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        0.3925429 -0.06878949
Green     -1.6773106  0.23078689
Liberals  -2.5094579 -0.11237152

Std. Errors:
         (Intercept)        sex
SPD       0.04888685 0.07150217
Green     0.09518466 0.13172435
Liberals  0.13773312 0.20564370

Residual Deviance: 7284.365
AIC: 7296.365

> exp(coef(logitParty))

         (Intercept)       sex
SPD        1.4807414 0.9335232
Green      0.1868759 1.2595908
Liberals   0.0813123 0.8937122
```

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,] 2.5094579 0.11237152
[2,] 2.9020008 0.04358204
[3,] 0.8321473 0.34315842

> exp(coefSPD)

          [,1]     [,2]
[1,] 12.298262 1.118928
[2,] 18.210545 1.044546
[3,]  2.298248 1.409392
```