

# Exploratory Analysis

## Contents

|  |    |
|--|----|
| Overview . . . . .                         | 1  |
| Descriptive Statistics . . . . .           | 1  |
| Categorical . . . . .                      | 1  |
| Numeric . . . . .                          | 2  |
| Chi-Squared Tests of Association . . . . . | 3  |
| Correlation Tests . . . . .                | 3  |
| Visualizations . . . . .                   | 6  |
| Univariate Plots . . . . .                 | 6  |
| Bivariate . . . . .                        | 60 |
| Networks . . . . .                         | 88 |

## Overview

This Rmarkdown report covers an exploratory analysis of the raw data. A variety of univariate and bivariate visualizations, and descriptive statistics are derived to better understand the underlying structures and patterns within the raw data. Visualizations and descriptive statistics are generated for both the numeric data and the categorical variables.

## Descriptive Statistics

### Categorical

|               | nlevels | 1st mode  | 1st mode % | 2nd mode | 2nd mode % | NA % |
|---------------|---------|-----------|------------|----------|------------|------|
| From_country  | 42      | Albania   | 2.38       | Armenia  | 2.38       | 0.00 |
| To_country    | 42      | Australia | 6.85       | Ukraine  | 6.07       | 0.00 |
| Points        | 10      | 1         | 10.00      | 2        | 10.00      | 0.00 |
| Round         | 3       | f         | 50.00      | sf1      | 25.00      | 0.00 |
| Voting_Method | 2       | J         | 50.00      | T        | 50.00      | 0.00 |
| Host_Nation   | 2       | n         | 97.26      | y        | 2.74       | 0.00 |
| OOA           | 26      | 18        | 7.98       | 9        | 7.14       | 0.00 |
| VBlocs1_TC    | 21      | 1         | 44.88      | 3        | 15.06      | 0.00 |
| VBlocs2_TC    | 6       | 1         | 42.74      | 5        | 17.98      | 0.00 |
| VBlocs1_FC    | 20      | 1         | 45.24      | 3        | 9.52       | 0.00 |
| VBlocs2_FC    | 6       | 1         | 35.71      | 5        | 21.43      | 0.00 |
| ComVBlocs1    | 2       | n         | 78.21      | y        | 21.79      | 0.00 |

|                 | nlevels | 1st mode | 1st mode % | 2nd mode | 2nd mode % | NA %  |
|-----------------|---------|----------|------------|----------|------------|-------|
| ComVBlocs2      | 2       | n        | 76.19      | y        | 23.81      | 0.00  |
| FC_LANGFAM      | 13      | Germanic | 28.57      | Slavic   | 28.51      | 0.00  |
| TC_LANGFAM      | 12      | Slavic   | 32.68      | Germanic | 26.07      | 0.00  |
| ComLANGFAM      | 2       | n        | 78.93      | y        | 21.07      | 0.00  |
| Neighbours      | 2       | n        | 89.11      | y        | 10.89      | 0.00  |
| TC_NumNeigh     | 10      | 3        | 21.43      | 5        | 18.15      | 0.00  |
| FC_SONGLANG     | 5       | English  | 80.95      | Mixed    | 11.90      | 0.00  |
| TC_SONGLANG     | 5       | English  | 78.04      | Mixed    | 16.55      | 0.00  |
| ComSONGLAN      | 2       | 1        | 63.69      | 0        | 36.31      | 0.00  |
| TC_PerfType     | 4       | Solo     | 90.83      | Group    | 7.38       | 0.00  |
| TC_SingerGender | 4       | Female   | 53.04      | Male     | 45.48      | 0.00  |
| key             | 12      | 5        | 12.50      | NA's     | 11.55      | 11.55 |
| mode            | 2       | 0        | 49.76      | 1        | 38.69      | 11.55 |
| time_signature  | 2       | 4        | 84.76      | NA's     | 11.55      | 11.55 |

## Numeric

|                  | mean         | stdev        | min        | max          | range        | NA %   |
|------------------|--------------|--------------|------------|--------------|--------------|--------|
| Average_Points   | 5.180        | 2.590        | 0.000      | 12.000       | 12.000       | 0.000  |
| FC_NonCOB        | 24641.890    | 70178.363    | 1.000      | 844024.000   | 844023.000   | 55.000 |
| FC_NonCitizens   | 24012.498    | 75437.495    | 0.000      | 928257.000   | 928257.000   | 46.131 |
| FC_COB           | 10189782.737 | 13529427.732 | 290507.000 | 54758099.000 | 54467592.000 | 54.762 |
| FC_Citizens      | 16452411.522 | 21139328.142 | 306044.000 | 73523726.000 | 73217682.000 | 45.238 |
| FC_Population    | 15021478.421 | 21049723.582 | 33005.000  | 82800000.000 | 82766995.000 | 4.762  |
| METRIC_COB       | 0.022        | 0.065        | 0.000      | 0.651        | 0.651        | 56.310 |
| METRIC_Citizens  | 0.019        | 0.048        | 0.000      | 0.476        | 0.476        | 49.464 |
| METRIC_COBCit    | 0.043        | 0.111        | 0.000      | 1.093        | 1.093        | 56.369 |
| danceability     | 0.565        | 0.132        | 0.170      | 0.809        | 0.639        | 11.548 |
| loudness         | -5.093       | 1.730        | -12.399    | -0.482       | 11.917       | 11.548 |
| liveness         | 0.145        | 0.071        | 0.021      | 0.434        | 0.413        | 11.548 |
| energy           | 0.720        | 0.134        | 0.414      | 0.917        | 0.503        | 11.548 |
| speechiness      | 0.050        | 0.020        | 0.027      | 0.158        | 0.131        | 11.548 |
| acousticness     | 0.235        | 0.246        | 0.001      | 0.836        | 0.835        | 11.548 |
| instrumentalness | 0.001        | 0.003        | 0.000      | 0.027        | 0.027        | 11.548 |
| valence          | 0.382        | 0.177        | -0.548     | 0.758        | 1.306        | 11.548 |
| tempo            | 123.099      | 23.461       | 71.915     | 205.008      | 133.093      | 11.548 |
| duration_ms      | 184161.459   | 10162.387    | 166173.000 | 232947.000   | 66774.000    | 11.548 |
| TC_NumNeigh      | 3.401        | 2.435        | 0.000      | 9.000        | 9.000        | 0.000  |
| FC_CAP_LON       | 29.460       | 45.021       | -21.817    | 253.000      | 274.817      | 0.000  |
| FC_CAP_LAT       | 46.088       | 14.764       | -35.474    | 64.126       | 99.600       | 0.000  |
| TC_CAP_LON       | 41.455       | 57.386       | -21.817    | 253.000      | 274.817      | 0.000  |
| TC_CAP_LAT       | 41.943       | 22.160       | -35.474    | 64.126       | 99.600       | 0.000  |
| FC_GDP_mil       | 474131.913   | 786940.917   | 1500.000   | 3466756.880  | 3465256.880  | 0.000  |
| TC_GDP_mil       | 445230.483   | 622770.868   | 1500.000   | 3466756.880  | 3465256.880  | 0.000  |
| GDP_PROP         | 11.072       | 34.903       | 0.001      | 513.897      | 513.896      | 0.000  |
| CAP_DIST_km      | 3404.963     | 4285.801     | 82.147     | 17570.778    | 17488.631    | 0.000  |
| OOA              | 11.756       | 6.437        | 1.000      | 26.000       | 25.000       | 0.000  |

## Chi-Squared Tests of Association

Chi-Squared Test Hypothesis:

- Ho: x is independent of y
- Ha: x is associated with y

| X               | Y      | P-Value | Significant |
|-----------------|--------|---------|-------------|
| From_country    | Points | 1.00000 | FALSE       |
| To_country      | Points | 0.00050 | TRUE        |
| Points          | Points | 0.00050 | TRUE        |
| Round           | Points | 1.00000 | FALSE       |
| Voting_Method   | Points | 1.00000 | FALSE       |
| Host_Nation     | Points | 0.74163 | FALSE       |
| OOA             | Points | 0.00050 | TRUE        |
| VBlocs1_TC      | Points | 0.00050 | TRUE        |
| VBlocs2_TC      | Points | 0.00350 | TRUE        |
| VBlocs1_FC      | Points | 1.00000 | FALSE       |
| VBlocs2_FC      | Points | 1.00000 | FALSE       |
| ComVBlocs1      | Points | 0.45427 | FALSE       |
| ComVBlocs2      | Points | 0.00500 | TRUE        |
| FC_LANGFAM      | Points | 1.00000 | FALSE       |
| TC_LANGFAM      | Points | 0.00750 | TRUE        |
| ComLANGFAM      | Points | 0.00050 | TRUE        |
| Neighbours      | Points | 0.00050 | TRUE        |
| TC_NumNeigh     | Points | 0.00050 | TRUE        |
| FC_SONGLANG     | Points | 1.00000 | FALSE       |
| TC_SONGLANG     | Points | 0.11694 | FALSE       |
| ComSONGLAN      | Points | 0.93853 | FALSE       |
| TC_PerfType     | Points | 0.36482 | FALSE       |
| TC_SingerGender | Points | 0.02549 | TRUE        |
| key             | Points | 0.00050 | TRUE        |
| mode            | Points | 0.22989 | FALSE       |
| time_signature  | Points | 0.03298 | TRUE        |

## Correlation Tests

Correlation Test Hypothesis:

- Ho: x is not correlated with y
- Ha: x is correlated with y

## Response Tests

| X              | Y      | Correlation | P-Value | Significant |
|----------------|--------|-------------|---------|-------------|
| Average_Points | Points | 0.27978     | 0.00000 | TRUE        |
| FC_NonCOB      | Points | 0.15331     | 0.00002 | TRUE        |
| FC_NonCitizens | Points | 0.12433     | 0.00018 | TRUE        |
| FC_COB         | Points | 0.00000     | 1.00000 | FALSE       |
| FC_Citizens    | Points | 0.00000     | 1.00000 | FALSE       |

| X                | Y      | Correlation | P-Value | Significant |
|------------------|--------|-------------|---------|-------------|
| FC_Population    | Points | -0.00014    | 0.99561 | FALSE       |
| METRIC_COB       | Points | 0.18595     | 0.00000 | TRUE        |
| METRIC_Citizens  | Points | 0.18617     | 0.00000 | TRUE        |
| METRIC_COBCit    | Points | 0.19742     | 0.00000 | TRUE        |
| danceability     | Points | 0.15863     | 0.00000 | TRUE        |
| loudness         | Points | 0.05444     | 0.03587 | TRUE        |
| liveness         | Points | -0.10847    | 0.00003 | TRUE        |
| energy           | Points | 0.04798     | 0.06446 | FALSE       |
| speechiness      | Points | 0.18043     | 0.00000 | TRUE        |
| acousticness     | Points | 0.13797     | 0.00000 | TRUE        |
| instrumentalness | Points | 0.07731     | 0.00286 | TRUE        |
| valence          | Points | 0.05778     | 0.02594 | TRUE        |
| tempo            | Points | 0.00930     | 0.72009 | FALSE       |
| duration_ms      | Points | 0.00848     | 0.74392 | FALSE       |
| TC_NumNeigh      | Points | 0.12083     | 0.00000 | TRUE        |
| FC_CAP_LON       | Points | 0.00000     | 1.00000 | FALSE       |
| FC_CAP_LAT       | Points | 0.00000     | 1.00000 | FALSE       |
| TC_CAP_LON       | Points | 0.10085     | 0.00003 | TRUE        |
| TC_CAP_LAT       | Points | -0.10784    | 0.00001 | TRUE        |
| FC_GDP_mil       | Points | 0.00000     | 1.00000 | FALSE       |
| TC_GDP_mil       | Points | 0.06960     | 0.00432 | TRUE        |
| GDP_PROP         | Points | -0.02374    | 0.33074 | FALSE       |
| CAP_DIST_km      | Points | 0.07070     | 0.00374 | TRUE        |
| OOA              | Points | 0.09913     | 0.00005 | TRUE        |

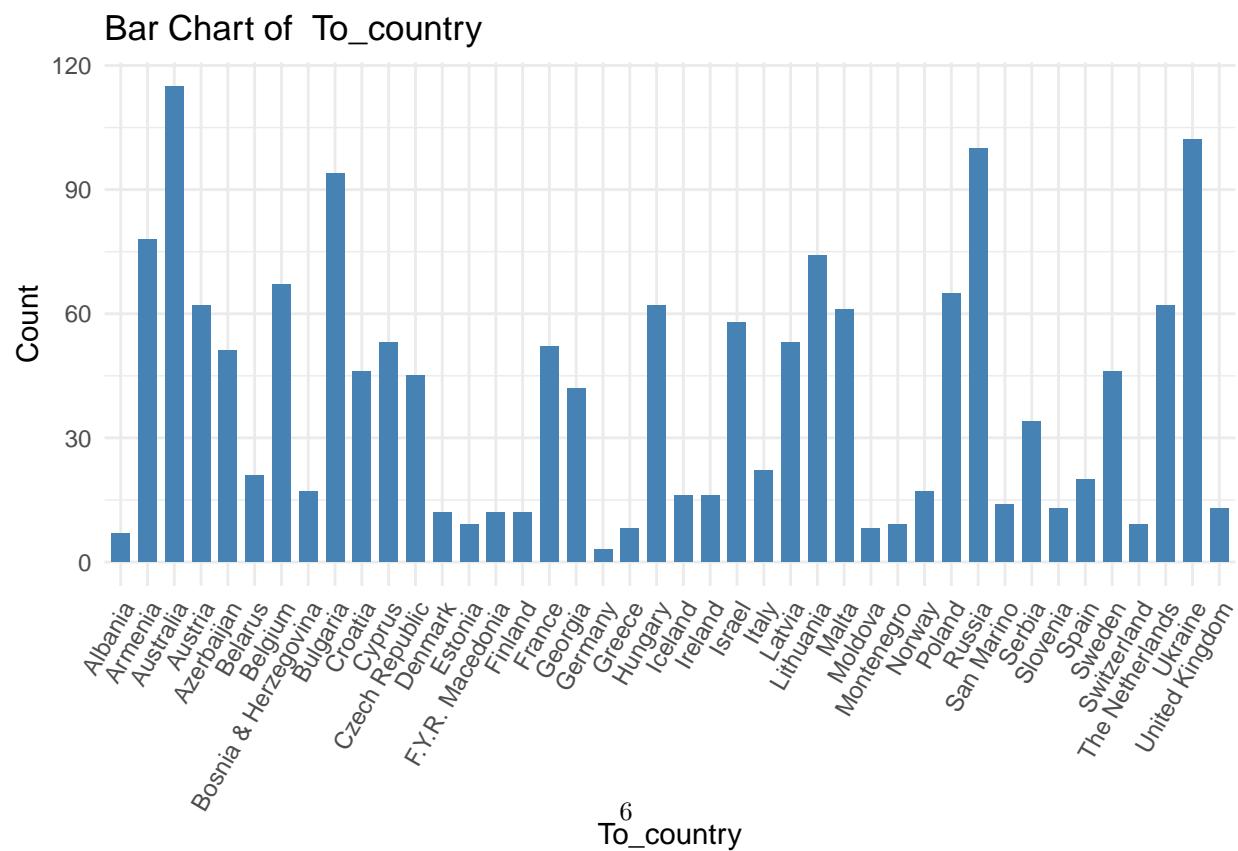
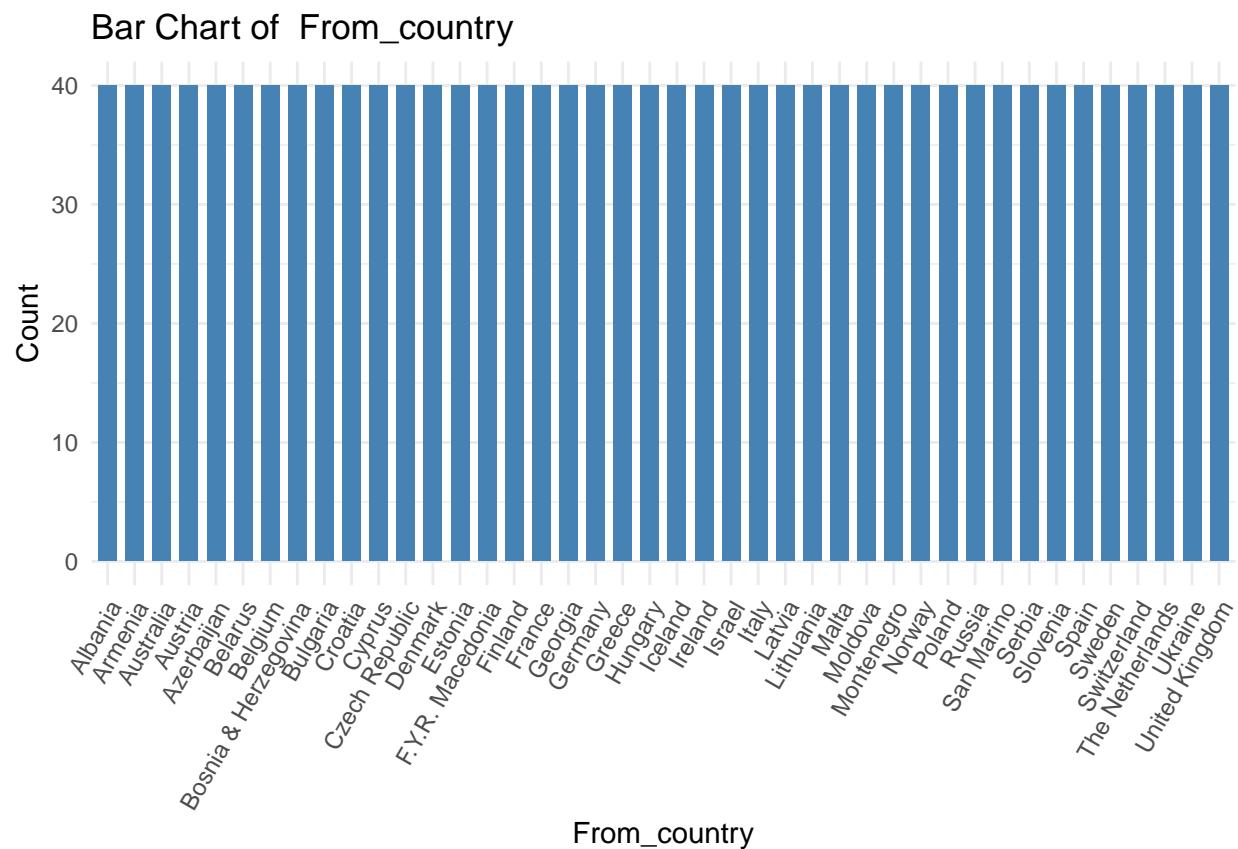
## Predictor Tests

| X               | Y               | Correlation | P-Value | Significant |
|-----------------|-----------------|-------------|---------|-------------|
| FC_NonCOB       | FC_NonCitizens  | 0.91531     | 0       | TRUE        |
| FC_NonCOB       | METRIC_COB      | 0.54440     | 0       | TRUE        |
| FC_NonCOB       | METRIC_Citizens | 0.46138     | 0       | TRUE        |
| FC_NonCOB       | METRIC_COBCit   | 0.53012     | 0       | TRUE        |
| FC_NonCOB       | FC_GDP_mil      | 0.43607     | 0       | TRUE        |
| FC_NonCitizens  | FC_Population   | 0.40975     | 0       | TRUE        |
| FC_NonCitizens  | METRIC_COBCit   | 0.43318     | 0       | TRUE        |
| FC_NonCitizens  | FC_GDP_mil      | 0.44188     | 0       | TRUE        |
| FC_COB          | FC_Citizens     | 0.99978     | 0       | TRUE        |
| FC_COB          | FC_Population   | 0.99914     | 0       | TRUE        |
| FC_COB          | FC_GDP_mil      | 0.92752     | 0       | TRUE        |
| FC_Citizens     | FC_Population   | 0.99904     | 0       | TRUE        |
| FC_Citizens     | FC_GDP_mil      | 0.93506     | 0       | TRUE        |
| FC_Citizens     | GDP_PROP        | 0.42348     | 0       | TRUE        |
| FC_Population   | FC_GDP_mil      | 0.91609     | 0       | TRUE        |
| FC_Population   | GDP_PROP        | 0.44412     | 0       | TRUE        |
| METRIC_COB      | METRIC_Citizens | 0.83307     | 0       | TRUE        |
| METRIC_COB      | METRIC_COBCit   | 0.96724     | 0       | TRUE        |
| METRIC_Citizens | METRIC_COBCit   | 0.94621     | 0       | TRUE        |
| loudness        | energy          | 0.50748     | 0       | TRUE        |
| loudness        | TC_GDP_mil      | 0.49045     | 0       | TRUE        |
| energy          | TC_GDP_mil      | 0.45341     | 0       | TRUE        |
| duration_ms     | TC_GDP_mil      | 0.49387     | 0       | TRUE        |

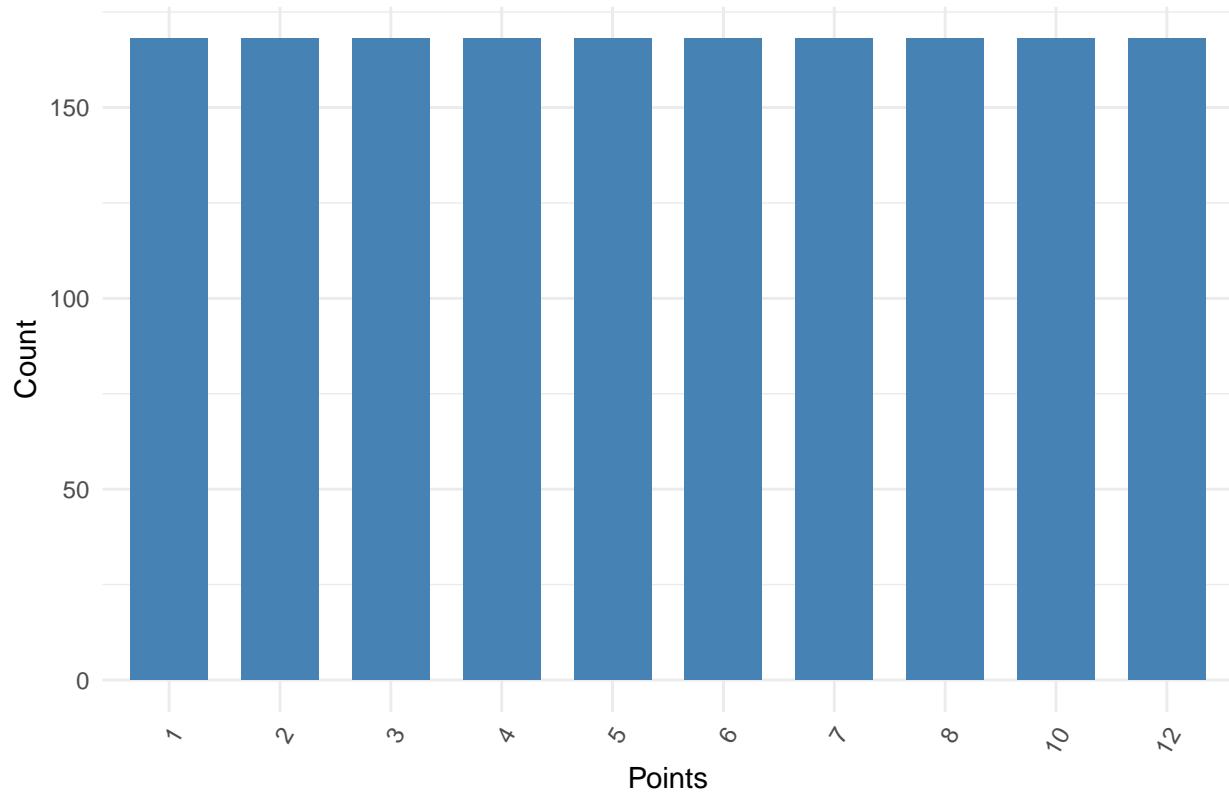
| X           | Y           | Correlation | P-Value | Significant |
|-------------|-------------|-------------|---------|-------------|
| TC_NumNeigh | TC_CAP_LAT  | 0.50228     | 0       | TRUE        |
| TC_CAP_LON  | CAP_DIST_km | 0.60951     | 0       | TRUE        |
| FC_GDP_mil  | GDP_PROP    | 0.46708     | 0       | TRUE        |

## Visualizations

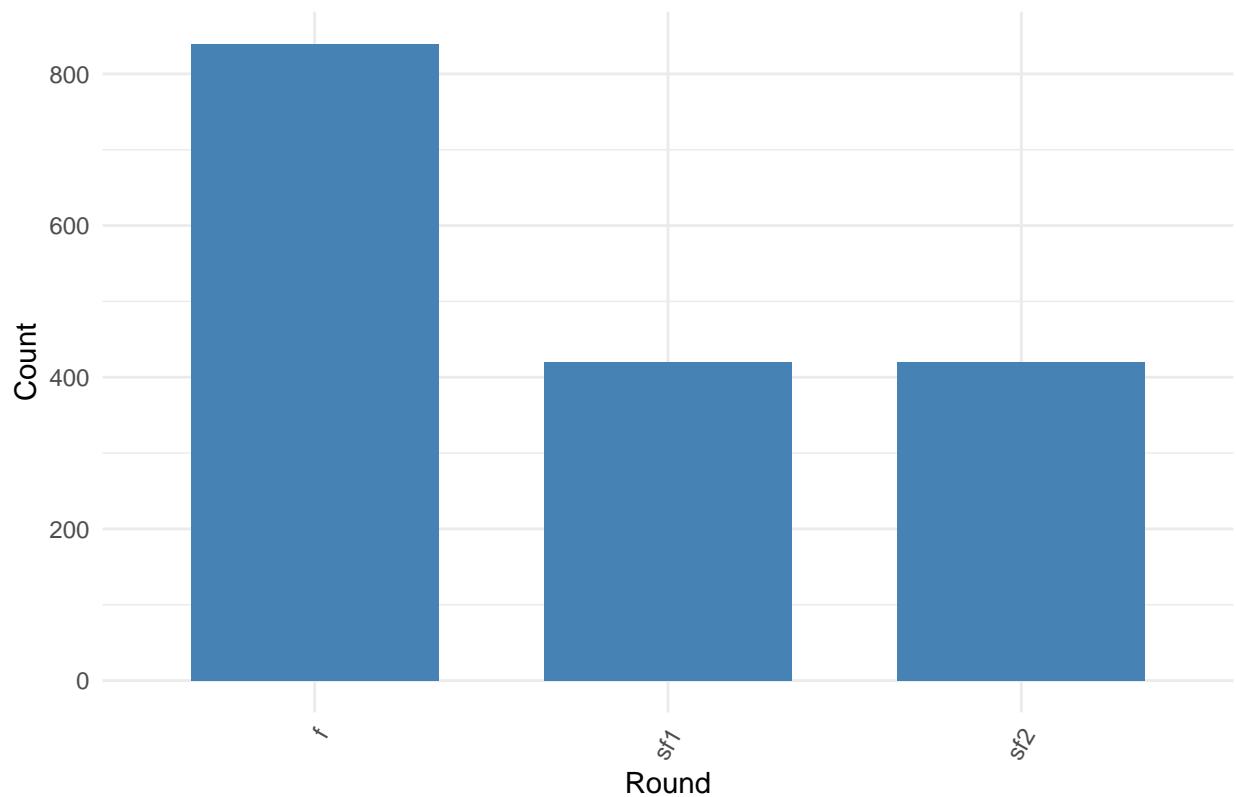
### Univariate Plots



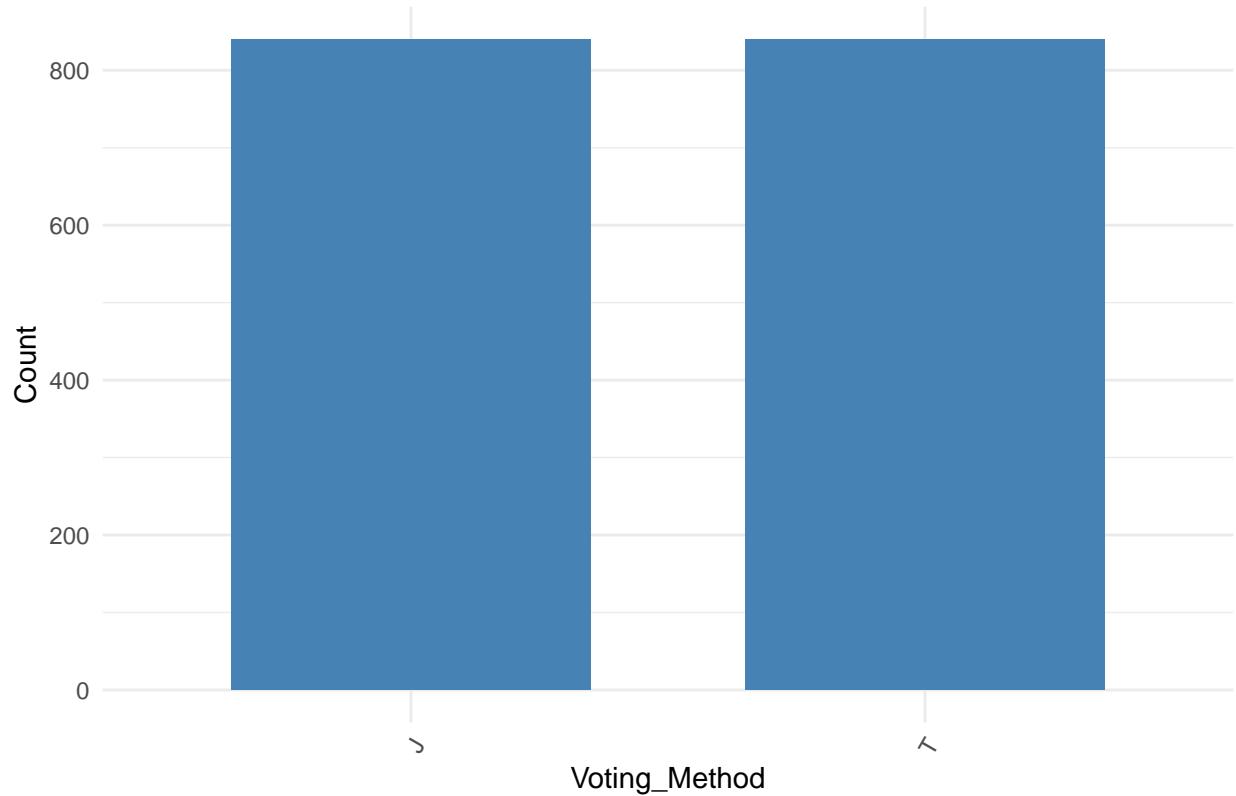
Bar Chart of Points



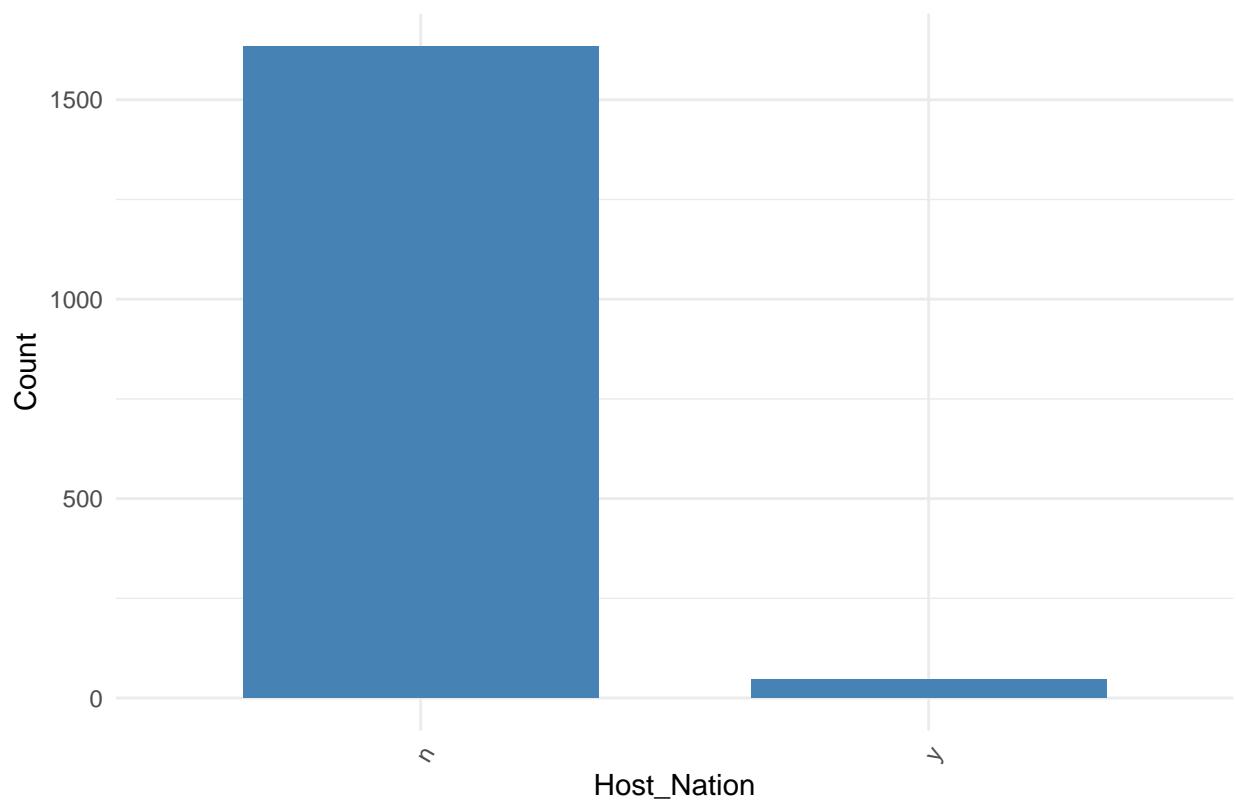
Bar Chart of Round



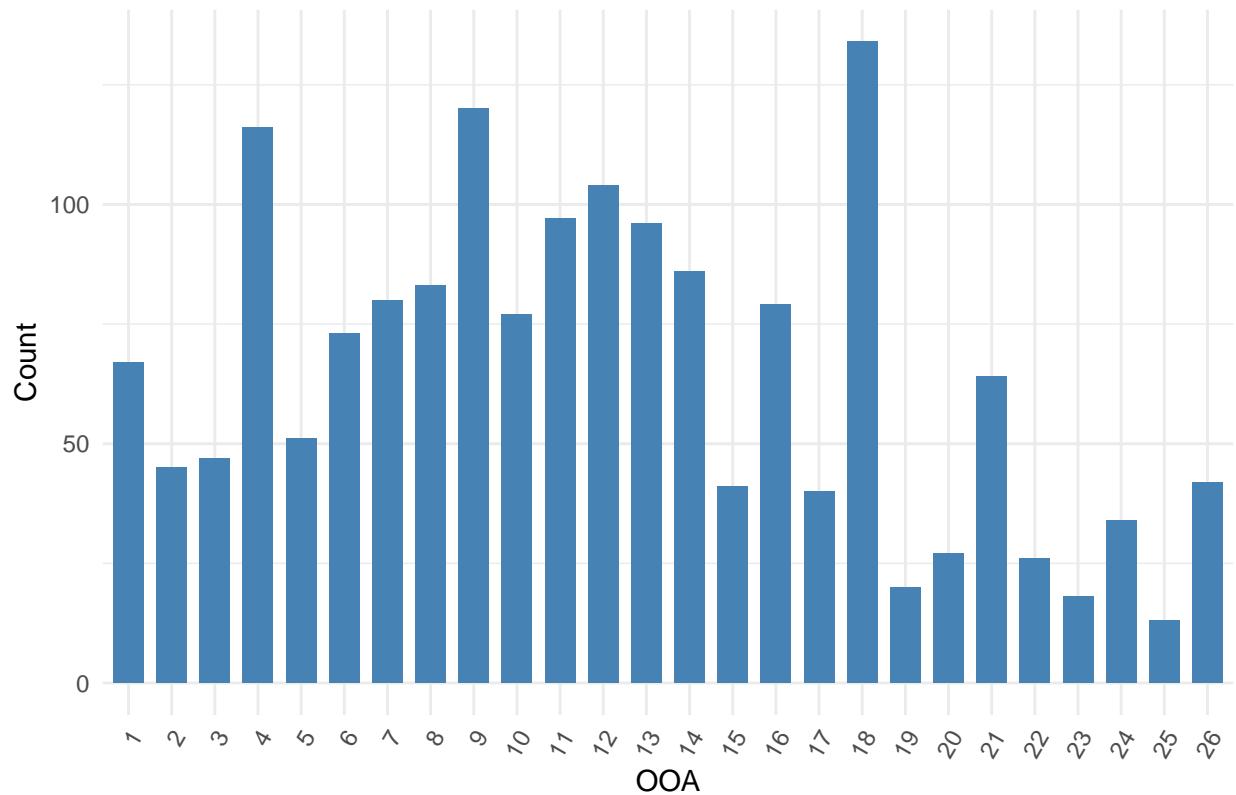
Bar Chart of Voting\_Method



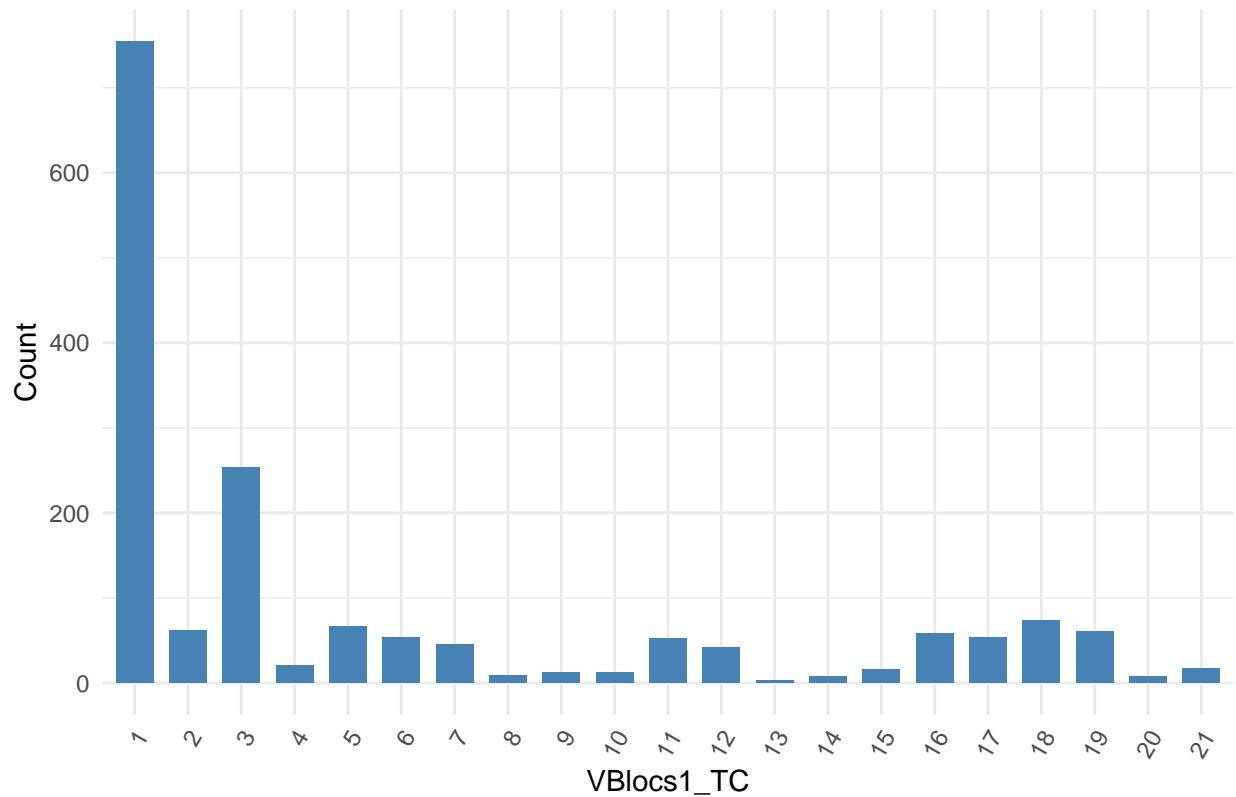
Bar Chart of Host\_Nation



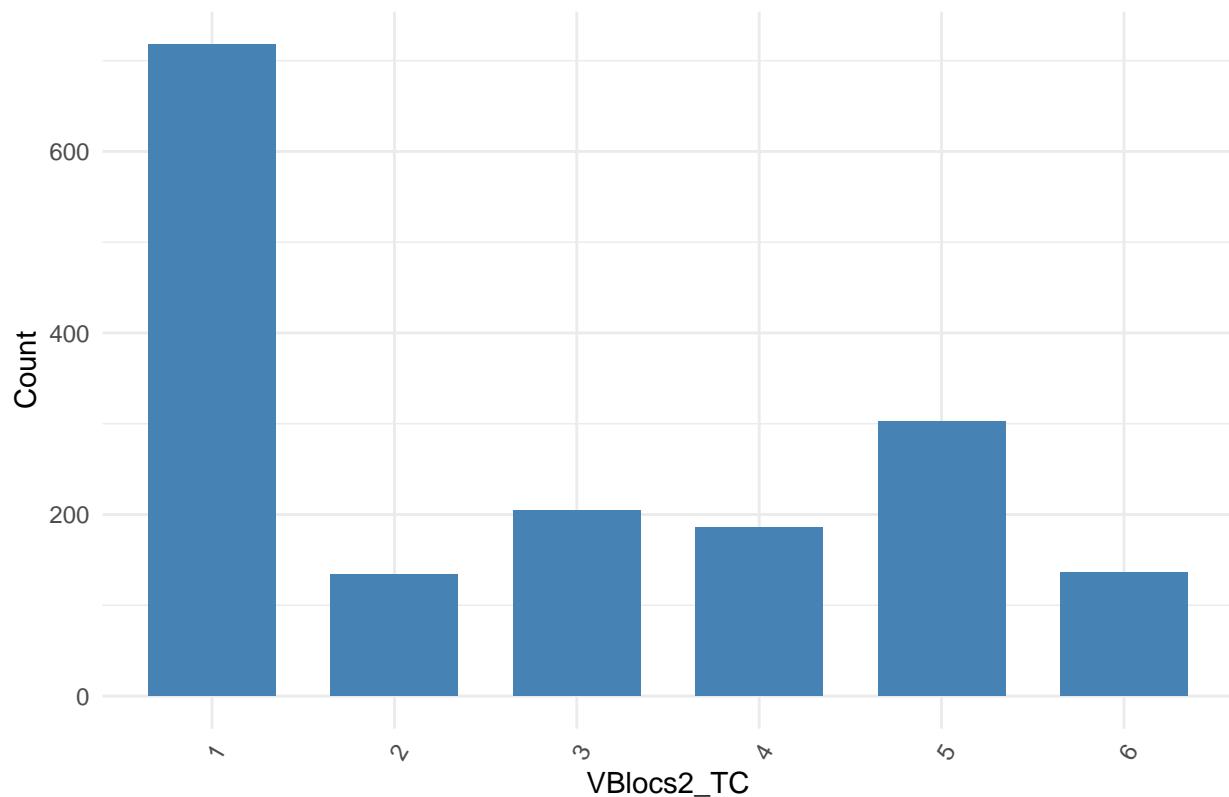
Bar Chart of OOA



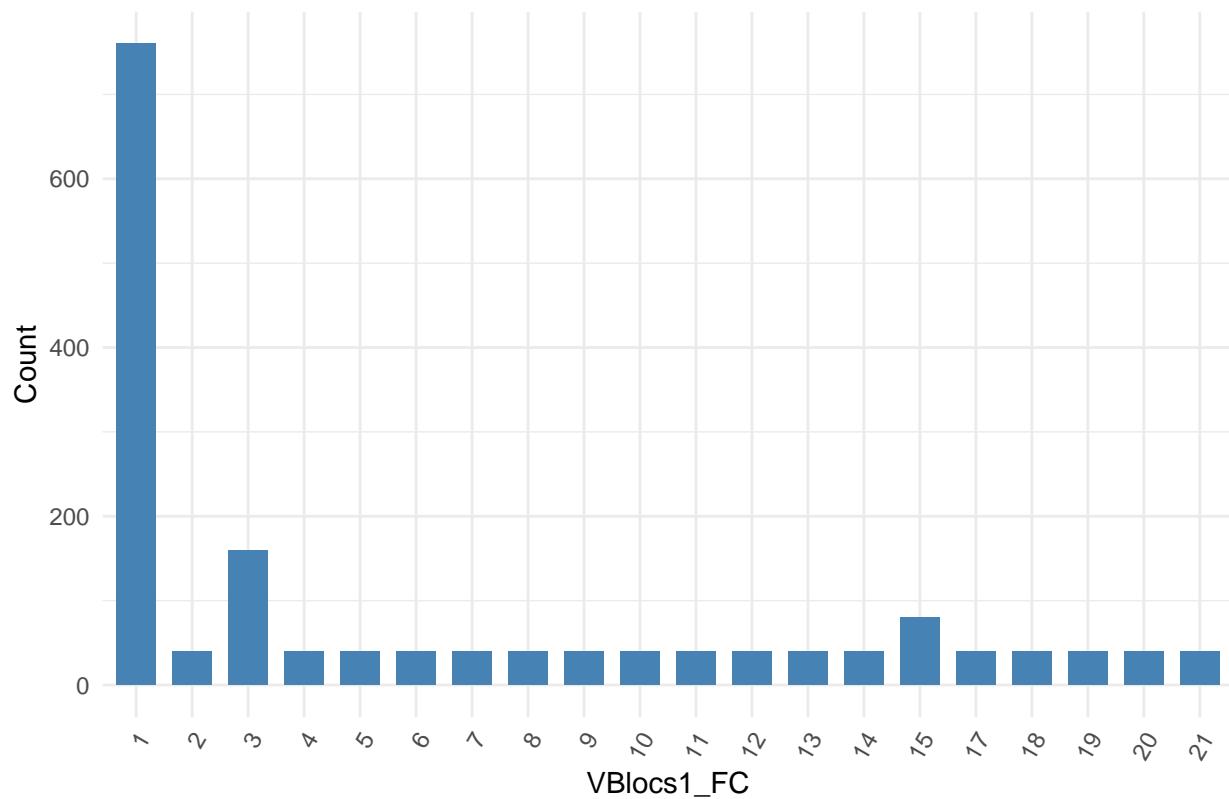
Bar Chart of VBlocs1\_TC



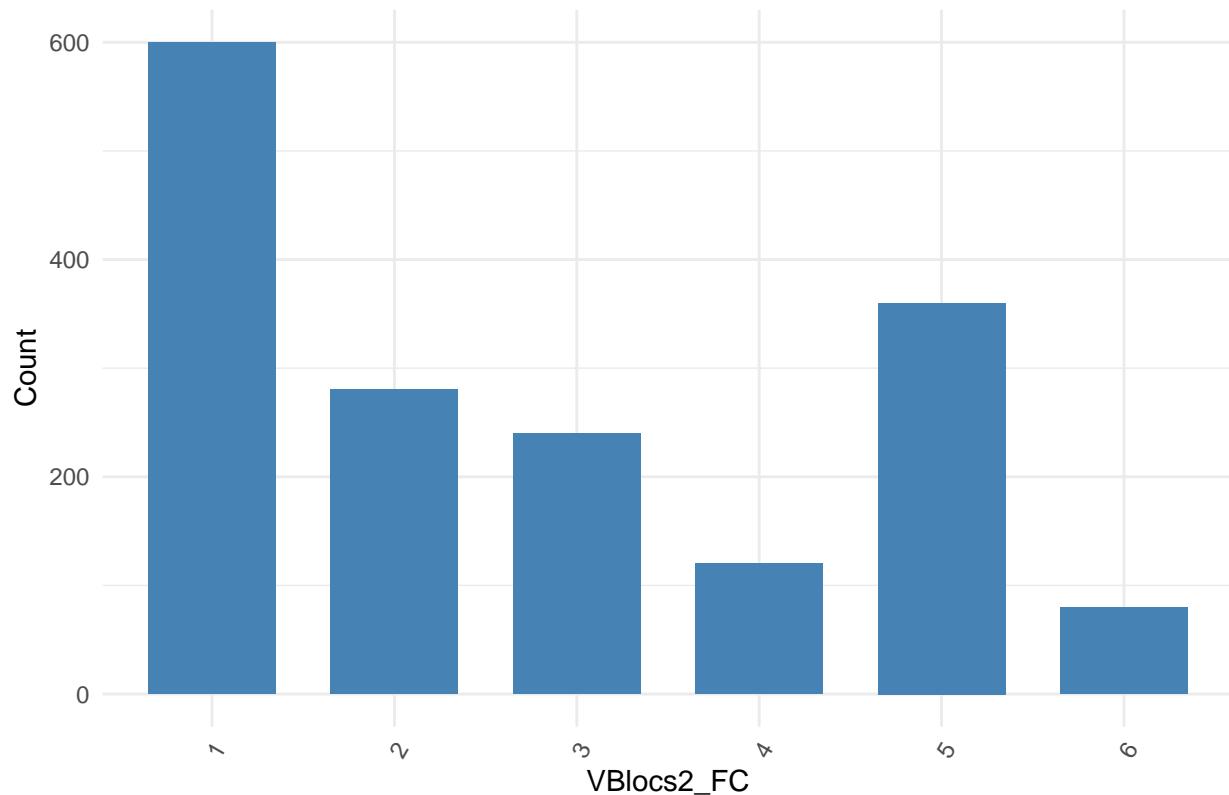
Bar Chart of VBlocs2\_TC



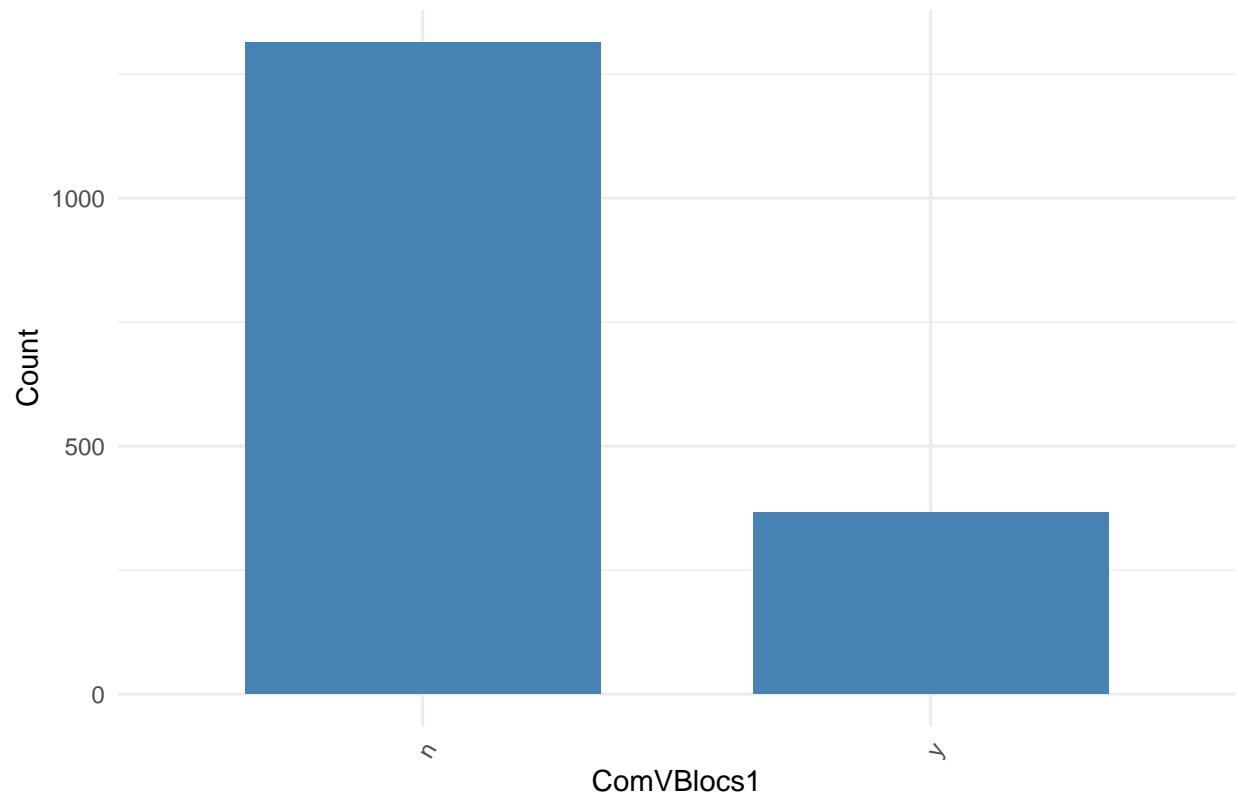
Bar Chart of VBlocs1\_FC



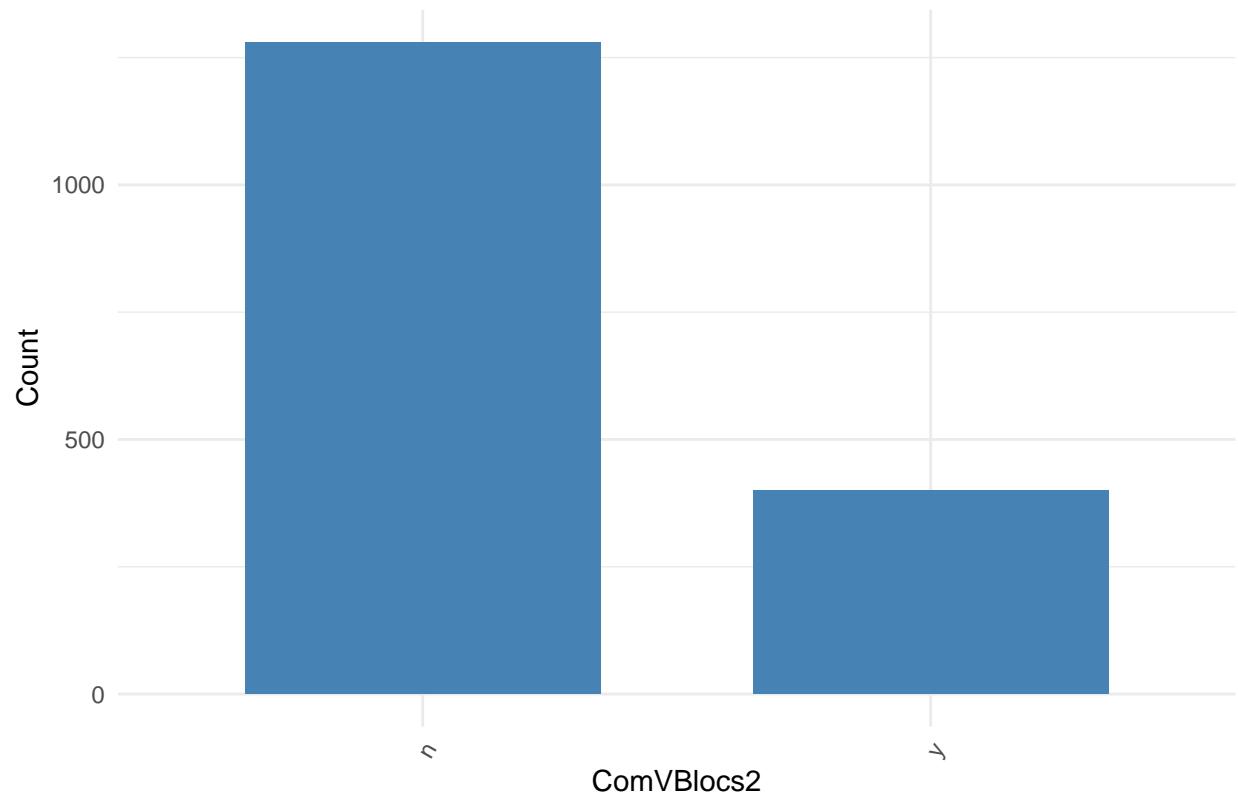
Bar Chart of VBlocs2\_FC



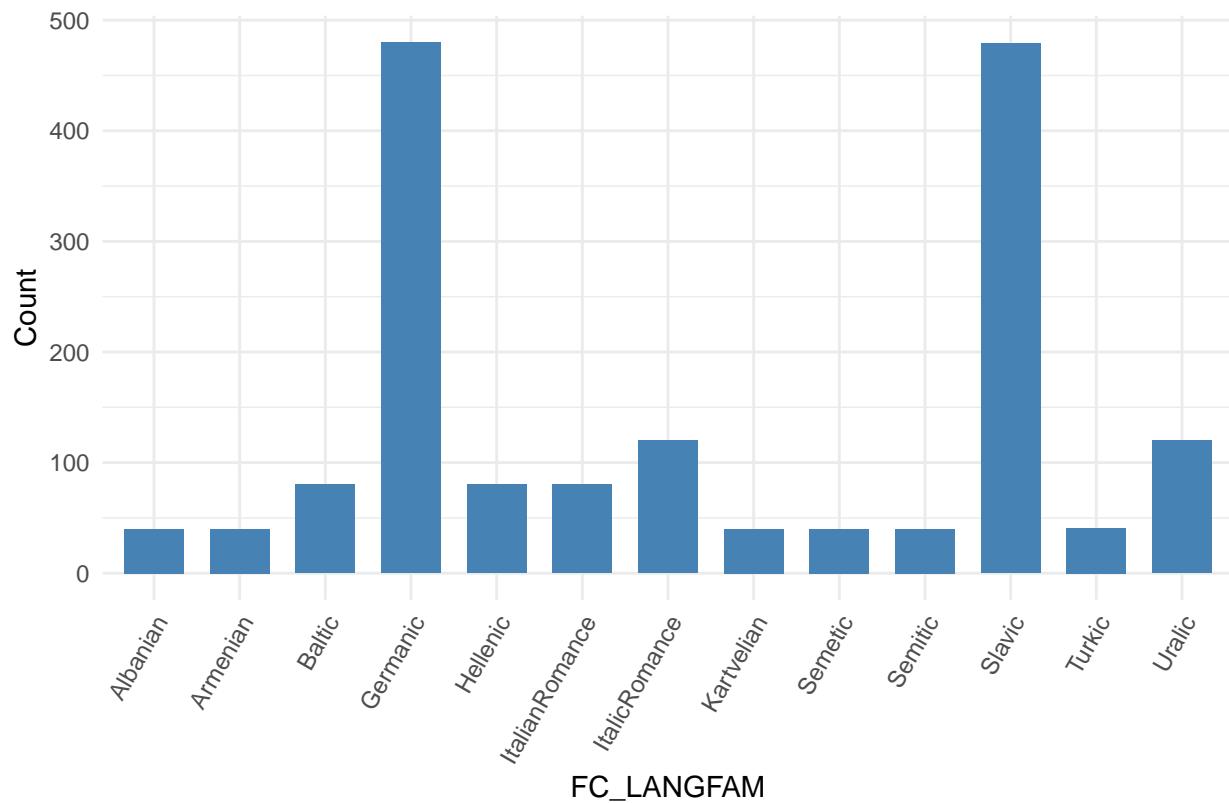
Bar Chart of ComVBlocs1



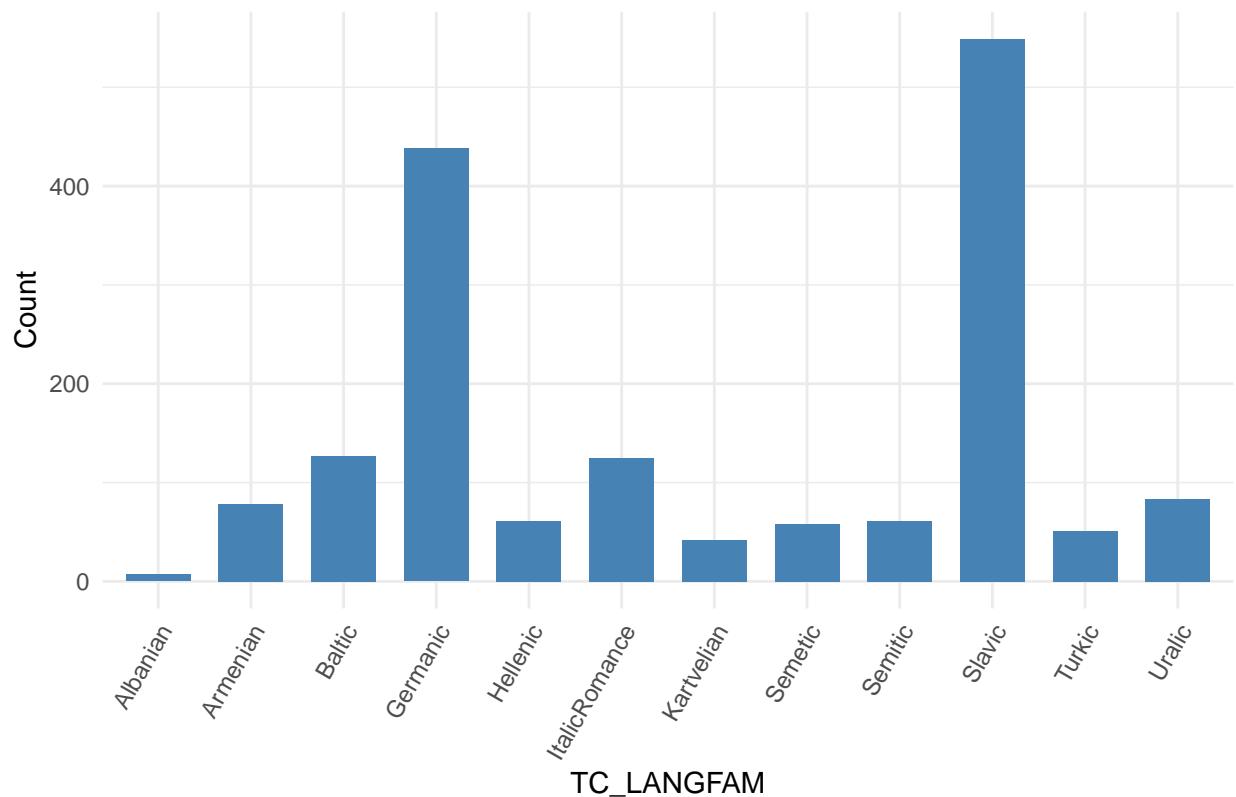
Bar Chart of ComVBlocs2



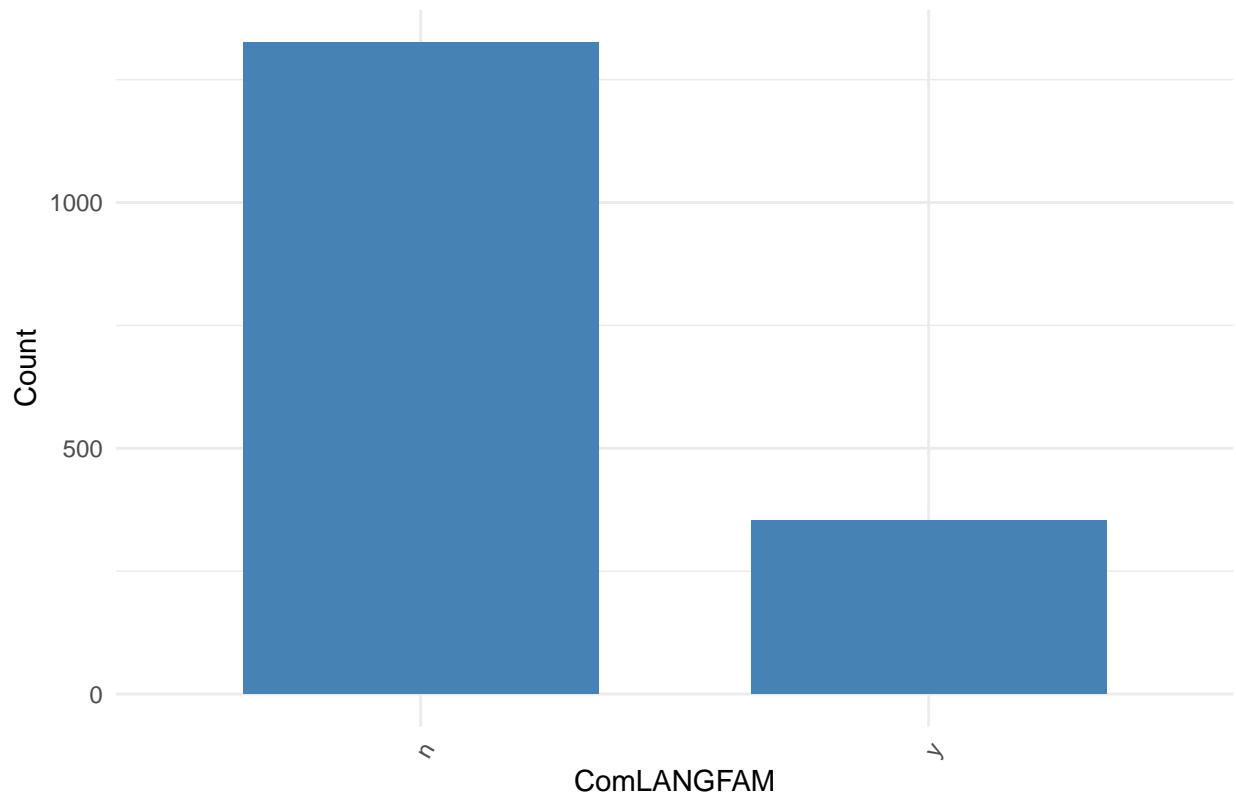
Bar Chart of FC\_LANGFAM



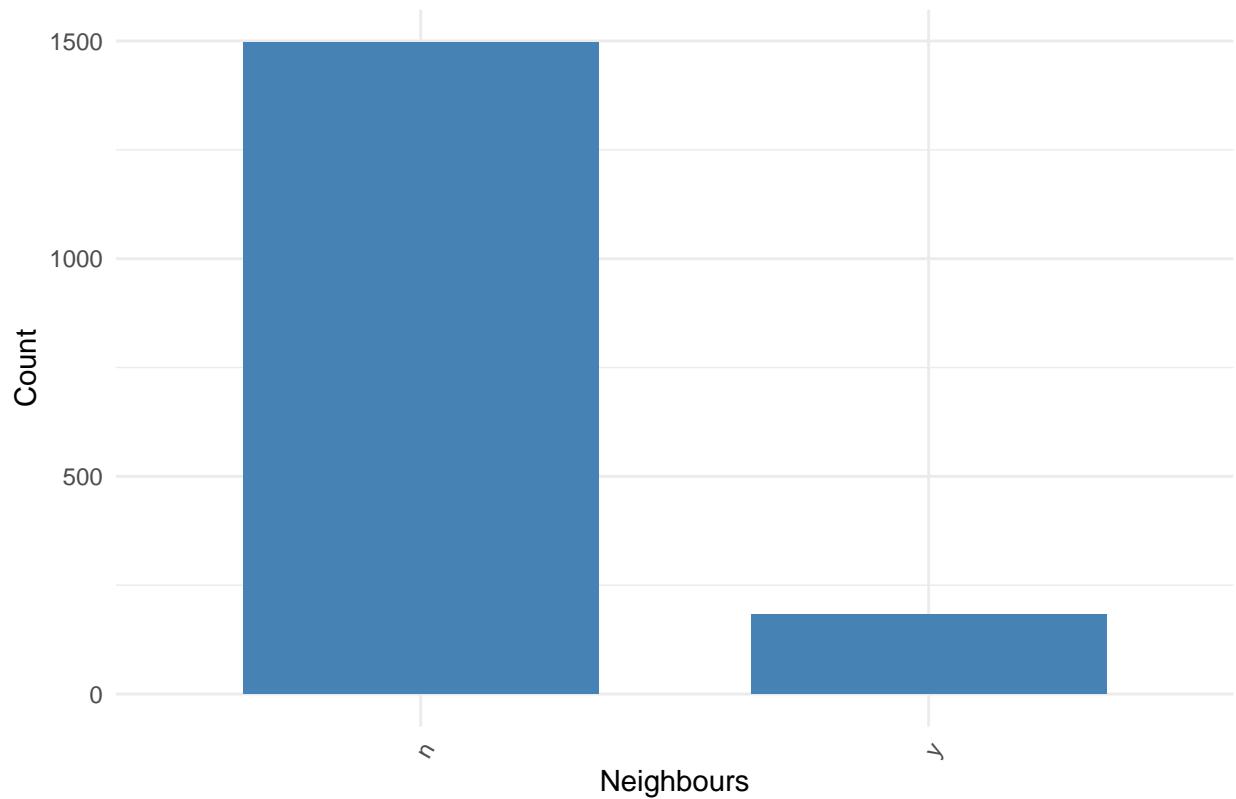
Bar Chart of TC\_LANGFAM



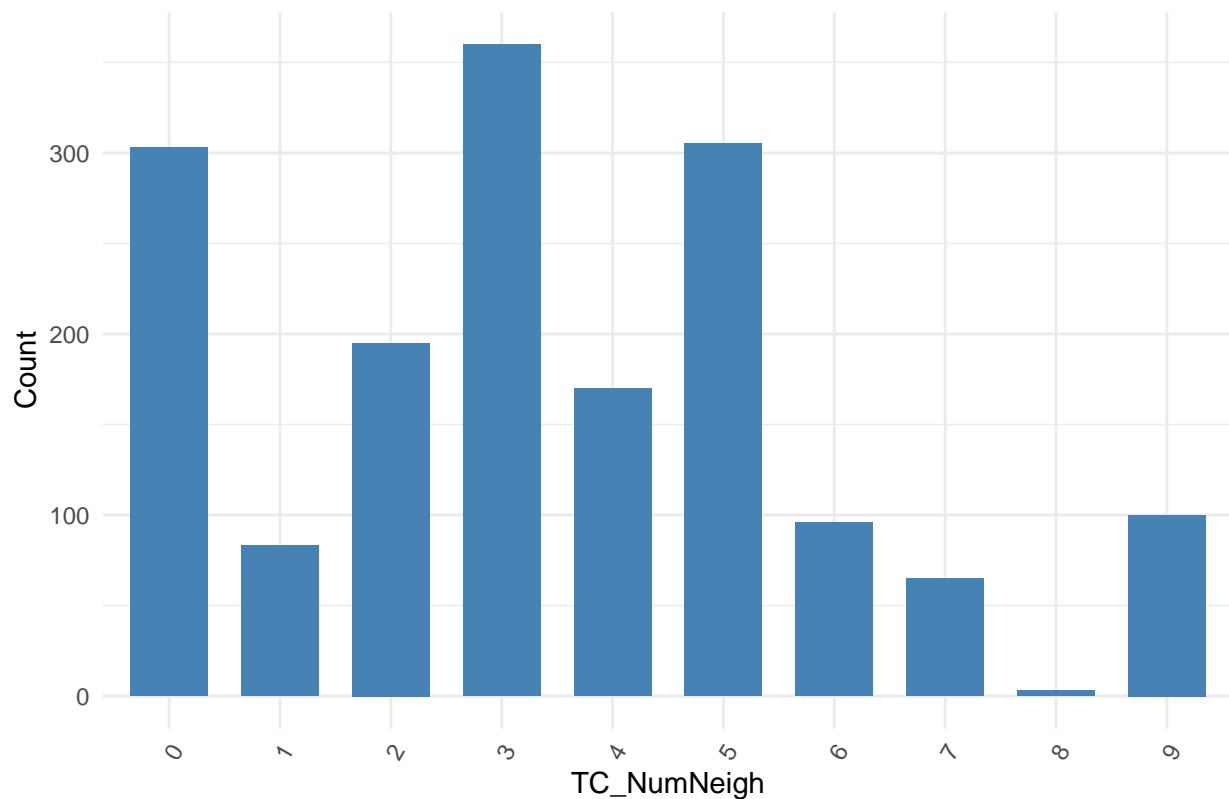
Bar Chart of ComLANGFAM



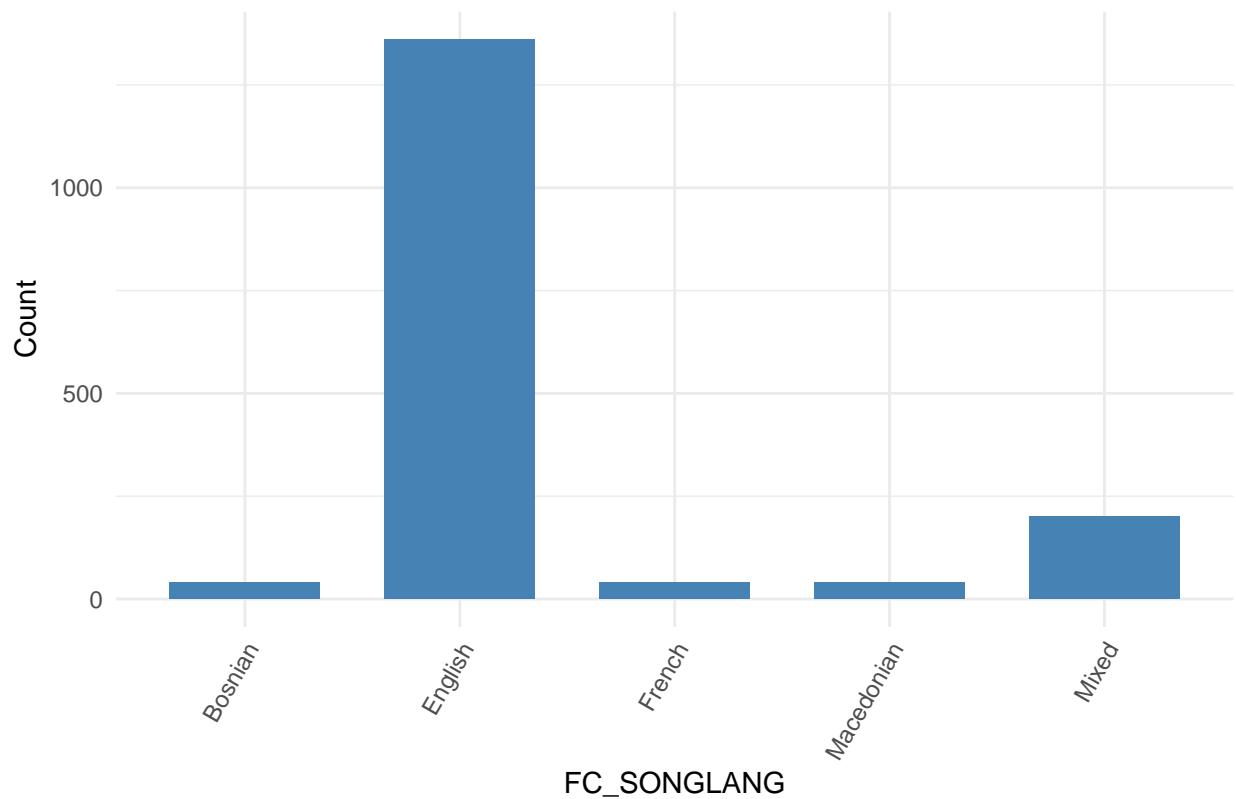
Bar Chart of Neighbours



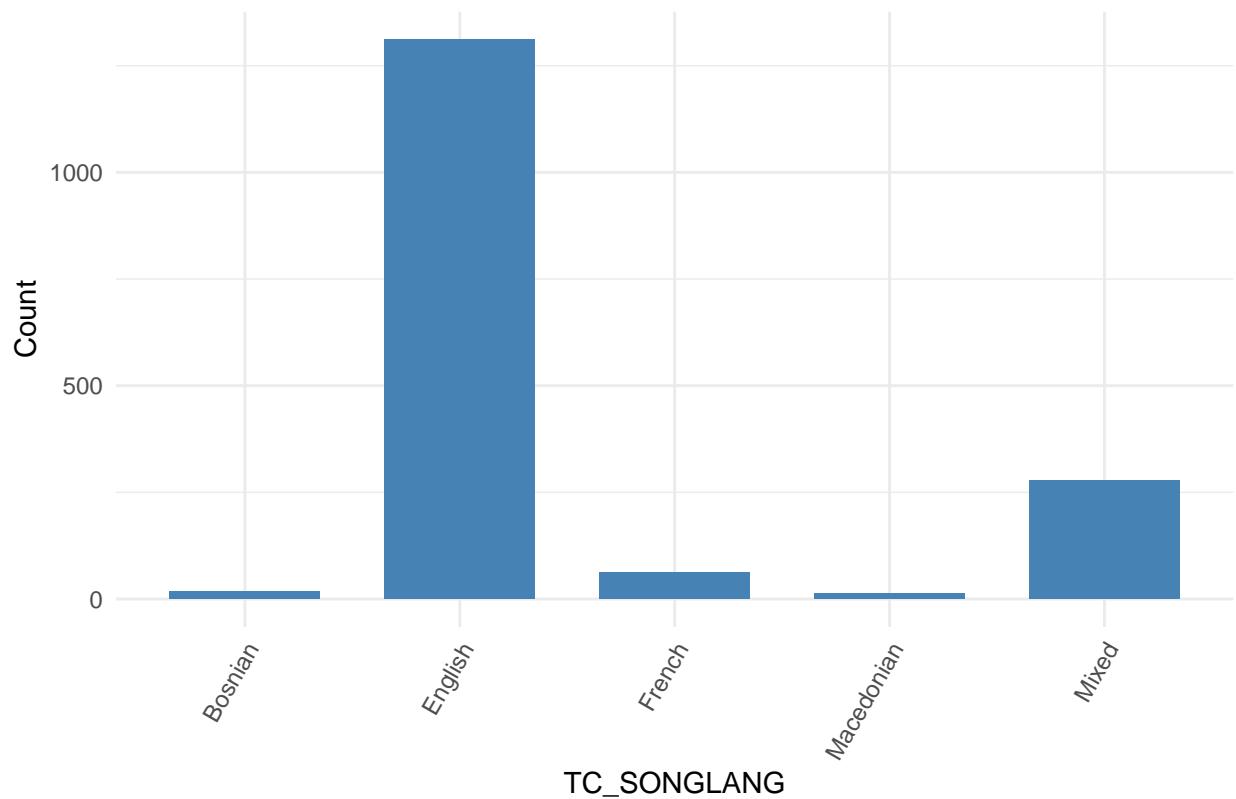
Bar Chart of TC\_NumNeigh



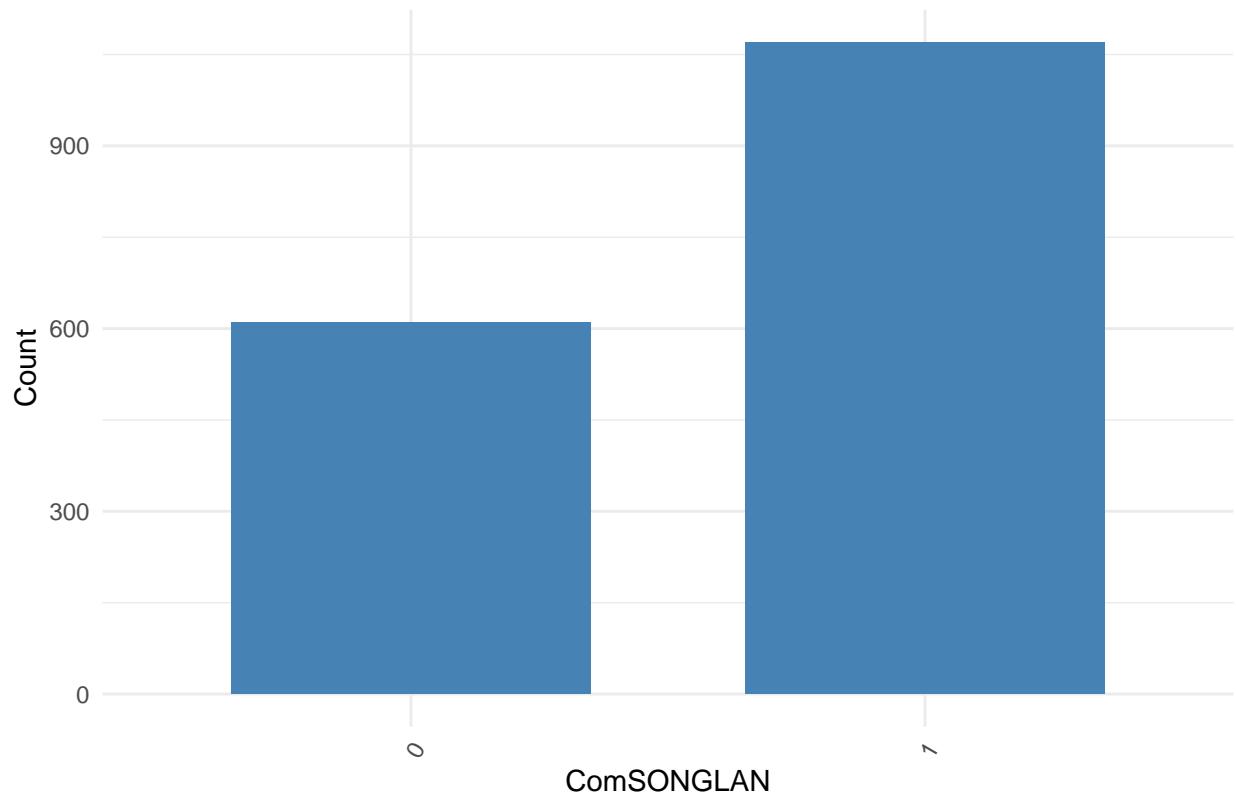
Bar Chart of FC\_SONGLANG



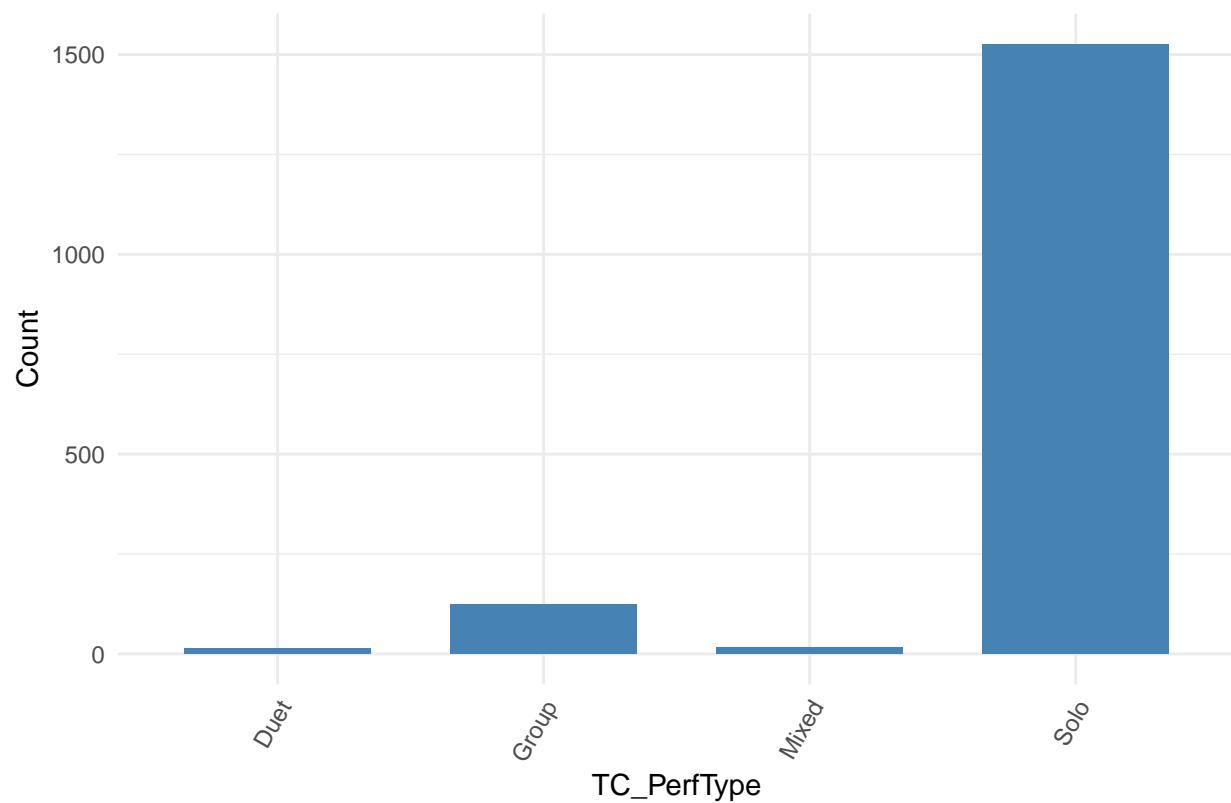
Bar Chart of TC\_SONGLANG



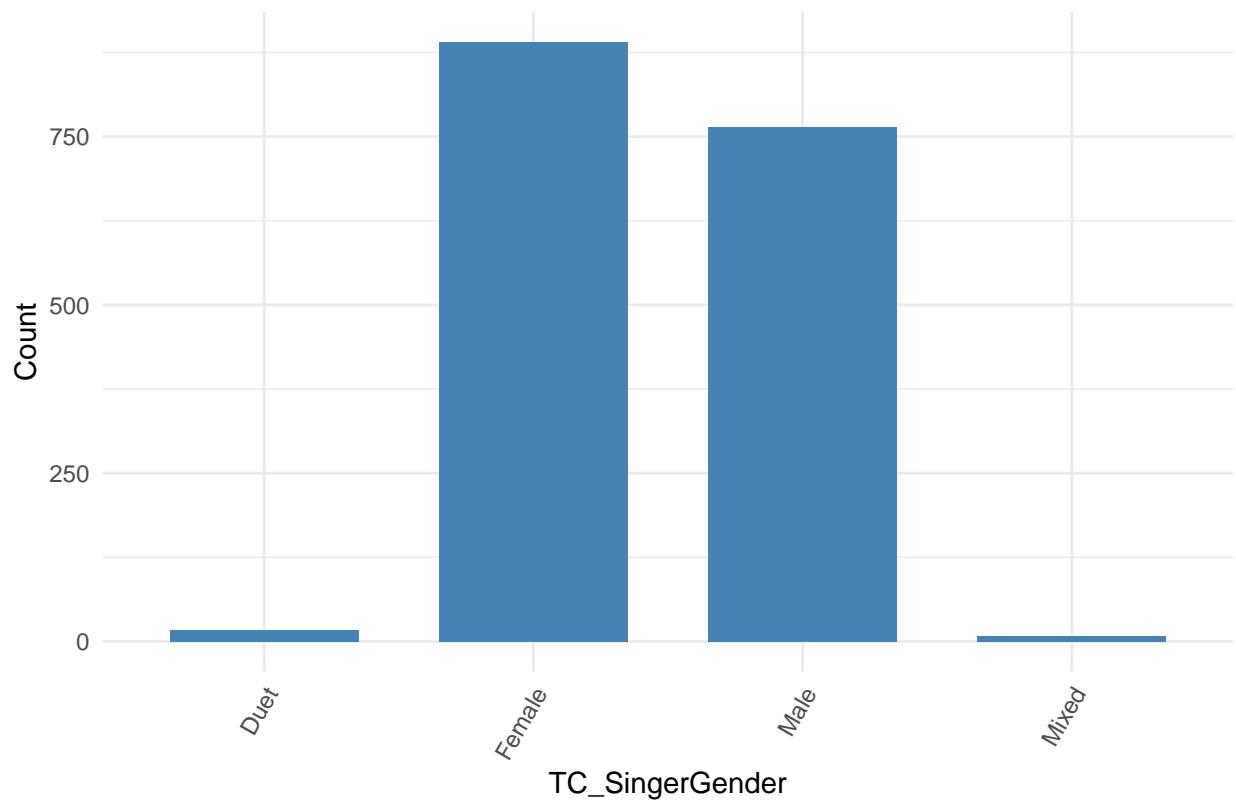
Bar Chart of ComSONGLAN



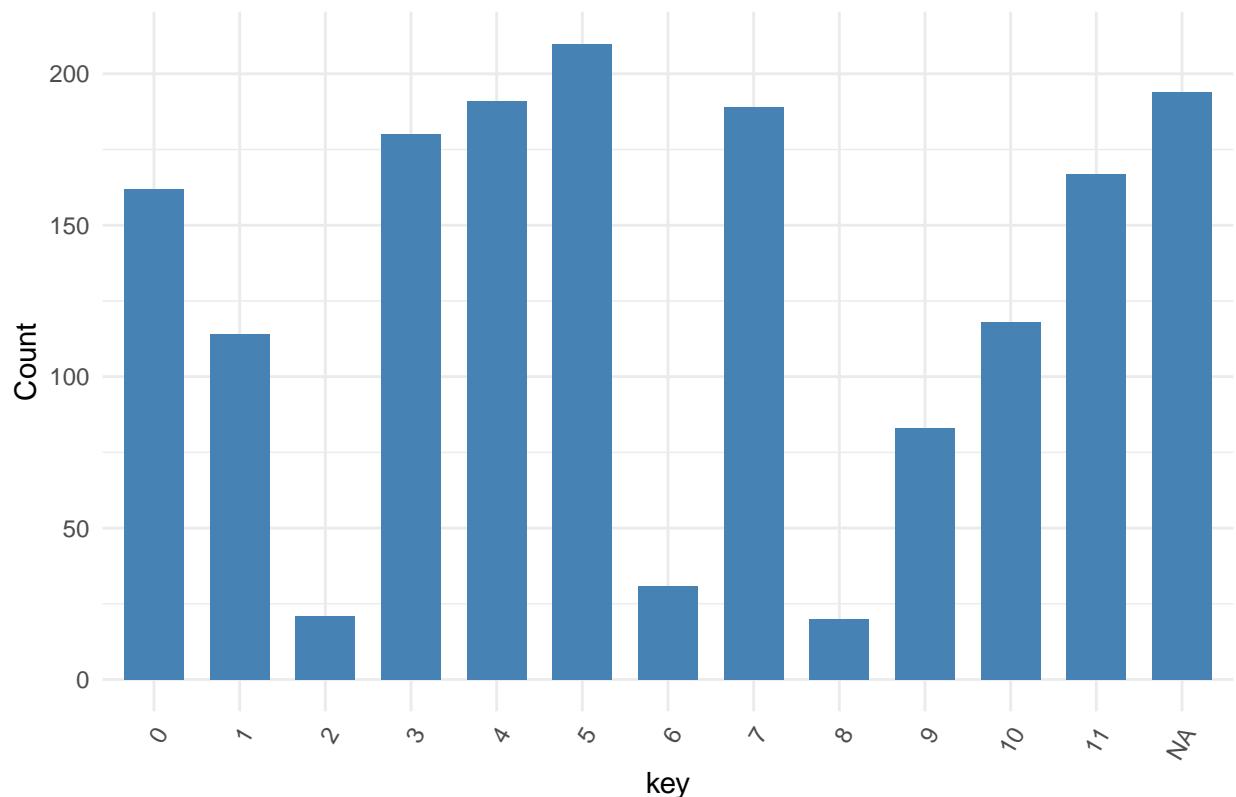
Bar Chart of TC\_PerfType



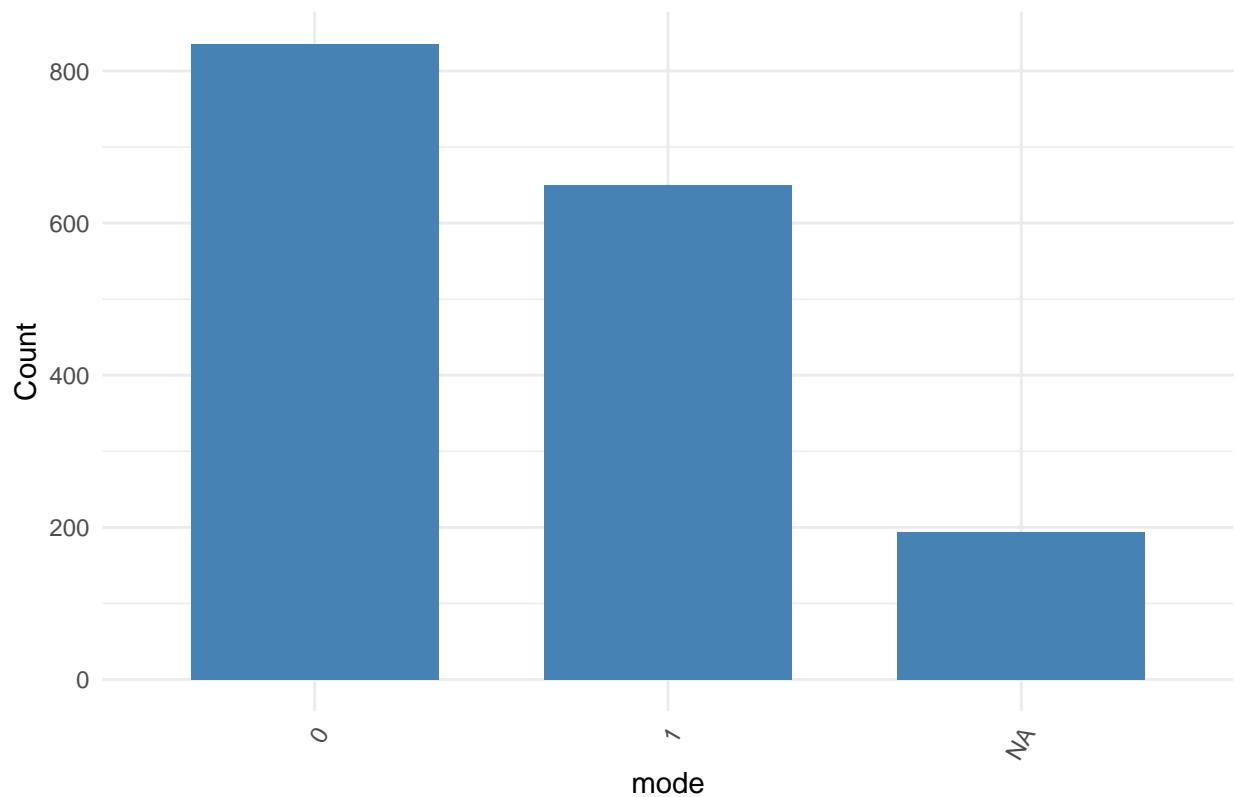
Bar Chart of TC\_SingerGender



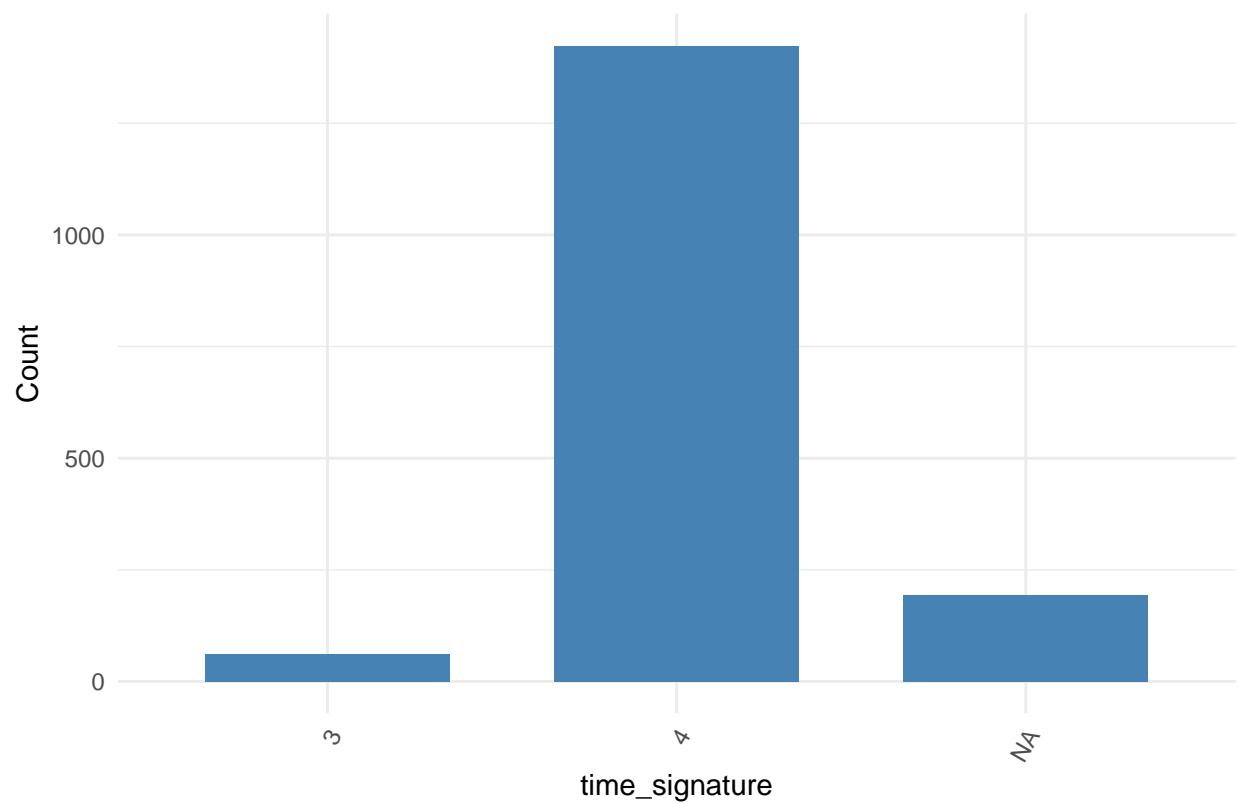
Bar Chart of key



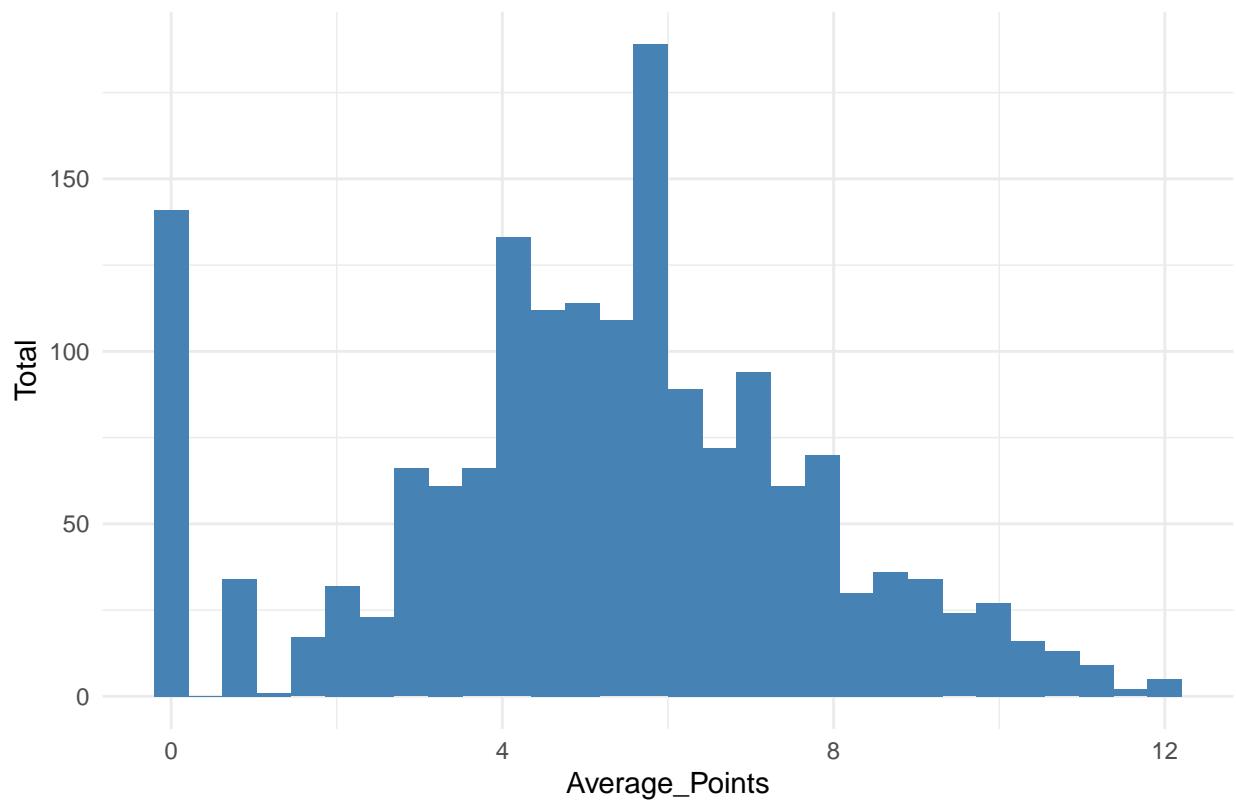
Bar Chart of mode



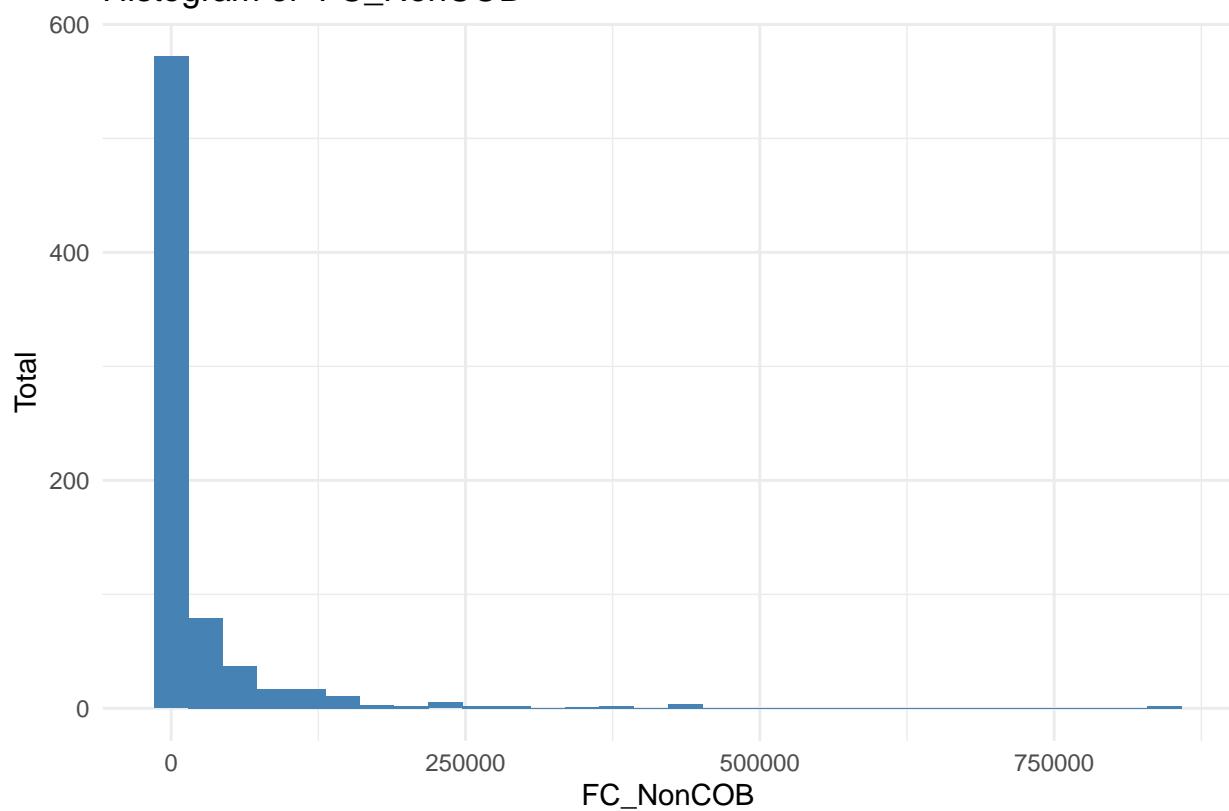
Bar Chart of time\_signature



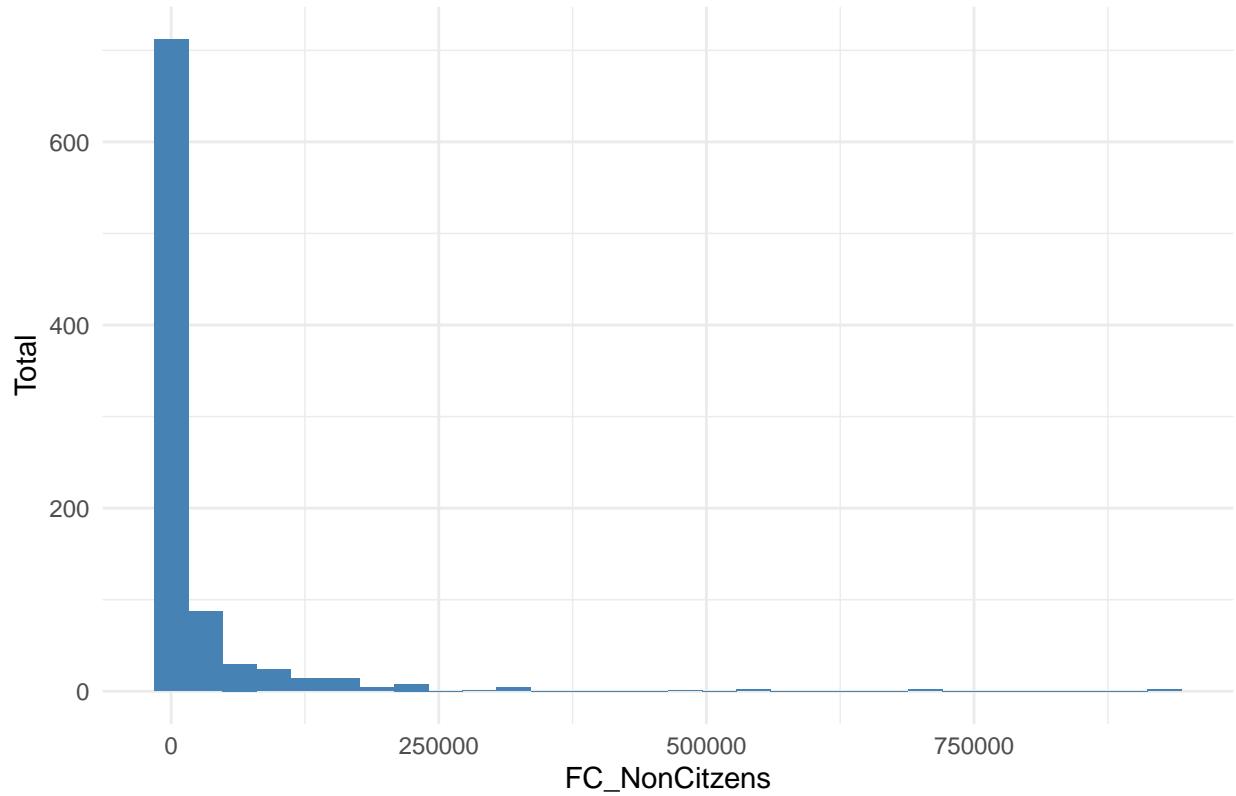
Histogram of Average\_Points

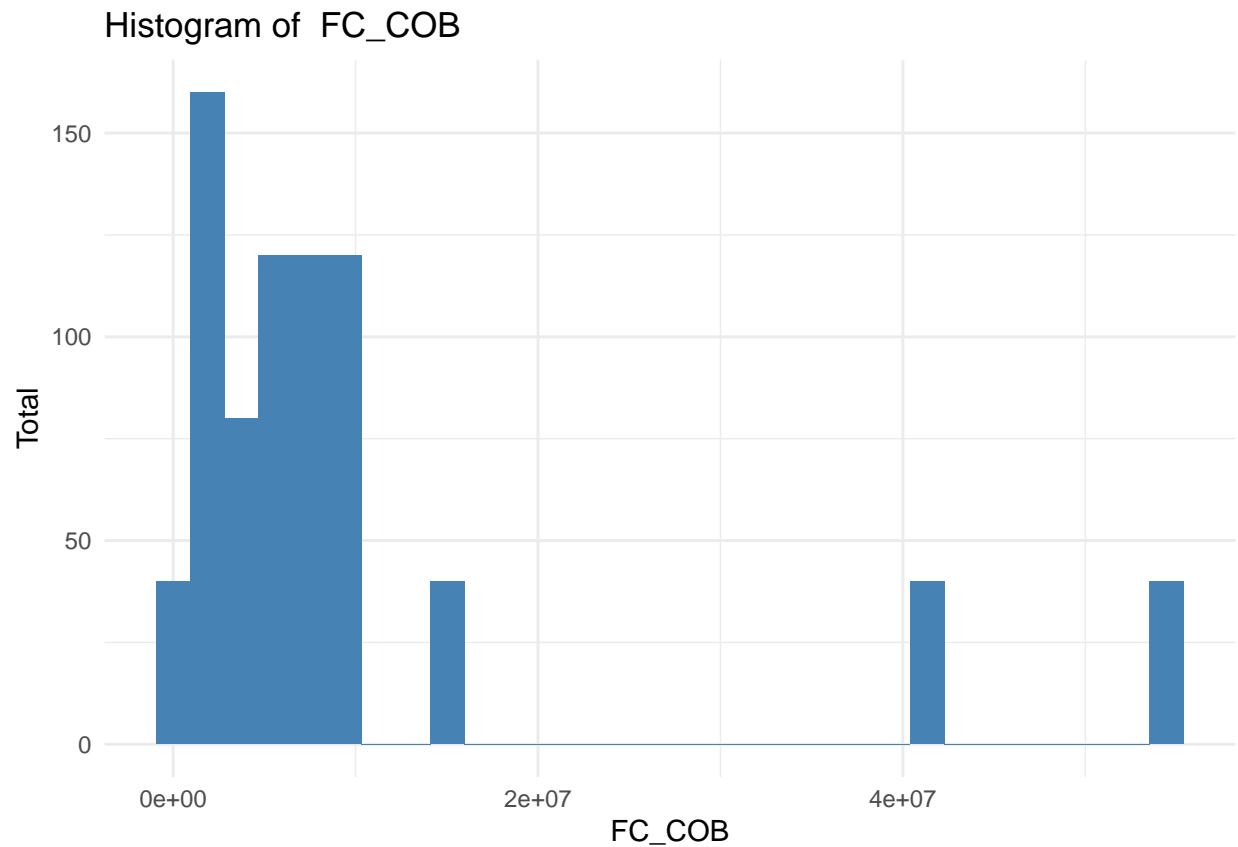


Histogram of FC\_NonCOB

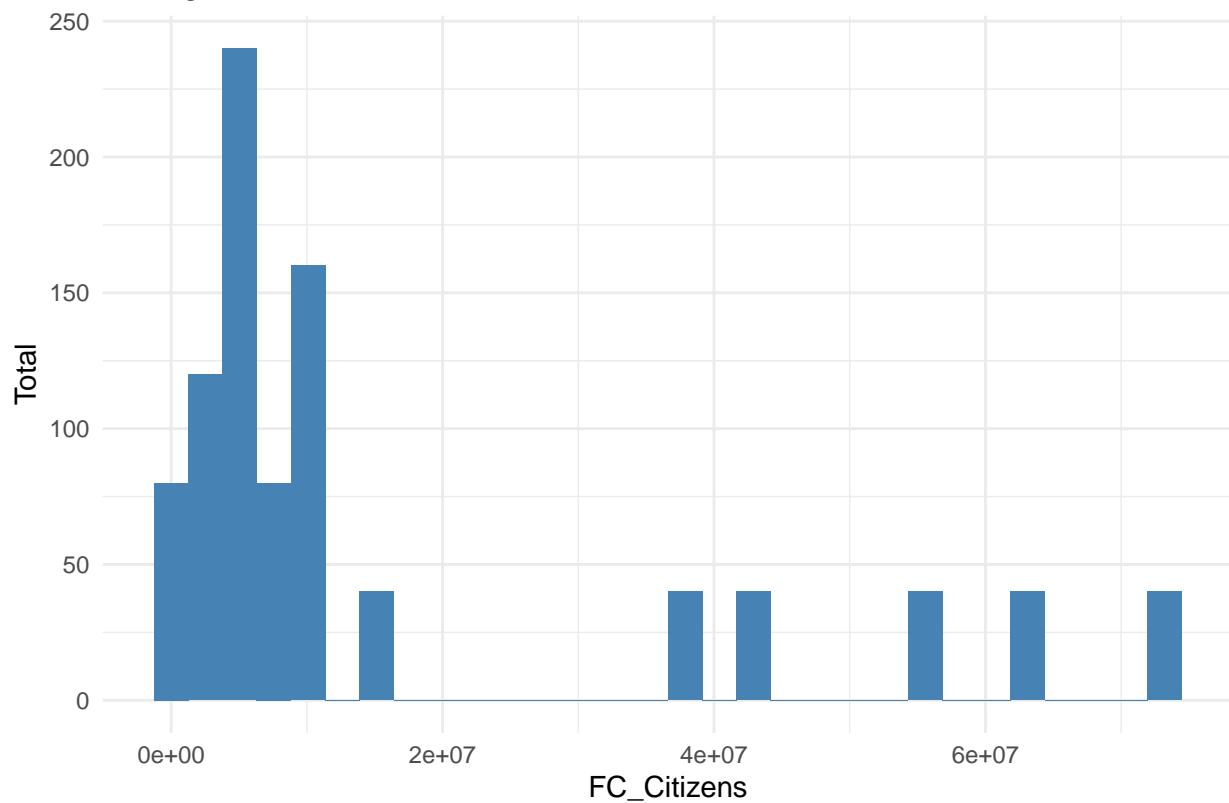


Histogram of FC\_NonCitizens

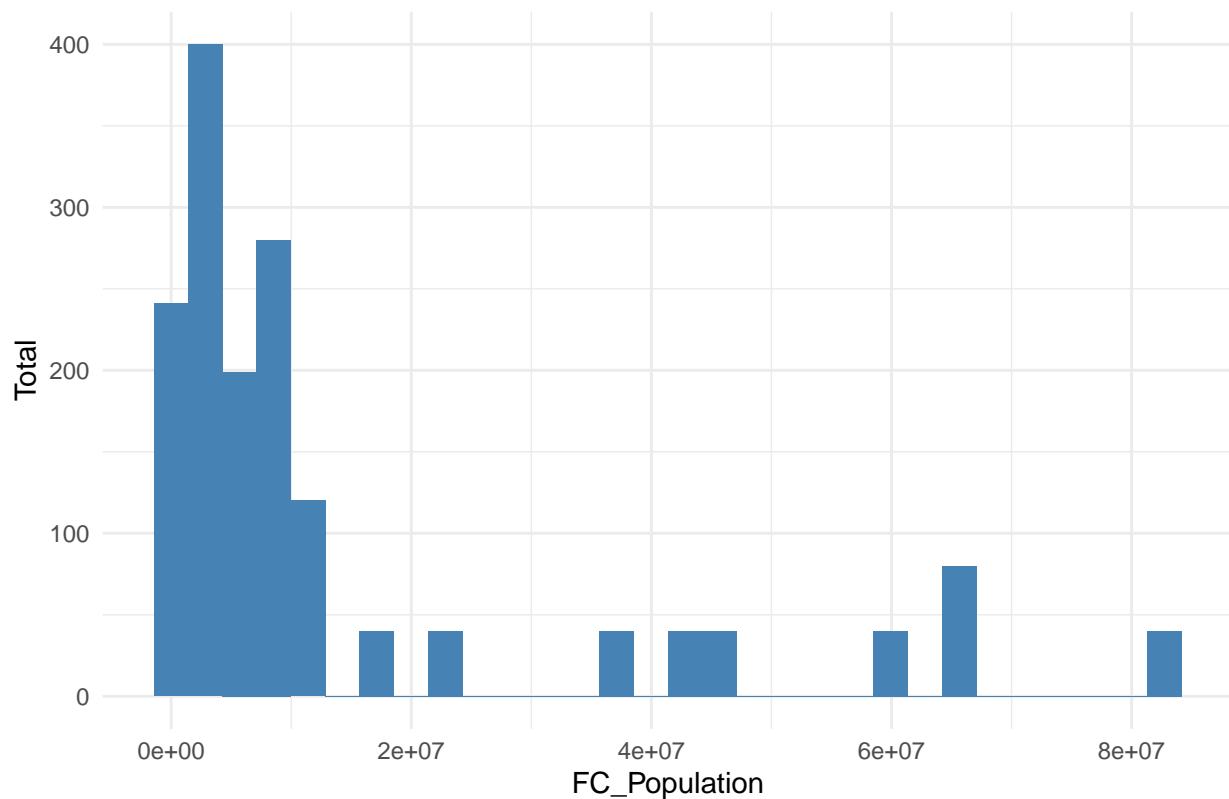




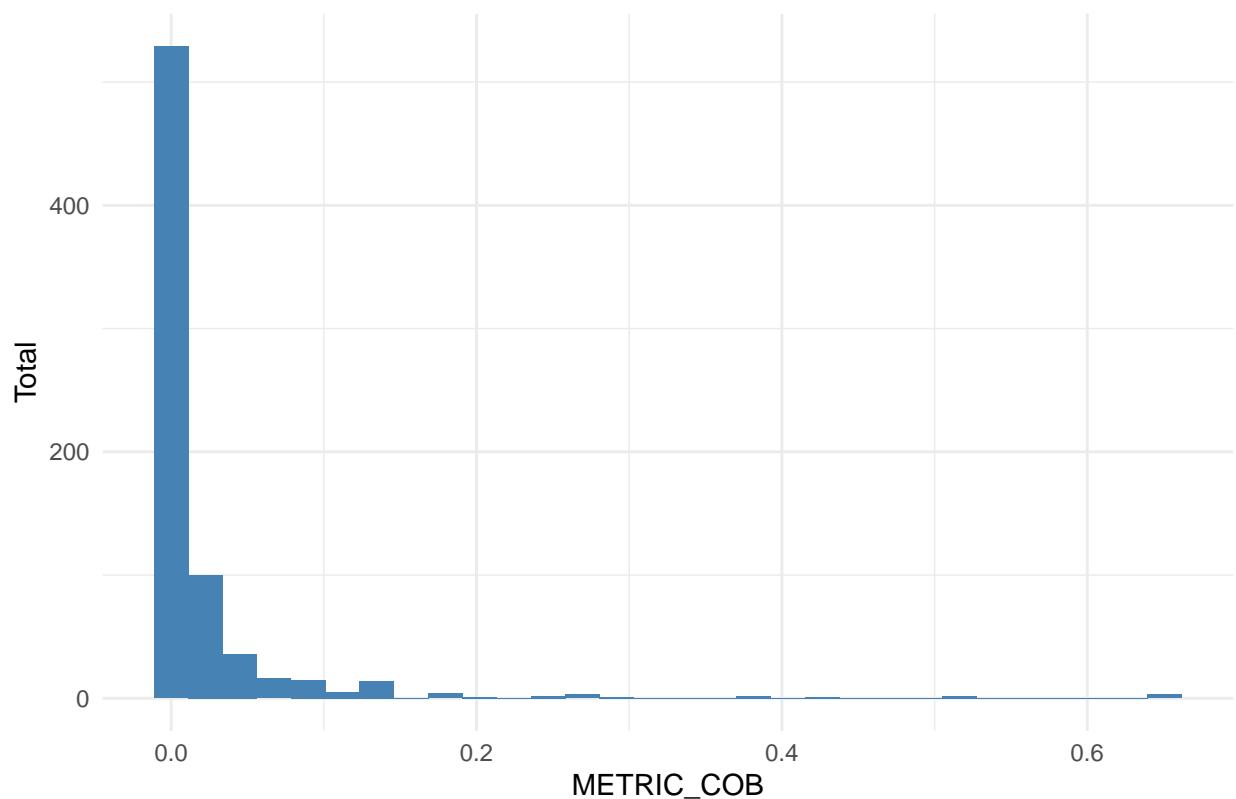
Histogram of FC\_Citizens



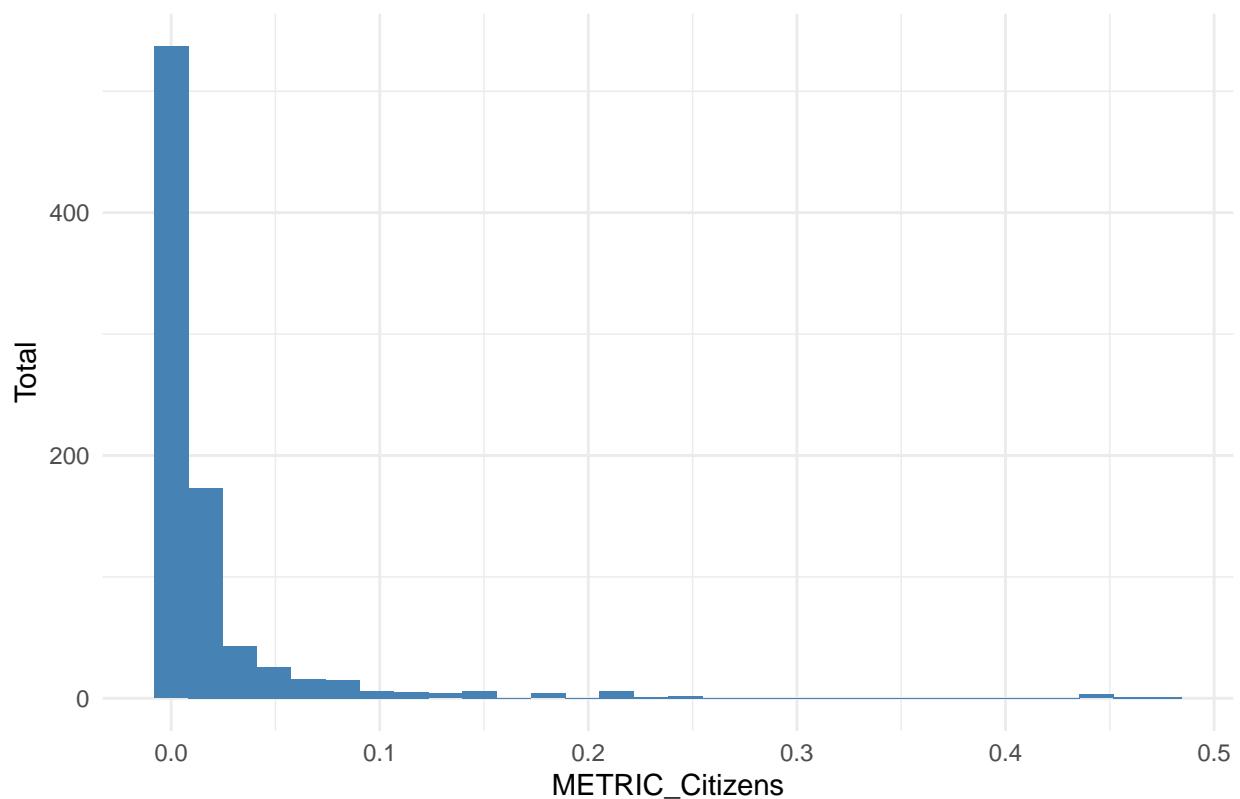
Histogram of FC\_Population



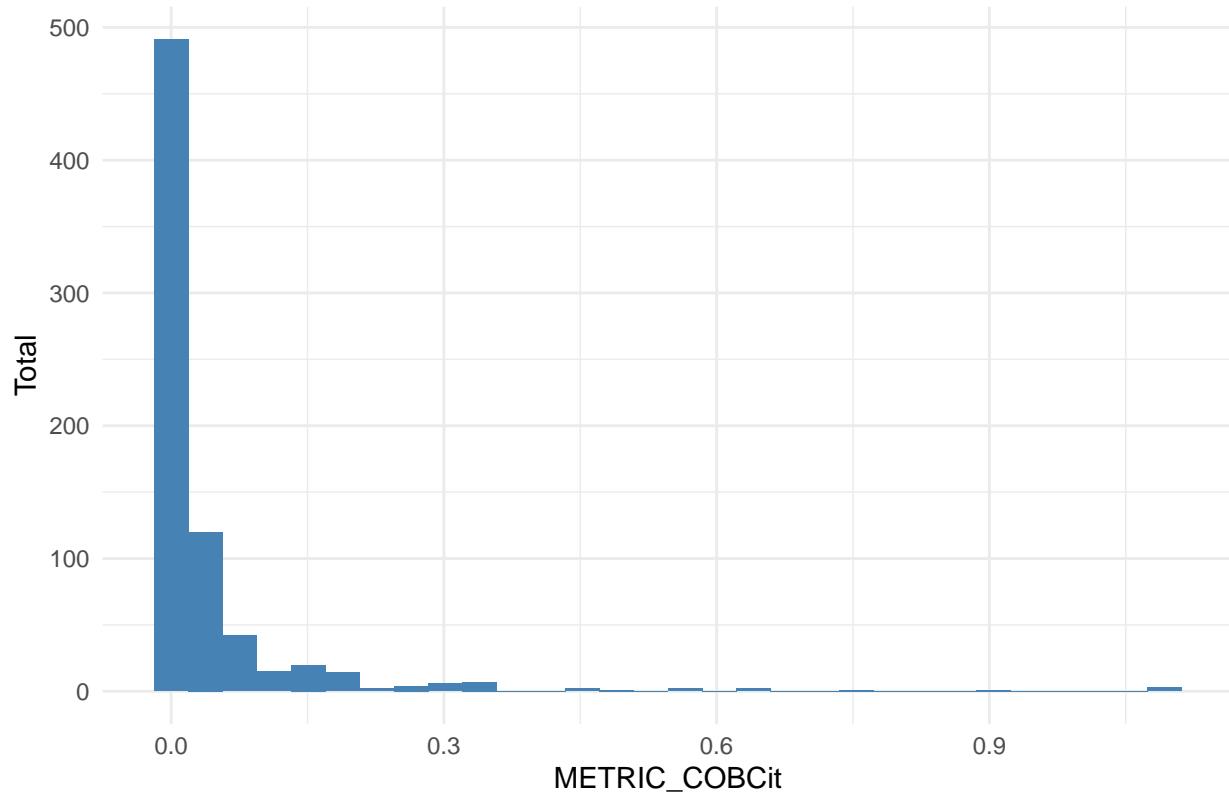
Histogram of METRIC\_COB



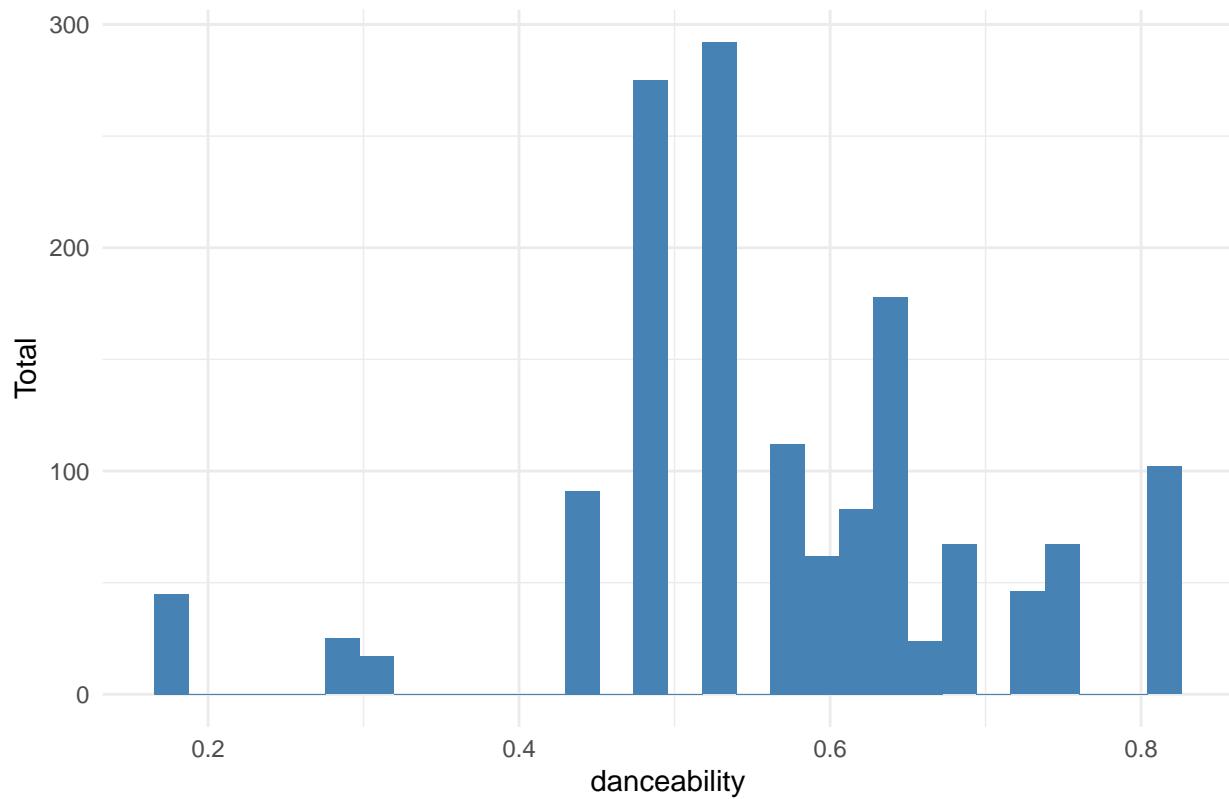
Histogram of METRIC\_Citizens



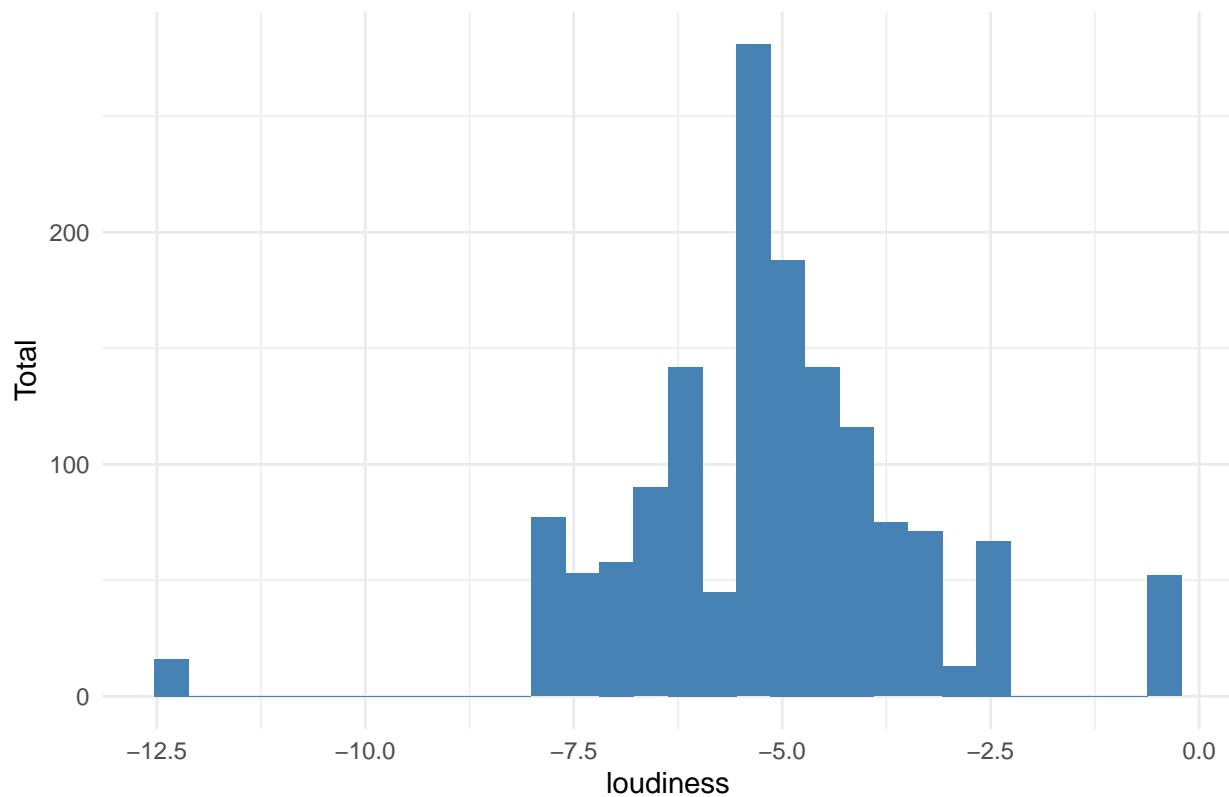
Histogram of METRIC\_COBCit



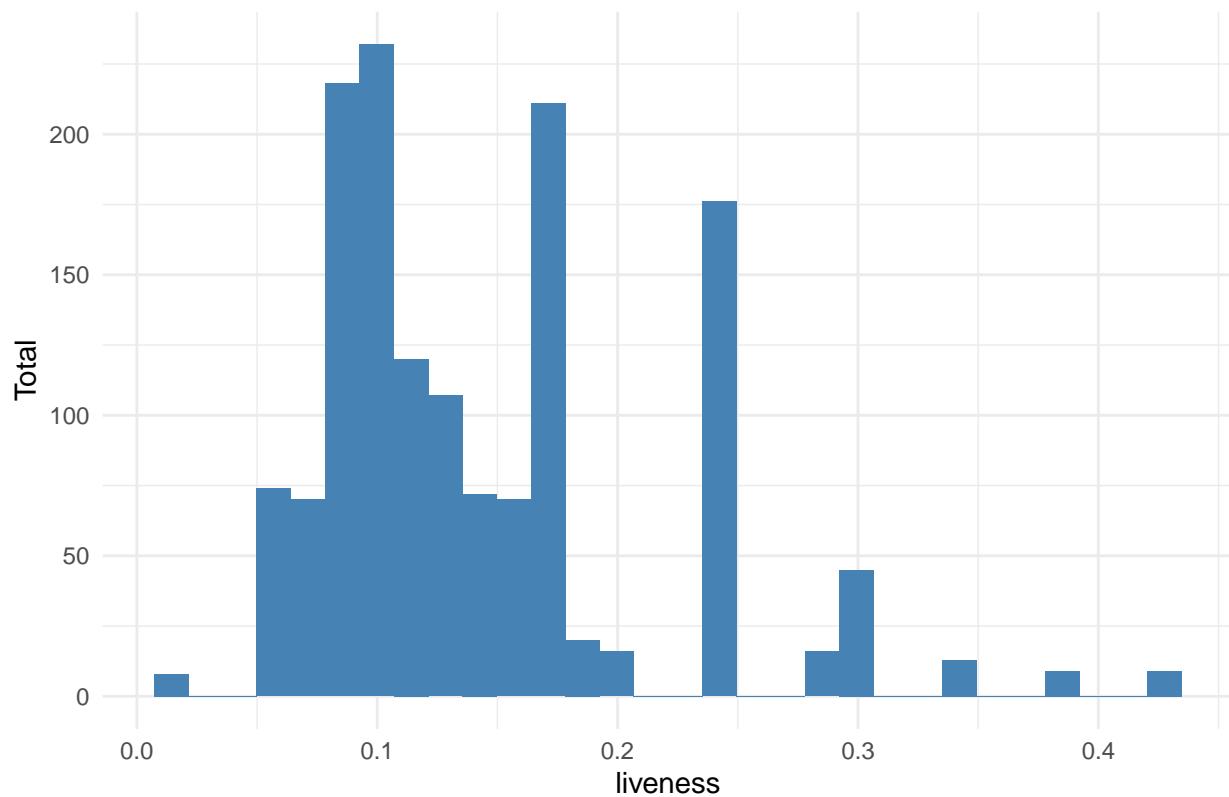
Histogram of danceability



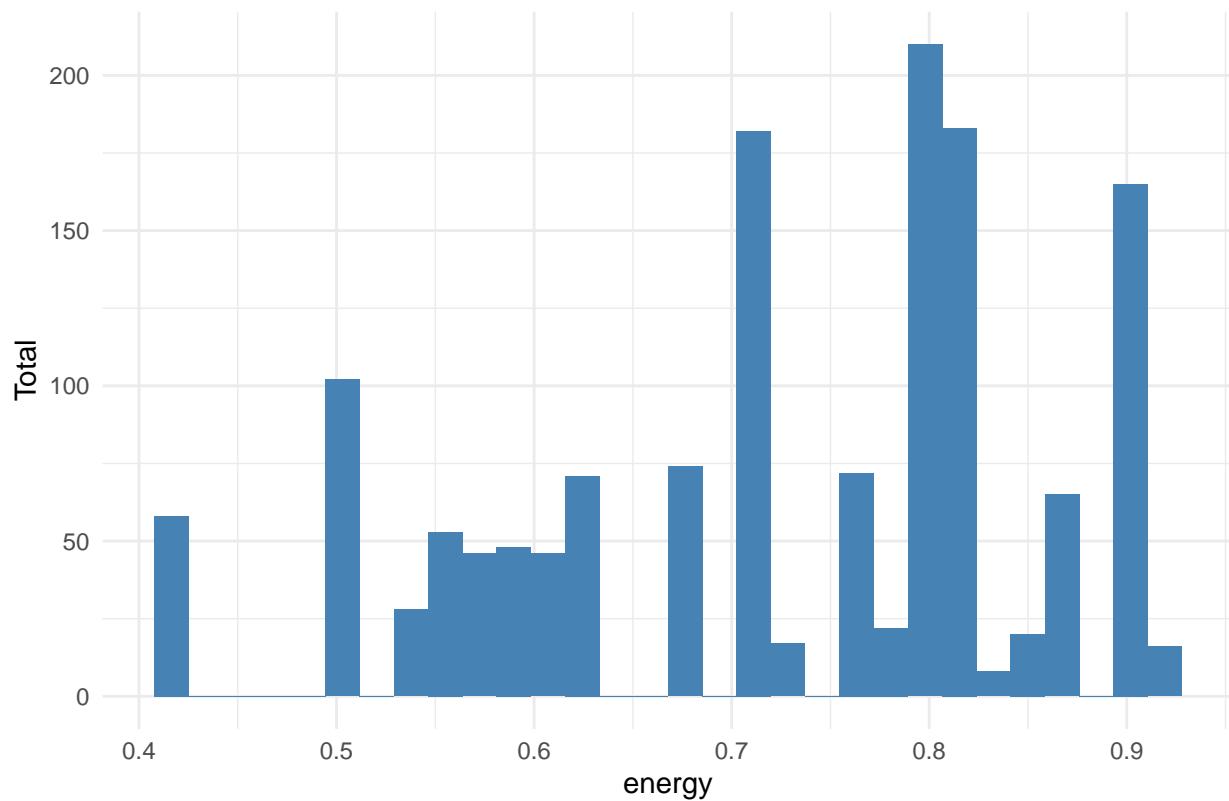
Histogram of loudness



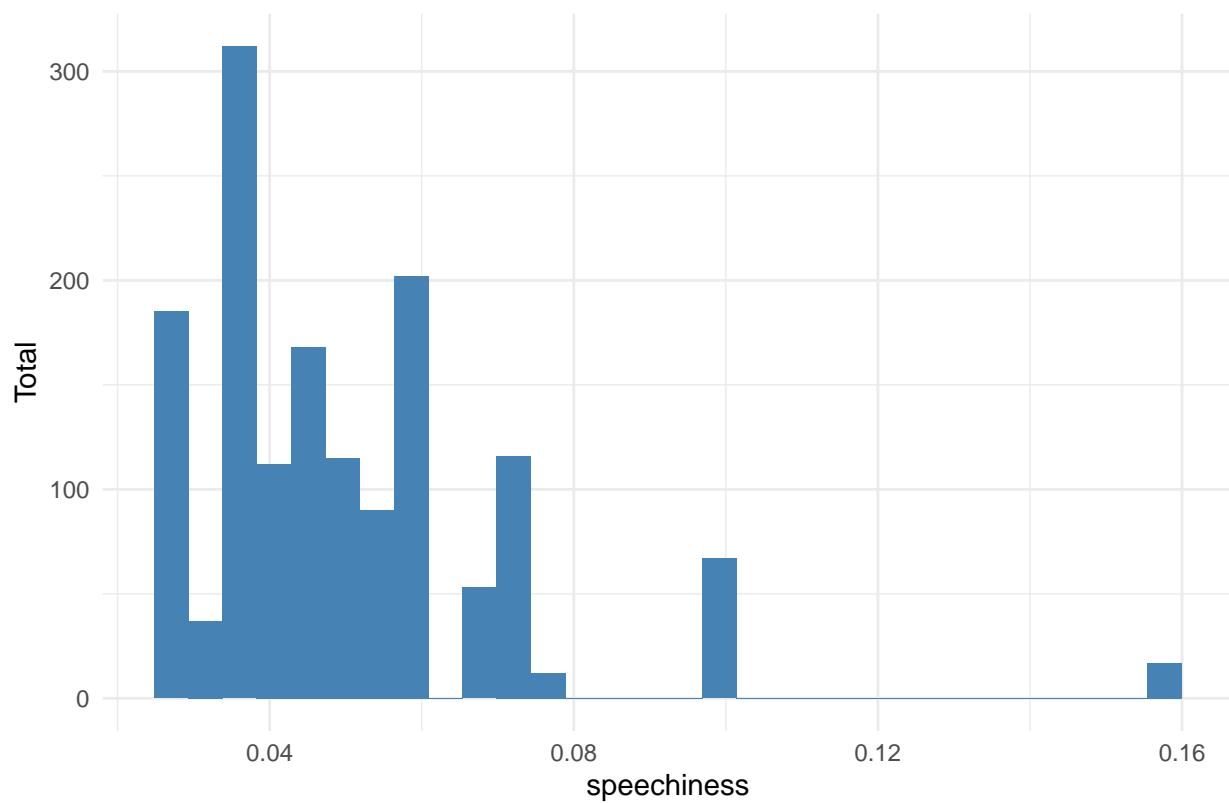
Histogram of liveness



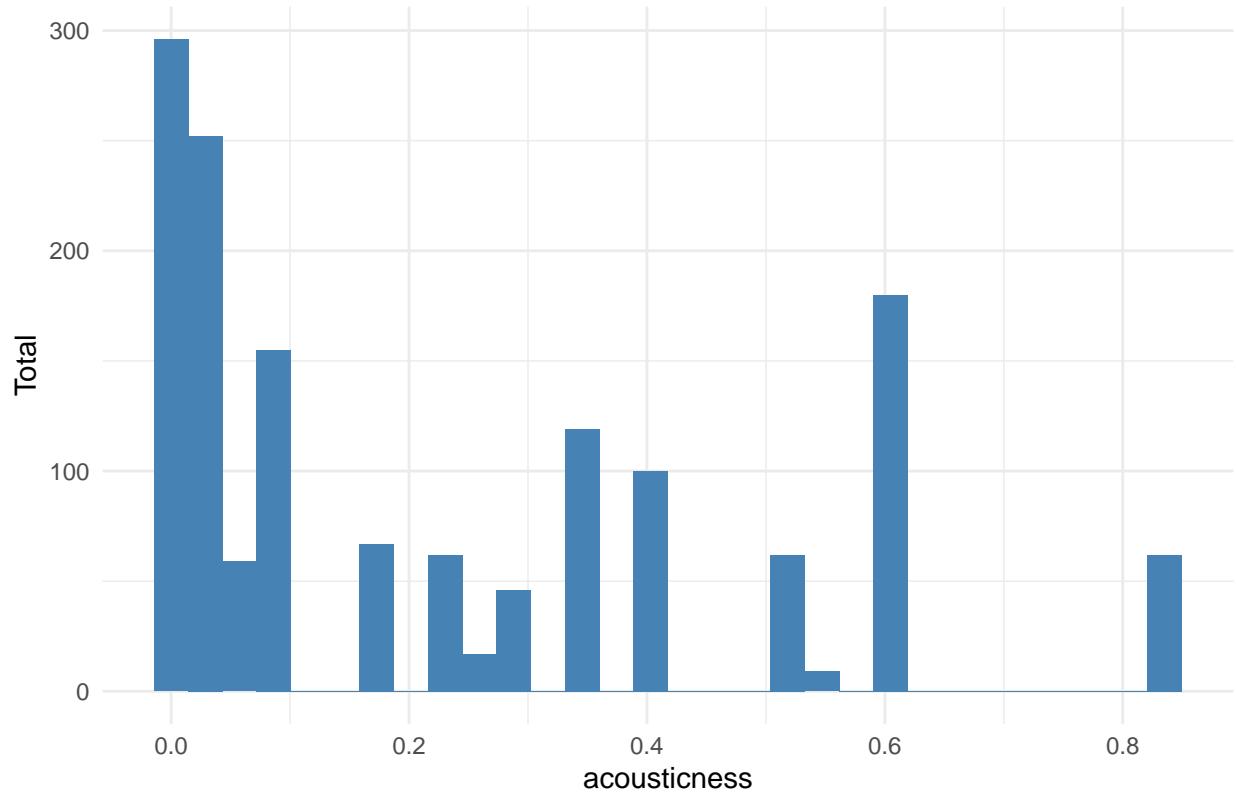
Histogram of energy



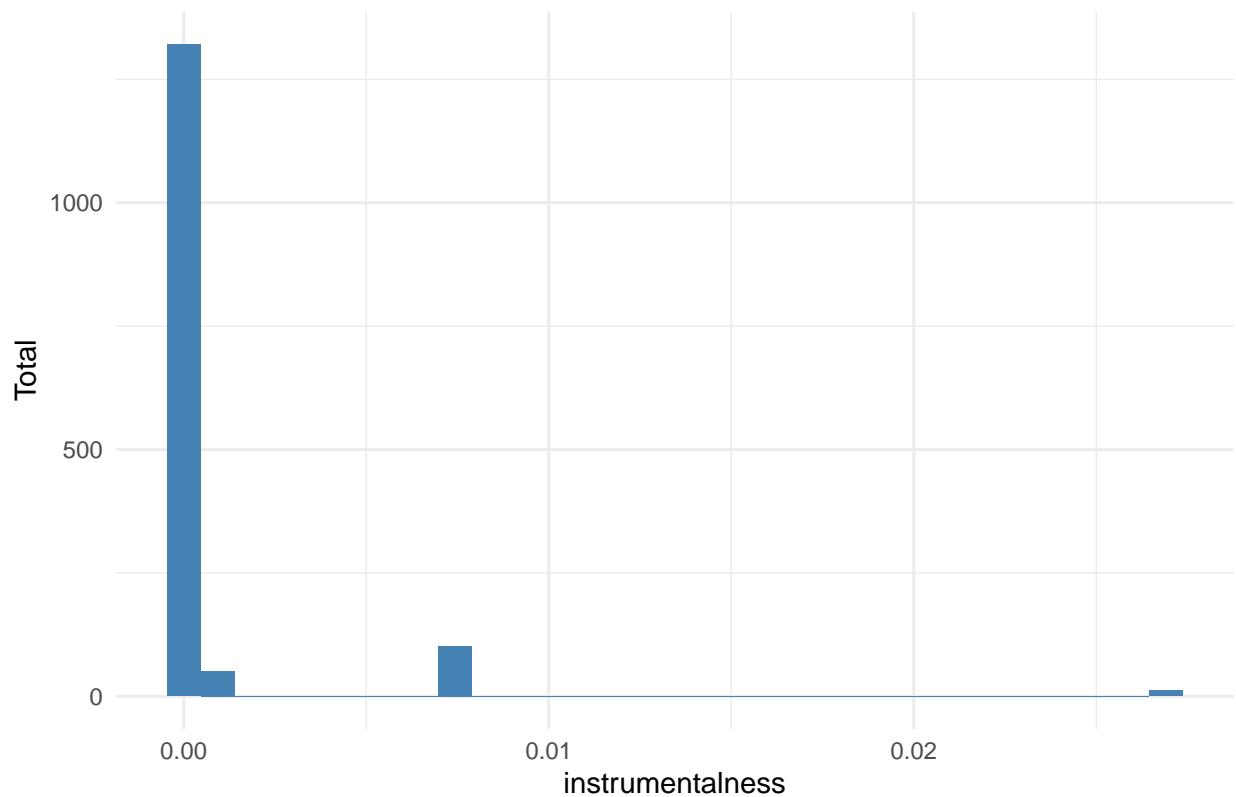
Histogram of speechiness



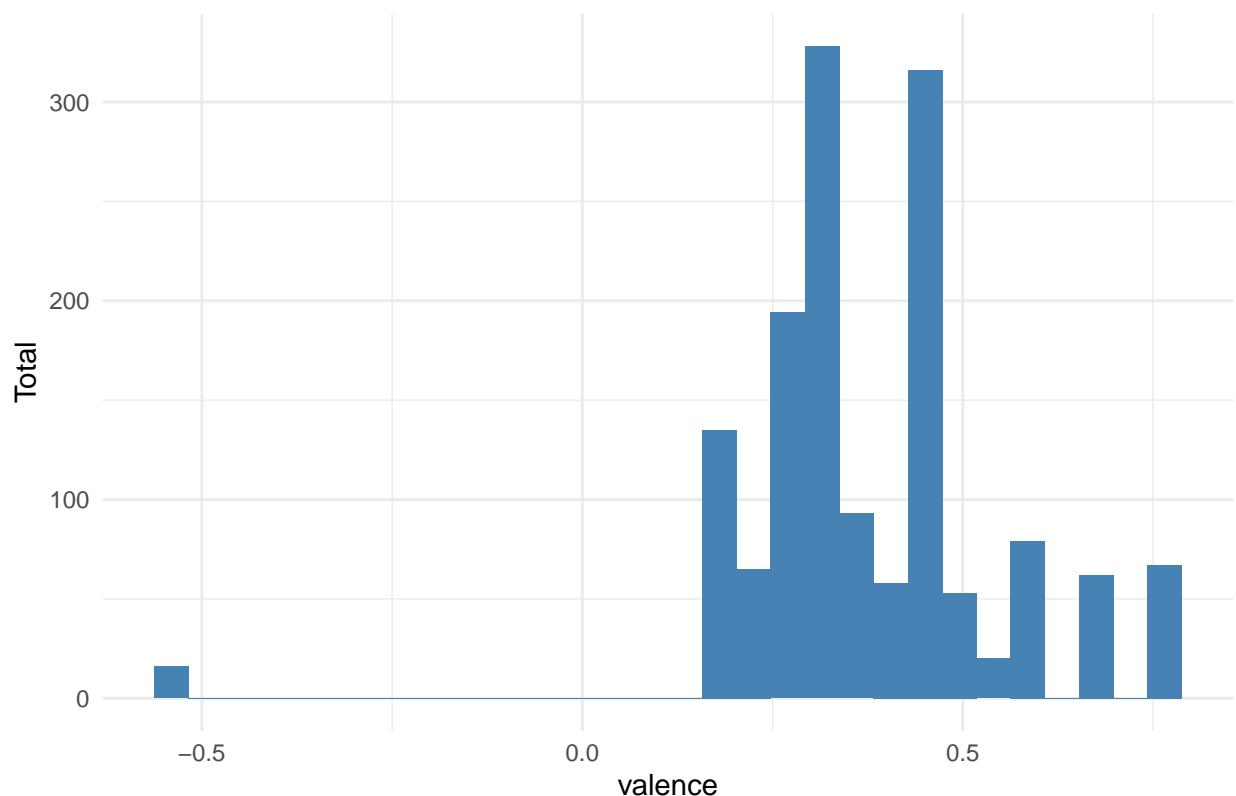
Histogram of acousticness



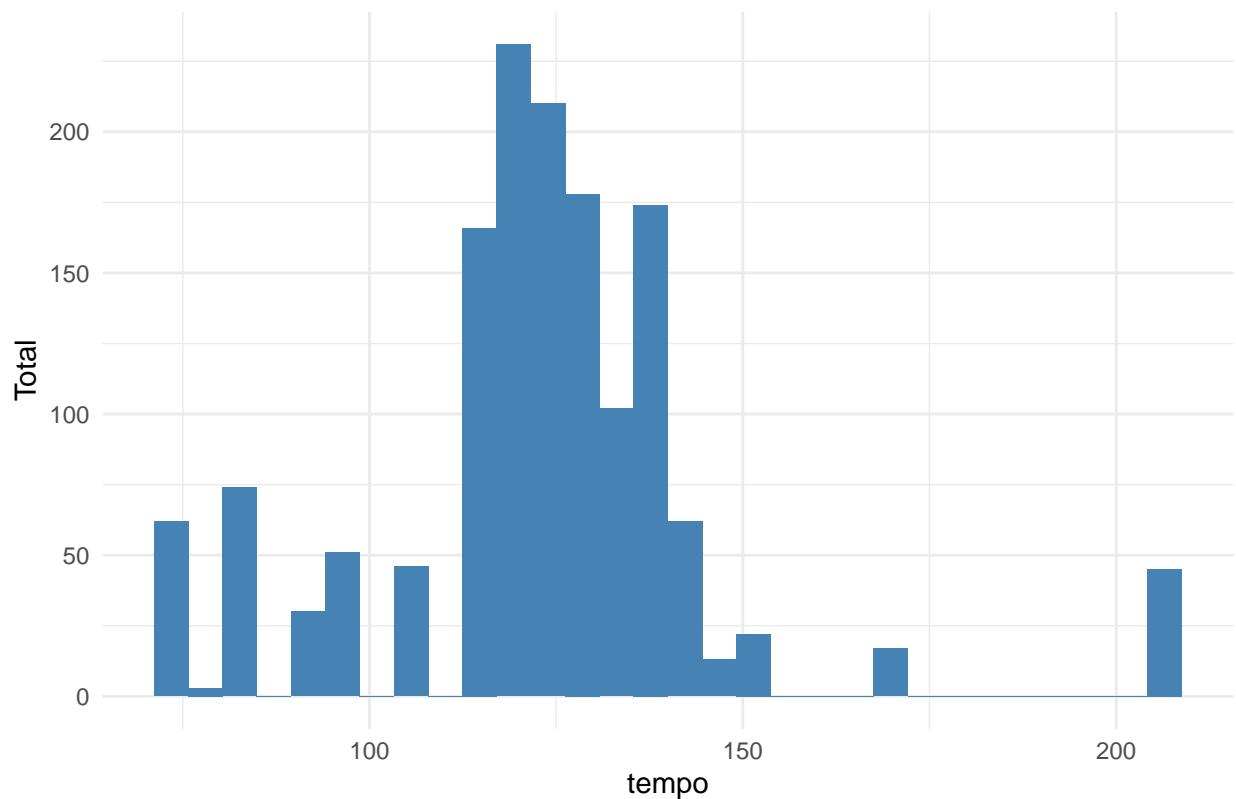
Histogram of instrumentalness



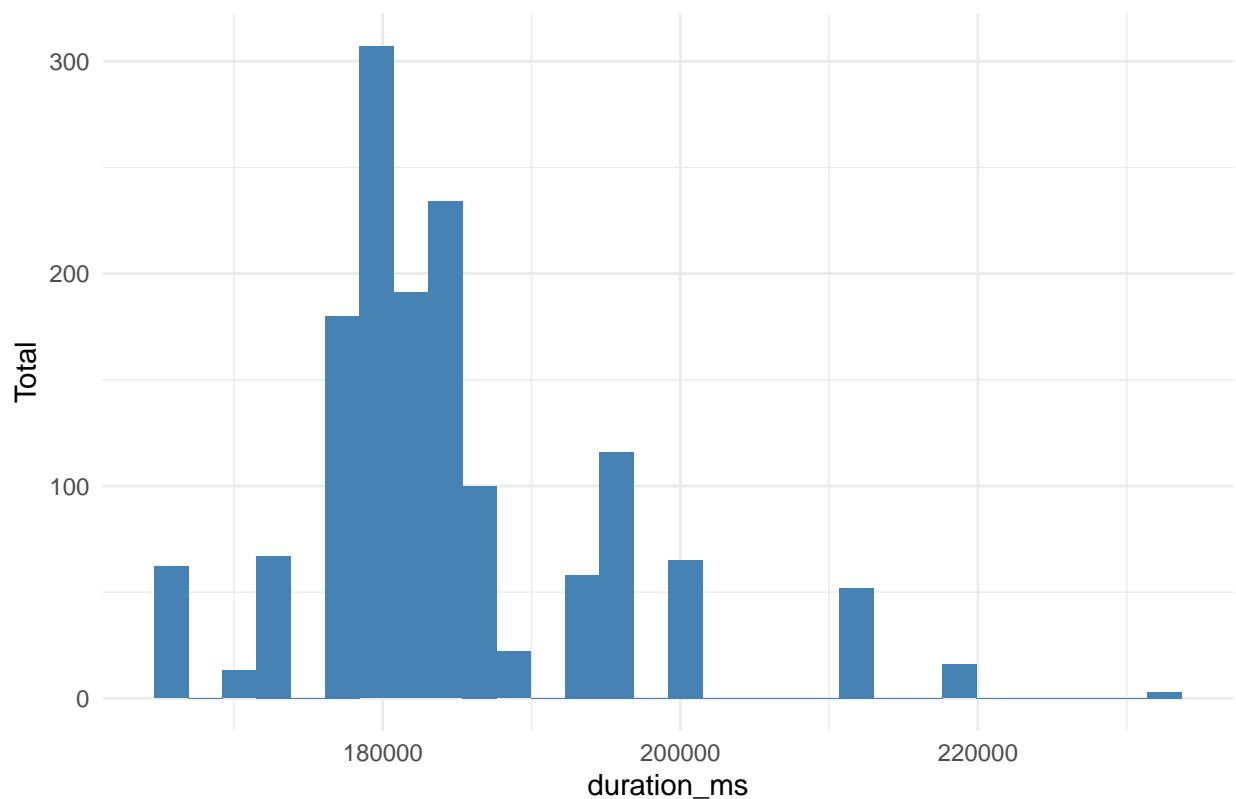
Histogram of valence



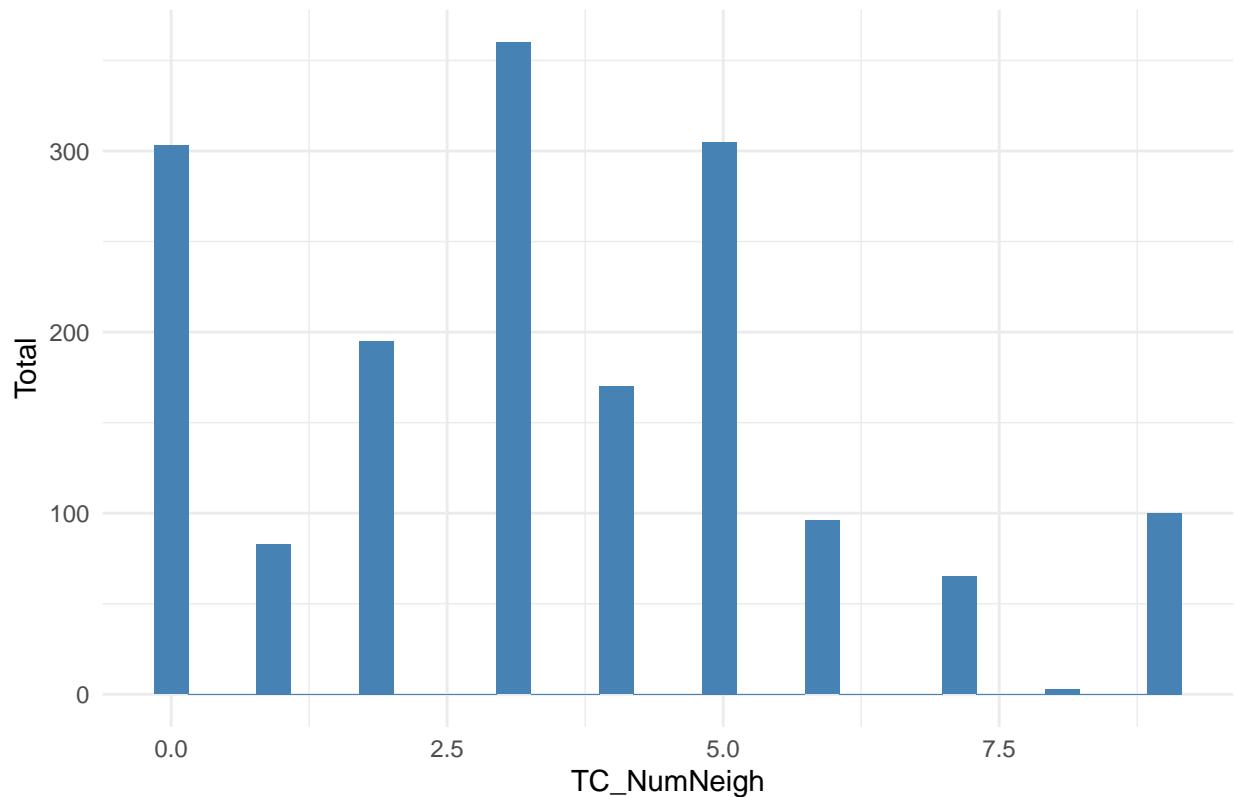
Histogram of tempo



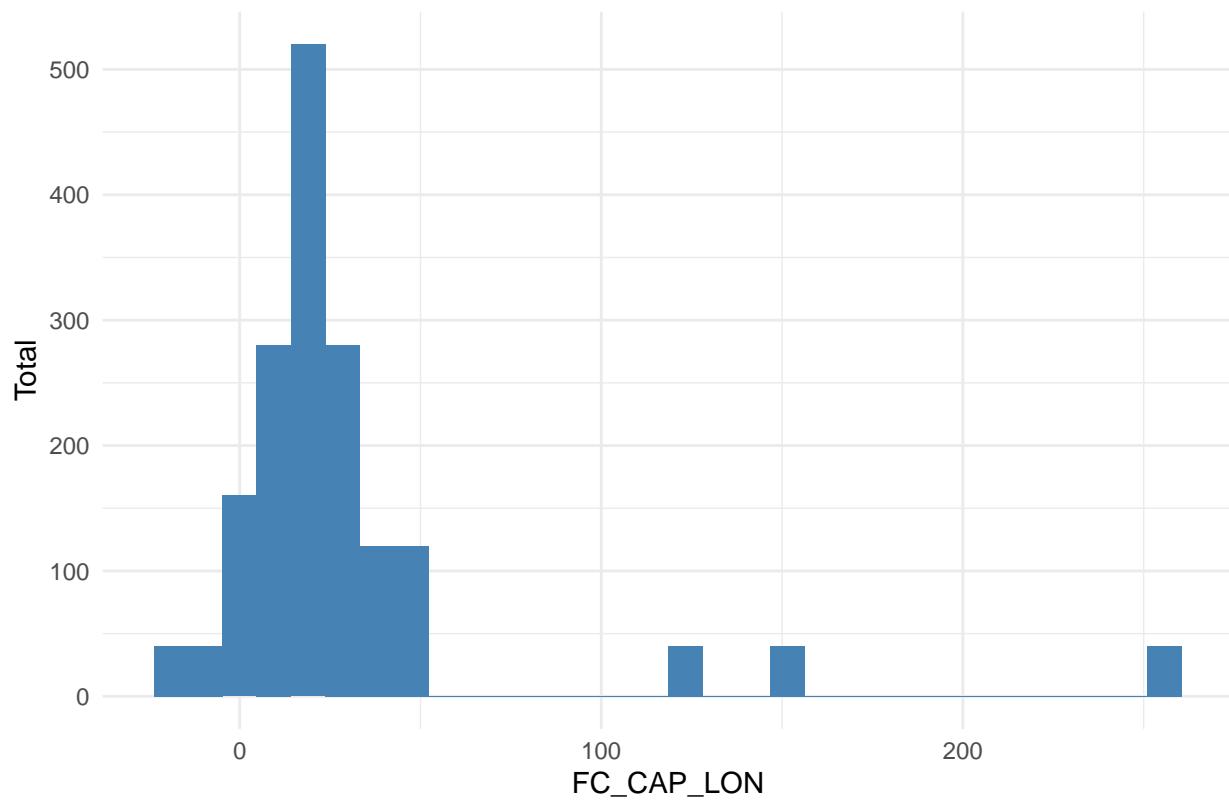
Histogram of duration\_ms



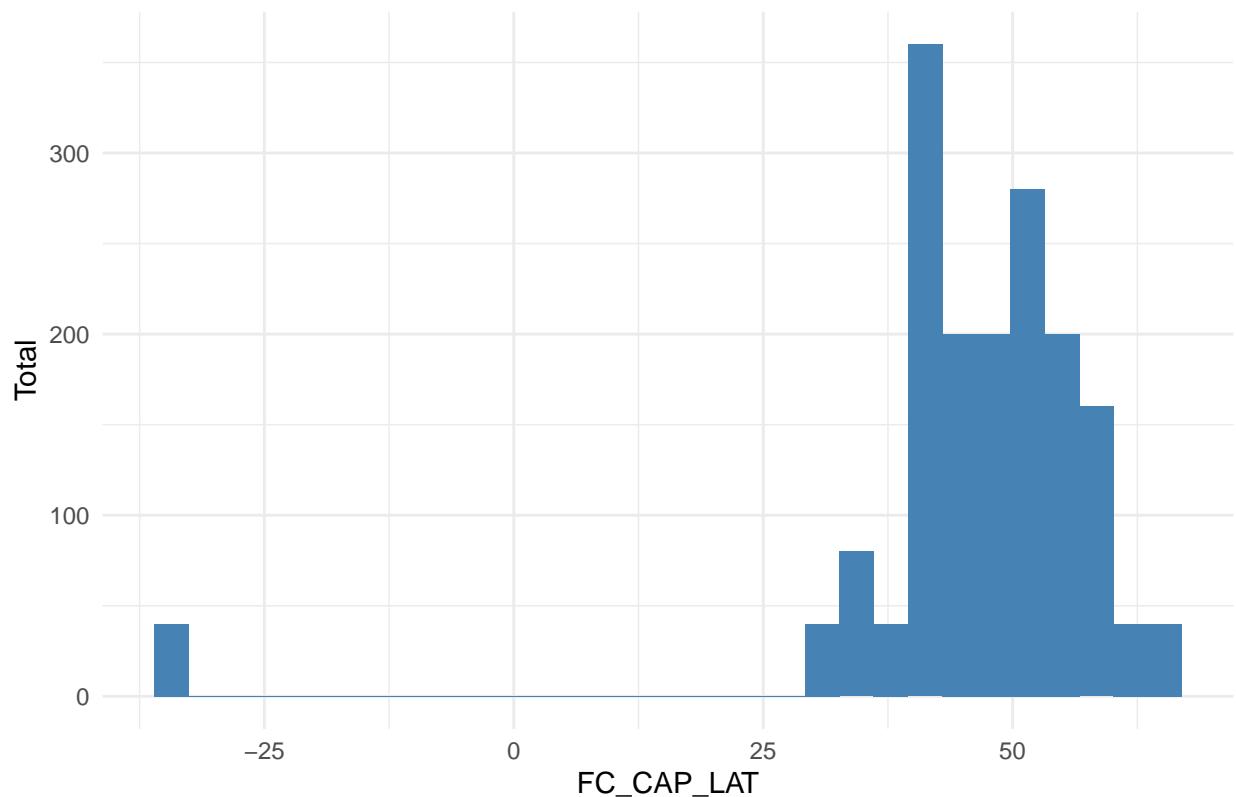
Histogram of TC\_NumNeigh



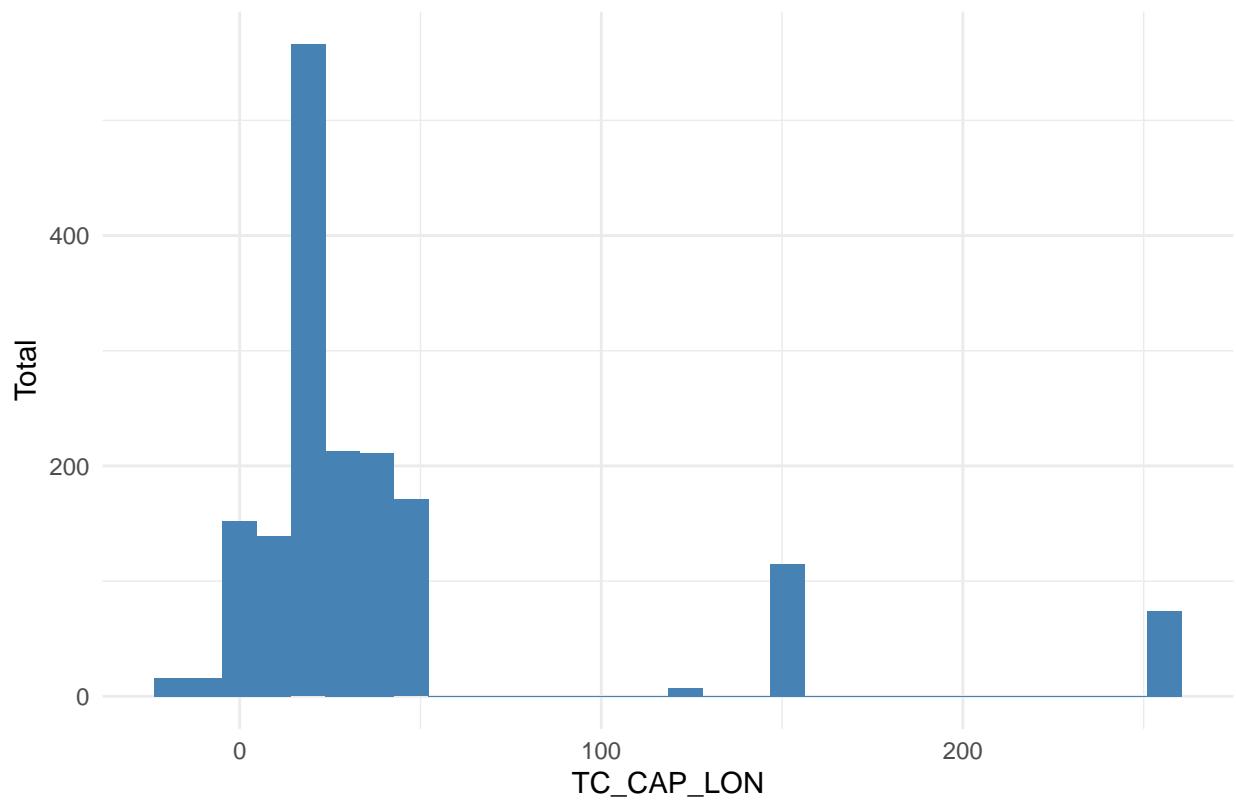
Histogram of FC\_CAP\_LON



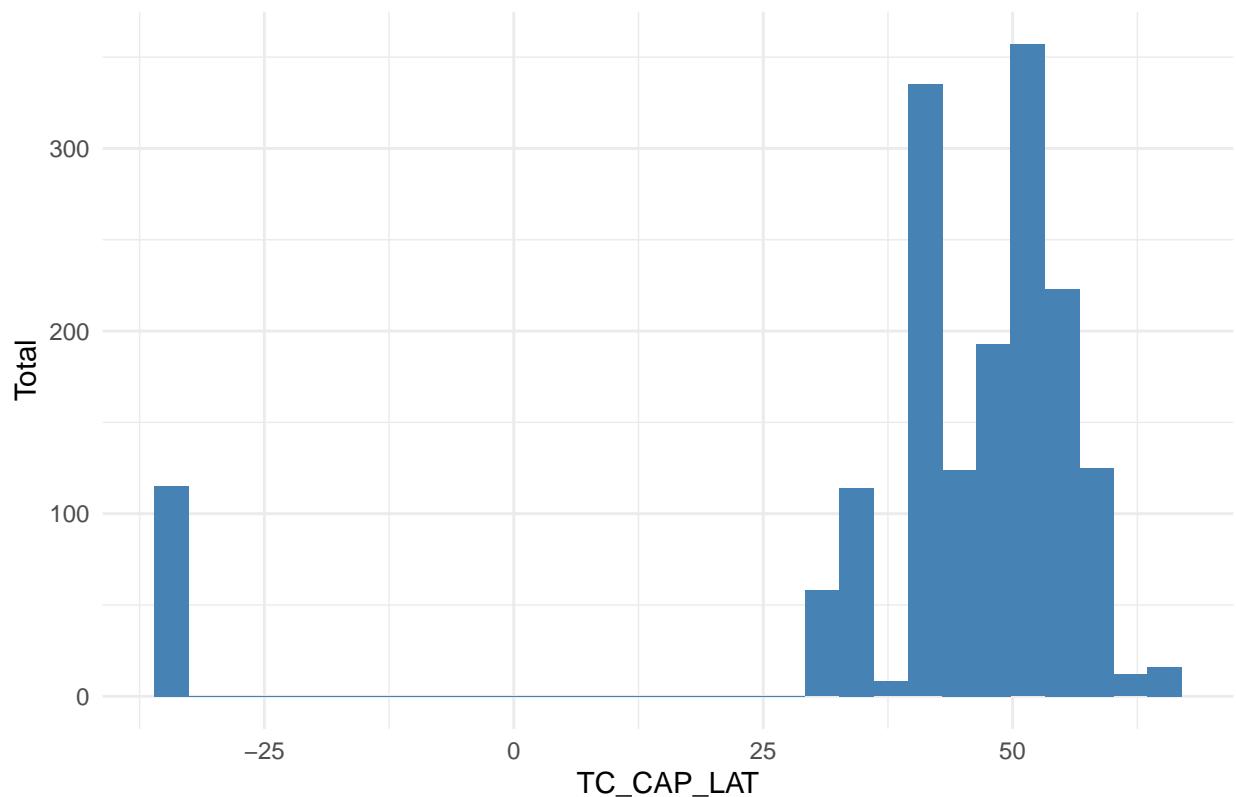
Histogram of FC\_CAP\_LAT



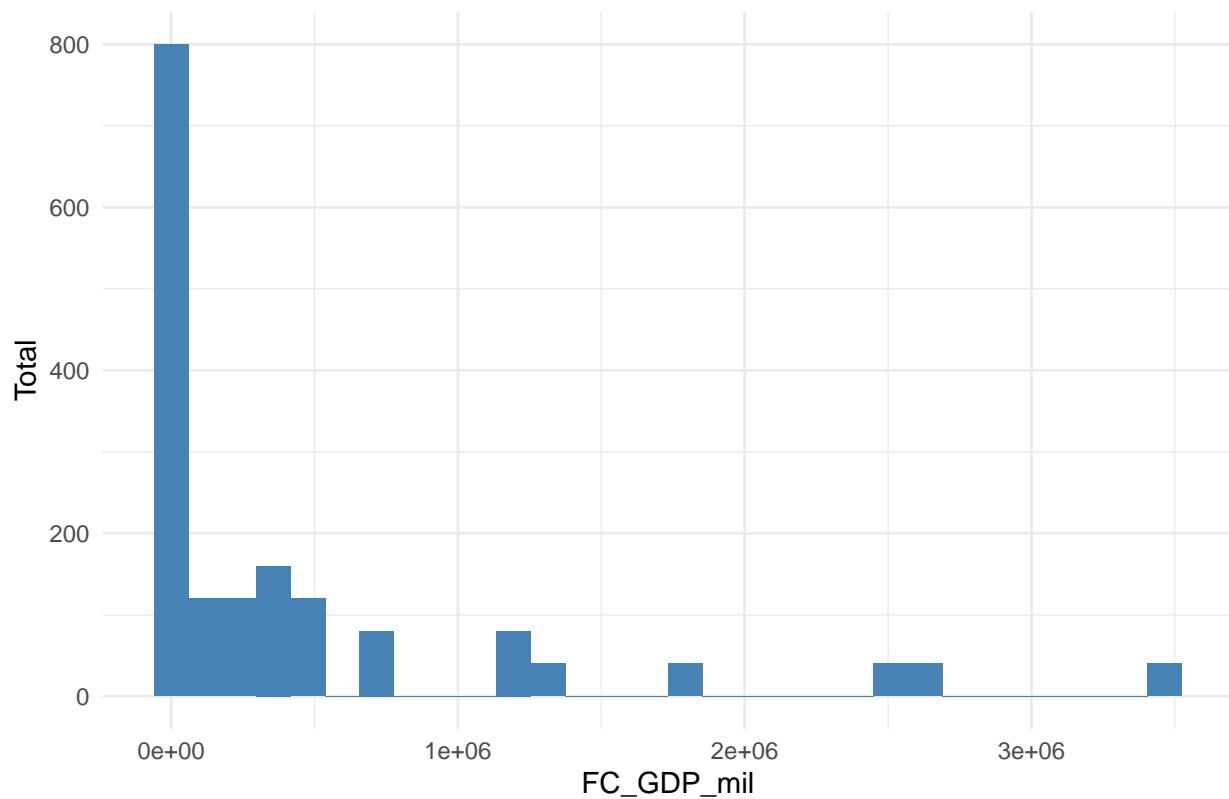
Histogram of TC\_CAP\_LON



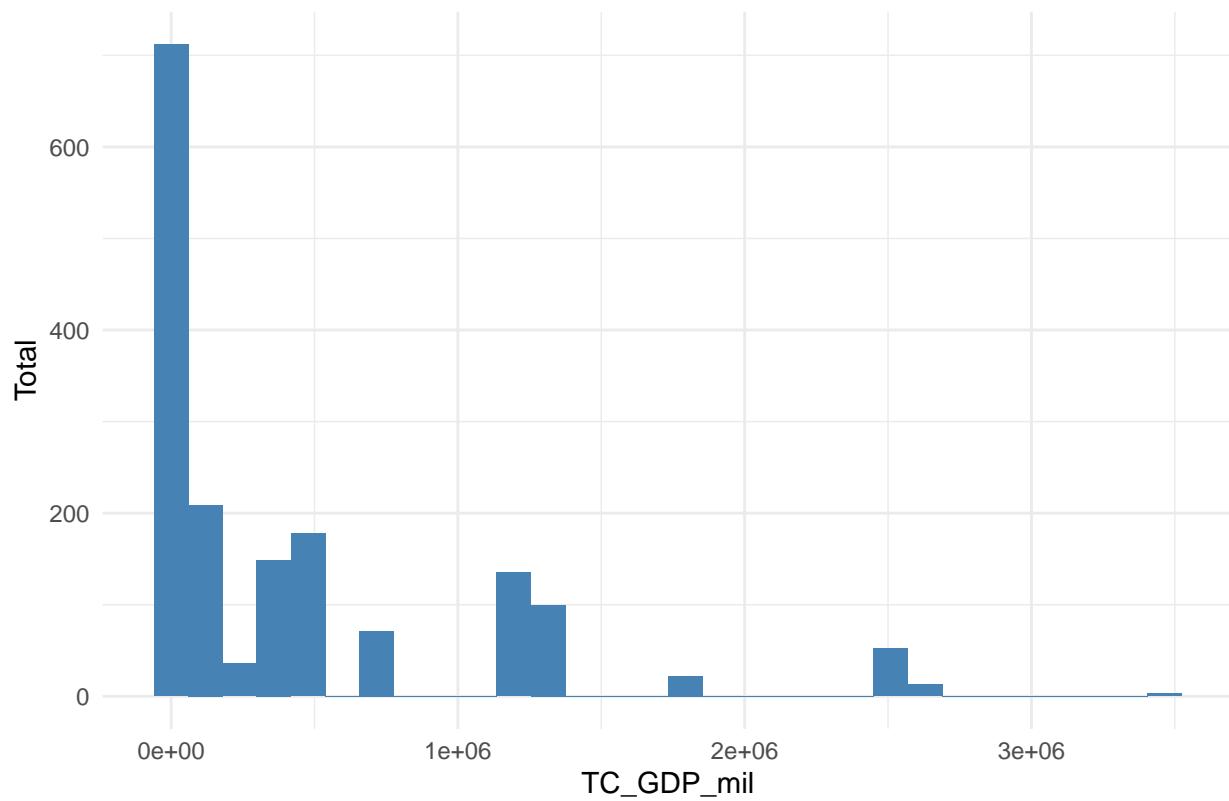
Histogram of TC\_CAP\_LAT



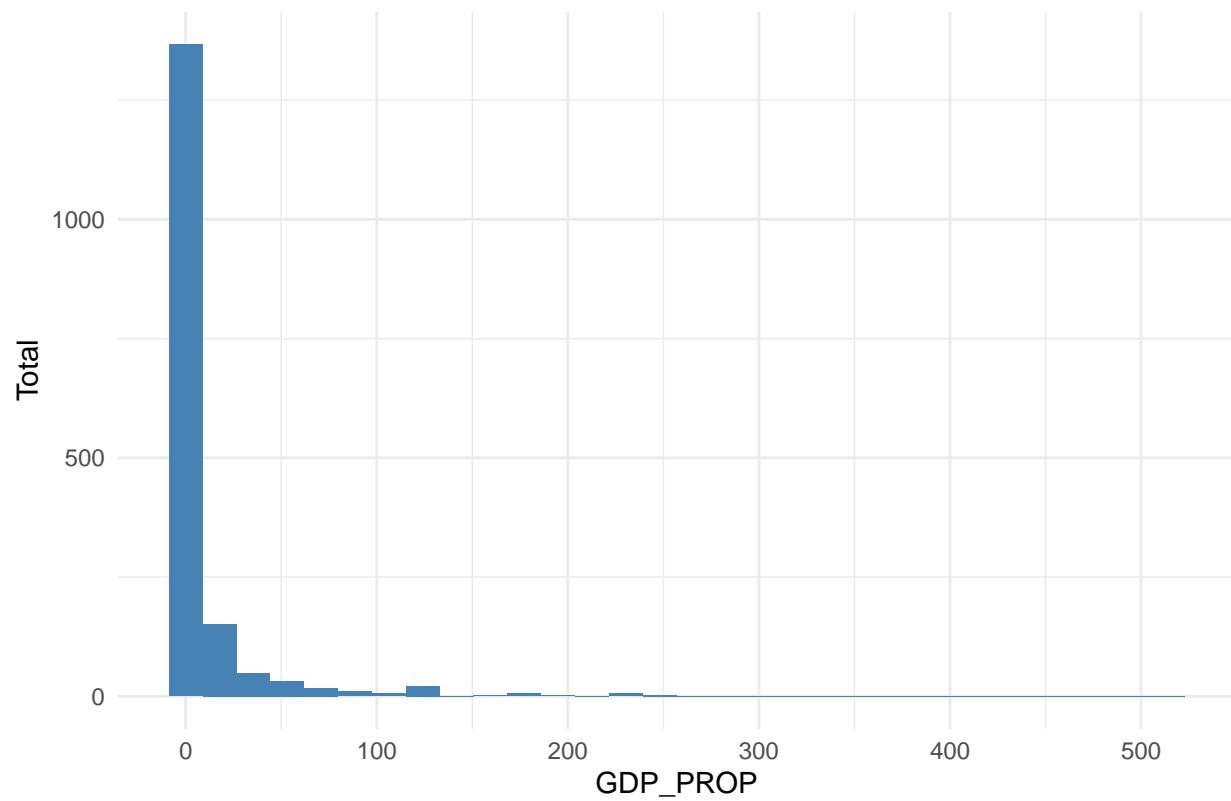
Histogram of FC\_GDP\_mil



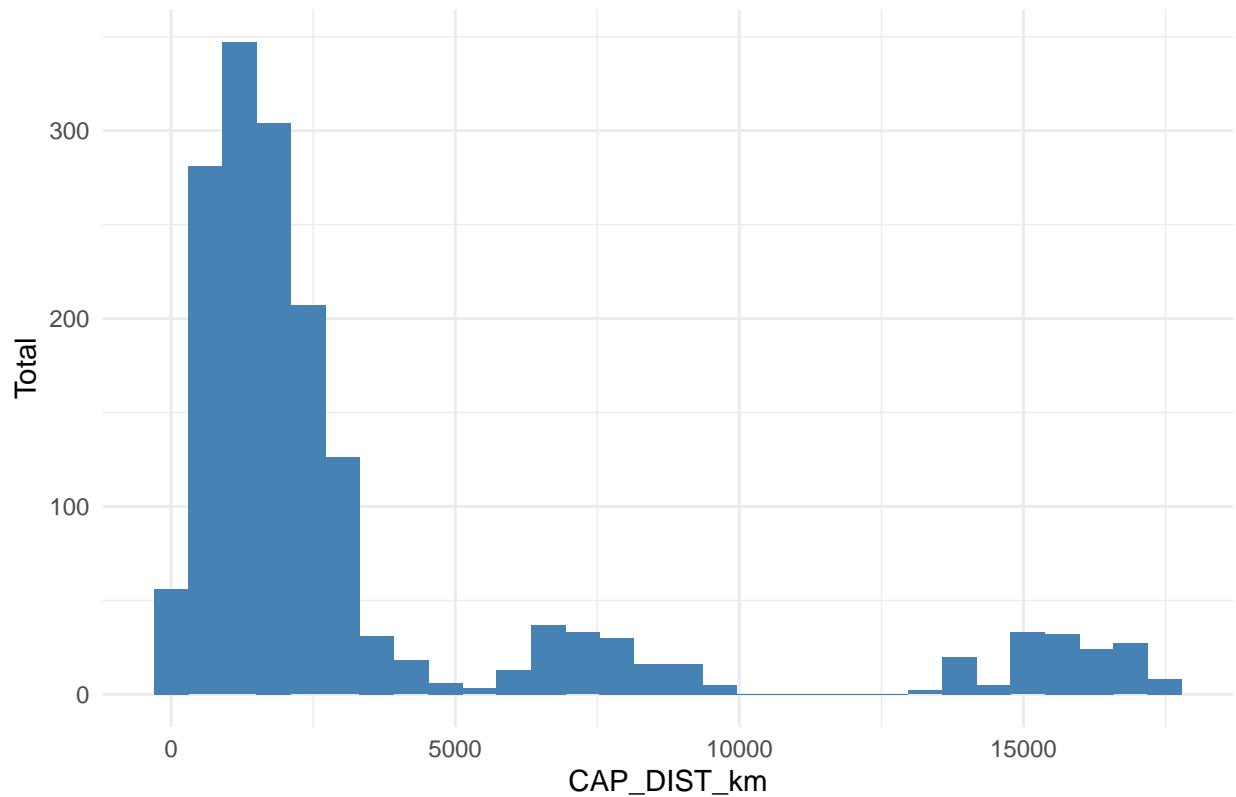
## Histogram of TC\_GDP\_mil



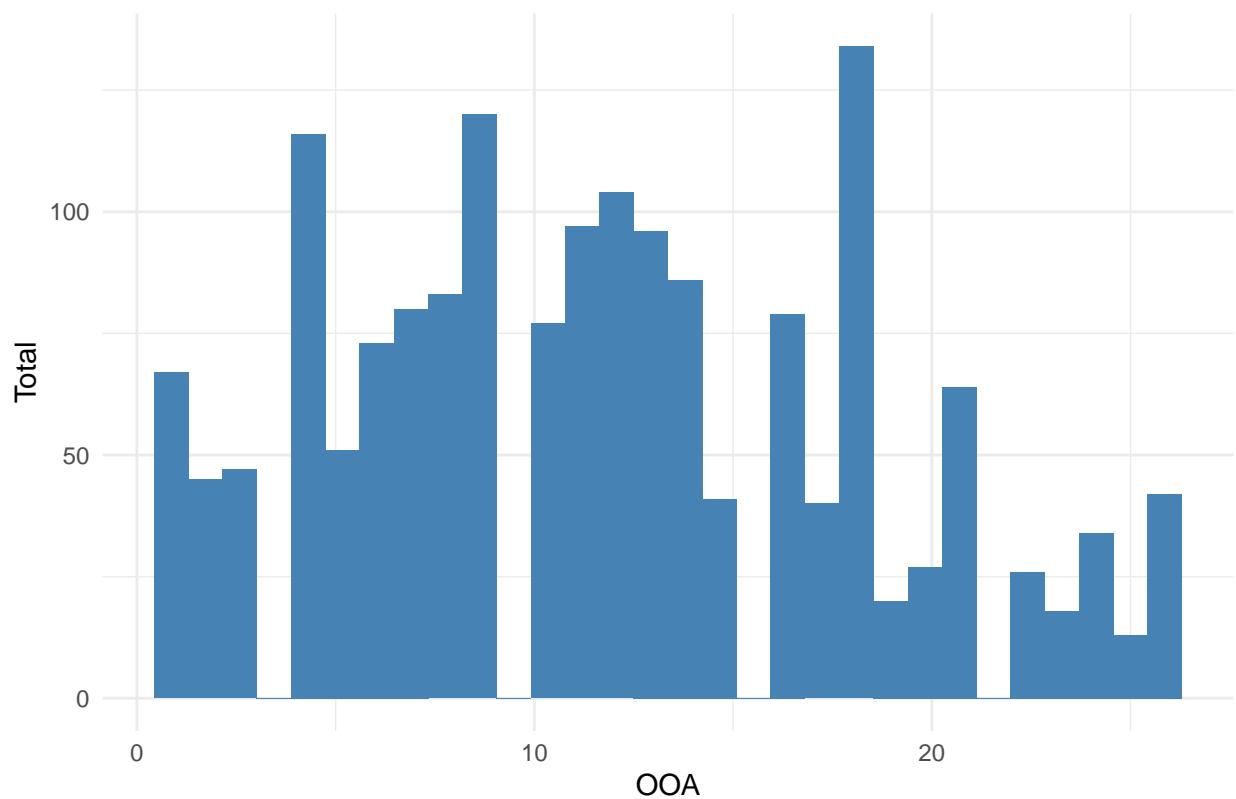
Histogram of GDP\_PROP



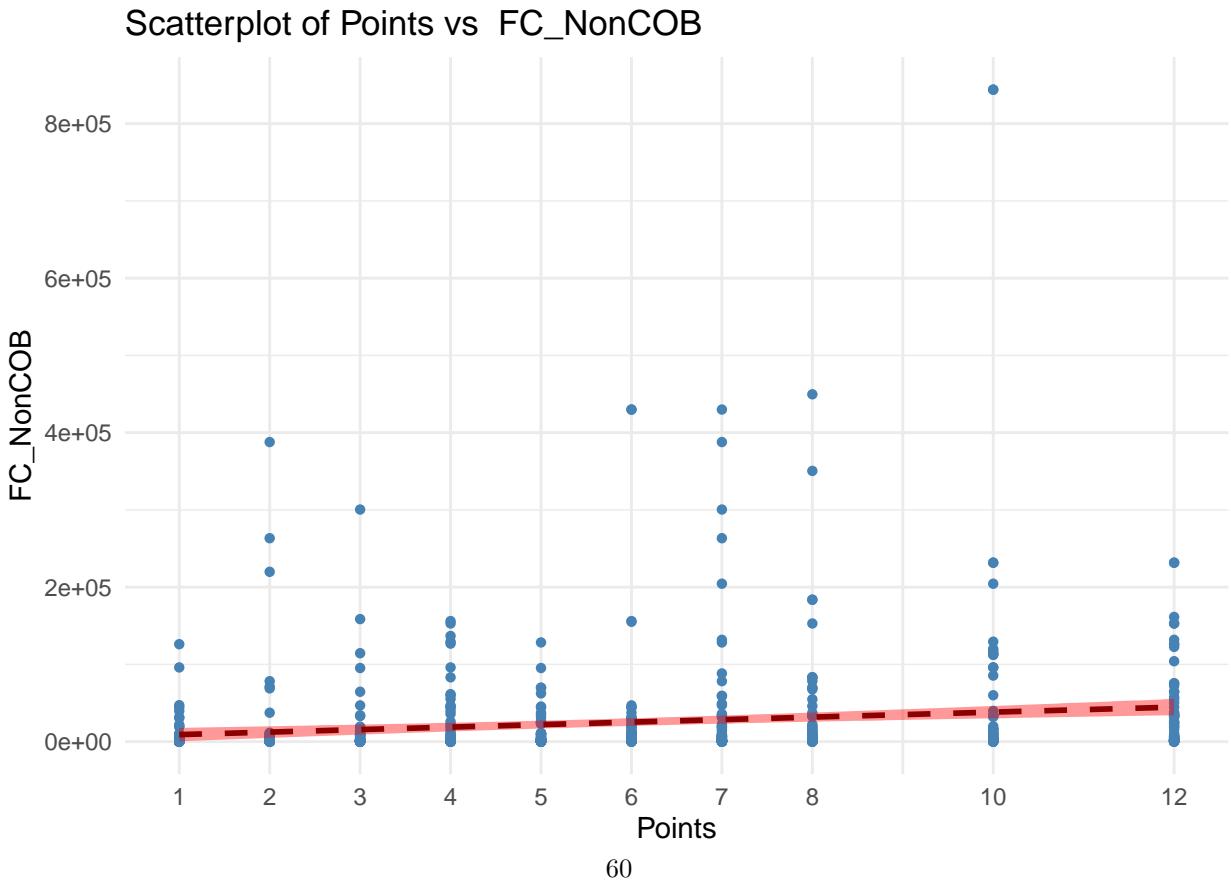
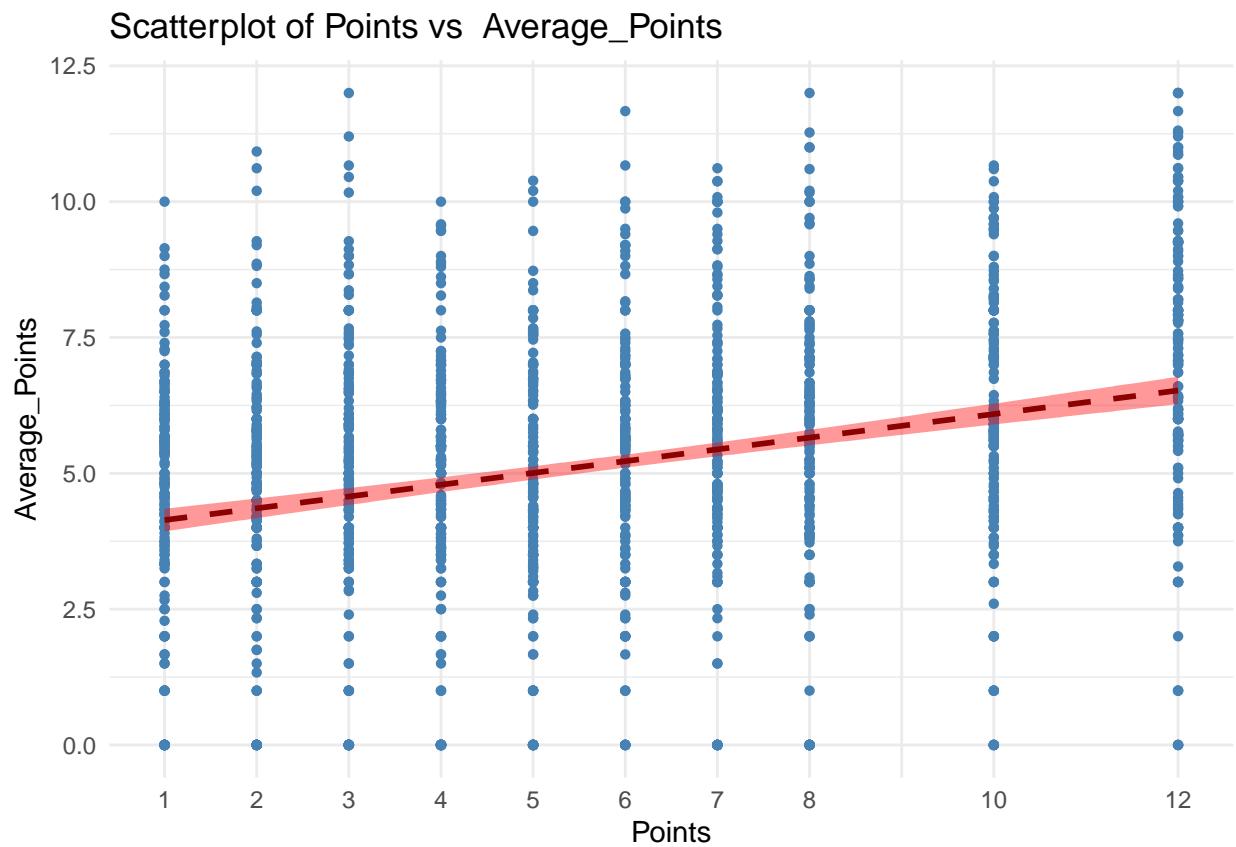
Histogram of CAP\_DIST\_km



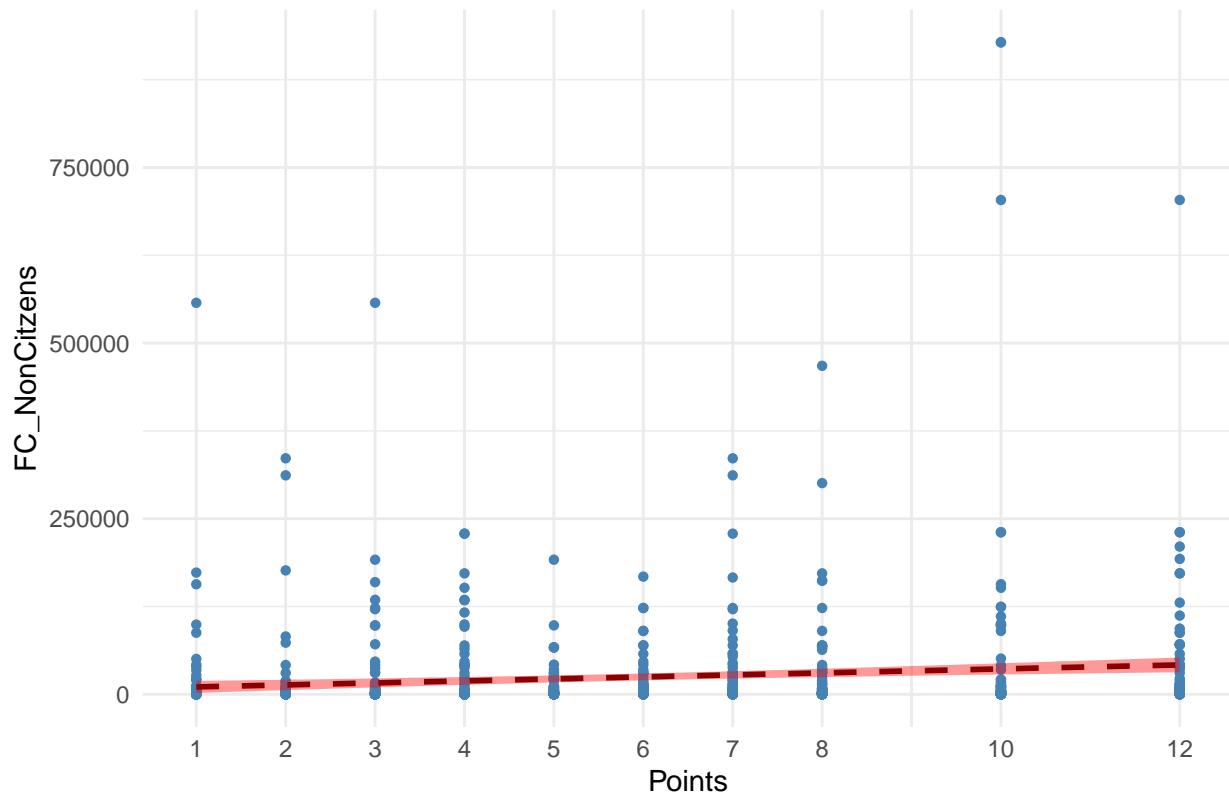
Histogram of OOA



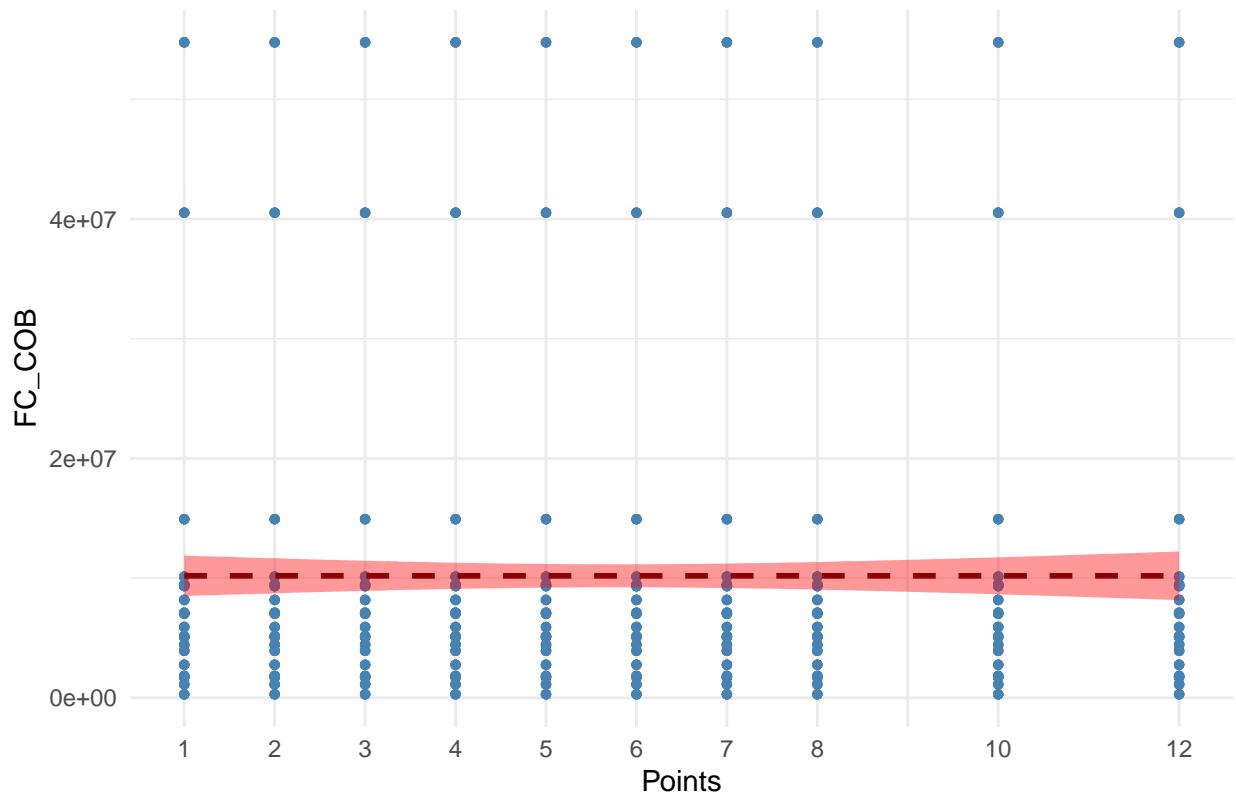
## Bivariate



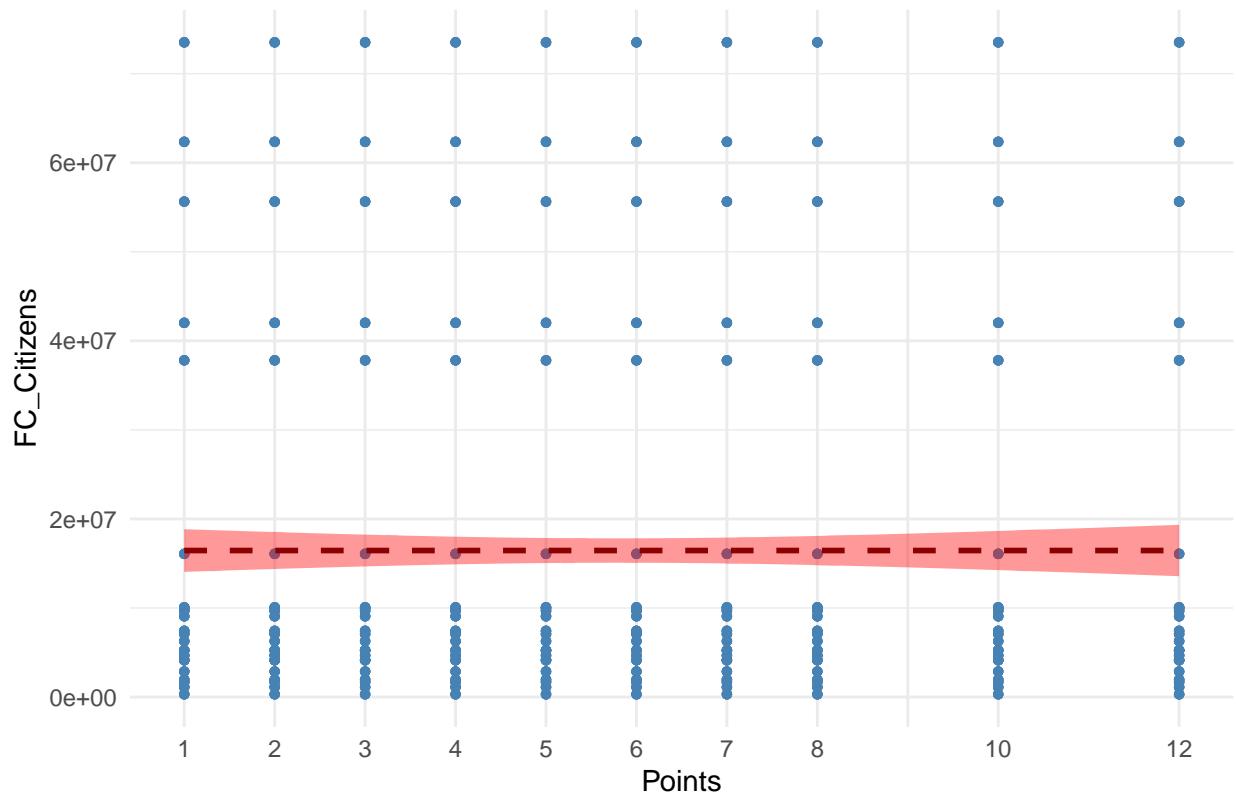
Scatterplot of Points vs FC\_NonCitizens



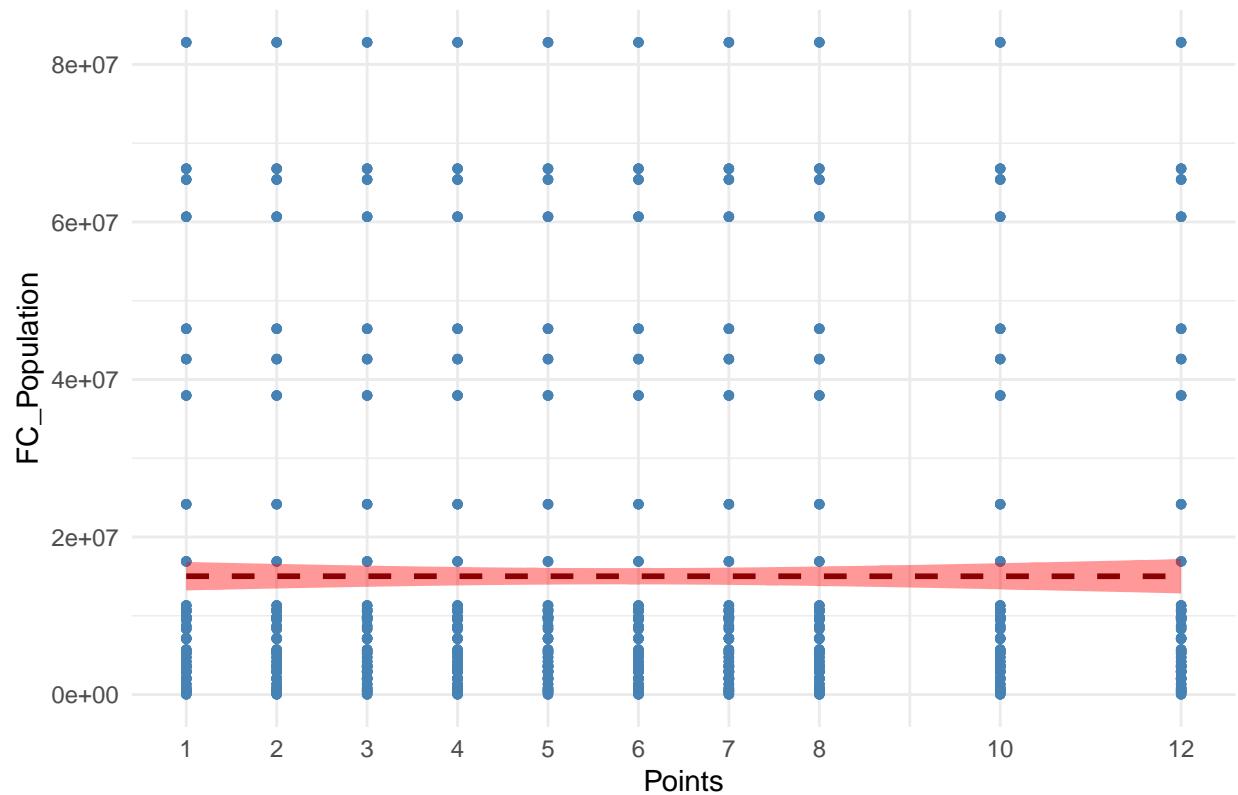
Scatterplot of Points vs FC\_COB



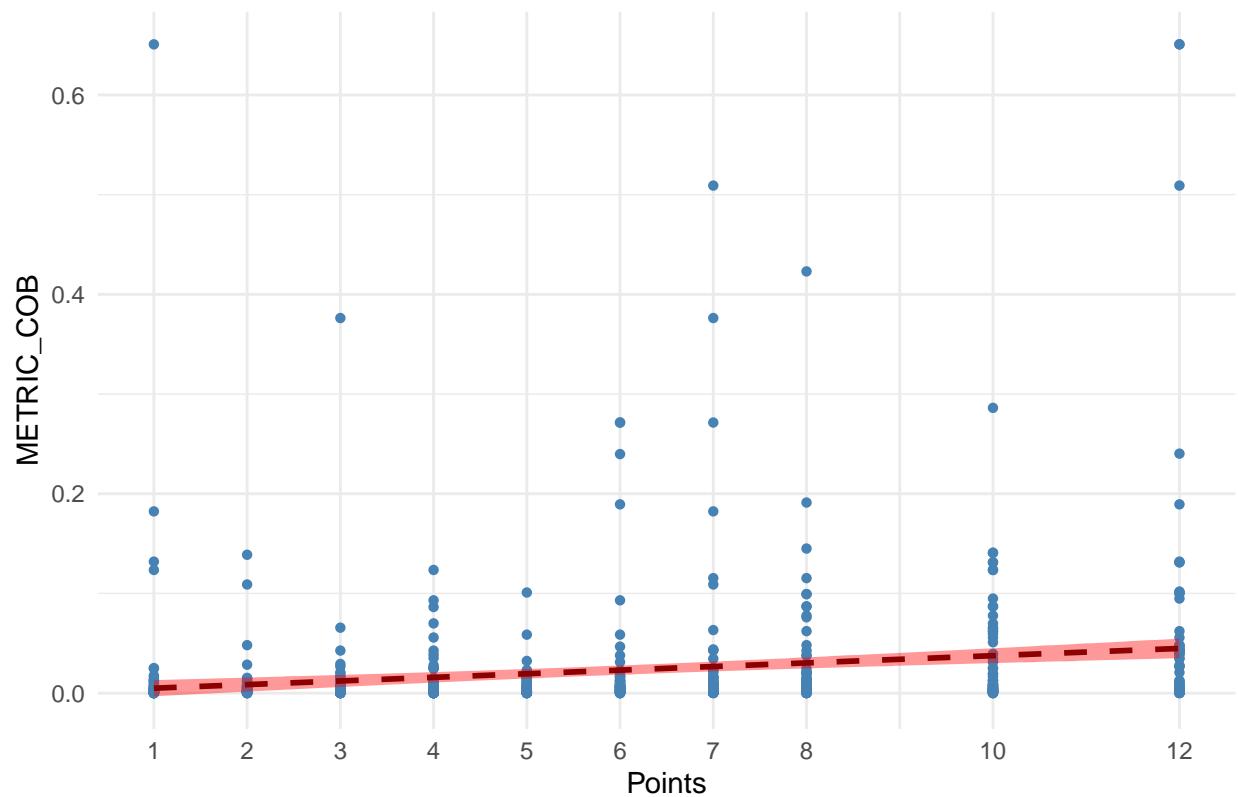
Scatterplot of Points vs FC\_Citizens



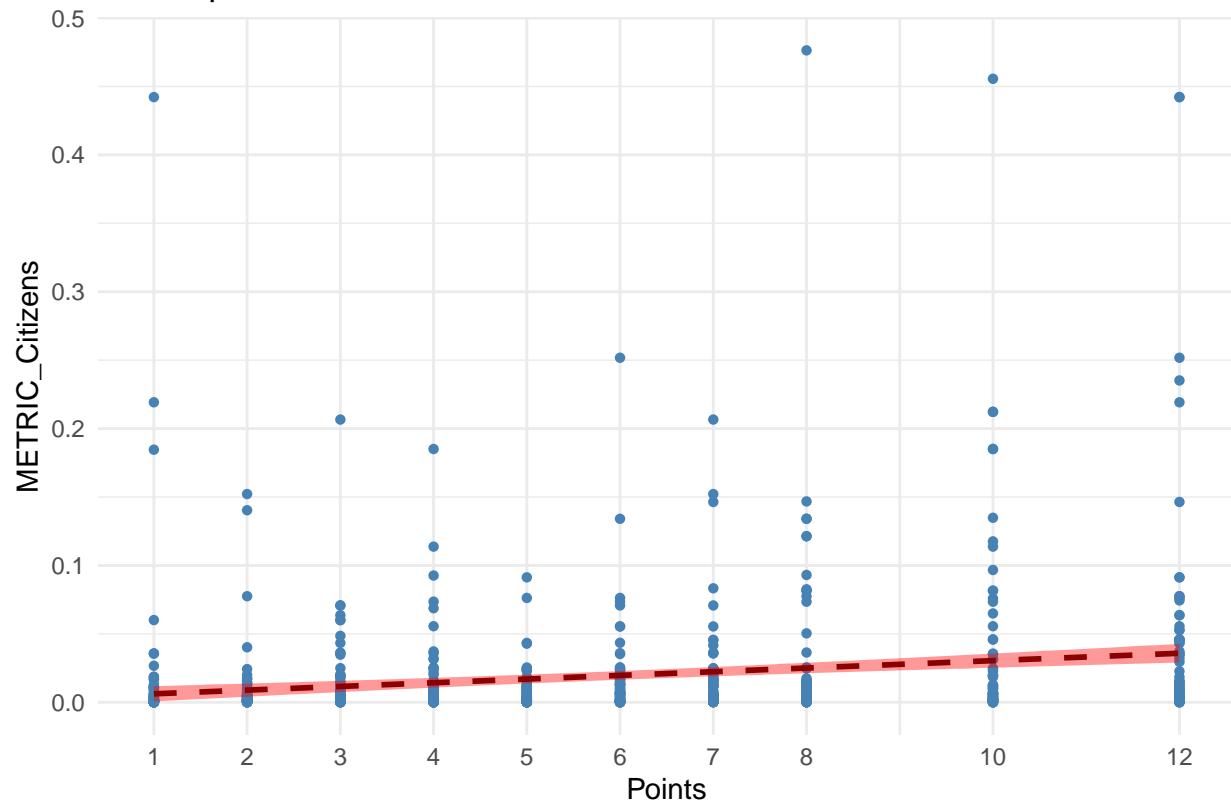
Scatterplot of Points vs FC\_Population



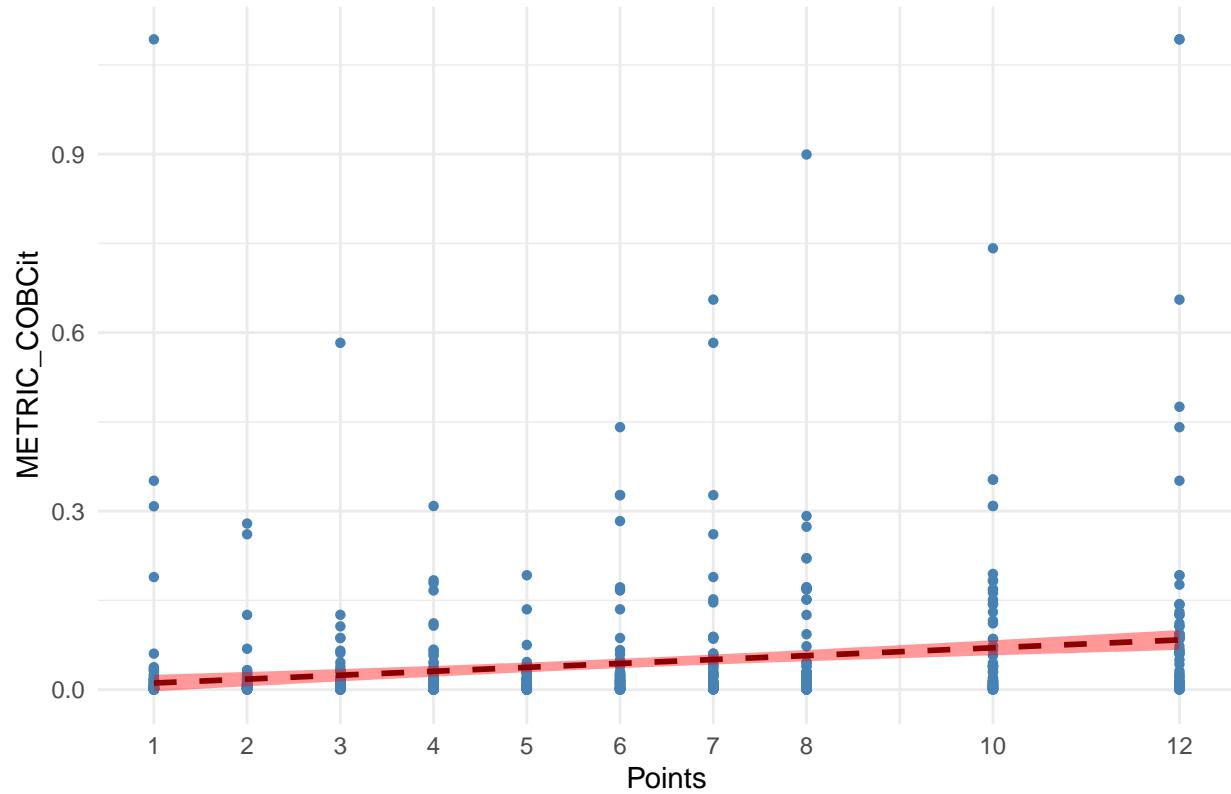
Scatterplot of Points vs METRIC\_COB



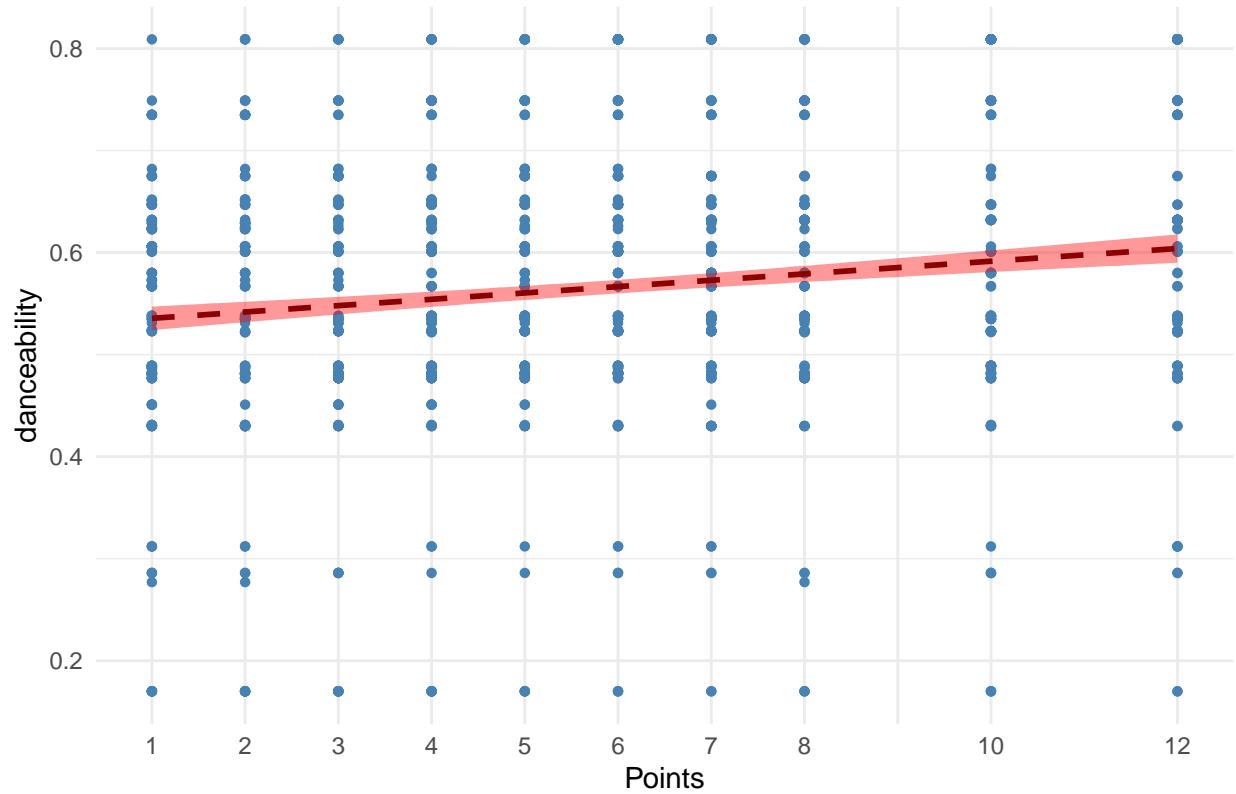
Scatterplot of Points vs METRIC\_Citizens



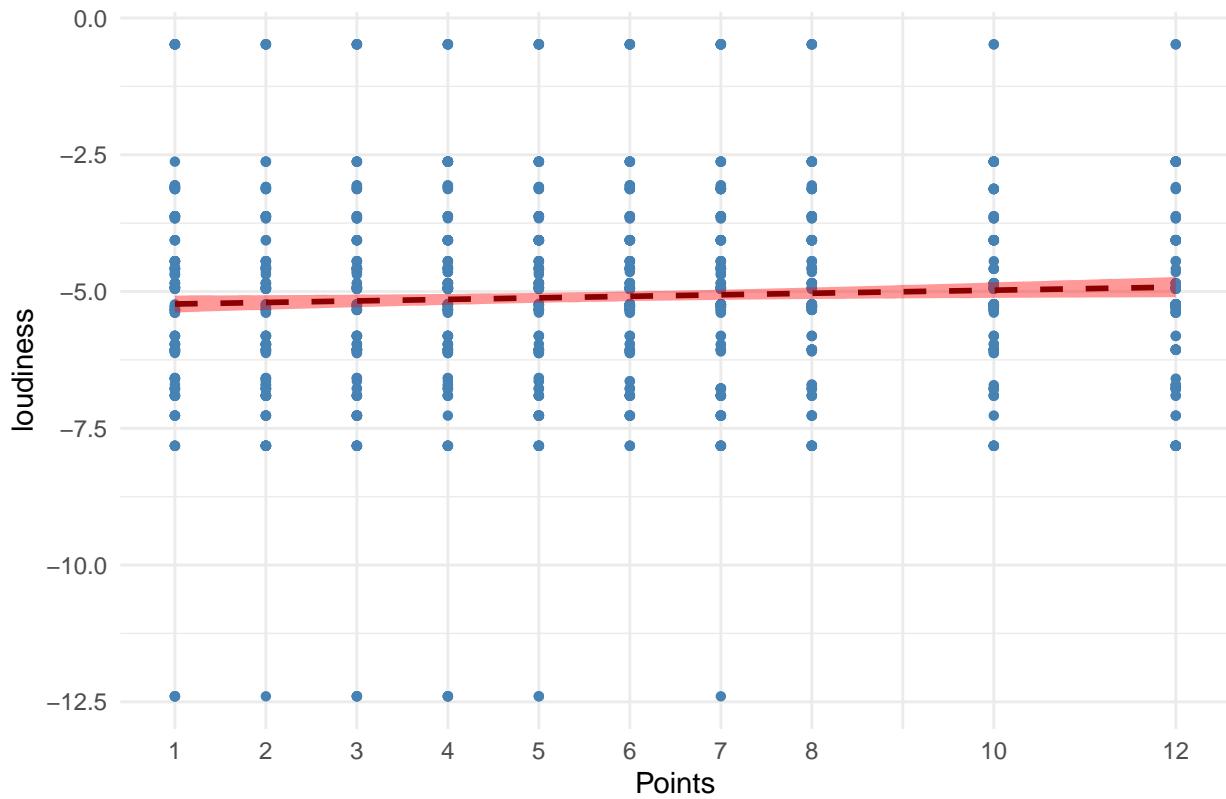
Scatterplot of Points vs METRIC\_COBCit



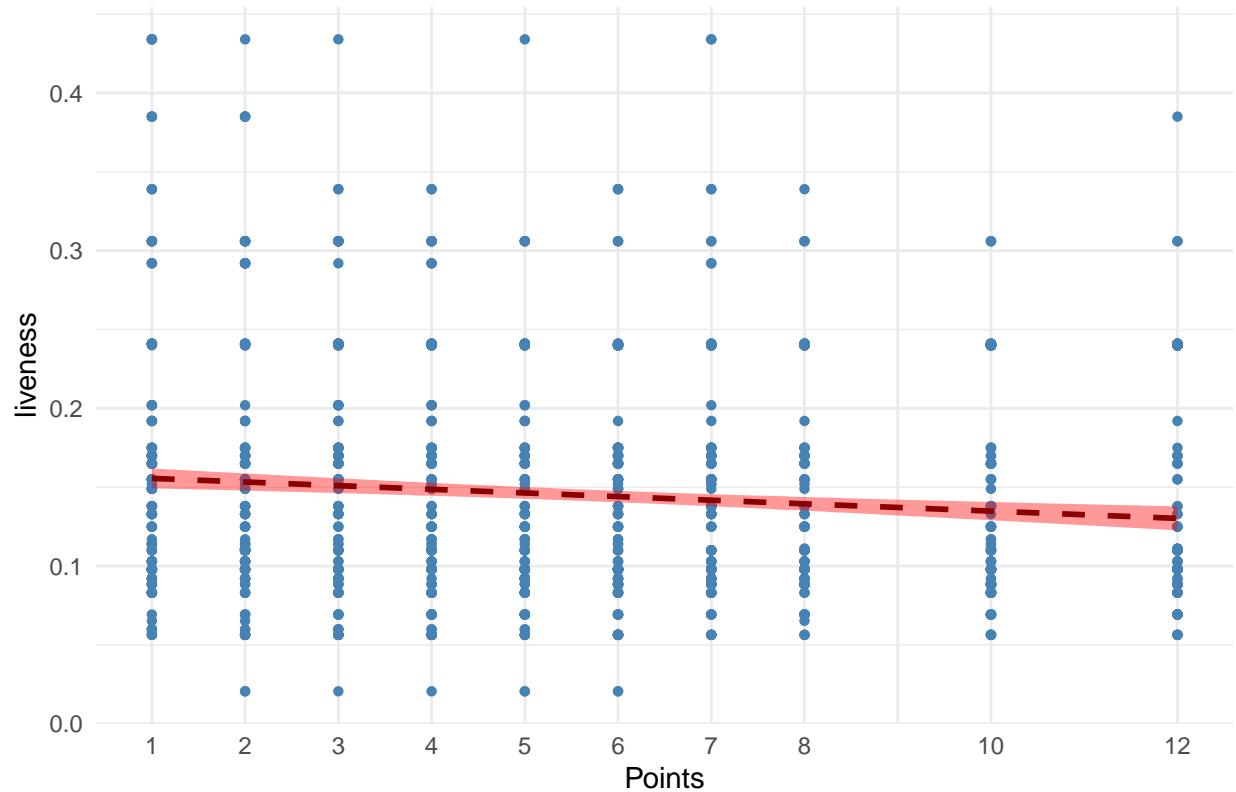
Scatterplot of Points vs danceability



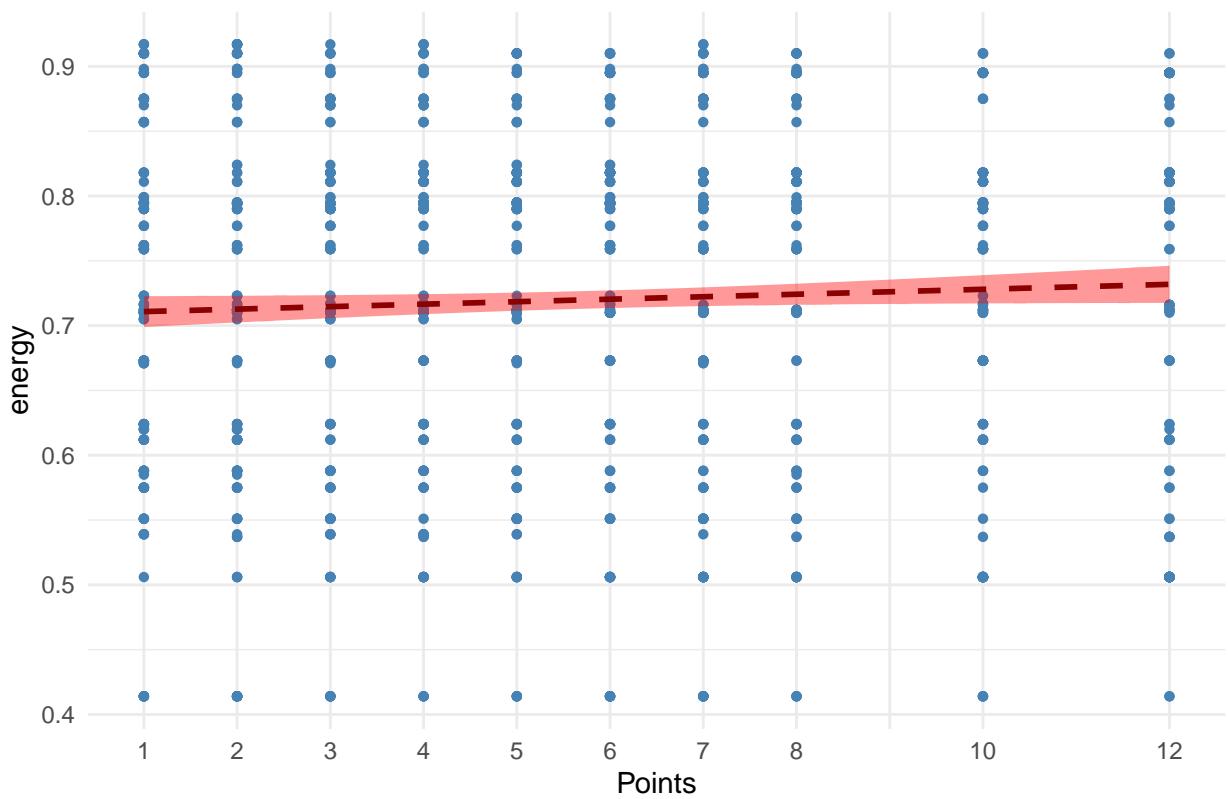
Scatterplot of Points vs loudness



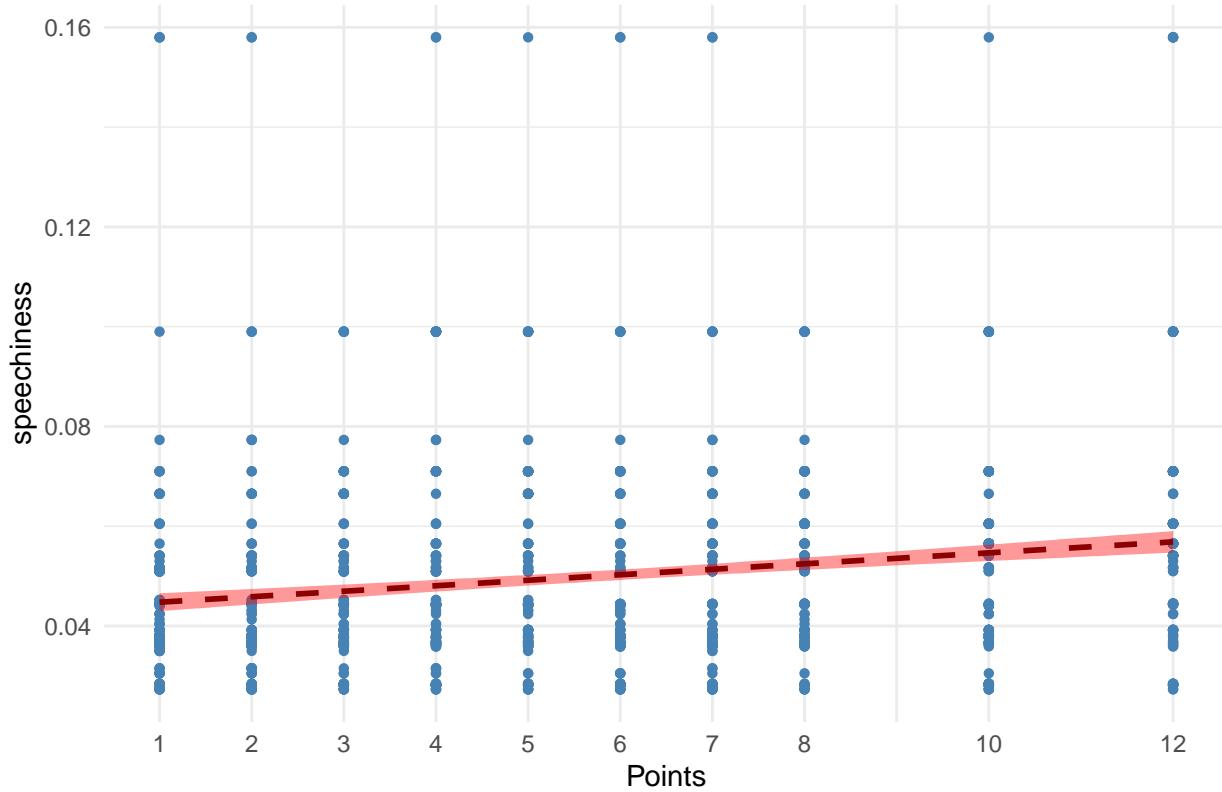
Scatterplot of Points vs liveness



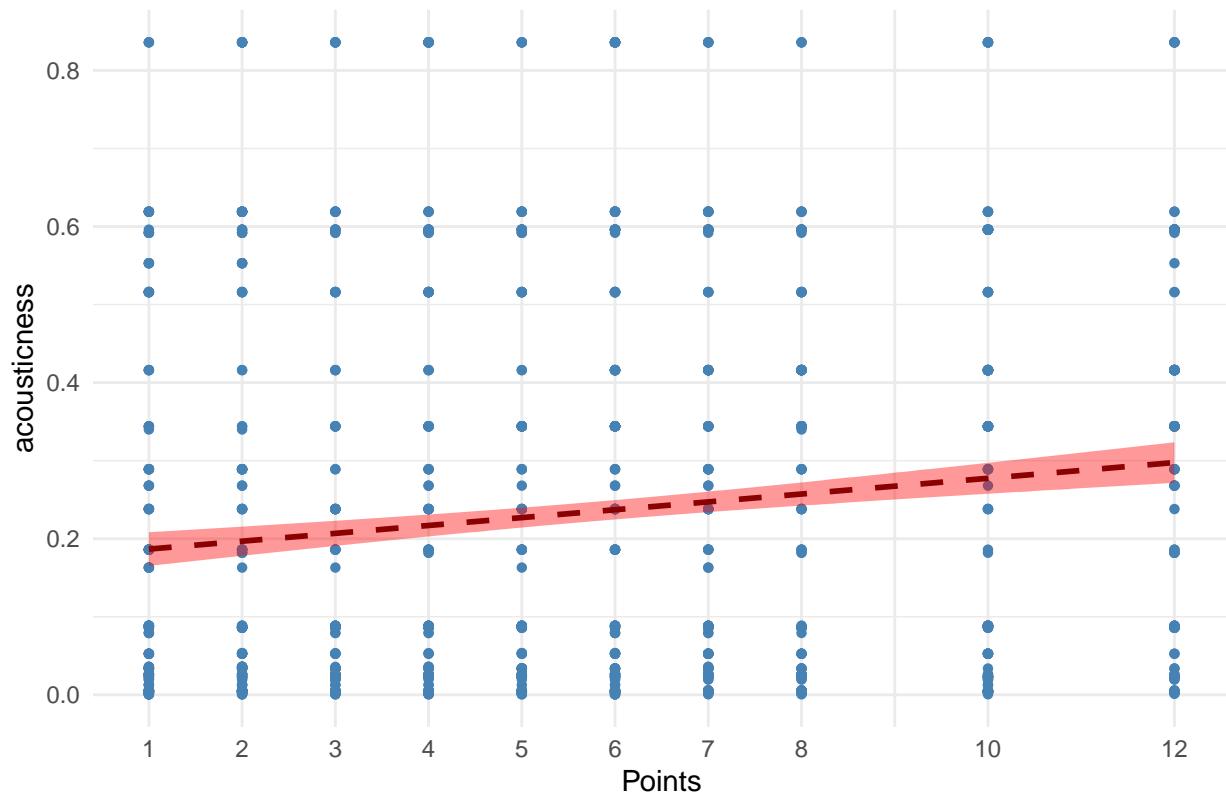
Scatterplot of Points vs energy



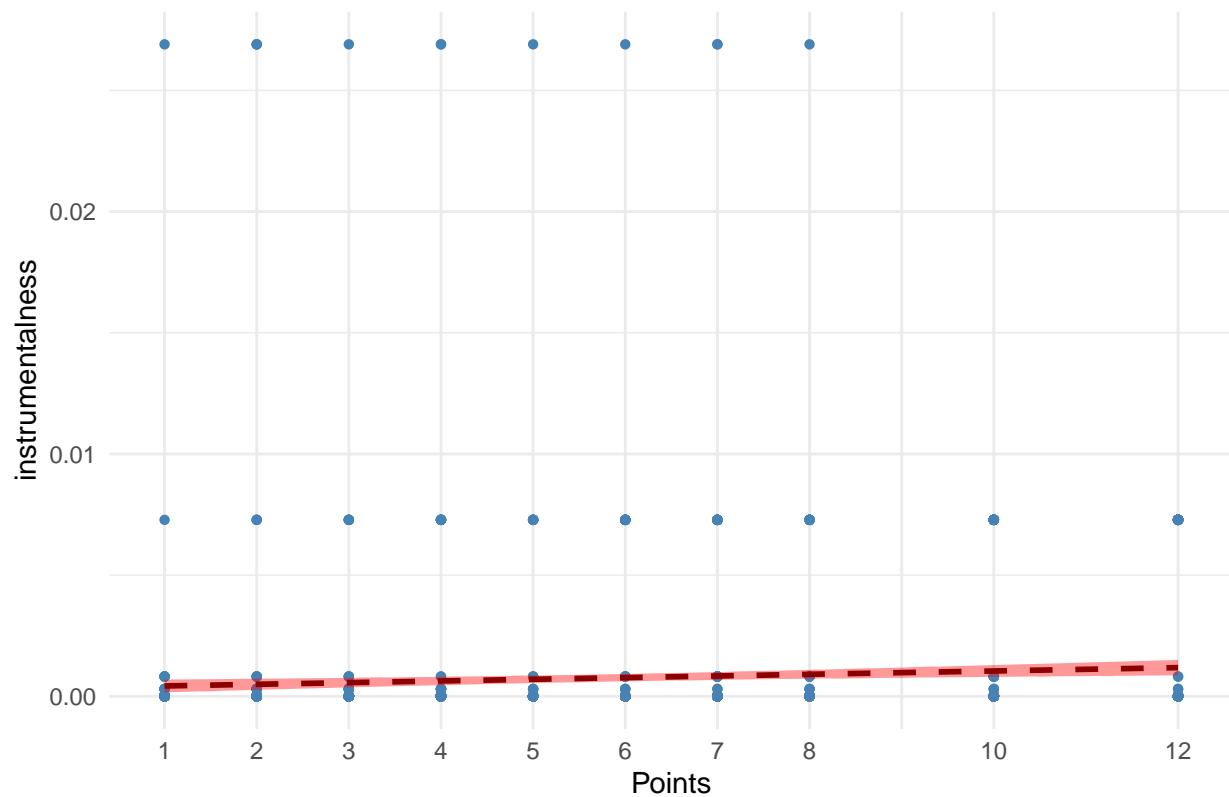
Scatterplot of Points vs speechiness



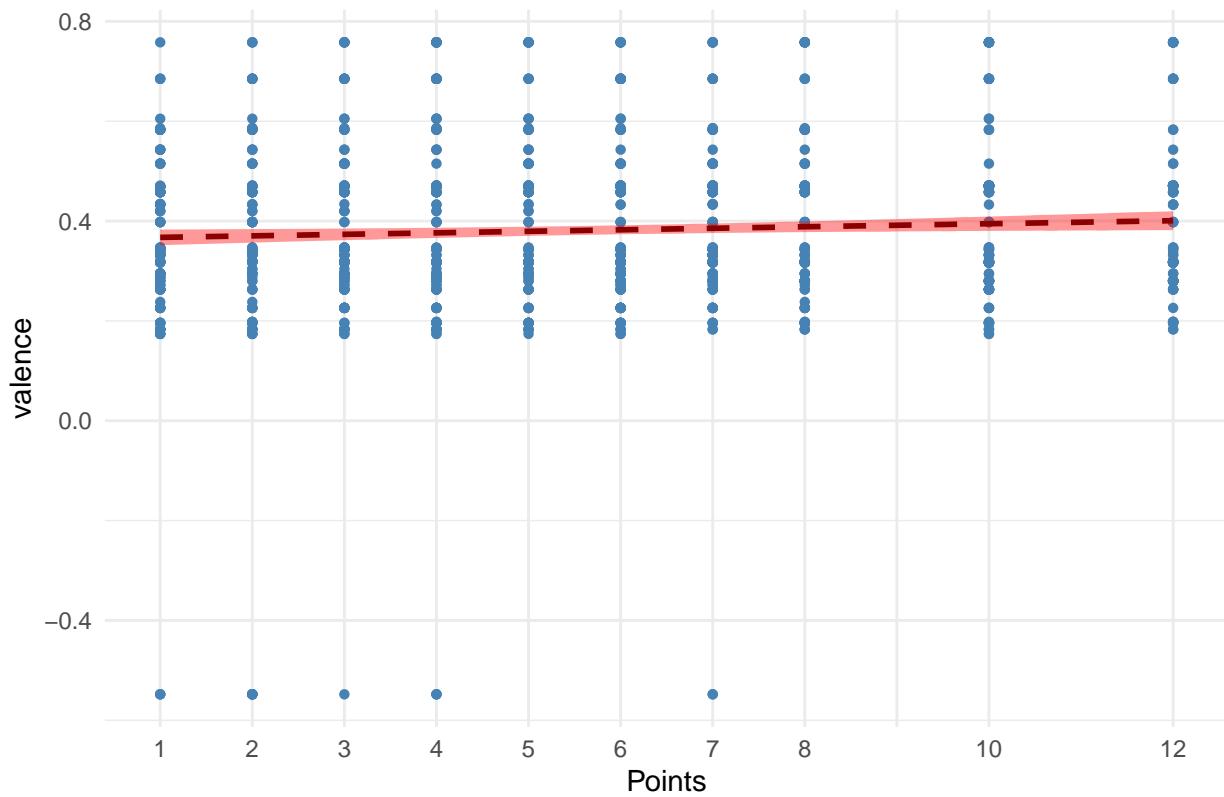
Scatterplot of Points vs acousticness



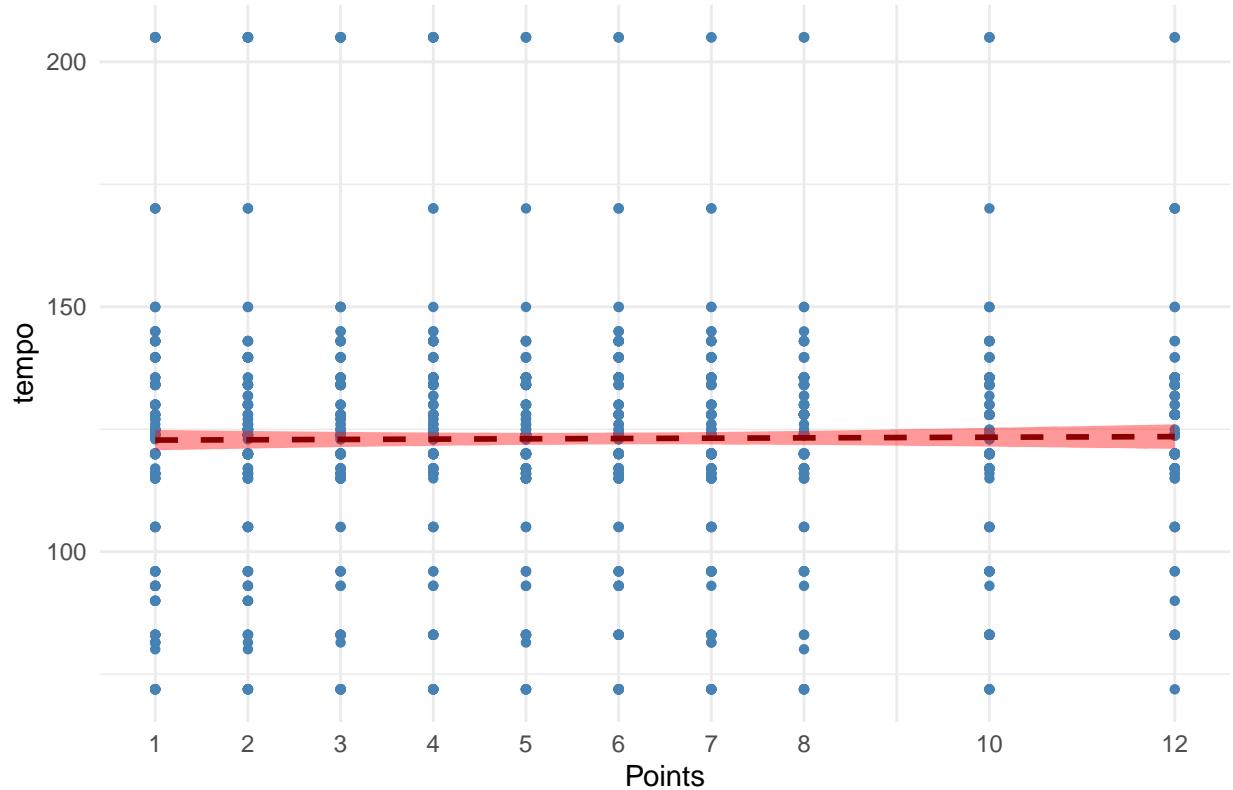
Scatterplot of Points vs instrumentalness



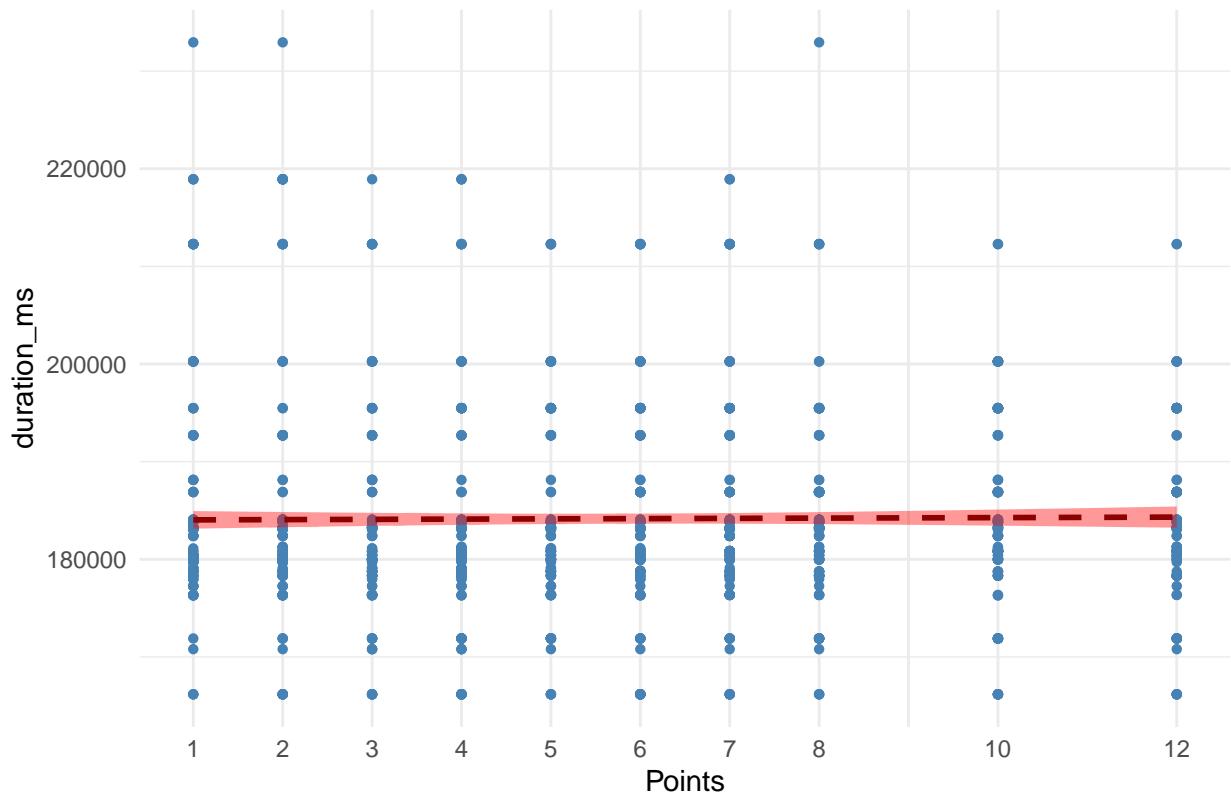
Scatterplot of Points vs valence



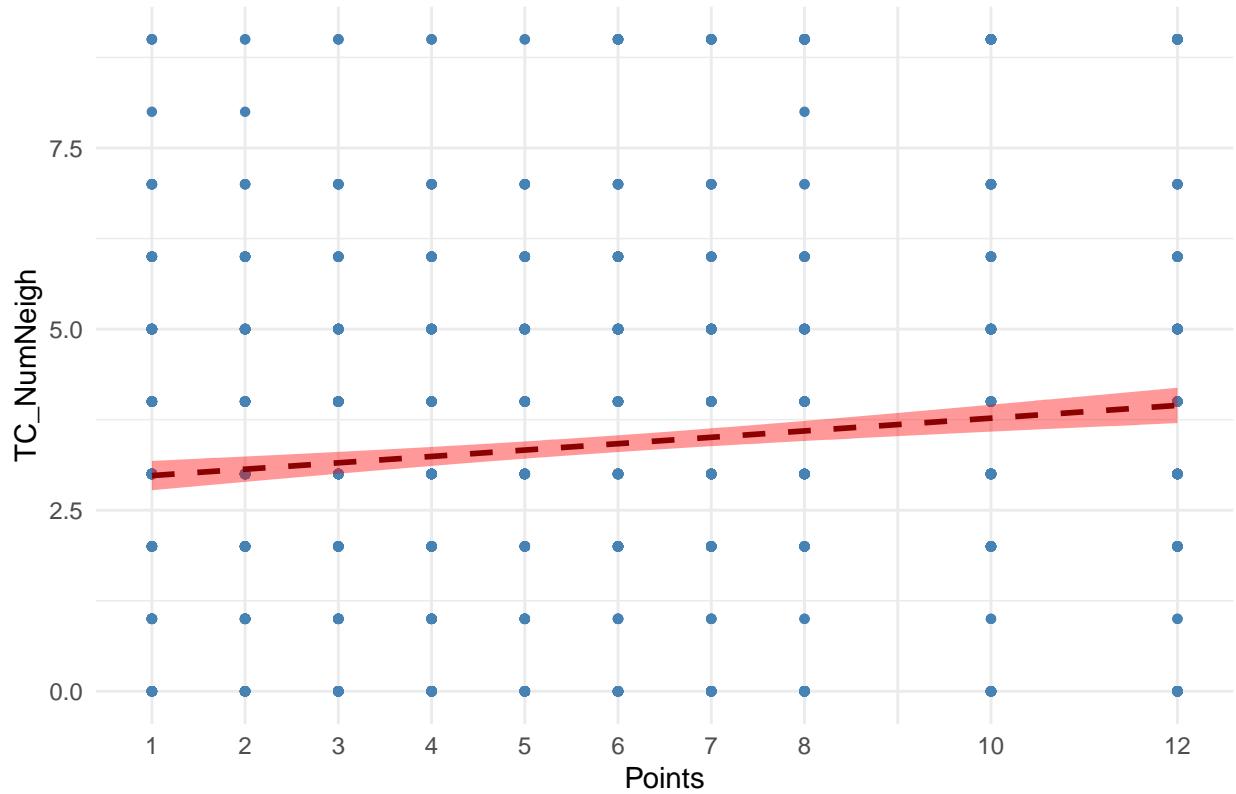
Scatterplot of Points vs tempo



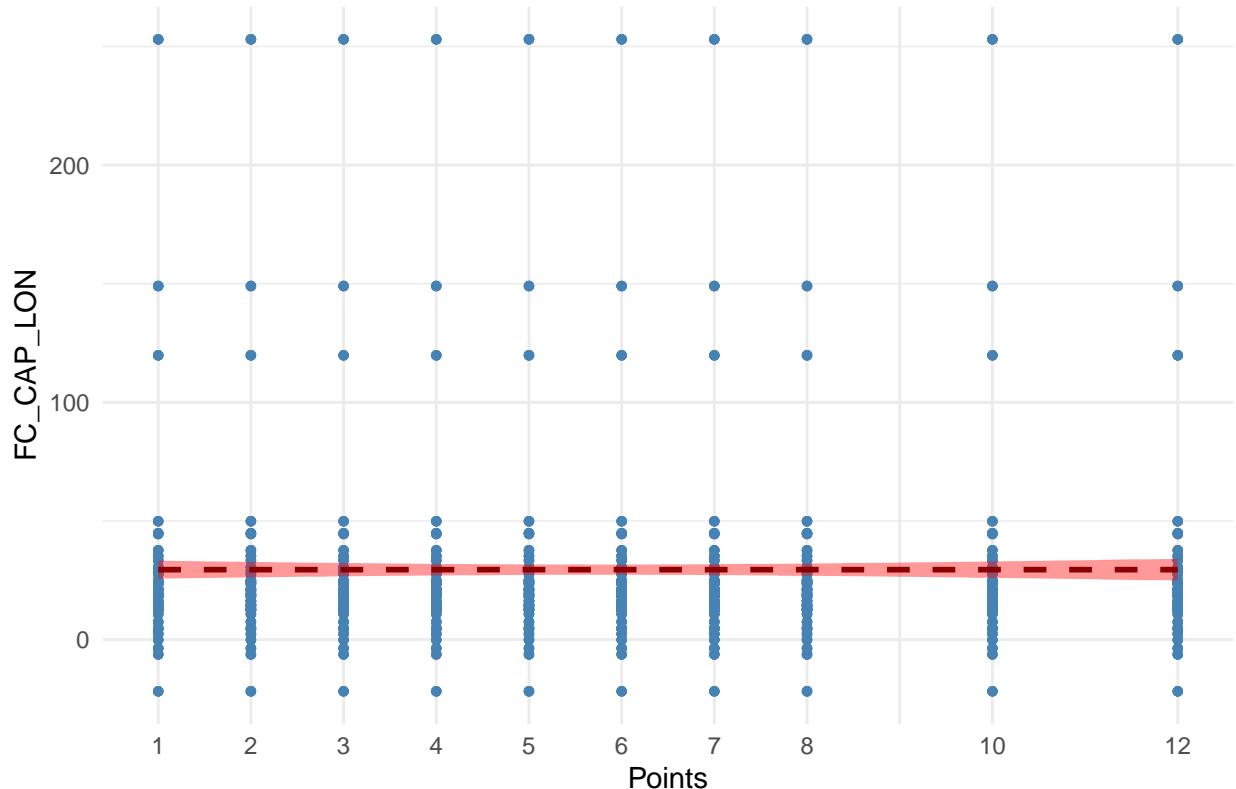
## Scatterplot of Points vs duration\_ms



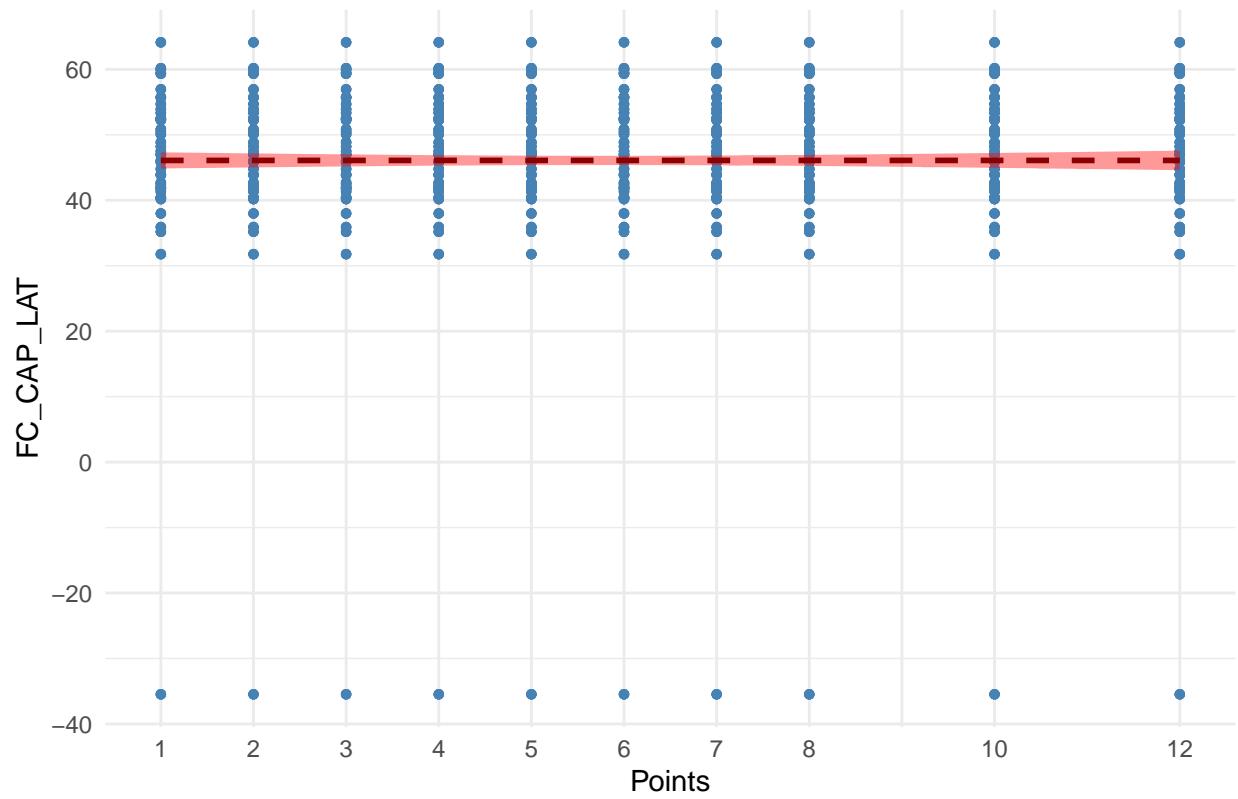
Scatterplot of Points vs TC\_NumNeigh



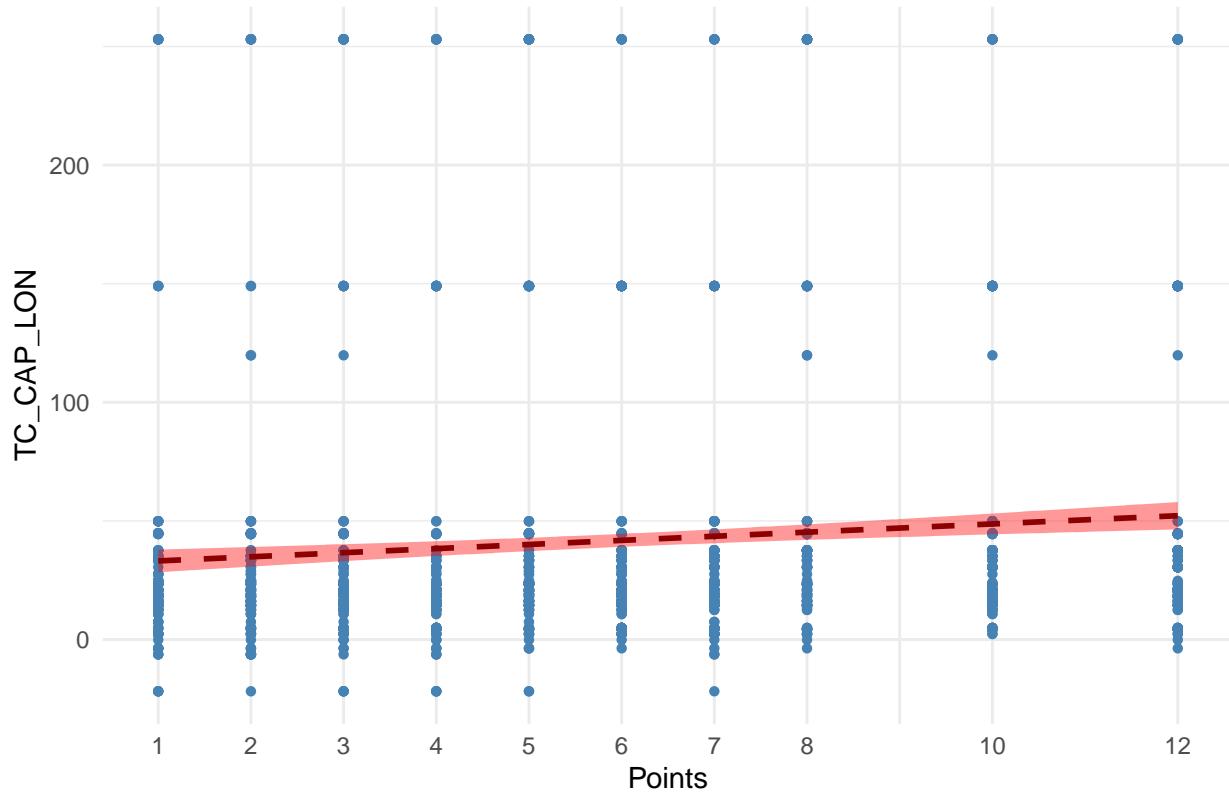
Scatterplot of Points vs FC\_CAP\_LON



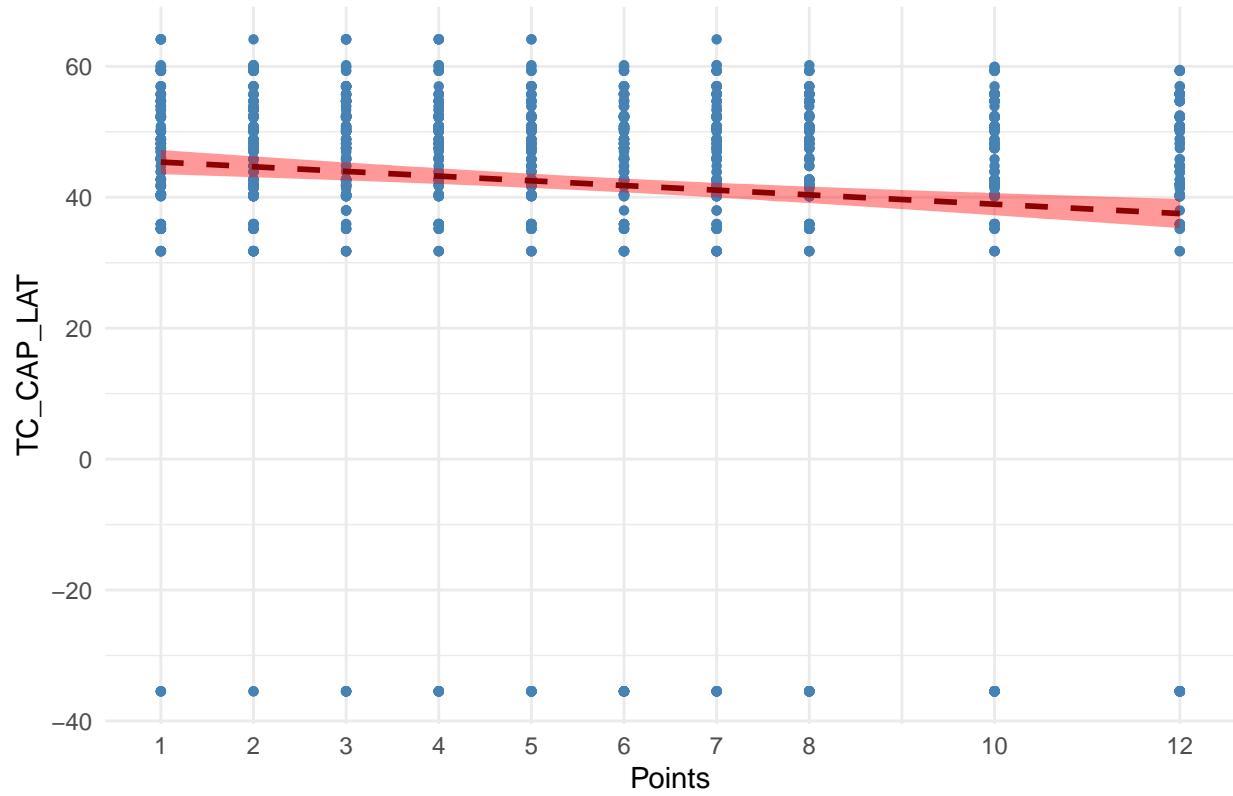
Scatterplot of Points vs FC\_CAP\_LAT



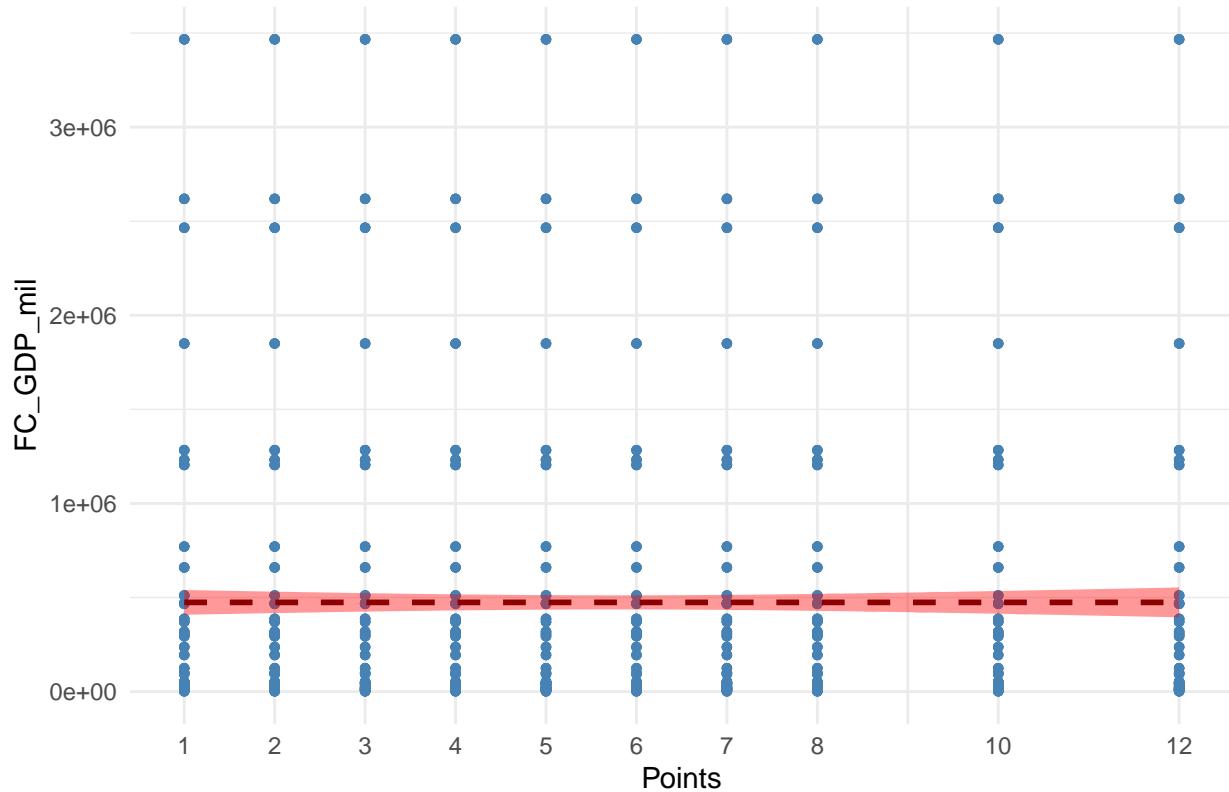
Scatterplot of Points vs TC\_CAP\_LON



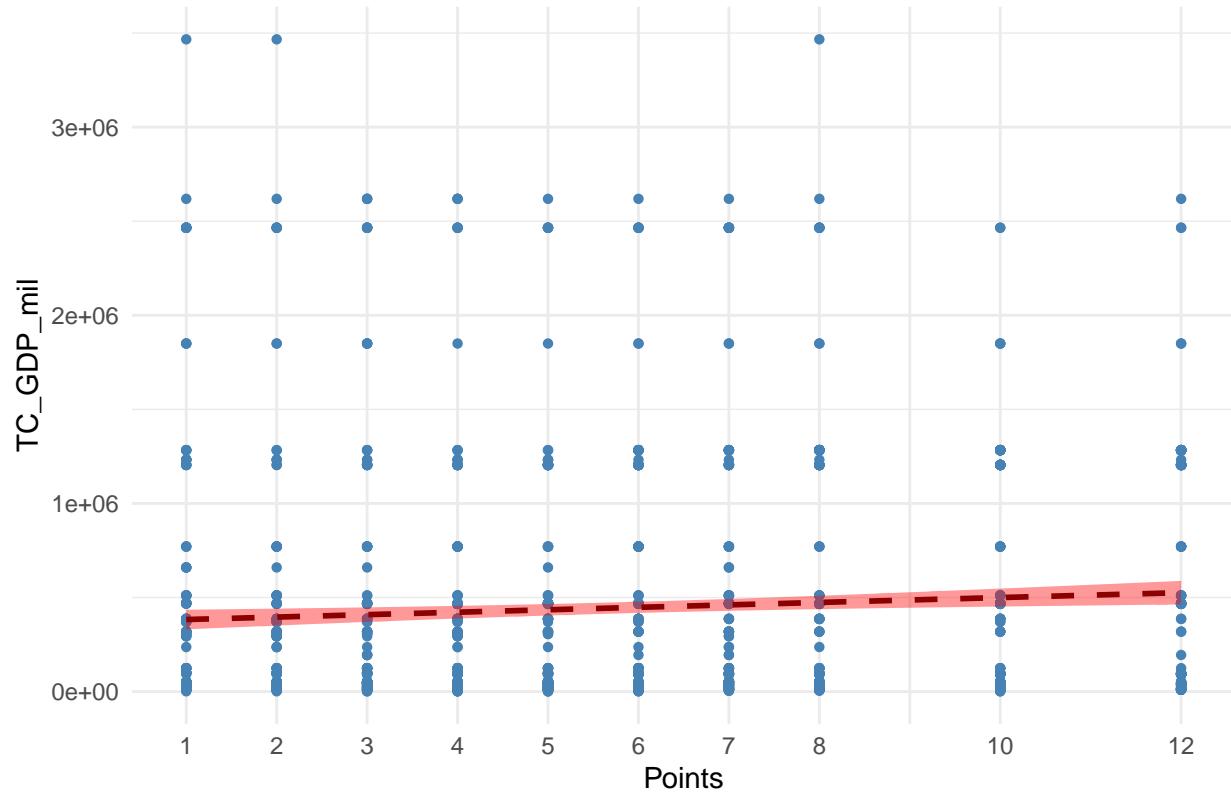
## Scatterplot of Points vs TC\_CAP\_LAT



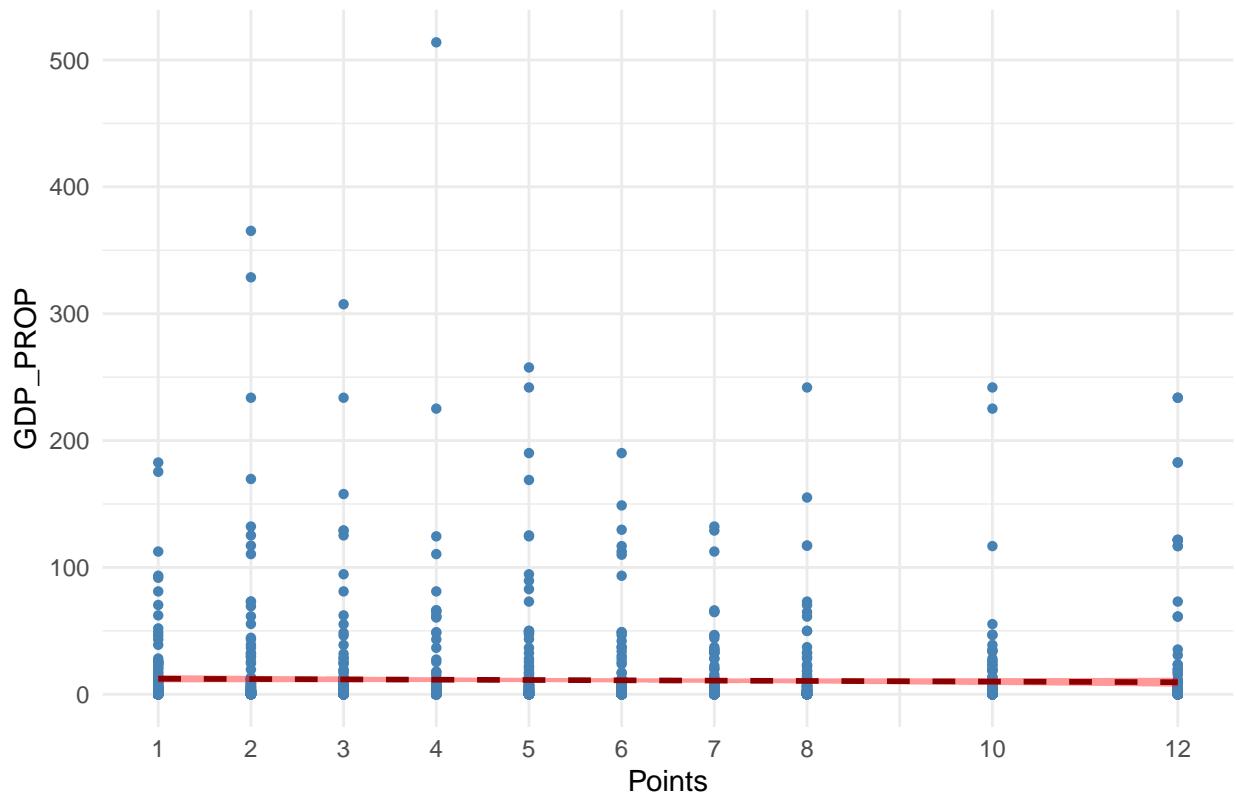
Scatterplot of Points vs FC\_GDP\_mil



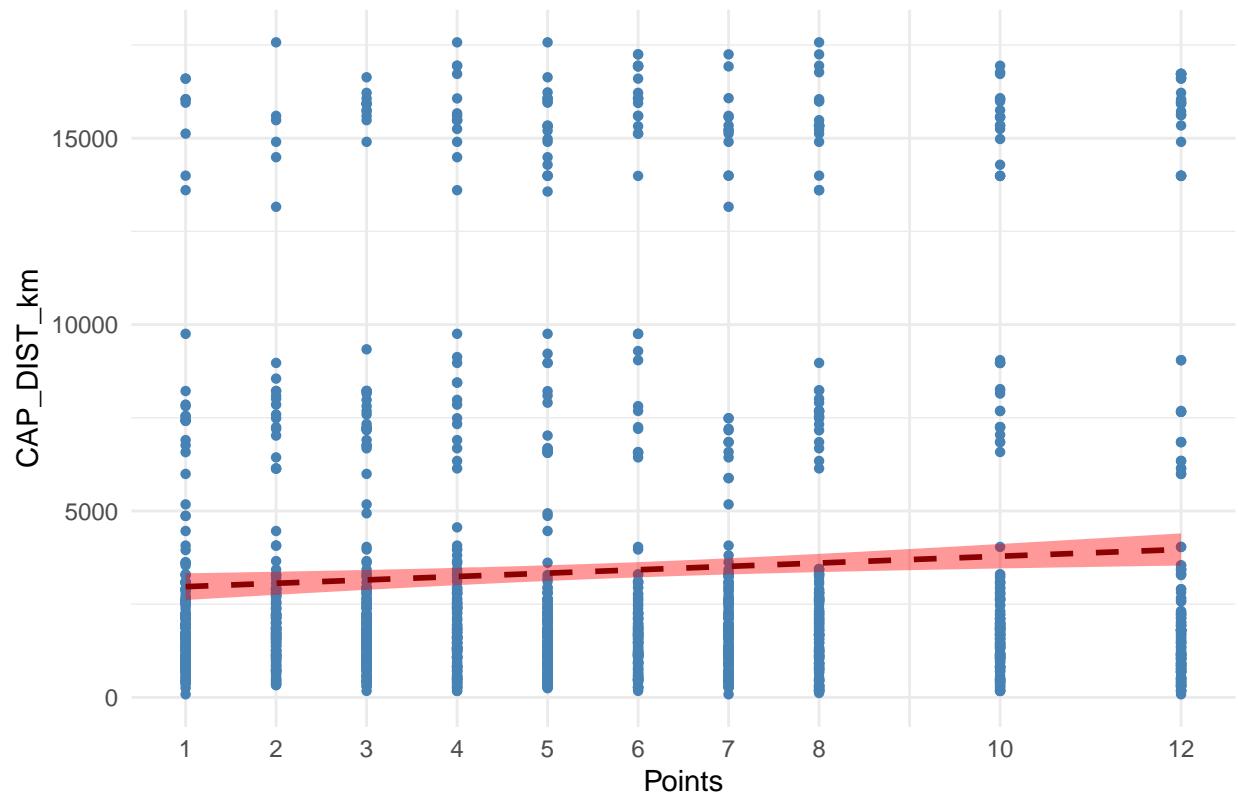
Scatterplot of Points vs TC\_GDP\_mil



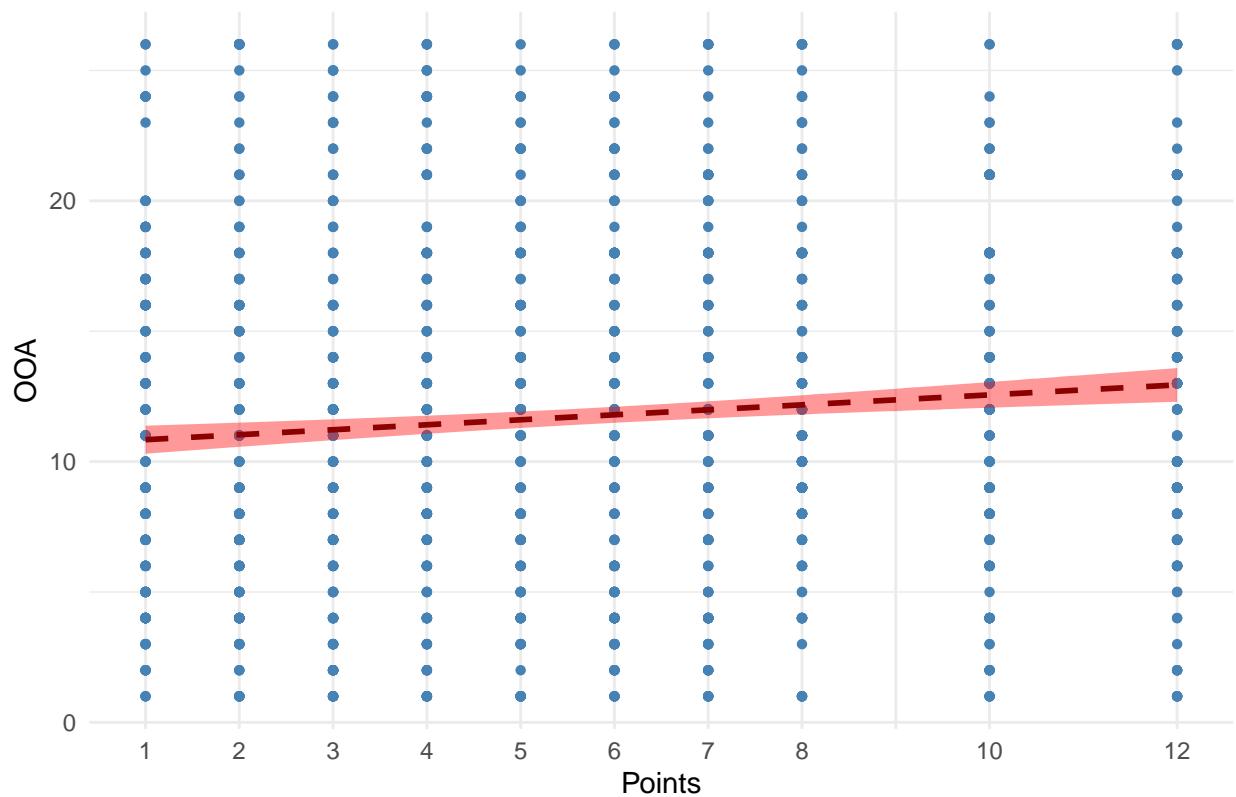
Scatterplot of Points vs GDP\_PROP



Scatterplot of Points vs CAP\_DIST\_km

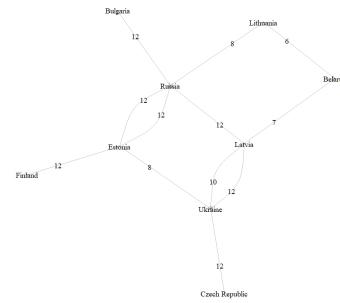
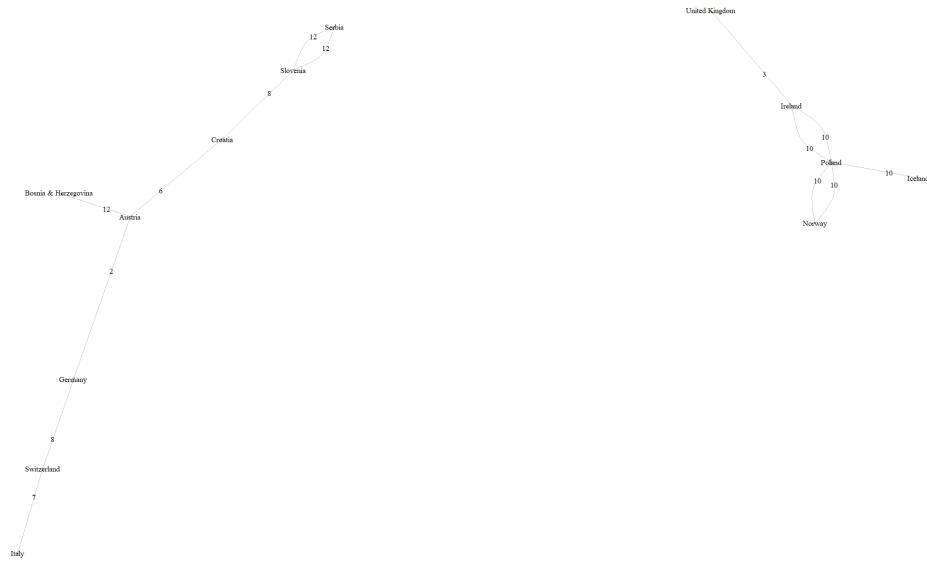


Scatterplot of Points vs OOA

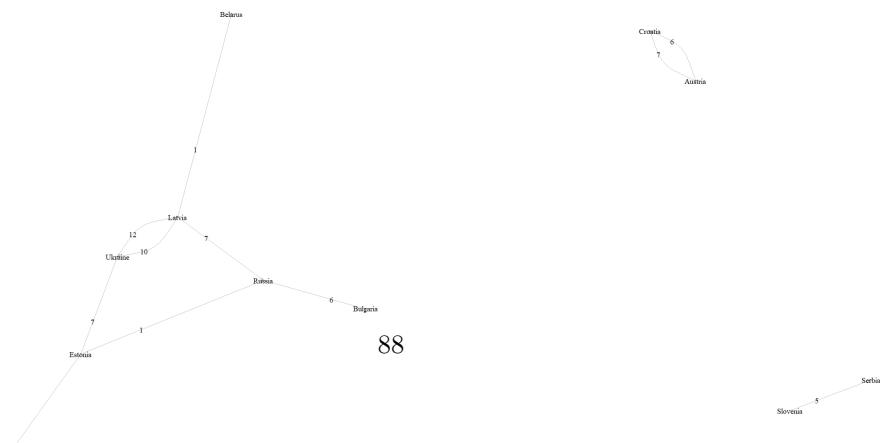


## Networks

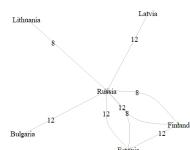
### Televote Metric COB



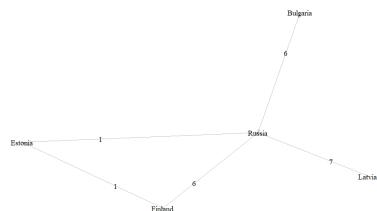
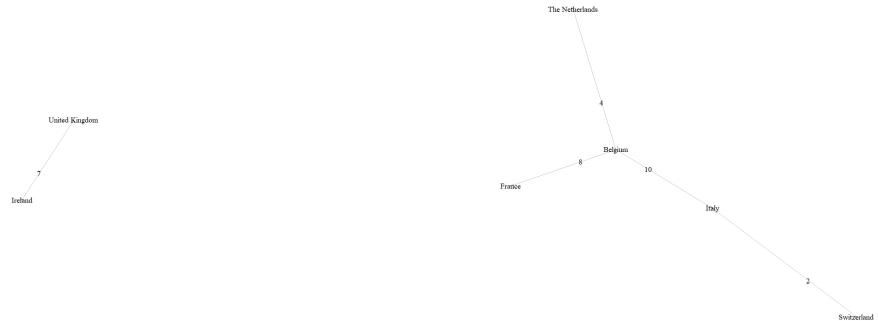
### Jury Metric COB



# Televote Metric Citizens

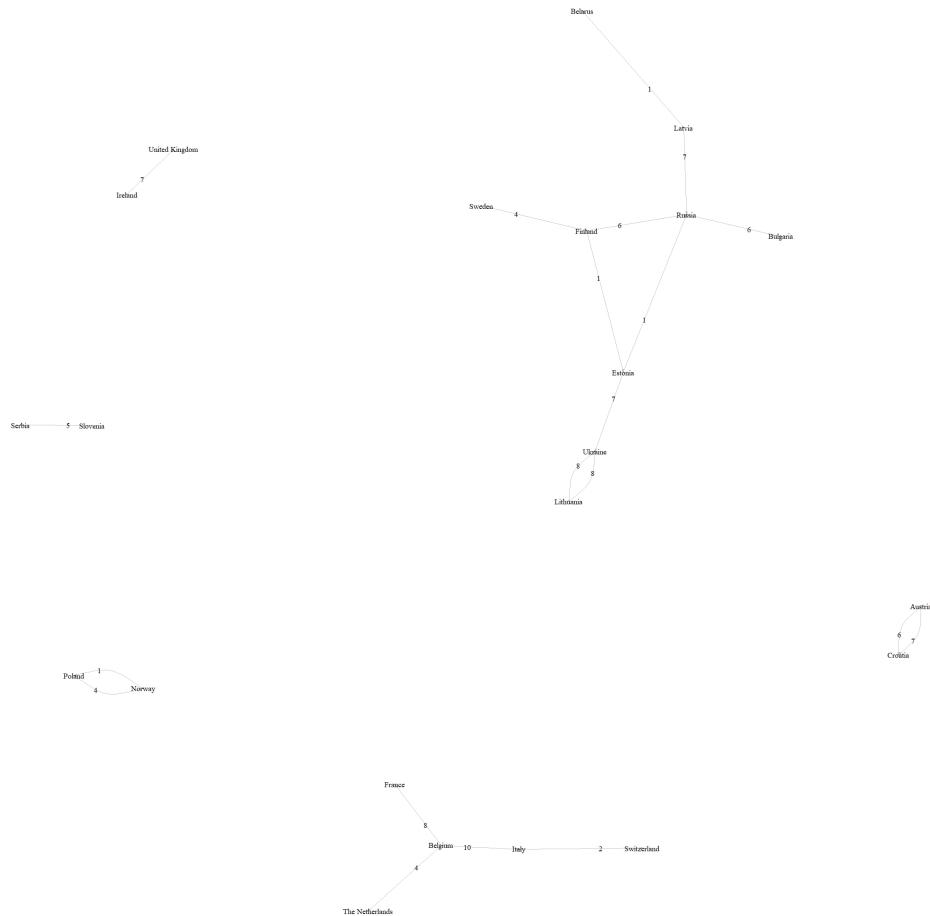


## Jury Metric Citizens

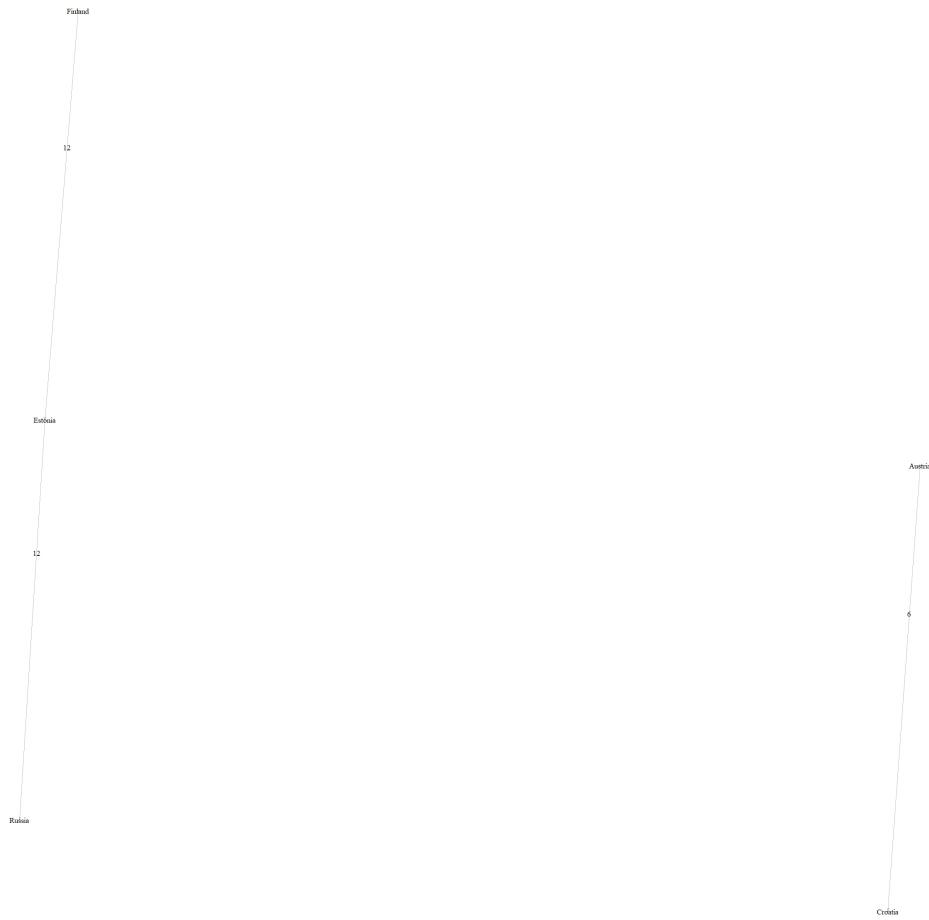


Televote Metric COBCit

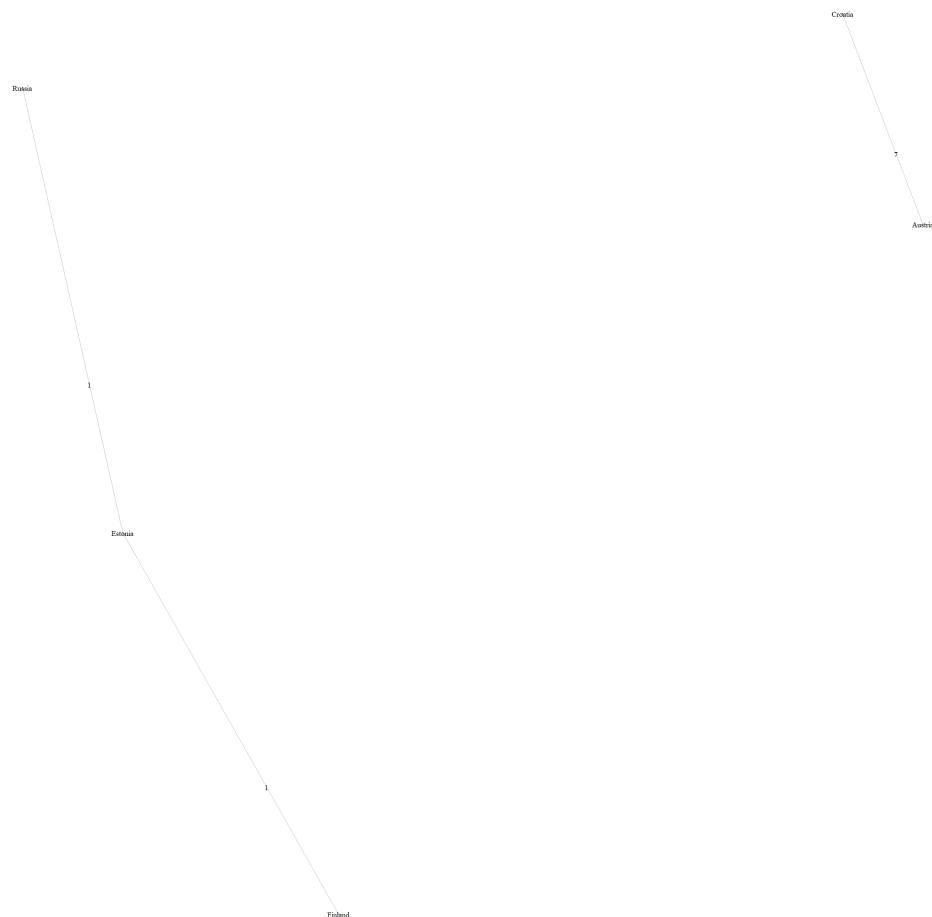
## Jury Metric COBCit



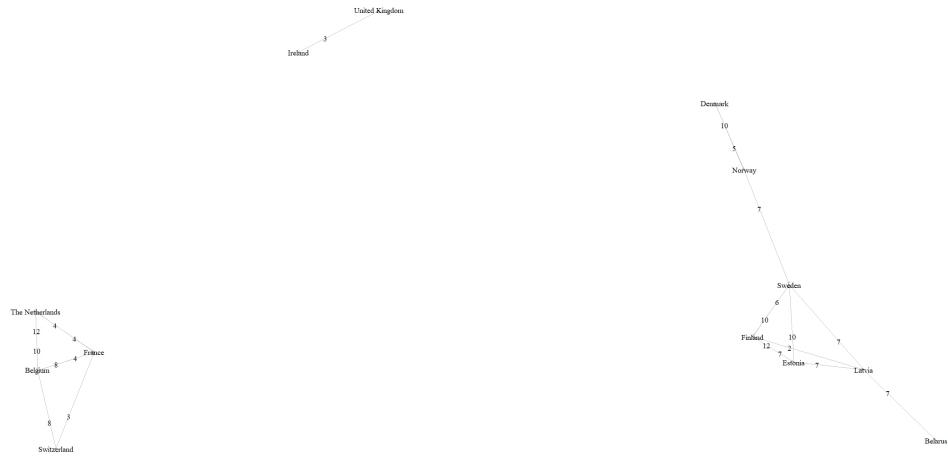
## Televote Metric COBCit SF1



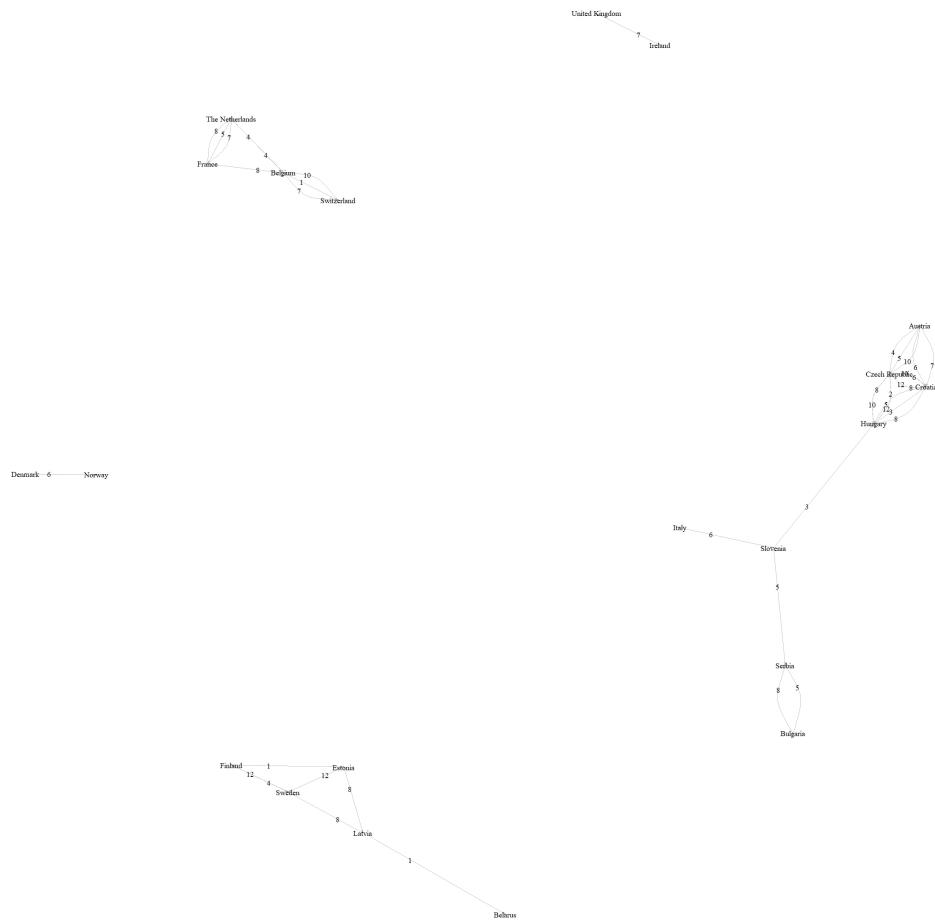
## Jury Metric COBCit SF1



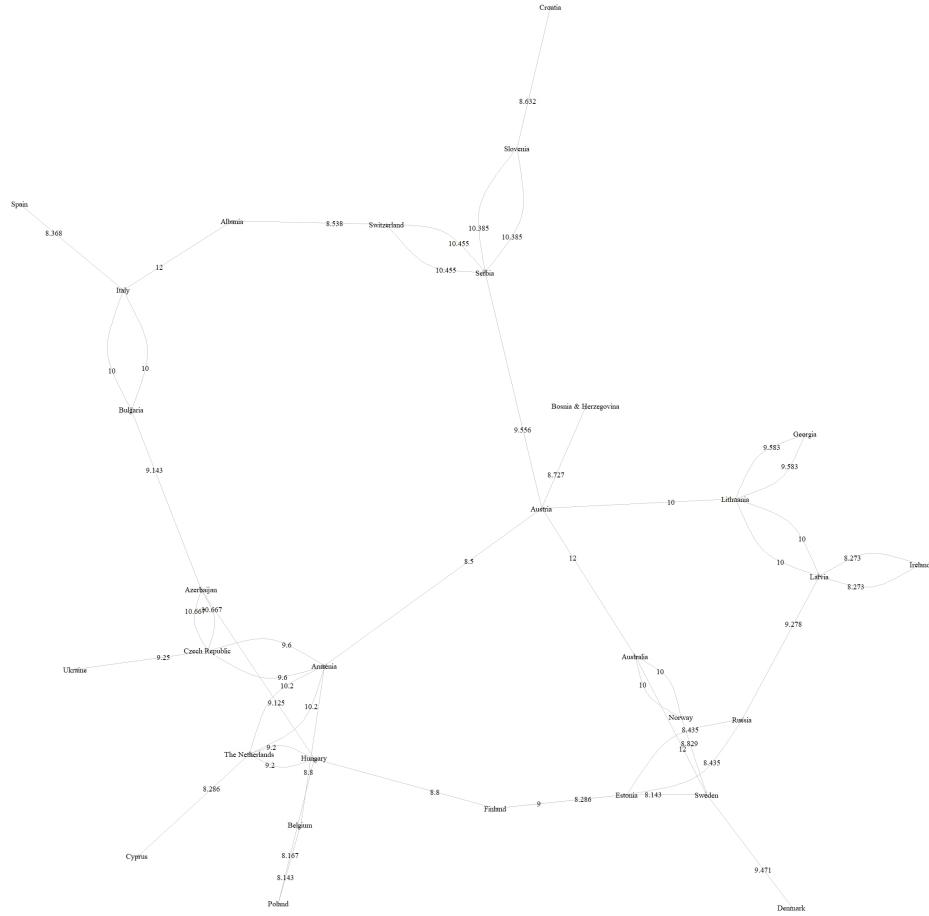
## Televote Cap Dist



## Jury Cap Dist



## Televote Average Points



## Jury Average Points

