

Oceń istotność klimatyzacji i wspomagania kierowcy

		slaba	wazna	istotna
kobieta	18-23	26	12	7
	24-40	9	21	15
	> 40	5	14	41
mezczyzna	18-23	40	17	8
	24-40	17	15	12
	> 40	8	15	18

```
> sam <- read.csv2("car_pref.csv",header=T)
> str(sam)
'data.frame': 6 obs. of 5 variables:
 $ plec : Factor w/ 2 levels "kobieta","mezczyzna": 1 1 1 2 2 2
 $ wiek : Factor w/ 3 levels "> 40","18-23",...: 2 3 1 2 3 1
 $ slaba : int 7 15 41 8 12 18
 $ wazna : int 12 21 14 17 15 15
 $ istotna: int 26 9 5 40 17 8
> sam
  plec wiek slaba wazna istotna
1 kobieta 18-23 7 12 26
2 kobieta 24-40 15 21 9
3 kobieta > 40 41 14 5
4 mezczyzna 18-23 8 17 40
5 mezczyzna 24-40 12 15 17
6 mezczyzna > 40 18 15 8

library("VGAM")

> m1 <- vglm(cbind(slaba,wazna,istotna) ~ plec+wiek, multinomial,data=sam)

> coef(m1)
(Intercept):1 (Intercept):2 plecmezczyzna:1 plecmezczyzna:2 wiek18-23:1
1.8776757 0.9969084 -0.8130175 -0.3881281 -2.9167514
wiek18-23:2 wiek24-40:1 wiek24-40:2
-1.5877072 -1.4386445 -0.4594414
> summary(m1)

Call:
vglm(formula = cbind(slaba, wazna, istotna) ~ plec + wiek, family =
multinomial,
data = sam)

Pearson Residuals:
log(mu[,1]/mu[,3]) log(mu[,2]/mu[,3])
1 -0.59747 -0.43958
2 -0.13747 0.89526
3 0.68642 -0.25745
4 0.59464 0.35593
5 0.27183 -0.86024
6 -0.77493 0.35191

Coefficients:
Value Std. Error t value
(Intercept):1 1.87768 0.34756 5.4024
(Intercept):2 0.99691 0.36851 2.7053
plecmezczyzna:1 -0.81302 0.32104 -2.5325
plecmezczyzna:2 -0.38813 0.30051 -1.2916
wiek18-23:1 -2.91675 0.42292 -6.8967
wiek18-23:2 -1.58771 0.40290 -3.9407
wiek24-40:1 -1.43864 0.41582 -3.4598
wiek24-40:2 -0.45944 0.42268 -1.0870

Number of linear predictors: 2

Names of linear predictors: log(mu[,1]/mu[,3]), log(mu[,2]/mu[,3])
```

Dispersion Parameter for multinomial family: 1

Residual Deviance: 3.93871 on 4 degrees of freedom

Log-likelihood: -25.37042 on 4 degrees of freedom

Number of Iterations: 3

MODEL MINIMALNY

```
> m0 <- vglm(cbind(slaba,wazna,istotna) ~ 1, multinomial,data=sam)
> coef(m0)
(Intercept):1 (Intercept):2
-0.03883983 -0.11066557
> summary(m0)
```

Call:
vglm(formula = cbind(slaba, wazna, istotna) ~ 1, family = multinomial,
data = sam)

Pearson Residuals:

	$\log(\mu_{[,1]}/\mu_{[,3]})$	$\log(\mu_{[,2]}/\mu_{[,3]})$
1	-3.02865	-1.48156
2	0.57029	2.43838
3	5.90016	0.14808
4	-4.27693	-2.03766
5	-0.88043	0.17933
6	1.73517	1.19833

Coefficients:

	Value	Std. Error	t value
(Intercept):1	-0.03884	0.13937	-0.27868
(Intercept):2	-0.11067	0.14199	-0.77937

Number of linear predictors: 2

Names of linear predictors: $\log(\mu_{[,1]}/\mu_{[,3]})$, $\log(\mu_{[,2]}/\mu_{[,3]})$

Dispersion Parameter for multinomial family: 1

Residual Deviance: 81.78056 on 10 degrees of freedom

Log-likelihood: -64.29135 on 10 degrees of freedom

Number of Iterations: 4

```
> 1-pchisq(81.78056-3.93871,10-4)
[1] 9.992007e-15
> 1-pchisq(-2*(-64.29135+25.37042),10-4)
[1] 9.992007e-15
```

```
> m2 <- vglm(cbind(slaba,wazna,istotna) ~ wiek, multinomial,data=sam)
> coef(m2)
(Intercept):1 (Intercept):2 wiek18-23:1 wiek18-23:2 wiek24-40:1
wiek24-40:2
1.5125881 0.8023465 -2.9941926 -1.6247054 -1.4748478 -
0.4769241
> summary(m2)
```

Call:
vglm(formula = cbind(slaba, wazna, istotna) ~ wiek, family = multinomial,
data = sam)

```
Pearson Residuals:
  log(mu[,1]/mu[,3]) log(mu[,2]/mu[,3])
1          0.39050          0.087561
2          0.79757          1.111161
3          1.58253         -0.265561
4         -0.32491         -0.072855
5         -0.80658         -1.123717
6         -1.91441          0.321253
```

```
Coefficients:
              value std. Error t value
(Intercept):1  1.51259    0.30639  4.9369
(Intercept):2  0.80235    0.33378  2.4039
wiek18-23:1    -2.99419    0.41915 -7.1434
wiek18-23:2    -1.62471    0.40130 -4.0486
wiek24-40:1    -1.47485    0.41155 -3.5837
wiek24-40:2    -0.47692    0.42148 -1.1315
```

Number of linear predictors: 2

Names of linear predictors: log(mu[,1]/mu[,3]), log(mu[,2]/mu[,3])

Dispersion Parameter for multinomial family: 1

Residual Deviance: 10.44389 on 6 degrees of freedom

Log-likelihood: -28.62301 on 6 degrees of freedom

Number of Iterations: 4

```
> 1-pchisq(10.44389-3.93871,6-4)
[1] 0.03867391
```

```
> m3 <- vglm(cbind(slaba,wazna,istotna) ~ plec, multinomial,data=sam)
> coef(m3)
(Intercept):1 (Intercept):2 plecmezczyzna:1 plecmezczyzna:2
  0.4542553    0.1612681   -0.9910564   -0.4855078
> summary(m3)
```

```
Call:
vglm(formula = cbind(slaba, wazna, istotna) ~ plec, family = multinomial,
      data = sam)
```

```
Pearson Residuals:
  log(mu[,1]/mu[,3]) log(mu[,2]/mu[,3])
1         -4.41582         -2.1538809
2         -0.57675          2.1444650
3          4.32369          0.0081544
4         -2.77936         -1.4684552
5          0.40452          0.4821630
6          3.08047          1.3494595
```

```
Coefficients:
              value std. Error t value
(Intercept):1  0.45426    0.20217  2.24689
(Intercept):2  0.16127    0.21512  0.74967
plecmezczyzna:1 -0.99106    0.28736 -3.44888
plecmezczyzna:2 -0.48551    0.28799 -1.68585
```

Number of linear predictors: 2

Names of linear predictors: log(mu[,1]/mu[,3]), log(mu[,2]/mu[,3])

Dispersion Parameter for multinomial family: 1

Residual Deviance: 69.51772 on 8 degrees of freedom

Log-likelihood: -58.15993 on 8 degrees of freedom

Number of Iterations: 4

```
> 1-pchisq(69.51772-3.93871,8-4)
[1] 1.942890e-13
```