

Preference for Political Parties - Multinomial Logit Model

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The dataset "partydat" is built by reading the data as a matrix given in "partypref".

```
> partypref <- matrix(data=c(114, 10, 53,224,134,9,42,226,114,8,23,174,339,30,13,  
+ 414,42,5,44,161,88,10, 60,171,90,8,31,168,413,23,14,375), nrow=8, byrow=TRUE)  
> partydat<-data.frame(  
+ party=c(rep("CDU",sum(partypref[,1])),rep("SPD",sum(partypref[,4])),  
+ rep("The Liberals",sum(partypref[,2])),rep("The Greens",sum(partypref[,3]))),  
+ sex=c(rep(0,sum(partypref[1:4,1])),rep(1,sum(partypref[5:8,1])),  
+ rep(0,sum(partypref[1:4,4])),rep(1,sum(partypref[5:8,4])),  
+ rep(0,sum(partypref[1:4,2])),rep(1,sum(partypref[5:8,2])),  
+ rep(0,sum(partypref[1:4,3])),rep(1,sum(partypref[5:8,3]))),  
+ age=c(rep(c(1:4,1:4), partypref[,1]),rep(c(1:4,1:4), partypref[,4]),  
+ rep(c(1:4,1:4), partypref[,2]),rep(c(1:4,1:4), partypref[,3])))  
>
```

For the fitting of a multinomial logit model the function "multinom" from the "nnet"-package is used.

```
> library(nnet)
```

The reference category for the multinomial logit model is taken alphabetically so in this case "CDU" is the reference category.

```
> datmat<-as.matrix(table(partydat$sex,partydat$party))  
> tparty<-data.frame("CDU"=datmat[,1],"SPD"=datmat[,2],"Green"=datmat[,3],  
+ "Liberals"=datmat[,4],"sex"=0:1)  
> tparty
```

	CDU	SPD	Green	Liberals	sex
0	701	1038	131	57	0
1	633	875	149	46	1

```
> logitParty <- multinom(cbind(CDU,SPD,Green,Liberals)~sex, data=tparty)
```

```
# weights: 12 (6 variable)  
initial value 5032.248531  
iter 10 value 3655.091249  
iter 20 value 3642.353995  
final value 3642.182612  
converged
```

```

> summary(logitParty)

Call:
multinom(formula = cbind(CDU, SPD, Green, Liberals) ~ sex, data = tparty)

Coefficients:
      (Intercept)          sex
SPD      0.392543 -0.06878944
Green   -1.677311  0.23078690
Liberals -2.509458 -0.11237159

Std. Errors:
      (Intercept)          sex
SPD      0.04888685 0.07150217
Green    0.09518466 0.13172436
Liberals 0.13773313 0.20564371

Residual Deviance: 7284.365
AIC: 7296.365

> exp(coef(logitParty))

      (Intercept)          sex
SPD      1.4807415 0.9335232
Green    0.1868759 1.2595908
Liberals 0.0813123 0.8937121

```

From the model with "CDU" as reference category the corresponding parameters for "SPD" are easily derived:

```

> coefSPD <- matrix(data = c(-coefficients(logitParty)[3,1],
+ coefficients(logitParty)[1,1] - coefficients(logitParty)[3,1],
+ coefficients(logitParty)[2,1] - coefficients(logitParty)[3,1],
+ -coefficients(logitParty)[3,2],
+ coefficients(logitParty)[1,2] - coefficients(logitParty)[3,2],
+ coefficients(logitParty)[2,2] - coefficients(logitParty)[3,2]),
+ nrow=3, ncol=2)
> coefSPD

      [,1]      [,2]
[1,] 2.5094580 0.11237159
[2,] 2.9020010 0.04358215
[3,] 0.8321474 0.34315849

> exp(coefSPD)

      [,1]      [,2]
[1,] 12.298262 1.118929
[2,] 18.210547 1.044546
[3,] 2.298249 1.409392

```