Assignment 2 - Vote Choice in Germany
Statistical Inference and Modelling - SIM
1st Semester 2022

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2023-01-03

Contents

1 Explanatory Data Analysis - EDA

1.1 Loading Voting Data

In this part of the report, setting up the working environment and loading of the data into R are taking place. Additionally, a first look at the summary of the raw voting choice in Germany data set is taken.

```
load("gles.RData")
summary(gles)
```

```
##      vote           egoposition_immigration    ostwest      political_interest
##  Length:1000        Min.   : 0.000          Min.   :0.000   Min.   :0.000
##  Class :character   1st Qu.: 3.000          1st Qu.:1.000   1st Qu.:2.000
##  Mode  :character   Median : 4.000          Median :1.000   Median :3.000
##                     Mean   : 4.361          Mean   :0.759   Mean   :2.874
##                     3rd Qu.: 6.000          3rd Qu.:1.000   3rd Qu.:4.000
##                     Max.   :10.000          Max.   :1.000   Max.   :4.000
##      income          gender
##  Min.   :0.000   Min.   :0.000
##  1st Qu.:3.000   1st Qu.:0.000
##  Median :3.000   Median :0.000
##  Mean   :2.906   Mean   :0.462
##  3rd Qu.:3.000   3rd Qu.:1.000
##  Max.   :4.000   Max.   :1.000
```

1.2 Data Types

To begin with, the types of the raw variables contained into the data set are being checked. It is clear, that the raw data set consists of 5 numerical variables and 1 categorical. On the one hand, based on the raw data types, the numeric variables are the following: *egoposition_immigration*, *ostwest*, *political_interest*, *income* and *gender*, while the categorical one is variable *vote*. On the other hand, if page 3 of the assignment statement (subsection *Variables*) is taken into account, all of the numerical variables correspond to qualitative concepts. In more detail, variables *egoposition_immigration, political_interest* and *income* (*income-satisfaction)* correspond to ordered factors, while *ostwest* and *gender* variables are binary ones.In the following sections, all the numerical variables will be transformed into labeled factors (ordered or not). From our point of view, using those variables as numerical does not make sense, but in order to cover all the points of the assignment, some extra analysis (containing the numerical versions) will take place in the Appendix.

1.3 Checking for Missing Data

To continue with, a check for missing data is conducted on the raw data set. Considering the summary of the data set presented before, there are no NA values in the variables of the data set. The same conclusion is derived when a check is completed for each individual variable.

1.4 Checking for Duplicates

By checking if there are duplicate rows inside the raw data set, the result indicates that a total number of 359 occurrences of duplicates exist.

```
dupli <- duplicated(gles); dupli_ind <- which(dupli); length(dupli_ind)
```

```
## [1] 359
```

With the following command, a closer look can be taken into the values of the first 5 duplicate rows (for space saving reasons).

```
gles[dupli_ind,][1:5,]
```

```
## # A tibble: 5 x 6
##   vote   egoposition_immigration ostwest political_interest income gender
##   <chr>                    <dbl>   <dbl>              <dbl>  <dbl>  <dbl>
## 1 Gruene                       2       1                  3      3      0
## 2 SPD                          4       1                  3      3      1
## 3 Gruene                       4       1                  3      3      1
## 4 LINKE                        3       0                  2      3      1
## 5 FDP                          6       1                  3      3      0
```

By taking a closer look at the duplicates, one can understand that, it is logical people with the same characteristics to vote for the same party during the elections. For that reason, the duplicates are not removed or treated, but a new factor will be created in the dataset indicating if a row is a duplicate or not.

1.5 Creating Factors for Qualitative Variables

In this subsection of EDA, all qualitative variables are transformed into labeled factors (nominal, ordinal and binary). All variables of the raw data set, as mentioned before, correspond to categorical ones. First of all, their unique values are presented below:

```
unique(gles$vote); unique(gles$egoposition_immigration); unique(gles$ostwest)
```

```
## [1] "FDP"     "SPD"     "CDU/CSU" "Gruene"  "AfD"     "LINKE"
```

```
##  [1]  4  8  3  7  2  1  5  0  6 10  9
```

```
## [1] 1 0
```

```
unique(gles$political_interest); unique(gles$income); unique(gles$gender)
```

```
## [1] 3 2 1 4 0
```

```
## [1] 3 2 4 1 0
```

```
## [1] 0 1
```

The next step includes the creation of the labeled factors based on the unique values of the categorical variables. Following the practice below, in case a categorical variable includes NA values, they will be transformed into zeros, which is an incorrect approach. In this case, once missing values check indicated that there are no missing data, proceeding with this practice does not result in erroneous data.

Additionally, it is crucial to mention here that the following variables were transformed into ordered factors: *income, political_interest* and *egoposition_immigration.* Moreover *gender, vote* and *ostwest* variables were transformed to nominal factors and finally a new nominal factor was generated, named *political_orientation.* This new variable discretize the 6 German parties into three political wings with labels *Left_Wing, Center_Wing* and *Right_Wing* respectively. In

order to accomplish this discretization, page 3 of the assignment statement (subsection *Variables* - indicating the character of each political party: left, center, right) was taken into account one more time.

1.6 Factor Conversion Check

After checking both manually and by executing commands on the terminal, the conversion of the categorical and numerical variables to factors has been completed correctly. In addition, while the categorical variables *vote*, *ostwest* and *gender* have been transformed into labeled factors, their old versions are discarded from the data frame (in those cases it is sure that their numerical representation does not provide any extra information). The remaining variables were not discarded in order to check if better results could be obtained by using their numerical representation in higher powers (poly function). Below the new structure of the data frame is presented.

```
summary(gles)
```

```
##  egoposition_immigration political_interest     income             f.duplicate
##  Min.   : 0.000          Min.   :0.000      Min.   :0.000   No.Duplicate :641
##  1st Qu.: 3.000          1st Qu.:2.000      1st Qu.:3.000   Yes.Duplicate:359
##  Median : 4.000          Median :3.000      Median :3.000
##  Mean   : 4.361          Mean   :2.874      Mean   :2.906
##  3rd Qu.: 6.000          3rd Qu.:4.000      3rd Qu.:3.000
##  Max.   :10.000          Max.   :4.000      Max.   :4.000
##
##          f.eastGermany f.gender               f.income
##  No.EastGermany :241   M:538    Low.Sat           : 13
##  Yes.EastGermany:759   F:462    Low_to_Medium.Sat : 28
##                                 Medium.Sat        :188
##                                 Medium_to_High.Sat:582
##                                 High.Sat          :189
##
##
##            f.political_interest       f.egoposition_immigration     f.vote
##  Low.Inter           :  3       4_Level.Imm        :179         AfD    : 69
##  Low_to_Medium.Inter : 34       5_Neutral_Level.Imm:155         CDU/CSU:289
##  Medium.Inter        :308       3_Level.Imm        :134         FDP    :121
##  Medium_to_High.Inter:396       2_Level.Imm        :130         Gruene :143
##  High.Inter          :259       6_Level.Imm        : 95         LINKE  :123
##                                 7_Level.Imm        : 78         SPD    :255
##                                 (Other)            :229
##  f.political_orientation
##  Center_Wing:665
##  Left_Wing  :266
##  Right_Wing : 69
##
##
##
##
```

1.7 Univariate Descriptive Analysis - UDA

As it is stated in the assignment's statement, but as it was concluded in the previous subsection, data set is unbalanced and it contains individuals who mostly vote for parties belonging in the center wing of politics, followed by left wing and finally left wing respectively. The differences between the numbers of each wing are significant. More details are presented below.

1.7.1 Descriptive Analysis for Numerical Variables

In this subsection, summary statistics, the standard deviation and histograms are presented for the numerical representation of the variables *egoposition_immigration*, *political_interest* and *income*.

1.7.2 Standard Deviation

```
lapply(quantiData, sd)
```

```
## $egoposition_immigration
## [1] 2.490157
##
## $political_interest
## [1] 0.8454814
##
## $income
## [1] 0.7731505
```

```
summary(gles$egoposition_immigration)
```

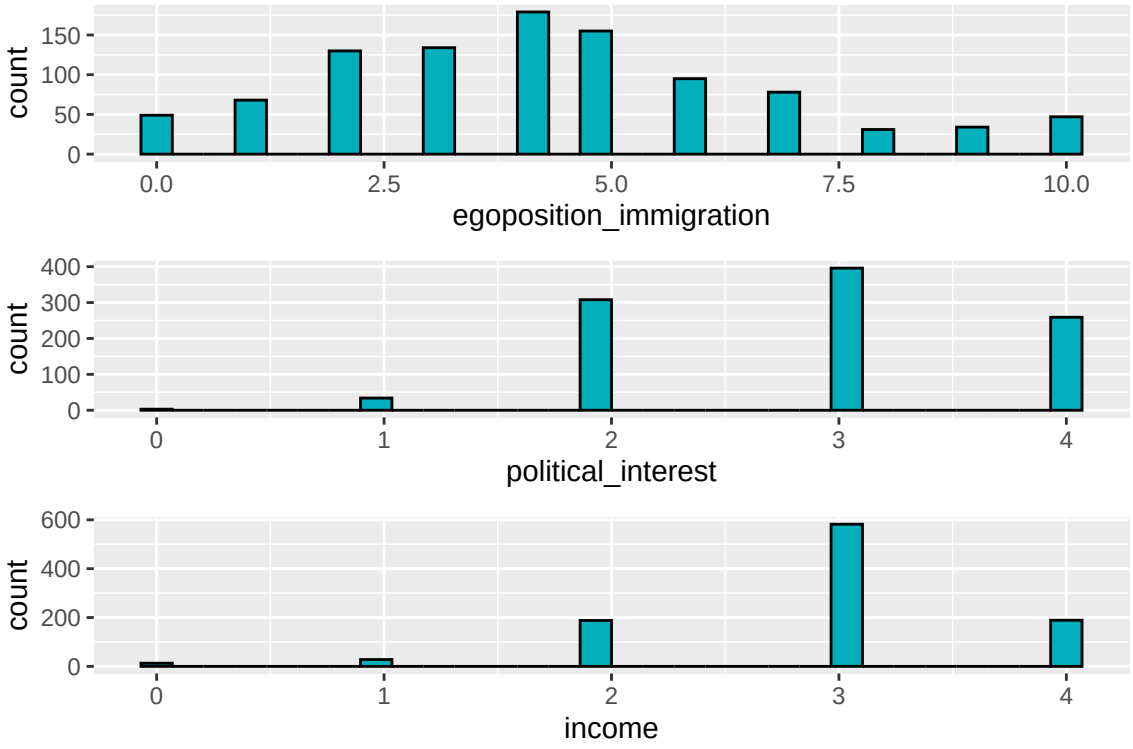
```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   0.000   3.000   4.000   4.361   6.000  10.000
```

```
summary(gles$political_interest)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   0.000   2.000   3.000   2.874   4.000   4.000
```

```
summary(gles$income)
```

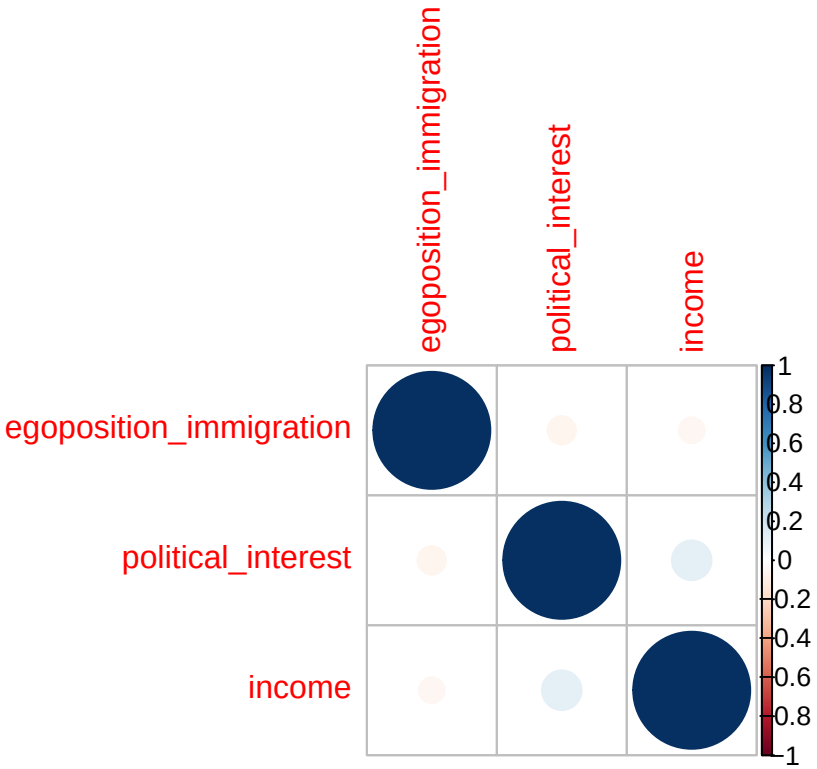
```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   0.000   3.000   3.000   2.906   3.000   4.000
```



From the histograms, it is clear that those 1000 German citizens show interest in the political elections since most of the observations belong to categories *Medium* to *High.* The same is true for variable *income* which depicts the satisfaction of the citizens with their income. Concerning variable *egoposition_immigration* it can be seen that the plot is close to follow a normal distribution with a slight right skewness. This means that most of the citizens in the data set are *Neutral* concerning immigration while the rest of them are scattered through the rest of the variable levels, with a small trend to follow more open ideas for immigration issues.

In addition, the calculation of Spearman correlation is presented for the numerical variables. In the following graph, it is clear that there is not strong correlation between the numerical representation of the variables *egoposition_immigration, political_interest* and *income.* By checking the correlation matrix the values are extremely low.

```
##                          egoposition_immigration political_interest      income
## egoposition_immigration              1.00000000        -0.05861542 -0.04823165
## political_interest                  -0.05861542         1.00000000  0.11449194
## income                              -0.04823165         0.11449194  1.00000000
```



1.7.3 Descriptive Analysis for Categorial Variables

Moreover, bar plots are generated illustrating the content of the variables *ostwest*, *gender* and target variables *vote* and *political_orientation (*new derived factor containing *left*, *center* and *right* wings).

1.7.4 Bar Plots

From the barplots, it is illustrated that most of the observations are from citizens of the Eastern

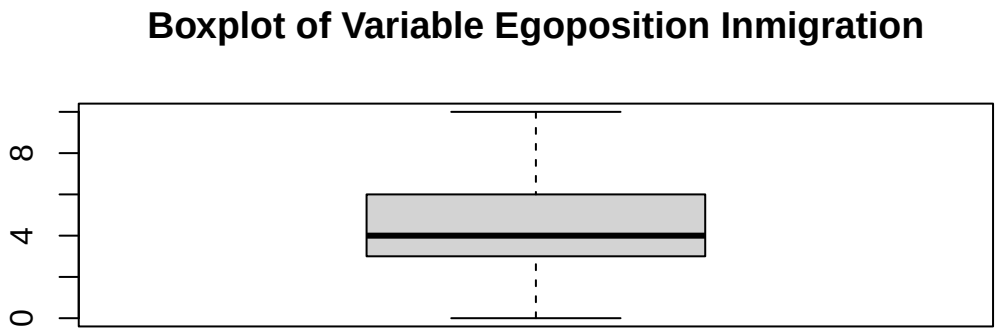
Gemany, while the gender of them are balanced. In addition, there is a huge difference in the numbers of citizens voting for parties in the *center political wing* while a smaller number of them vote for the *left wing* and finally the *right* one. Finally, party wise, the one with the most votes is party *CDU/CSU,* followed by *SPD* with a small difference. At the same time Gruene, LINKE and FDP are pretty close with each other, but with approximately half of the votes of *CDU/CSU* and *SPD.*

1.8 Outliers Detection

In the following subsections both uni-variate and multivariate outliers will be detected and treated.

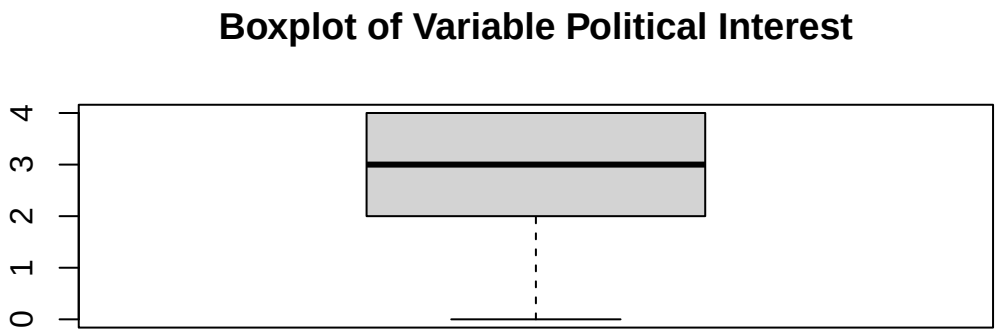
1.8.1 Uni-variate Outliers

To start with, in the following subsection the uni-variate outliers will be detected for the numerical variables: *egoposition_immigration*, *political_interest* and *income* with the respective order. It is crucial to mention here, that only severe outliers were taken into account and not mild ones. Now, concerning variable *egoposition_immigration*, as it is depicted in the boxplot of the variable, outliers do not exist. The same result is derived after trying to detect outliers using the IQR method, which is implemented by function calcQ.



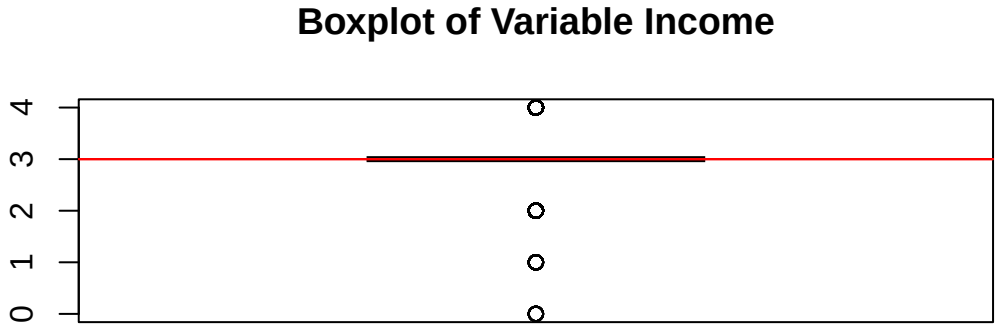

```
## [1] 0
```

Following by, the same approach is used for variable *political_interest.*




```
## [1] 0
```

The results are the same, there are no severe outliers for variable *political_interest* as well. Finally, the outlier detection for the income is taking place.




```
## [1] 418
```

In this case, there are extreme outliers for the income variable, which are presented below (only first 10 rows out of 418 in total).

```
gles[llout_income,][1:10,]
```

```
## # A tibble: 10 x 11
##    egopo~1 polit~2 income f.dup~3 f.eas~4 f.gen~5 f.inc~6 f.pol~7 f.ego~8 f.vote
##      <dbl>   <dbl>  <dbl> <fct>   <fct>   <fct>   <ord>   <ord>   <ord>   <fct>
##  1       8       2      2 No.Dup~ No.Eas~ F       Medium~ Medium~ 8_Leve~ SPD
##  2       1       2      4 No.Dup~ Yes.Ea~ F       High.S~ Medium~ 1_Leve~ Gruene
##  3       2       4      4 No.Dup~ Yes.Ea~ F       High.S~ High.I~ 2_Leve~ Gruene
##  4       3       3      2 No.Dup~ Yes.Ea~ M       Medium~ Medium~ 3_Leve~ AfD
##  5       4       4      4 No.Dup~ Yes.Ea~ M       High.S~ High.I~ 4_Leve~ CDU/C~
##  6       4       2      2 No.Dup~ No.Eas~ F       Medium~ Medium~ 4_Leve~ SPD
```

```
##  7       3       3      2 No.Dup~ Yes.Ea~ M       Medium~ Medium~ 3_Leve~ CDU/C~
##  8       1       3      1 No.Dup~ Yes.Ea~ F       Low_to~ Medium~ 1_Leve~ SPD
##  9       5       4      1 No.Dup~ Yes.Ea~ M       Low_to~ High.I~ 5_Neut~ FDP
## 10       5       2      2 No.Dup~ Yes.Ea~ F       Medium~ Medium~ 5_Neut~ Gruene
## # ... with 1 more variable: f.political_orientation <fct>, and abbreviated
## #   variable names 1: egoposition_immigration, 2: political_interest,
## #   3: f.duplicate, 4: f.eastGermany, 5: f.gender, 6: f.income,
## #   7: f.political_interest, 8: f.egoposition_immigration
```

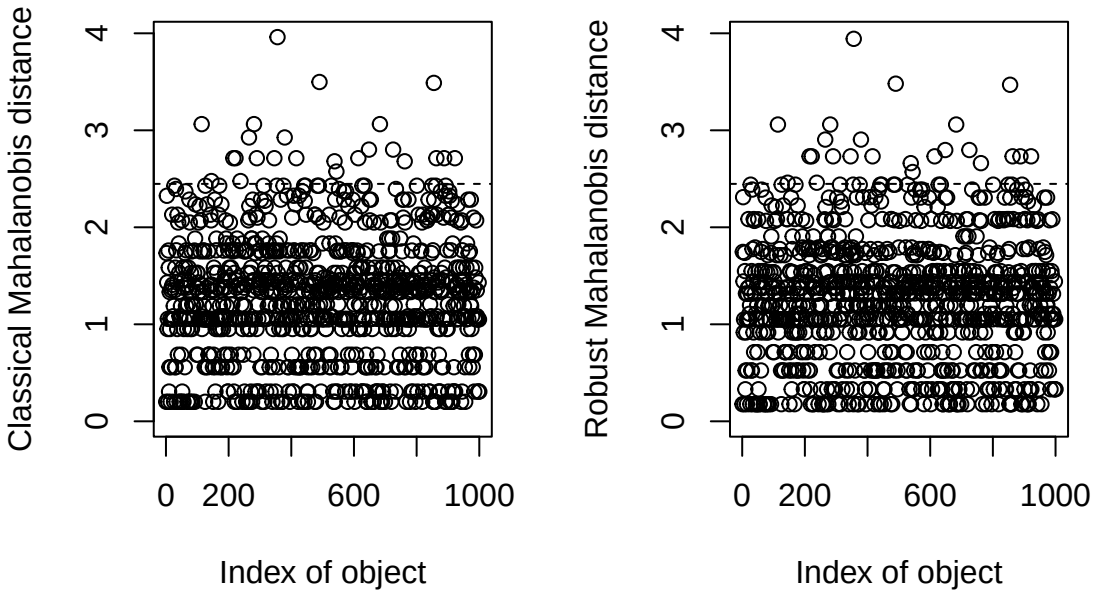
```
table(gles$income)
```

```
##
##   0   1   2   3   4
##  13  28 188 582 189
```

Additionally, by taking a look at the figure and the table of occurrences for factor variable *income*, it is clear that by using the IQR method in this case, all categories except *Medium_to_High.Sat (level 3)* are considered outliers (13+28+188+189 = 418). For that reason, a new column is generated to indicate the uni-variate outliers for *income.* For now, those outliers are kept into the data set, and in the subsections below, it will be decided if it is necessary to be removed.

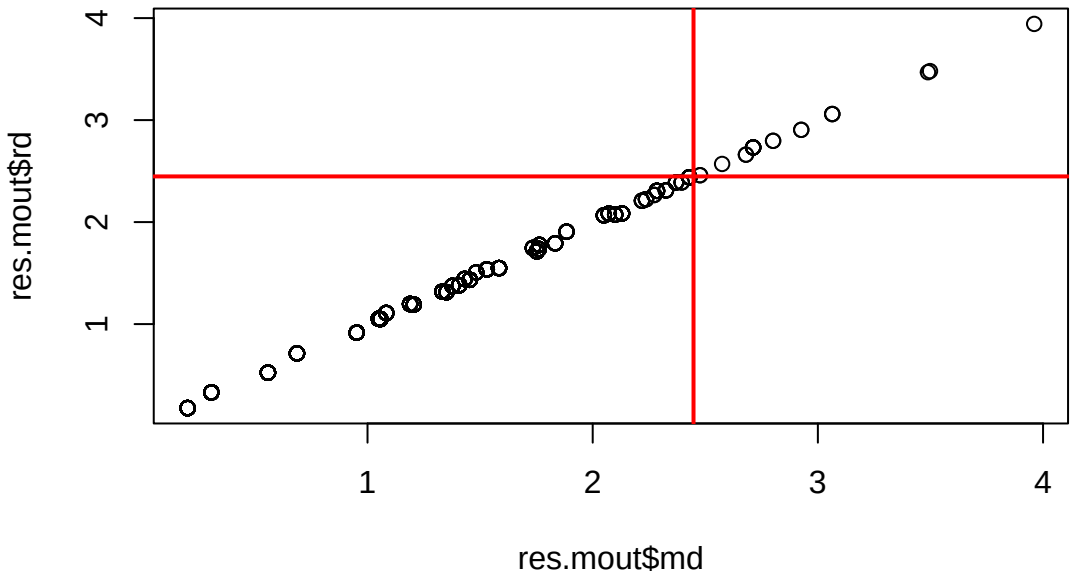
1.8.2 Multivariate Outliers

In this subsection, an attempt for the detection of multivariate outliers took place. To start with, the calculation of the Mahalanobis distance is possible only for numerical variables. At this point, at first, an attempt to calculate the Mahalanobis distance for the numerical representation of *egoposition_immigration*, *political_interest* and *income* with a confidence interval of 95% was followed. Due to the fact that those variables create a singular matrix for the calculation of the Mahalanobis distance, its inverse matrix cannot be calculated and in that way an error is thrown. Additionally, an attempt was completed to calculate the distance for all the variables in their raw format (all variables at numerical representation), but the same problem occurred again. The Classical and Robust Mahalanobis distances could be only calculated for the combination of *egoposition_immigration* and *political_interest* variables of the data set. The results are presented in the following figure:



After calculating Mahalanobis distance at a 95% confidence interval, the cut off given is 2.447747.

Then, all the observations which have a classical and a robust distance bigger than this cut off are marked as multivariate outliers (in this case the term *multivariate* refers only to *egoposition_immigration* and *political_interest* variables). After detecting them, a new factor (*f.mout*) is being created in the data set, indicating if an observation belongs to multivariate outliers or not. It can be seen in the final result that 24 observations are marked as multivariate outliers. Further analysis about them will be conducted in the following sections.




```
##         f.mout
```

```
##  MvOut.No :976
##  MvOut.Yes: 24
```

1.9 Profiling of Target Variable(s)

The goal of this chapter is to discover the relationships between the different variables of the data set and the target variable(s). In order to do so the calculation and presentation of interactions between the target and explanatory variables by using the library FactoMineR and Boxplots are completed.

Moreover, with the usage of the library FactoMineR and specifically the function catdes, which calculate the dependencies of a categorical variable, it is able to check the dependencies of the target variable(s) with the explanatory variables of the data set. At first, the dependency between the target variable *f.vote* and the rest of the variables will take place, followed by the same analysis for the new derived target variable *f.political_orientation*.

Furthermore, the relationship of the target variable with the qualitative variables is analyzed below.

```
## $AfD
##                                                    Cla/Mod    Mod/Cla
## f.political_orientation=Right_Wing                100.000000 100.000000
## f.egoposition_immigration=8_Level.Imm              45.161290  20.289855
## f.egoposition_immigration=10_Very_Restrictive_Level.Imm  34.042553  23.188406
## f.gender=M                                         10.408922  81.159420
## f.mout=MvOut.Yes                                   37.500000  13.043478
## f.duplicate=No.Duplicate                            8.892356  82.608696
## f.egoposition_immigration=7_Level.Imm              17.948718  20.289855
## f.egoposition_immigration=9_Level.Imm              23.529412  11.594203
## f.eastGermany=No.EastGermany                       11.618257  40.579710
## f.political_interest=Low.Inter                     66.666667   2.898551
## f.income=Low_to_Medium.Sat                         17.857143   7.246377
## f.egoposition_immigration=1_Level.Imm               1.470588   1.449275
## f.egoposition_immigration=3_Level.Imm               2.985075   5.797101
## f.eastGermany=Yes.EastGermany                       5.401845  59.420290
## f.egoposition_immigration=5_Neutral_Level.Imm       1.290323   2.898551
## f.duplicate=Yes.Duplicate                           3.342618  17.391304
## f.egoposition_immigration=4_Level.Imm               1.117318   2.898551
## f.egoposition_immigration=2_Level.Imm               0.000000   0.000000
## f.mout=MvOut.No                                     6.147541  86.956522
## f.gender=F                                          2.813853  18.840580
## f.political_orientation=Left_Wing                   0.000000   0.000000
## f.political_orientation=Center_Wing                 0.000000   0.000000
##                                                    Global       p.value
## f.political_orientation=Right_Wing                    6.9 1.889108e-108
## f.egoposition_immigration=8_Level.Imm                 3.1  1.675803e-09
## f.egoposition_immigration=10_Very_Restrictive_Level.Imm   4.7  1.468400e-08
## f.gender=M                                           53.8  1.101835e-06
## f.mout=MvOut.Yes                                      2.4  1.316568e-05
## f.duplicate=No.Duplicate                             64.1  5.540764e-04
## f.egoposition_immigration=7_Level.Imm                 7.8  5.783367e-04
## f.egoposition_immigration=9_Level.Imm                 3.4  1.731296e-03
```

```
## f.eastGermany=No.EastGermany                                  24.1  1.731634e-03
## f.political_interest=Low.Inter                                 0.3  1.377478e-02
## f.income=Low_to_Medium.Sat                                     2.8  4.793709e-02
## f.egoposition_immigration=1_Level.Imm                          6.8  4.815760e-02
## f.egoposition_immigration=3_Level.Imm                         13.4  4.305493e-02
## f.eastGermany=Yes.EastGermany                                 75.9  1.731634e-03
## f.egoposition_immigration=5_Neutral_Level.Imm                 15.5  6.970986e-04
## f.duplicate=Yes.Duplicate                                     35.9  5.540764e-04
## f.egoposition_immigration=4_Level.Imm                         17.9  1.193747e-04
## f.egoposition_immigration=2_Level.Imm                         13.0  4.641675e-05
## f.mout=MvOut.No                                               97.6  1.316568e-05
## f.gender=F                                                    46.2  1.101835e-06
## f.political_orientation=Left_Wing                             26.6  2.200779e-10
## f.political_orientation=Center_Wing                           66.5  9.958160e-36
##                                                                      v.test
## f.political_orientation=Right_Wing                                22.123229
## f.egoposition_immigration=8_Level.Imm                              6.026469
## f.egoposition_immigration=10_Very_Restrictive_Level.Imm            5.665215
## f.gender=M                                                         4.872520
## f.mout=MvOut.Yes                                                   4.357333
## f.duplicate=No.Duplicate                                           3.453152
## f.egoposition_immigration=7_Level.Imm                              3.441576
## f.egoposition_immigration=9_Level.Imm                              3.132830
## f.eastGermany=No.EastGermany                                       3.132773
## f.political_interest=Low.Inter                                     2.463084
## f.income=Low_to_Medium.Sat                                         1.977926
## f.egoposition_immigration=1_Level.Imm                             -1.975975
## f.egoposition_immigration=3_Level.Imm                             -2.023177
## f.eastGermany=Yes.EastGermany                                     -3.132773
## f.egoposition_immigration=5_Neutral_Level.Imm                     -3.390718
## f.duplicate=Yes.Duplicate                                         -3.453152
## f.egoposition_immigration=4_Level.Imm                             -3.847407
## f.egoposition_immigration=2_Level.Imm                             -4.072973
## f.mout=MvOut.No                                                   -4.357333
## f.gender=F                                                        -4.872520
## f.political_orientation=Left_Wing                                 -6.346633
## f.political_orientation=Center_Wing                              -12.477072
##
## $`CDU/CSU`
##                                                 Cla/Mod    Mod/Cla Global
## f.political_orientation=Center_Wing           43.45865 100.000000   66.5
## f.duplicate=Yes.Duplicate                     36.21170  44.982699   35.9
## f.egoposition_immigration=5_Neutral_Level.Imm 39.35484  21.107266   15.5
## f.egoposition_immigration=7_Level.Imm         43.58974  11.764706    7.8
## f.egoposition_immigration=6_Level.Imm         40.00000  13.148789    9.5
## f.political_interest=Medium.Inter             33.44156  35.640138   30.8
## f.egoposition_immigration=1_Level.Imm         17.64706   4.152249    6.8
## f.income=Medium.Sat                           22.34043  14.532872   18.8
## f.duplicate=No.Duplicate                      24.80499  55.017301   64.1
## f.egoposition_immigration=2_Level.Imm         14.61538   6.574394   13.0
```

```
## f.political_orientation=Right_Wing             0.00000   0.000000    6.9
## f.political_orientation=Left_Wing              0.00000   0.000000   26.6
##                                                    p.value     v.test
## f.political_orientation=Center_Wing           4.312957e-64  16.902491
## f.duplicate=Yes.Duplicate                     1.578900e-04   3.778320
## f.egoposition_immigration=5_Neutral_Level.Imm 2.326304e-03   3.045064
## f.egoposition_immigration=7_Level.Imm         4.123963e-03   2.868521
## f.egoposition_immigration=6_Level.Imm         1.484342e-02   2.436177
## f.political_interest=Medium.Inter             3.612343e-02   2.095535
## f.egoposition_immigration=1_Level.Imm         2.975586e-02  -2.173325
## f.income=Medium.Sat                           2.589708e-02  -2.227752
## f.duplicate=No.Duplicate                      1.578900e-04  -3.778320
## f.egoposition_immigration=2_Level.Imm         5.395182e-05  -4.037813
## f.political_orientation=Right_Wing            2.190738e-11  -6.692711
## f.political_orientation=Left_Wing             4.116942e-48 -14.573901
##
## $FDP
##                                                  Cla/Mod     Mod/Cla Global
## f.political_orientation=Center_Wing            18.195489 100.0000000   66.5
## f.egoposition_immigration=6_Level.Imm          22.105263  17.3553719    9.5
## f.egoposition_immigration=0_Very_Open_Level.Imm  2.040816   0.8264463    4.9
## f.egoposition_immigration=2_Level.Imm            3.076923   3.3057851   13.0
## f.political_orientation=Right_Wing               0.000000   0.0000000    6.9
## f.political_orientation=Left_Wing                0.000000   0.0000000   26.6
##                                                      p.value    v.test
## f.political_orientation=Center_Wing            6.200298e-24 10.088671
## f.egoposition_immigration=6_Level.Imm          3.784565e-03  2.895582
## f.egoposition_immigration=0_Very_Open_Level.Imm 1.390975e-02 -2.459586
## f.egoposition_immigration=2_Level.Imm          1.560324e-04 -3.781267
## f.political_orientation=Right_Wing             9.721535e-05 -3.897439
## f.political_orientation=Left_Wing              3.054680e-18 -8.709407
##
## $Gruene
##                                                    Cla/Mod     Mod/Cla
## f.political_orientation=Left_Wing                53.759398 100.0000000
## f.egoposition_immigration=2_Level.Imm            28.461538  25.8741259
## f.gender=F                                       17.748918  57.3426573
## f.political_interest=Medium_to_High.Inter        17.676768  48.9510490
## f.egoposition_immigration=1_Level.Imm            25.000000  11.8881119
## f.egoposition_immigration=6_Level.Imm             7.368421   4.8951049
## f.egoposition_immigration=8_Level.Imm             0.000000   0.0000000
## f.egoposition_immigration=10_Very_Restrictive_Level.Imm  2.127660   0.6993007
## f.egoposition_immigration=9_Level.Imm             0.000000   0.0000000
## f.gender=M                                       11.338290  42.6573427
## f.egoposition_immigration=7_Level.Imm             2.564103   1.3986014
## f.political_orientation=Right_Wing                0.000000   0.0000000
## f.political_orientation=Center_Wing               0.000000   0.0000000
##                                                  Global      p.value
## f.political_orientation=Left_Wing                  26.6 4.555935e-99
## f.egoposition_immigration=2_Level.Imm              13.0 5.773018e-06
```

```
## f.gender=F                                              46.2 4.072838e-03
## f.political_interest=Medium_to_High.Inter               39.6 1.459058e-02
## f.egoposition_immigration=1_Level.Imm                    6.8 1.540367e-02
## f.egoposition_immigration=6_Level.Imm                    9.5 3.395532e-02
## f.egoposition_immigration=8_Level.Imm                    3.1 7.725865e-03
## f.egoposition_immigration=10_Very_Restrictive_Level.Imm  4.7 6.044056e-03
## f.egoposition_immigration=9_Level.Imm                    3.4 4.782805e-03
## f.gender=M                                              53.8 4.072838e-03
## f.egoposition_immigration=7_Level.Imm                    7.8 4.551511e-04
## f.political_orientation=Right_Wing                       6.9 1.573110e-05
## f.political_orientation=Center_Wing                     66.5 1.406134e-79
##                                                          v.test
## f.political_orientation=Left_Wing                      21.126332
## f.egoposition_immigration=2_Level.Imm                   4.534536
## f.gender=F                                              2.872465
## f.political_interest=Medium_to_High.Inter               2.442385
## f.egoposition_immigration=1_Level.Imm                   2.422746
## f.egoposition_immigration=6_Level.Imm                  -2.120602
## f.egoposition_immigration=8_Level.Imm                  -2.663821
## f.egoposition_immigration=10_Very_Restrictive_Level.Imm -2.745382
## f.egoposition_immigration=9_Level.Imm                  -2.821309
## f.gender=M                                             -2.872465
## f.egoposition_immigration=7_Level.Imm                  -3.505850
## f.political_orientation=Right_Wing                     -4.318194
## f.political_orientation=Center_Wing                   -18.888951
##
## $LINKE
##                                                 Cla/Mod    Mod/Cla Global
## f.political_orientation=Left_Wing             46.240602 100.000000   26.6
## f.eastGermany=No.EastGermany                  19.087137  37.398374   24.1
## f.egoposition_immigration=0_Very_Open_Level.Imm 28.571429  11.382114    4.9
## f.egoposition_immigration=3_Level.Imm         19.402985  21.138211   13.4
## f.duplicate=No.Duplicate                      14.196568  73.983740   64.1
## f.income=Medium.Sat                           17.553191  26.829268   18.8
## f.duplicate=Yes.Duplicate                      8.913649  26.016260   35.9
## f.egoposition_immigration=6_Level.Imm          4.210526   3.252033    9.5
## f.egoposition_immigration=5_Neutral_Level.Imm  5.161290   6.504065   15.5
## f.eastGermany=Yes.EastGermany                 10.144928  62.601626   75.9
## f.income=High.Sat                              4.761905   7.317073   18.9
## f.political_orientation=Right_Wing             0.000000   0.000000    6.9
## f.political_orientation=Center_Wing            0.000000   0.000000   66.5
##                                                    p.value     v.test
## f.political_orientation=Left_Wing             8.361150e-83  19.277115
## f.eastGermany=No.EastGermany                  4.265885e-04   3.523064
## f.egoposition_immigration=0_Very_Open_Level.Imm 1.737035e-03   3.131859
## f.egoposition_immigration=3_Level.Imm         1.099556e-02   2.542840
## f.duplicate=No.Duplicate                      1.345692e-02   2.471442
## f.income=Medium.Sat                           1.925059e-02   2.340643
## f.duplicate=Yes.Duplicate                     1.345692e-02  -2.471442
## f.egoposition_immigration=6_Level.Imm         6.136722e-03  -2.740385
```

```
## f.egoposition_immigration=5_Neutral_Level.Imm   1.585127e-03  -3.158630
## f.eastGermany=Yes.EastGermany                   4.265885e-04  -3.523064
## f.income=High.Sat                               1.536281e-04  -3.785130
## f.political_orientation=Right_Wing              8.254390e-05  -3.936892
## f.political_orientation=Center_Wing             6.141124e-67 -17.284633
##
## $SPD
##                                                   Cla/Mod     Mod/Cla Global
## f.political_orientation=Center_Wing             38.345865 100.0000000   66.5
## f.egoposition_immigration=2_Level.Imm           36.923077  18.8235294   13.0
## f.mout=MvOut.No                                 26.024590  99.6078431   97.6
## f.egoposition_immigration=1_Level.Imm           38.235294  10.1960784    6.8
## f.political_interest=Low_to_Medium.Inter         8.823529   1.1764706    3.4
## f.mout=MvOut.Yes                                 4.166667   0.3921569    2.4
## f.political_orientation=Right_Wing               0.000000   0.0000000    6.9
## f.political_orientation=Left_Wing                0.000000   0.0000000   26.6
##                                                      p.value     v.test
## f.political_orientation=Center_Wing             5.401466e-55  15.619038
## f.egoposition_immigration=2_Level.Imm           1.985233e-03   3.092433
## f.mout=MvOut.No                                 8.131457e-03   2.646562
## f.egoposition_immigration=1_Level.Imm           1.674243e-02   2.392316
## f.political_interest=Low_to_Medium.Inter        1.626155e-02  -2.402992
## f.mout=MvOut.Yes                                8.131457e-03  -2.646562
## f.political_orientation=Right_Wing              6.459324e-10  -6.178794
## f.political_orientation=Left_Wing               2.115265e-41 -13.477726

## $Center_Wing
##                                                    Cla/Mod   Mod/Cla Global
## f.vote=CDU/CSU                                   100.00000 43.458647   28.9
## f.vote=SPD                                       100.00000 38.345865   25.5
## f.vote=FDP                                       100.00000 18.195489   12.1
## f.egoposition_immigration=5_Neutral_Level.Imm     83.22581 19.398496   15.5
## f.eastGermany=Yes.EastGermany                     69.43347 79.248120   75.9
## f.duplicate=Yes.Duplicate                         73.25905 39.548872   35.9
## f.egoposition_immigration=6_Level.Imm             81.05263 11.578947    9.5
## f.income=High.Sat                                 74.07407 21.052632   18.9
## f.political_interest=Medium.Inter                 71.75325 33.233083   30.8
## f.egoposition_immigration=8_Level.Imm             48.38710  2.255639    3.1
## f.egoposition_immigration=0_Very_Open_Level.Imm   48.97959  3.609023    4.9
## f.egoposition_immigration=2_Level.Imm             54.61538 10.676692   13.0
## f.duplicate=No.Duplicate                          62.71451 60.451128   64.1
## f.eastGermany=No.EastGermany                      57.26141 20.751880   24.1
## f.vote=AfD                                         0.00000  0.000000    6.9
## f.vote=LINKE                                       0.00000  0.000000   12.3
## f.vote=Gruene                                      0.00000  0.000000   14.3
##                                                       p.value     v.test
## f.vote=CDU/CSU                                  4.312957e-64  16.902491
## f.vote=SPD                                      5.401466e-55  15.619038
## f.vote=FDP                                      6.200298e-24  10.088671
## f.egoposition_immigration=5_Neutral_Level.Imm   5.513189e-07   5.007534
## f.eastGermany=Yes.EastGermany                   5.849772e-04   3.438486
```

```
## f.duplicate=Yes.Duplicate                          6.507953e-04   3.409511
## f.egoposition_immigration=6_Level.Imm              1.102026e-03   3.263095
## f.income=High.Sat                                  1.331258e-02   2.475296
## f.political_interest=Medium.Inter                  1.837781e-02   2.357917
## f.egoposition_immigration=8_Level.Imm              3.695876e-02  -2.086219
## f.egoposition_immigration=0_Very_Open_Level.Imm    1.008813e-02  -2.572794
## f.egoposition_immigration=2_Level.Imm              2.600362e-03  -3.011411
## f.duplicate=No.Duplicate                           6.507953e-04  -3.409511
## f.eastGermany=No.EastGermany                       5.849772e-04  -3.438486
## f.vote=AfD                                         9.958160e-36 -12.477072
## f.vote=LINKE                                       6.141124e-67 -17.284633
## f.vote=Gruene                                      1.406134e-79 -18.888951
##
## $Left_Wing
##                                                        Cla/Mod    Mod/Cla
## f.vote=Gruene                                       100.000000 53.7593985
## f.vote=LINKE                                        100.000000 46.2406015
## f.egoposition_immigration=2_Level.Imm                45.384615 22.1804511
## f.egoposition_immigration=0_Very_Open_Level.Imm      48.979592  9.0225564
## f.egoposition_immigration=3_Level.Imm                38.059701 19.1729323
## f.gender=F                                           30.086580 52.2556391
## f.gender=M                                           23.605948 47.7443609
## f.income=High.Sat                                    19.576720 13.9097744
## f.egoposition_immigration=10_Very_Restrictive_Level.Imm 10.638298  1.8796992
## f.egoposition_immigration=8_Level.Imm                 6.451613  0.7518797
## f.egoposition_immigration=9_Level.Imm                 5.882353  0.7518797
## f.egoposition_immigration=5_Neutral_Level.Imm        15.483871  9.0225564
## f.egoposition_immigration=7_Level.Imm                10.256410  3.0075188
## f.egoposition_immigration=6_Level.Imm                11.578947  4.1353383
## f.vote=AfD                                            0.000000  0.0000000
## f.vote=FDP                                            0.000000  0.0000000
## f.vote=SPD                                            0.000000  0.0000000
## f.vote=CDU/CSU                                        0.000000  0.0000000
##                                                       Global      p.value
## f.vote=Gruene                                           14.3 4.555935e-99
## f.vote=LINKE                                            12.3 8.361150e-83
## f.egoposition_immigration=2_Level.Imm                   13.0 7.347278e-07
## f.egoposition_immigration=0_Very_Open_Level.Imm          4.9 6.479798e-04
## f.egoposition_immigration=3_Level.Imm                   13.4 1.798442e-03
## f.gender=F                                              46.2 2.119615e-02
## f.gender=M                                              53.8 2.119615e-02
## f.income=High.Sat                                       18.9 1.362802e-02
## f.egoposition_immigration=10_Very_Restrictive_Level.Imm  4.7 7.300975e-03
## f.egoposition_immigration=8_Level.Imm                    3.1 5.282681e-03
## f.egoposition_immigration=9_Level.Imm                    3.4 2.382574e-03
## f.egoposition_immigration=5_Neutral_Level.Imm           15.5 4.059018e-04
## f.egoposition_immigration=7_Level.Imm                    7.8 2.687651e-04
## f.egoposition_immigration=6_Level.Imm                    9.5 2.154814e-04
## f.vote=AfD                                               6.9 2.200779e-10
## f.vote=FDP                                              12.1 3.054680e-18
```

```
## f.vote=SPD                                                    25.5 2.115265e-41
## f.vote=CDU/CSU                                                28.9 4.116942e-48
##                                                                 v.test
## f.vote=Gruene                                                21.126332
## f.vote=LINKE                                                 19.277115
## f.egoposition_immigration=2_Level.Imm                         4.951952
## f.egoposition_immigration=0_Very_Open_Level.Imm               3.410693
## f.egoposition_immigration=3_Level.Imm                         3.121644
## f.gender=F                                                    2.304472
## f.gender=M                                                   -2.304472
## f.income=High.Sat                                            -2.466922
## f.egoposition_immigration=10_Very_Restrictive_Level.Imm      -2.682795
## f.egoposition_immigration=8_Level.Imm                        -2.789271
## f.egoposition_immigration=9_Level.Imm                        -3.037869
## f.egoposition_immigration=5_Neutral_Level.Imm                -3.536217
## f.egoposition_immigration=7_Level.Imm                        -3.643682
## f.egoposition_immigration=6_Level.Imm                        -3.700139
## f.vote=AfD                                                   -6.346633
## f.vote=FDP                                                   -8.709407
## f.vote=SPD                                                  -13.477726
## f.vote=CDU/CSU                                              -14.573901
##
## $Right_Wing
##                                                                Cla/Mod    Mod/Cla
## f.vote=AfD                                                  100.000000 100.000000
## f.egoposition_immigration=8_Level.Imm                        45.161290  20.289855
## f.egoposition_immigration=10_Very_Restrictive_Level.Imm      34.042553  23.188406
## f.gender=M                                                   10.408922  81.159420
## f.mout=MvOut.Yes                                             37.500000  13.043478
## f.duplicate=No.Duplicate                                      8.892356  82.608696
## f.egoposition_immigration=7_Level.Imm                        17.948718  20.289855
## f.egoposition_immigration=9_Level.Imm                        23.529412  11.594203
## f.eastGermany=No.EastGermany                                 11.618257  40.579710
## f.political_interest=Low.Inter                               66.666667   2.898551
## f.income=Low_to_Medium.Sat                                   17.857143   7.246377
## f.egoposition_immigration=1_Level.Imm                         1.470588   1.449275
## f.egoposition_immigration=3_Level.Imm                         2.985075   5.797101
## f.eastGermany=Yes.EastGermany                                 5.401845  59.420290
## f.egoposition_immigration=5_Neutral_Level.Imm                 1.290323   2.898551
## f.duplicate=Yes.Duplicate                                     3.342618  17.391304
## f.egoposition_immigration=4_Level.Imm                         1.117318   2.898551
## f.vote=FDP                                                    0.000000   0.000000
## f.vote=LINKE                                                  0.000000   0.000000
## f.egoposition_immigration=2_Level.Imm                         0.000000   0.000000
## f.vote=Gruene                                                 0.000000   0.000000
## f.mout=MvOut.No                                               6.147541  86.956522
## f.gender=F                                                    2.813853  18.840580
## f.vote=SPD                                                    0.000000   0.000000
## f.vote=CDU/CSU                                                0.000000   0.000000
##                                                              Global       p.value
```

```
## f.vote=AfD                                                    6.9 1.889108e-108
## f.egoposition_immigration=8_Level.Imm                         3.1  1.675803e-09
## f.egoposition_immigration=10_Very_Restrictive_Level.Imm       4.7  1.468400e-08
## f.gender=M                                                   53.8  1.101835e-06
## f.mout=MvOut.Yes                                              2.4  1.316568e-05
## f.duplicate=No.Duplicate                                     64.1  5.540764e-04
## f.egoposition_immigration=7_Level.Imm                         7.8  5.783367e-04
## f.egoposition_immigration=9_Level.Imm                         3.4  1.731296e-03
## f.eastGermany=No.EastGermany                                 24.1  1.731634e-03
## f.political_interest=Low.Inter                                0.3  1.377478e-02
## f.income=Low_to_Medium.Sat                                    2.8  4.793709e-02
## f.egoposition_immigration=1_Level.Imm                         6.8  4.815760e-02
## f.egoposition_immigration=3_Level.Imm                        13.4  4.305493e-02
## f.eastGermany=Yes.EastGermany                                75.9  1.731634e-03
## f.egoposition_immigration=5_Neutral_Level.Imm                15.5  6.970986e-04
## f.duplicate=Yes.Duplicate                                    35.9  5.540764e-04
## f.egoposition_immigration=4_Level.Imm                        17.9  1.193747e-04
## f.vote=FDP                                                   12.1  9.721535e-05
## f.vote=LINKE                                                 12.3  8.254390e-05
## f.egoposition_immigration=2_Level.Imm                        13.0  4.641675e-05
## f.vote=Gruene                                                14.3  1.573110e-05
## f.mout=MvOut.No                                              97.6  1.316568e-05
## f.gender=F                                                   46.2  1.101835e-06
## f.vote=SPD                                                   25.5  6.459324e-10
## f.vote=CDU/CSU                                               28.9  2.190738e-11
##                                                              v.test
## f.vote=AfD                                                22.123229
## f.egoposition_immigration=8_Level.Imm                      6.026469
## f.egoposition_immigration=10_Very_Restrictive_Level.Imm    5.665215
## f.gender=M                                                 4.872520
## f.mout=MvOut.Yes                                           4.357333
## f.duplicate=No.Duplicate                                   3.453152
## f.egoposition_immigration=7_Level.Imm                      3.441576
## f.egoposition_immigration=9_Level.Imm                      3.132830
## f.eastGermany=No.EastGermany                               3.132773
## f.political_interest=Low.Inter                             2.463084
## f.income=Low_to_Medium.Sat                                 1.977926
## f.egoposition_immigration=1_Level.Imm                     -1.975975
## f.egoposition_immigration=3_Level.Imm                     -2.023177
## f.eastGermany=Yes.EastGermany                             -3.132773
## f.egoposition_immigration=5_Neutral_Level.Imm             -3.390718
## f.duplicate=Yes.Duplicate                                 -3.453152
## f.egoposition_immigration=4_Level.Imm                     -3.847407
## f.vote=FDP                                                -3.897439
## f.vote=LINKE                                              -3.936892
## f.egoposition_immigration=2_Level.Imm                     -4.072973
## f.vote=Gruene                                             -4.318194
## f.mout=MvOut.No                                           -4.357333
## f.gender=F                                                -4.872520
## f.vote=SPD                                                -6.178794
```

```
## f.vote=CDU/CSU                                          -6.692711
```

2 Polytomous Modelling