.522e-03  1.950e-02  -0.181    0.857
as.factor(BioID)S001214 -6.252e-02  1.242e-01  -0.504    0.615
as.factor(BioID)S001215 -4.371e-02  1.035e-01  -0.422    0.673
as.factor(BioID)S001216 -3.093e-02  6.824e-02  -0.453    0.650
as.factor(BioID)T000193  1.296e-02  2.342e-02   0.553    0.580
as.factor(BioID)T000238 -3.104e-02  6.734e-02  -0.461    0.645
as.factor(BioID)T000462 -3.195e-02  6.623e-02  -0.482    0.630
as.factor(BioID)T000463 -2.759e-02  5.052e-02  -0.546    0.585
as.factor(BioID)T000465  1.014e-03  1.582e-02   0.064    0.949
as.factor(BioID)T000468  4.512e-03  1.984e-02   0.227    0.820
as.factor(BioID)T000469 -6.664e-02  1.311e-01  -0.508    0.611
as.factor(BioID)T000470 -1.560e-03  3.220e-02  -0.048    0.961
as.factor(BioID)T000474 -1.318e-01  2.551e-01  -0.516    0.606
as.factor(BioID)T000475 -3.617e-02  6.051e-02  -0.598    0.550
as.factor(BioID)T000477 -2.428e-03  1.864e-02  -0.130    0.896
as.factor(BioID)T000479 -7.206e-03  2.184e-02  -0.330    0.741
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as.factor(BioID)T000482 -1.071e-02  4.343e-02  -0.247    0.805
as.factor(BioID)U000040 -5.346e-02  1.391e-01  -0.384    0.701
as.factor(BioID)V000081 -6.742e-03  4.218e-02  -0.160    0.873
as.factor(BioID)V000108  1.922e-02  2.823e-02   0.681    0.496
as.factor(BioID)V000133  9.919e-01  4.477e-02  22.153  < 2e-16 ***
as.factor(BioID)W000187 -1.431e-01  2.926e-01  -0.489    0.625
as.factor(BioID)W000413  1.624e-02  6.635e-02   0.245    0.807
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as.factor(BioID)W000791   7.264e-03  4.404e-02   0.165    0.869
as.factor(BioID)W000795   9.593e-03  4.092e-02   0.234    0.815
as.factor(BioID)W000796   5.715e-03  2.806e-02   0.204    0.839
as.factor(BioID)W000799   5.828e-03  2.075e-02   0.281    0.779
as.factor(BioID)W000804   7.735e-03  3.721e-02   0.208    0.835
as.factor(BioID)W000808  -8.247e-02  1.565e-01  -0.527    0.598
as.factor(BioID)W000809  -3.638e-03  2.132e-02  -0.171    0.865
as.factor(BioID)W000810  -1.745e-02  3.674e-02  -0.475    0.635
as.factor(BioID)W000812  -7.130e-04  2.054e-02  -0.035    0.972
as.factor(BioID)W000813   1.178e-04  1.682e-02   0.007    0.994
as.factor(BioID)W000814  -4.244e-02  7.968e-02  -0.533    0.594
as.factor(BioID)W000815   1.359e-03  1.927e-02   0.071    0.944
as.factor(BioID)W000816  -8.659e-02  1.571e-01  -0.551    0.582
as.factor(BioID)W000820  -1.683e-01  3.138e-01  -0.536    0.592
as.factor(BioID)W000821  -8.452e-03  1.709e-02  -0.494    0.621
as.factor(BioID)W000822  -3.691e-02  7.422e-02  -0.497    0.619
as.factor(BioID)W000825  -3.821e-02  8.010e-02  -0.477    0.633
as.factor(BioID)W000826  -2.537e-02  4.580e-02  -0.554    0.580
as.factor(BioID)Y000033   2.382e-02  9.158e-02   0.260    0.795
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                -1.109e-03  1.426e-03  -0.778    0.437
Contribution_minus        2.244e-09  4.203e-08   0.053    0.957
Contribution_plus        -2.542e-07  3.247e-07  -0.783    0.434
Dmajority                 5.886e-03  4.277e-03   1.376    0.169
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.0234 on 1365 degrees of freedom
  (401 observations deleted due to missingness)
Multiple R-squared:  0.9983,    Adjusted R-squared:  0.9978
F-statistic:  1845 on 447 and 1365 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	

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 our ot 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…

checking differences in party

```
ols_change_D <- lm(Vote ~ . - party - Geographical - anti_env_dummy - BioID, data = df_vote_
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_
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 birthday since these are already included in the individual fixed effects, i.e. these dont chance 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_lon
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 + s
    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_plu
#     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 + Contri
# # nominate_dim1 + nominate_dim2

# # Vote 51_2
# logit_51_2 <- bife(Vote51_minus ~ Contribution_3_minus + Contribution_3_plus + Contributio
#     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 ~ Contribution_minus + Contribution_plus + Dmajority | BioID, data
summary(logit_ind_fe)
```

```
binomial - logit link

Vote ~ Contribution_minus + Contribution_plus + Dmajority | BioID

Estimates:
                    Estimate Std. error z value Pr(> |z|)
Contribution_minus  -0.02834    0.13244  -0.214   0.83055
Contribution_plus    0.01612    0.09468   0.170   0.86481
Dmajority            2.13029    0.79417   2.682   0.00731 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

residual deviance= 109.61,
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: 5

Average individual fixed effect= -0.241
```

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
# summary(logit)

# probit <- glm(all_votes_minus ~ . - all_votes_plus, family = binomial(link = "probit"), dat
# 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. –>