

Ilmastonmuutos ja vastuut

Yleistetyt lineaariset -mallit kurssin harjoitustyö, kevät 2018

Erik Manelius & Lasse Rintakumpu

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1 Johdanto

Analyysityössämme tarkastelemme *European Social Survey*n 8. kierroksen aineiston (ESS 2016) pohjalta millaisena suomalaiset kokevat henkilökohtaisen vastuunsa ilmastonmuutoksen hillitsemisestä.

European Social Survey on tieteellisistä lähtökohdista toteutettava vertaileva kyselytutkimus, joka kattaa yli 30 Euroopan ja lähialueiden maata. ESS kartoittaa Euroopan maiden yhteiskunnallisen muutoksen ja väestön asenteiden, uskomusten ja käyttäytymisen välisiä suhteita. Suomessa tutkimus tunnetaan myös nimellä *Arvot ja mielipiteet Suomessa*.

Tutkimus on toteutettu Tilastokeskuksen ja Turun yliopiston yhteistyönä. Tutkimukseen on poimittu satunnaisesti 3 400 yli 15-vuotiaasta suomalaista. Jokainen haastateltava edustaa vastauksillaan noin 1 300 suomalaista.¹

2 Aineiston ja tutkimuskysymyksen kuvaus

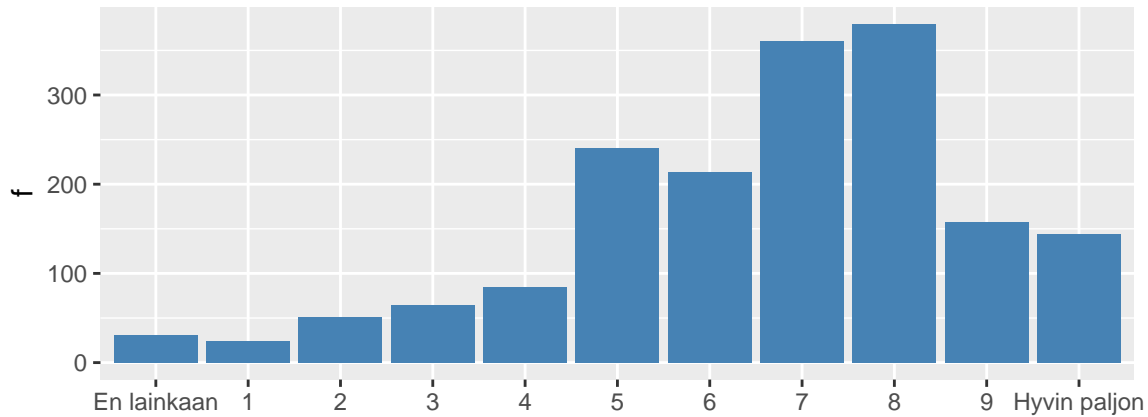
Suomen aineisto sisältää $n = 1925$ tilastoyksikköä, joilta kultakin on kerättyä tietoa 499 muuttujasta. Tutkiesämme suomalaisten henkilökohtaista ilmastovastuuta päämielenkiintomme kohdistuu muuttujaan D23. **To what extent do you feel a personal responsibility to try to reduce climate change?** eli “kuinka paljon tunnet henkilökohtaista vastuuta ilmastonmuutokset vähentämiseksi?”. Muuttuja on 11-luokkainen ordinaalinen muuttuja, jossa luokka 1 vastaa vastausta “en lainkaan” ja luokka 11 vastausta “hyvin paljon”.

Havainto kyseisestä muuttujasta puuttuu 34 tilastoyksiköltä. Kun tarkastellaan ... tukee pudottamista.

MissMech: An R Package for Testing Homoscedasticity, Multivariate Normality, and Missing Completely at Random (MCAR) Mortaza Jamshidian 2014 Journal of Statistical Softwares January 2014, Volume 56, Issue 6.

Kun aineistosta on pudotettu puuttuvat havainnot, havaitaan, että aineiston mukaan suomalaiset tuntevat keskimääräisesti (vastausten ka. 7.6) paljon vastuuta ilmastonmuutoksen ehkäisemisestä (kts. Kaavio 1).

¹Tilastokeskus: "Arvot ja mielipiteet Suomessa -tutkimus (ESS)", <https://www.stat.fi/tup/htpalvelut/tutkimukset/arvot-ja-mielipiteet-suomessa-tutkimus-ess.html>, haettu 6.5.2018.



Kaavio 1: Henkilökohtainen vastuu ilmastonmuutoksesta.

Pyritään ensin tarkastelemaan miten muuttuja D28. *How likely do you think it is that governments in enough countries will take action that reduces climate change?* eli se “kuinka todennäköisenä pitää sitä, että riittävän monen maan hallitus toimii ilmastonmuutoksen hillitsemiseksi” vaikuttaa vastaajan omaan vastuun kokemiseen ilmastonmuutoksen vähentämisestä. Kyseinen muuttuja on niin ikään 11-luokkainen ordinaalinen muuttuja, jossa luokka 1 vastaa vastausta “en lainkaan todennäköisenä” ja luokka 11 vastausta “hyvin todennäköisenä”.

Tämän jälkeen tarkastellaan, miten näiden kysymysten välinen yhteys muuttuu, kun vastaajan käsitys ilmastonmuutoksen syistä huomioidaan. Käsitystä mitataan muuttujalla D22. *Do you think that climate change is caused by natural processes, human activity, or both?* eli “uskotko ilmastonmuutoksen aiheutuvan luonnollisista prosesseista, ihmisen toiminnasta vai molemmista”.

Ilmastonmuutoksen syiden mittaamiseen on käytetty viisiluokkaista ordinaalista muuttujaa, jossa luokka 1 vastaa vastausta “kokonaan luonnollisista prosesseista”, luokka 3 vastausta “yhtä paljon luonnollisista prosesseista ja ihmisen toiminnasta” ja luokka 5 vastausta “kokonaan ihmisen toiminnasta”. Lisäksi muuttujassa on kuudes luokka “en usko ilmastonmuutokseen”, mutta tässä luokassa ei Suomen aineistossa ole yhtään vastausta (kun vastemuuttujan D23 puuttuvat havainnot poistetaan).

Lisäksi pyrimme tarkastelemaan taustamuuttujien

- **ikä** (*ika*), jatkuva ja numeerinen, vaihteluväli 1 – 81,
- **sukupuoli** (*sukupuoli*), kategorinen, kaksiluokkainen,

vaikutusta henkilökohtaisen ilmastovastuun kokemiseen. Muuttujien välistä korrelaatiota (Taulukko 1) tarkastelemalla havaitaan, **TODO: JOTAIN ETTÄ PIDETÄÄN YKSINKERTAISENA**. Korrelaatiotarkastelua ei nyt varmaan tällaisilla muuttujilla tarvita?

Taulukko 1: Taulukko 1: Muuttujien väliset korrelaatiot.

	syy	vastuu	hallitus	sukupuoli	ikä
syy	1.000	0.244	-0.073	0.024	-0.197
vastuu	0.244	1.000	0.100	0.199	-0.092
hallitus	-0.073	0.100	1.000	-0.001	0.131
sukupuoli	0.024	0.199	-0.001	1.000	0.056
ikä	-0.197	-0.092	0.131	0.056	1.000

```
## gender
## government_action 1 2
## 1 4 4
## 2 4 4
```

```
##          3 4 4
```

```
##
```

```
##      Cell Contents
```

```
## |-----|
## |          Count |
## |      Row Percent |
## |      Column Percent |
## |      Total Percent |
## |-----|
```

```
##
```

```
## Total Observations in Table:  1752
```

```
##
```

		round8_numeric\$government_action			
round8_numeric\$personal_responsibility		1	2	3	Row Total
----- ----- ----- -----					
1		31	44	31	106
		29.25%	41.51%	29.25%	6.05%
		15.35%	5.43%	4.19%	
		1.77%	2.51%	1.77%	
----- ----- ----- -----					
2		48	200	143	391
		12.28%	51.15%	36.57%	22.32%
		23.76%	24.66%	19.35%	
		2.74%	11.42%	8.16%	
----- ----- ----- -----					
3		123	567	565	1255
		9.80%	45.18%	45.02%	71.63%
		60.89%	69.91%	76.45%	
		7.02%	32.36%	32.25%	
----- ----- ----- -----					
Column Total		202	811	739	1752
		11.53%	46.29%	42.18%	
----- ----- ----- -----					

```
##
```

```
##
```

```
##
```

```
##      Cell Contents
```

```
## |-----|
## |          Count |
## |      Row Percent |
## |      Column Percent |
## |      Total Percent |
## |-----|
```

```
##
```

```
## Total Observations in Table:  1752
```

```
##
```

		round8_numeric\$gender		
round8_numeric\$personal_responsibility		1	2	Row Total
----- ----- -----				
1		79	27	106
		74.53%	25.47%	6.05%
		8.85%	3.14%	
		4.51%	1.54%	

##	-----	-----	-----	-----
##	2	234	157	391
##		59.85%	40.15%	22.32%
##		26.20%	18.28%	
##		13.36%	8.96%	
##	-----	-----	-----	-----
##	3	580	675	1255
##		46.22%	53.78%	71.63%
##		64.95%	78.58%	
##		33.11%	38.53%	
##	-----	-----	-----	-----
##	Column Total	893	859	1752
##		50.97%	49.03%	
##	-----	-----	-----	-----

##

##	Cell Contents
##	-----
##	Count
##	Row Percent
##	Column Percent
##	Total Percent
##	-----

Total Observations in Table: 1752
##

##		round8_numeric\$page				
##	round8_numeric\$personal_responsibility	1	2	3	4	Row Total
##	-----	-----	-----	-----	-----	-----
##	1	30	24	35	17	106
##		28.30%	22.64%	33.02%	16.04%	6.05%
##		4.52%	5.21%	6.64%	17.00%	
##		1.71%	1.37%	2.00%	0.97%	
##	-----	-----	-----	-----	-----	-----
##	2	146	91	122	32	391
##		37.34%	23.27%	31.20%	8.18%	22.32%
##		21.99%	19.74%	23.15%	32.00%	
##		8.33%	5.19%	6.96%	1.83%	
##	-----	-----	-----	-----	-----	-----
##	3	488	346	370	51	1255
##		38.88%	27.57%	29.48%	4.06%	71.63%
##		73.49%	75.05%	70.21%	51.00%	
##		27.85%	19.75%	21.12%	2.91%	
##	-----	-----	-----	-----	-----	-----
##	Column Total	664	461	527	100	1752
##		37.90%	26.31%	30.08%	5.71%	
##	-----	-----	-----	-----	-----	-----

##

##	Cell Contents
##	-----

```
## |          Count |
## |      Row Percent |
## |      Column Percent |
## |      Total Percent |
## |-----|
##
## Total Observations in Table:  1752
##
##              | round8_numeric$caused_by
## round8_numeric$personal_responsibility |      1 |      2 |      3 | Row Total |
## -----|-----|-----|-----|-----|
##              1 |      20 |      43 |      43 |      106 |
##              | 18.87% | 40.57% | 40.57% | 6.05% |
##              | 20.00% |  5.80% |  4.72% |      |
##              |  1.14% |  2.45% |  2.45% |      |
## -----|-----|-----|-----|-----|
##              2 |      36 |     208 |     147 |     391 |
##              |  9.21% | 53.20% | 37.60% | 22.32% |
##              | 36.00% | 28.07% | 16.14% |      |
##              |  2.05% | 11.87% |  8.39% |      |
## -----|-----|-----|-----|-----|
##              3 |      44 |     490 |     721 |    1255 |
##              |  3.51% | 39.04% | 57.45% | 71.63% |
##              | 44.00% | 66.13% | 79.14% |      |
##              |  2.51% | 27.97% | 41.15% |      |
## -----|-----|-----|-----|-----|
##              Column Total |     100 |     741 |     911 |    1752 |
##              |  5.71% | 42.29% | 52.00% |      |
## -----|-----|-----|-----|-----|
##
##
```

3 Tutkimuskysymyksen mallintaminen

Koska ... vähennetään luokkia. Molemmat muuttujat ordinaalisia, henkilökohtainen vastuu 0-10 (11 luokkaa), tarpeeksi monen maan hallituksen toimet 0-10 (11 luokkaa) => logit malli, koska ordinaalinen, kumulatiivinen logit Kolmiluokkainen vaikuttaa järkevältä, (tähän varmaan perusteet miksi tehty), luokitellaan 4-3-4.

- käytettyjen menetelmien kuvauksen
- menetelmien teoreettista taustaa
- mallien rakentamisen periaatteet
- mallien diagnostiikan

```
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action *
##       gender * age, family = cumulative(parallel = TRUE), data = round8)
##
##
## Pearson residuals:
##              Min      1Q   Median      3Q      Max
## logit(P[Y<=1]) -1.591 -0.5843 -0.05156 0.6185 1.9505
## logit(P[Y<=2]) -1.048 -0.3193  0.02117 0.2737 0.7064
##
```

```

## Coefficients:
##
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept):1      -2.1352    0.2727  -7.828 4.94e-15 ***
## (Intercept):2      -0.2122    0.2609  -0.814  0.41586
## government_action2   -0.4247    0.3049  -1.393  0.16353
## government_action3   -0.5551    0.3186  -1.742  0.08152 .
## gender2             -1.3740    0.4899  -2.804  0.00504 **
## age2                -0.1423    0.4619  -0.308  0.75795
## age3                 0.6219    0.4932   1.261  0.20731
## age4                 2.6736    0.9499   2.815  0.00488 **
## government_action2:gender2  0.3444    0.5616   0.613  0.53972
## government_action3:gender2  0.5087    0.5809   0.876  0.38124
## government_action2:age2    0.2776    0.5271   0.527  0.59838
## government_action3:age2   -0.3994    0.5539  -0.721  0.47092
## government_action2:age3   -0.2968    0.5482  -0.541  0.58831
## government_action3:age3   -0.9689    0.5668  -1.709  0.08737 .
## government_action2:age4   -1.9217    1.0726  -1.792  0.07319 .
## government_action3:age4   -1.4240    1.0485  -1.358  0.17442
## gender2:age2           1.0830    0.7273   1.489  0.13644
## gender2:age3           1.1619    0.7703   1.508  0.13143
## gender2:age4          -0.1259    1.4904  -0.084  0.93268
## government_action2:gender2:age2 -1.1210    0.8417  -1.332  0.18290
## government_action3:gender2:age2 -0.4895    0.8728  -0.561  0.57493
## government_action2:gender2:age3 -0.8730    0.8630  -1.012  0.31170
## government_action3:gender2:age3 -0.6598    0.8865  -0.744  0.45670
## government_action2:gender2:age4  1.0360    1.6317   0.635  0.52548
## government_action3:gender2:age4 -0.3276    1.6263  -0.201  0.84037
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: logit(P[Y<=1]), logit(P[Y<=2])
##
## Residual deviance: 26.4703 on 23 degrees of freedom
##
## Log-likelihood: -95.1892 on 23 degrees of freedom
##
## Number of iterations: 5
##
## No Hauck-Donner effect found in any of the estimates
##
## Exponentiated coefficients:
##
##              government_action2      government_action3
##              0.6539339              0.5740430
##              gender2              age2
##              0.2530974              0.8673307
##              age3              age4
##              1.8624289              14.4917688
## government_action2:gender2      government_action3:gender2
##              1.4111104              1.6630554
## government_action2:age2      government_action3:age2
##              1.3200109              0.6707514
## government_action2:age3      government_action3:age3

```

```

##              0.7432251              0.3795181
##      government_action2:age4      government_action3:age4
##              0.1463583              0.2407605
##      gender2:age2              gender2:age3
##      2.9536570              3.1960555
##      gender2:age4 government_action2:gender2:age2
##      0.8817036              0.3259576
## government_action3:gender2:age2 government_action2:gender2:age3
##      0.6129407              0.4176838
## government_action3:gender2:age3 government_action2:gender2:age4
##      0.5169293              2.8178925
## government_action3:gender2:age4
##      0.7206845
## [1] 240.3783
## [1] 269.8297
## [1] 26.47027
## [1] -95.18915
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action *
##      gender * age, family = acat(parallel = TRUE), data = round8)
##
##
## Pearson residuals:
##              Min      1Q   Median     3Q      Max
## loge(P[Y=2]/P[Y=1]) -1.3997 -0.5334 -0.01612 0.5554 0.9557
## loge(P[Y=3]/P[Y=2]) -0.7485 -0.3120  0.00527 0.2857 0.9410
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept):1      0.89773    0.21007   4.274 1.92e-05 ***
## (Intercept):2      0.51431    0.19562   2.629  0.00856 **
## government_action2    0.40258    0.22473   1.791  0.07322 .
## government_action3    0.50004    0.23728   2.107  0.03508 *
## gender2              1.15562    0.39986   2.890  0.00385 **
## age2                 0.06788    0.33360   0.203  0.83876
## age3                -0.37997    0.34553  -1.100  0.27148
## age4                -1.83908    0.75213  -2.445  0.01448 *
## government_action2:gender2 -0.25998    0.46240  -0.562  0.57395
## government_action3:gender2 -0.39483    0.47909  -0.824  0.40987
## government_action2:age2 -0.19654    0.38610  -0.509  0.61073
## government_action3:age2   0.33072    0.41516   0.797  0.42569
## government_action2:age3   0.12714    0.39045   0.326  0.74470
## government_action3:age3   0.57669    0.40983   1.407  0.15939
## government_action2:age4   1.25175    0.83191   1.505  0.13241
## government_action3:age4   0.94310    0.81512   1.157  0.24727
## gender2:age2          -0.88157    0.56391  -1.563  0.11798
## gender2:age3          -0.98281    0.57697  -1.703  0.08849 .
## gender2:age4          -0.02256    1.10556  -0.020  0.98372
## government_action2:gender2:age2 0.91938    0.66692   1.379  0.16803
## government_action3:gender2:age2 0.38579    0.69507   0.555  0.57886
## government_action2:gender2:age3 0.67363    0.65905   1.022  0.30672
## government_action3:gender2:age3 0.57511    0.68261   0.843  0.39950

```

```

## government_action2:gender2:age4 -0.81164      1.20877  -0.671  0.50193
## government_action3:gender2:age4  0.23967      1.21472   0.197  0.84359
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: loge(P[Y=2]/P[Y=1]), loge(P[Y=3]/P[Y=2])
##
## Residual deviance: 17.373 on 23 degrees of freedom
##
## Log-likelihood: -90.6405 on 23 degrees of freedom
##
## Number of iterations: 4
##
## No Hauck-Donner effect found in any of the estimates
## [1] 231.281
## [1] 260.7324
## [1] 17.37301
## [1] -90.64052
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action *
##      gender * age, family = cratio(parallel = TRUE), data = round8)
##
## Pearson residuals:
##               Min        1Q      Median        3Q       Max
## logit(P[Y>1|Y>=1]) -1.9424 -0.6351  0.02677  0.5662  1.565
## logit(P[Y>2|Y>=2]) -0.7656 -0.3470 -0.01767  0.3994  1.270
##
## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept):1      2.19145    0.25723   8.519 < 2e-16 ***
## (Intercept):2      0.49963    0.24586   2.032  0.04213 *
## government_action2  0.36560    0.28576   1.279  0.20077
## government_action3  0.49004    0.29948   1.636  0.10177
## gender2            1.28155    0.47242   2.713  0.00667 **
## age2               0.13834    0.43386   0.319  0.74984
## age3              -0.56016    0.45156  -1.241  0.21479
## age4              -2.75757    0.90955  -3.032  0.00243 **
## government_action2:gender2 -0.29025    0.54177  -0.536  0.59214
## government_action3:gender2 -0.44767    0.56066  -0.798  0.42460
## government_action2:age2 -0.26054    0.49567  -0.526  0.59915
## government_action3:age2  0.38535    0.52437   0.735  0.46241
## government_action2:age3  0.25633    0.50449   0.508  0.61138
## government_action3:age3  0.90048    0.52508   1.715  0.08636 .
## government_action2:age4  2.08218    1.01877   2.044  0.04097 *
## government_action3:age4  1.59568    0.99548   1.603  0.10895
## gender2:age2       -1.03356    0.69391  -1.489  0.13636
## gender2:age3       -1.13112    0.71842  -1.574  0.11538
## gender2:age4        0.42070    1.38383   0.304  0.76112
## government_action2:gender2:age2 1.06066    0.80517   1.317  0.18773

```



```

## government_action3:gender2:age2  0.46154    0.83720    0.551  0.58144
## government_action2:gender2:age3  0.84039    0.80937    1.038  0.29912
## government_action3:gender2:age3  0.64329    0.83480    0.771  0.44094
## government_action2:gender2:age4 -1.29443    1.51509   -0.854  0.39291
## government_action3:gender2:age4 -0.03034    1.51218   -0.020  0.98399
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors:  2
##
## Names of linear predictors: logit(P[Y>1|Y>=1]), logit(P[Y>2|Y>=2])
##
## Residual deviance: 27.993 on 23 degrees of freedom
##
## Log-likelihood: -95.9505 on 23 degrees of freedom
##
## Number of iterations: 5
##
## No Hauck-Donner effect found in any of the estimates
## [1] 241.901
## [1] 271.3523
## [1] 27.99296
## [1] -95.9505
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action *
##     gender * age, family = cumulative(link = probit, parallel = TRUE),
##     data = round8)
##
##
## Pearson residuals:
##           Min      1Q   Median      3Q      Max
## probit(P[Y<=1]) -1.170 -0.5280 -0.01444  0.4682  1.498
## probit(P[Y<=2]) -1.073 -0.2993  0.00230  0.3159  0.708
##
## Coefficients:
##
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept):1      -1.16209    0.15927   -7.296 2.96e-13 ***
## (Intercept):2      -0.10857    0.15622   -0.695  0.48708
## government_action2   -0.30115    0.18180   -1.656  0.09762 .
## government_action3   -0.37648    0.18948   -1.987  0.04693 *
## gender2             -0.83862    0.27462   -3.054  0.00226 **
## age2                -0.06508    0.27455   -0.237  0.81261
## age3                 0.33870    0.29568    1.145  0.25201
## age4                 1.56061    0.57058    2.735  0.00624 **
## government_action2:gender2  0.23154    0.31494    0.735  0.46222
## government_action3:gender2  0.32792    0.32584    1.006  0.31422
## government_action2:age2    0.15852    0.31337    0.506  0.61295
## government_action3:age2   -0.23263    0.32534   -0.715  0.47460
## government_action2:age3   -0.14089    0.32849   -0.429  0.66800
## government_action3:age3   -0.50559    0.33675   -1.501  0.13326
## government_action2:age4   -1.09133    0.64453   -1.693  0.09042 .
## government_action3:age4   -0.82311    0.63000   -1.307  0.19138

```

```

## gender2:age2          0.63134      0.41990      1.504      0.13269
## gender2:age3          0.69639      0.45083      1.545      0.12242
## gender2:age4         -0.08667      0.88864     -0.098      0.92231
## government_action2:gender2:age2 -0.66969      0.48350     -1.385      0.16603
## government_action3:gender2:age2 -0.28673      0.49845     -0.575      0.56513
## government_action2:gender2:age3 -0.53319      0.50327     -1.059      0.28939
## government_action3:gender2:age3 -0.41562      0.51358     -0.809      0.41836
## government_action2:gender2:age4  0.63577      0.97237      0.654      0.51322
## government_action3:gender2:age4 -0.19344      0.96744     -0.200      0.84152
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors:  2
##
## Names of linear predictors: probit(P[Y<=1]), probit(P[Y<=2])
##
## Residual deviance: 19.6486 on 23 degrees of freedom
##
## Log-likelihood: -91.7783 on 23 degrees of freedom
##
## Number of iterations: 4
##
## No Hauck-Donner effect found in any of the estimates
##
## Exponentiated coefficients:
##
##           government_action2          government_action3
##           0.7399679              0.6862741
##           gender2              age2
##           0.4323082              0.9369879
##           age3              age4
##           1.4031158              4.7617298
## government_action2:gender2 government_action3:gender2
##           1.2605373              1.3880787
## government_action2:age2      government_action3:age2
##           1.1717779              0.7924485
## government_action2:age3      government_action3:age3
##           0.8685852              0.6031523
## government_action2:age4      government_action3:age4
##           0.3357686              0.4390639
##           gender2:age2          gender2:age3
##           1.8801326              2.0064923
##           gender2:age4 government_action2:gender2:age2
##           0.9169824              0.5118684
## government_action3:gender2:age2 government_action2:gender2:age3
##           0.7507131              0.5867314
## government_action3:gender2:age3 government_action2:gender2:age4
##           0.6599332              1.8884785
## government_action3:gender2:age4
##           0.8241189
## [1] 233.5566
## [1] 263.008
## [1] 19.64857
## [1] -91.7783

```

```

##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action *
##       gender * age, family = cumulative(link = cloglog, parallel = TRUE),
##       data = round8)
##
##
## Pearson residuals:
##               Min        1Q      Median        3Q        Max
## cloglog(P[Y<=1]) -1.7696 -0.6646 -0.06082 0.7133 2.2764
## cloglog(P[Y<=2]) -0.8825 -0.3185 0.02245 0.2408 0.5977
##
## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept):1      -2.3102     0.2228 -10.369 < 2e-16 ***
## (Intercept):2      -0.5809     0.2056  -2.825 0.004729 **
## government_action2   -0.2671     0.2433  -1.098 0.272213
## government_action3   -0.3766     0.2566  -1.468 0.142133
## gender2             -1.0990     0.4312  -2.549 0.010812 *
## age2                -0.1242     0.3719  -0.334 0.738346
## age3                 0.4393     0.3623   1.213 0.225297
## age4                 2.2608     0.5911   3.825 0.000131 ***
## government_action2:gender2 0.2022     0.4951   0.409 0.682900
## government_action3:gender2 0.3423     0.5126   0.668 0.504314
## government_action2:age2   0.2212     0.4255   0.520 0.603155
## government_action3:age2  -0.3525     0.4579  -0.770 0.441353
## government_action2:age3  -0.1841     0.4100  -0.449 0.653363
## government_action3:age3  -0.7563     0.4349  -1.739 0.082025 .
## government_action2:age4  -1.7312     0.6998  -2.474 0.013361 *
## government_action3:age4  -1.3144     0.6717  -1.957 0.050344 .
## gender2:age2           0.9196     0.6175   1.489 0.136440
## gender2:age3            1.0279     0.6064   1.695 0.090046 .
## gender2:age4           -0.3609     0.9950  -0.363 0.716827
## government_action2:gender2:age2 -0.9273     0.7208  -1.286 0.198298
## government_action3:gender2:age2 -0.4017     0.7542  -0.533 0.594279
## government_action2:gender2:age3 -0.7369     0.6924  -1.064 0.287180
## government_action3:gender2:age3 -0.5799     0.7216  -0.804 0.421649
## government_action2:gender2:age4 1.1542     1.1201   1.031 0.302770
## government_action3:gender2:age4 0.1220     1.1219   0.109 0.913435
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: cloglog(P[Y<=1]), cloglog(P[Y<=2])
##
## Residual deviance: 31.4389 on 23 degrees of freedom
##
## Log-likelihood: -97.6735 on 23 degrees of freedom
##
## Number of iterations: 5
##
## No Hauck-Donner effect found in any of the estimates
##

```

```
## Exponentiated coefficients:
##           government_action2      government_action3
##           0.7655738              0.6861666
##           gender2                age2
##           0.3331930              0.8831752
##           age3                    age4
##           1.5516701              9.5908405
##   government_action2:gender2   government_action3:gender2
##           1.2241334              1.4081863
##   government_action2:age2      government_action3:age2
##           1.2475833              0.7029145
##   government_action2:age3      government_action3:age3
##           0.8318346              0.4693897
##   government_action2:age4      government_action3:age4
##           0.1770690              0.2686222
##           gender2:age2          gender2:age3
##           2.5081620              2.7952120
##           gender2:age4   government_action2:gender2:age2
##           0.6970624              0.3956207
##   government_action3:gender2:age2   government_action2:gender2:age3
##           0.6691532              0.4785747
##   government_action3:gender2:age3   government_action2:gender2:age4
##           0.5599822              3.1716233
##   government_action3:gender2:age4
##           1.1297068
## [1] 245.3469
## [1] 274.7983
## [1] 31.43889
## [1] -97.67347
```

	AIC	BIC	Deviance	LogLikelihood
Cumulative logit	240.3783	269.8297	26.47027	-95.18915
Adjacent-categories logit	231.2810	260.7324	17.37301	-90.64052
Continuation-Ratio logit	241.9010	271.3523	27.99296	-95.95050
Cumulative probit	233.5566	263.0080	19.64857	-91.77830
Cumulative clog-log	245.3469	274.7983	31.43889	-97.67347

```
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action *
##   gender * age, family = acat(parallel = TRUE), data = round8)
##
##
## Pearson residuals:
##           Min      1Q   Median     3Q      Max
## loge(P[Y=2]/P[Y=1]) -1.3997 -0.5334 -0.01612 0.5554 0.9557
## loge(P[Y=3]/P[Y=2]) -0.7485 -0.3120  0.00527 0.2857 0.9410
##
## Coefficients:
##           Estimate Std. Error z value Pr(>|z|)
## (Intercept):1      0.89773    0.21007   4.274 1.92e-05 ***
## (Intercept):2      0.51431    0.19562   2.629 0.00856 **
```

```

## government_action2          0.40258      0.22473      1.791      0.07322 .
## government_action3          0.50004      0.23728      2.107      0.03508 *
## gender2                    1.15562      0.39986      2.890      0.00385 **
## age2                       0.06788      0.33360      0.203      0.83876
## age3                      -0.37997      0.34553     -1.100      0.27148
## age4                      -1.83908      0.75213     -2.445      0.01448 *
## government_action2:gender2 -0.25998      0.46240     -0.562      0.57395
## government_action3:gender2 -0.39483      0.47909     -0.824      0.40987
## government_action2:age2    -0.19654      0.38610     -0.509      0.61073
## government_action3:age2      0.33072      0.41516      0.797      0.42569
## government_action2:age3      0.12714      0.39045      0.326      0.74470
## government_action3:age3      0.57669      0.40983      1.407      0.15939
## government_action2:age4      1.25175      0.83191      1.505      0.13241
## government_action3:age4      0.94310      0.81512      1.157      0.24727
## gender2:age2              -0.88157      0.56391     -1.563      0.11798
## gender2:age3              -0.98281      0.57697     -1.703      0.08849 .
## gender2:age4              -0.02256      1.10556     -0.020      0.98372
## government_action2:gender2:age2 0.91938      0.66692      1.379      0.16803
## government_action3:gender2:age2 0.38579      0.69507      0.555      0.57886
## government_action2:gender2:age3 0.67363      0.65905      1.022      0.30672
## government_action3:gender2:age3 0.57511      0.68261      0.843      0.39950
## government_action2:gender2:age4 -0.81164      1.20877     -0.671      0.50193
## government_action3:gender2:age4 0.23967      1.21472      0.197      0.84359
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: loge(P[Y=2]/P[Y=1]), loge(P[Y=3]/P[Y=2])
##
## Residual deviance: 17.373 on 23 degrees of freedom
##
## Log-likelihood: -90.6405 on 23 degrees of freedom
##
## Number of iterations: 4
##
## No Hauck-Donner effect found in any of the estimates
## [1] 231.281
## [1] 260.7324
## [1] 17.37301
## [1] -90.64052
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action *
##       gender * age - government_action:gender:age, family = acat(parallel = TRUE),
##       data = round8)
##
##
## Pearson residuals:
##               Min        1Q      Median        3Q       Max
## loge(P[Y=2]/P[Y=1]) -1.592 -0.4192  0.07509  0.6112  0.974
## loge(P[Y=3]/P[Y=2]) -1.006 -0.4917 -0.08549  0.6121  1.254
##

```

```

## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept):1      0.9677    0.2020   4.790 1.67e-06 ***
## (Intercept):2      0.5973    0.1854   3.222  0.00127 **
## government_action2    0.2994    0.2065   1.450  0.14699
## government_action3    0.4089    0.2171   1.883  0.05967 .
## gender2              0.8359    0.2551   3.277  0.00105 **
## age2                 -0.1244    0.2753  -0.452  0.65152
## age3                 -0.5581    0.2822  -1.977  0.04801 *
## age4                 -1.6312    0.5394  -3.024  0.00249 **
## government_action2:gender2  0.1474    0.2580   0.571  0.56791
## government_action3:gender2 -0.0363    0.2685  -0.135  0.89248
## government_action2:age2    0.1092    0.3077   0.355  0.72263
## government_action3:age2    0.4465    0.3261   1.369  0.17094
## government_action2:age3    0.3506    0.3081   1.138  0.25508
## government_action3:age3    0.7681    0.3216   2.389  0.01692 *
## government_action2:age4    0.7131    0.5745   1.241  0.21447
## government_action3:age4    0.9779    0.5747   1.702  0.08883 .
## gender2:age2          -0.3143    0.2400  -1.309  0.19037
## gender2:age3          -0.4516    0.2216  -2.038  0.04155 *
## gender2:age4          -0.3098    0.3280  -0.945  0.34486
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: loge(P[Y=2]/P[Y=1]), loge(P[Y=3]/P[Y=2])
##
## Residual deviance: 24.1722 on 29 degrees of freedom
##
## Log-likelihood: -94.0401 on 29 degrees of freedom
##
## Number of iterations: 4
##
## No Hauck-Donner effect found in any of the estimates
## [1] 226.0803
## [1] 248.4633
## [1] 24.17223
## [1] -94.04013
## [1] 0.3398151
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action *
##   gender * age - government_action:gender:age - government_action:gender,
##   family = acat(parallel = TRUE), data = round8)
##
##
## Pearson residuals:
##               Min      1Q   Median     3Q      Max
## loge(P[Y=2]/P[Y=1]) -1.5319 -0.5399  0.08844 0.6537 1.033
## loge(P[Y=3]/P[Y=2]) -0.8964 -0.6912 -0.05499 0.6581 1.332
##

```

```

## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept):1      0.9517    0.1946   4.891 1.00e-06 ***
## (Intercept):2      0.5832    0.1773   3.290 0.00100 **
## government_action2  0.3389    0.1946   1.742 0.08157 .
## government_action3  0.3979    0.2042   1.949 0.05131 .
## gender2            0.8908    0.1613   5.523 3.34e-08 ***
## age2              -0.1358    0.2732  -0.497 0.61905
## age3              -0.5714    0.2787  -2.050 0.04033 *
## age4              -1.6369    0.5388  -3.038 0.00238 **
## government_action2:age2  0.1284    0.3053   0.420 0.67419
## government_action3:age2  0.4486    0.3245   1.382 0.16691
## government_action2:age3  0.3738    0.3047   1.227 0.21987
## government_action3:age3  0.7655    0.3185   2.404 0.01623 *
## government_action2:age4  0.7496    0.5729   1.309 0.19070
## government_action3:age4  0.9672    0.5739   1.685 0.09191 .
## gender2:age2        -0.3086    0.2398  -1.287 0.19806
## gender2:age3        -0.4456    0.2209  -2.017 0.04367 *
## gender2:age4        -0.3167    0.3266  -0.970 0.33213
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: loge(P[Y=2]/P[Y=1]), loge(P[Y=3]/P[Y=2])
##
## Residual deviance: 25.1235 on 31 degrees of freedom
##
## Log-likelihood: -94.5158 on 31 degrees of freedom
##
## Number of iterations: 4
##
## No Hauck-Donner effect found in any of the estimates
## [1] 223.0316
## [1] 243.0585
## [1] 25.12355
## [1] -94.51579
## [1] 0.6214749
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action *
##   gender * age - government_action:gender:age - government_action:gender -
##   gender:age, family = acat(parallel = TRUE), data = round8)
##
##
## Pearson residuals:
##               Min      1Q  Median      3Q      Max
## loge(P[Y=2]/P[Y=1]) -1.808 -0.6272  0.1422  0.5068  1.159
## loge(P[Y=3]/P[Y=2]) -1.080 -0.5847 -0.0755  0.6096  1.398
##
## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)

```

```

## (Intercept):1      1.02047    0.19158    5.327 1.00e-07 ***
## (Intercept):2      0.65790    0.17256    3.813 0.000137 ***
## government_action2  0.34302    0.19312    1.776 0.075704 .
## government_action3  0.40046    0.20271    1.976 0.048201 *
## gender2            0.63513    0.08956    7.091 1.33e-12 ***
## age2              -0.23089    0.25852   -0.893 0.371777
## age3              -0.72954    0.26765   -2.726 0.006416 **
## age4              -1.73498    0.52346   -3.314 0.000918 ***
## government_action2:age2 0.12617    0.30460    0.414 0.678707
## government_action3:age2 0.44946    0.32364    1.389 0.164905
## government_action2:age3 0.38066    0.30530    1.247 0.212465
## government_action3:age3 0.77286    0.31897    2.423 0.015394 *
## government_action2:age4 0.73718    0.57276    1.287 0.198070
## government_action3:age4 0.96029    0.57448    1.672 0.094607 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: loge(P[Y=2]/P[Y=1]), loge(P[Y=3]/P[Y=2])
##
## Residual deviance: 29.4483 on 34 degrees of freedom
##
## Log-likelihood: -96.6782 on 34 degrees of freedom
##
## Number of iterations: 4
##
## No Hauck-Donner effect found in any of the estimates
## [1] 221.3563
## [1] 237.8491
## [1] 29.44829
## [1] -96.67817
## [1] 0.2284659
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action +
##   gender + age, family = acat(parallel = TRUE), data = round8)
##
##
## Pearson residuals:
##               Min       1Q   Median       3Q      Max
## loge(P[Y=2]/P[Y=1]) -1.093 -0.5604 -0.2221  0.5540  1.219
## loge(P[Y=3]/P[Y=2]) -1.736 -0.7206 -0.1136  0.8067  1.963
##
## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept):1    0.81260    0.14946    5.437 5.42e-08 ***
## (Intercept):2    0.46671    0.13070    3.571 0.000356 ***
## government_action2 0.49701    0.12138    4.095 4.23e-05 ***
## government_action3 0.78678    0.12851    6.122 9.22e-10 ***
## gender2          0.63248    0.08910    7.099 1.26e-12 ***
## age2            -0.02698    0.11210   -0.241 0.809827

```



```

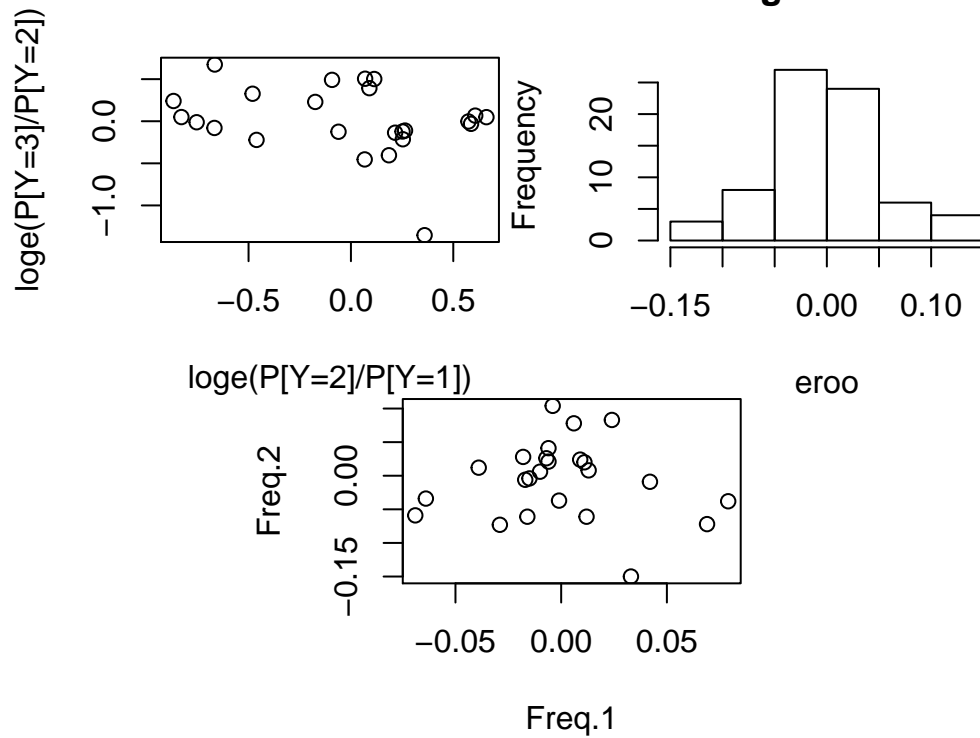
## age3          -0.27201    0.10424   -2.609 0.009071 **
## age4          -1.00867    0.16044   -6.287 3.24e-10 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: loge(P[Y=2]/P[Y=1]), loge(P[Y=3]/P[Y=2])
##
## Residual deviance: 37.6601 on 40 degrees of freedom
##
## Log-likelihood: -100.7841 on 40 degrees of freedom
##
## Number of iterations: 4
##
## No Hauck-Donner effect found in any of the estimates
## [1] 217.5682
## [1] 226.9926
## [1] 37.66011
## [1] -100.7841
## [1] 0.2229919
##      loge(P[Y=2]/P[Y=1]) loge(P[Y=3]/P[Y=2])
## 1      -0.86656725      0.240484132
## 2       0.25352712     -0.214009421
## 3       0.21579577     -0.136032225
## 10      0.09006828      0.392781879
## 11      0.66182697      0.048670518
## 12      0.58665056     -0.030632846
## 19     -0.66507078      0.673863946
## 20     -0.06066373     -0.124678206
## 21     -0.17430316      0.229500008
## 28     -0.75358832     -0.011806373
## 29      0.60714569      0.066629746
## 30     -0.46106634     -0.221819912
## 37     -0.09218290      0.491276694
## 38      0.26417751     -0.110825489
## 39     -0.48039691      0.326521407
## 46      0.06722015     -0.453553879
## 47      0.25206186     -0.121731348
## 48     -0.66670936     -0.079706370
## 55      0.35984399     -1.353515429
## 56      0.11386135      0.501463553
## 57      0.18560312     -0.404155649
## 64      0.06933382      0.504872956
## 65     -0.82802656      0.049545124
## 66      0.57391280     -0.002617181
##      Freq.1 Freq.2 Freq.3 Freq.1 Freq.2 Freq.3
## 1      0.179 0.232 0.589 0.110 0.304 0.587
## 2      0.058 0.292 0.649 0.064 0.251 0.684
## 3      0.052 0.269 0.679 0.059 0.243 0.699
## 10     0.024 0.146 0.829 0.040 0.207 0.754
## 11     0.007 0.155 0.838 0.022 0.159 0.819

```

## 12	0.009	0.158	0.833	0.019	0.152	0.828		
## 19	0.185	0.185	0.630	0.152	0.335	0.513		
## 20	0.087	0.288	0.625	0.076	0.268	0.656		
## 21	0.040	0.172	0.788	0.041	0.209	0.750		
## 28	0.100	0.233	0.667	0.058	0.242	0.700		
## 29	0.009	0.167	0.824	0.026	0.173	0.801		
## 30	0.022	0.151	0.828	0.013	0.127	0.860		
## 37	0.250	0.300	0.450	0.279	0.373	0.348		
## 38	0.092	0.333	0.575	0.110	0.305	0.585		
## 39	0.067	0.175	0.758	0.055	0.236	0.710		
## 46	0.150	0.400	0.450	0.126	0.317	0.557		
## 47	0.034	0.229	0.737	0.040	0.208	0.752		
## 48	0.031	0.155	0.814	0.018	0.147	0.835		
## 55	0.600	0.400	0.000	0.604	0.296	0.101		
## 56	0.188	0.312	0.500	0.257	0.371	0.372		
## 57	0.190	0.429	0.381	0.184	0.351	0.466		
## 64	0.333	0.333	0.333	0.397	0.367	0.236		
## 65	0.192	0.269	0.538	0.113	0.307	0.581		
## 66	0.034	0.276	0.690	0.073	0.264	0.662		
##	government_action	gender	age	Freq.1	Freq.2	Freq.3	Freq.1.1	Freq.2.1
## 1		1	1	0.179	0.232	0.589	0.11	0.30
## 2		2	1	0.058	0.292	0.649	0.06	0.25
## 3		3	1	0.052	0.269	0.679	0.06	0.24
## 10		1	2	0.024	0.146	0.829	0.04	0.21
## 11		2	2	0.007	0.155	0.838	0.02	0.16
## 12		3	2	0.009	0.158	0.833	0.02	0.15
## 19		1	1	2	0.185	0.185	0.630	0.15
## 20		2	1	2	0.087	0.288	0.625	0.08
## 21		3	1	2	0.040	0.172	0.788	0.04
## 28		1	2	2	0.100	0.233	0.667	0.06
## 29		2	2	2	0.009	0.167	0.824	0.03
## 30		3	2	2	0.022	0.151	0.828	0.01
## 37		1	1	3	0.250	0.300	0.450	0.28
## 38		2	1	3	0.092	0.333	0.575	0.11
## 39		3	1	3	0.067	0.175	0.758	0.05
## 46		1	2	3	0.150	0.400	0.450	0.13
## 47		2	2	3	0.034	0.229	0.737	0.04
## 48		3	2	3	0.031	0.155	0.814	0.02
## 55		1	1	4	0.600	0.400	0.000	0.60
## 56		2	1	4	0.188	0.312	0.500	0.26
## 57		3	1	4	0.190	0.429	0.381	0.18
## 64		1	2	4	0.333	0.333	0.333	0.40
## 65		2	2	4	0.192	0.269	0.538	0.11
## 66		3	2	4	0.034	0.276	0.690	0.07
##	Freq.3.1	loge.P.Y.2..P.Y.1..	loge.P.Y.3..P.Y.2..					
## 1	0.59	-0.87	0.24					
## 2	0.68	0.25	-0.21					
## 3	0.70	0.22	-0.14					
## 10	0.75	0.09	0.39					
## 11	0.82	0.66	0.05					
## 12	0.83	0.59	-0.03					
## 19	0.51	-0.67	0.67					
## 20	0.66	-0.06	-0.12					
## 21	0.75	-0.17	0.23					

## 28	0.70	-0.75	-0.01
## 29	0.80	0.61	0.07
## 30	0.86	-0.46	-0.22
## 37	0.35	-0.09	0.49
## 38	0.58	0.26	-0.11
## 39	0.71	-0.48	0.33
## 46	0.56	0.07	-0.45
## 47	0.75	0.25	-0.12
## 48	0.83	-0.67	-0.08
## 55	0.10	0.36	-1.35
## 56	0.37	0.11	0.50
## 57	0.47	0.19	-0.40
## 64	0.24	0.07	0.50
## 65	0.58	-0.83	0.05
## 66	0.66	0.57	0.00

Histogram of eroo



```
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action +
##   caused_by + gender + age, family = cumulative(parallel = TRUE),
##   data = round8_2)
##
##
## Pearson residuals:
##           Min       1Q   Median       3Q      Max
## logit(P[Y<=1]) -1.496 -0.6481 -0.07881 0.5458 3.032
## logit(P[Y<=2]) -2.868 -0.5440  0.05282 0.7047 2.194
##
## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
```

```

## (Intercept):1      -0.7847      0.2536    -3.094  0.00197 **
## (Intercept):2       1.1724      0.2502     4.686  2.78e-06 ***
## government_action2  -0.6705      0.1647    -4.070  4.70e-05 ***
## government_action3  -1.0652      0.1717    -6.205  5.49e-10 ***
## caused_by2         -0.8666      0.2074    -4.177  2.95e-05 ***
## caused_by3         -1.5255      0.2102    -7.257  3.97e-13 ***
## gender2            -0.7311      0.1120    -6.528  6.69e-11 ***
## age2               -0.0681      0.1433    -0.475  0.63466
## age3               0.1685      0.1361     1.238  0.21583
## age4               1.0898      0.2190     4.976  6.49e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors:  2
##
## Names of linear predictors: logit(P[Y<=1]), logit(P[Y<=2])
##
## Residual deviance: 157.193 on 128 degrees of freedom
##
## Log-likelihood: -218.1362 on 128 degrees of freedom
##
## Number of iterations: 5
##
## No Hauck-Donner effect found in any of the estimates
##
## Exponentiated coefficients:
## government_action2 government_action3      caused_by2
##      0.5114711      0.3446438      0.4203625
##      caused_by3      gender2      age2
##      0.2175170      0.4813706      0.9341643
##      age3      age4
##      1.1834912      2.9736579
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action +
##      caused_by + gender + age, family = acat(parallel = TRUE),
##      data = round8_2)
##
##
## Pearson residuals:
##           Min      1Q   Median      3Q      Max
## loge(P[Y=2]/P[Y=1]) -2.735 -0.5455  0.04930 0.7526 1.617
## loge(P[Y=3]/P[Y=2]) -2.551 -0.7828 -0.05219 0.7271 2.781
##
## Coefficients:
##           Estimate Std. Error z value Pr(>|z|)
## (Intercept):1    -0.02528   0.19429  -0.130   0.8965
## (Intercept):2    -0.47921   0.19802  -2.420   0.0155 *
## government_action2  0.57674   0.12515   4.608  4.06e-06 ***
## government_action3  0.87078   0.13238   6.578  4.76e-11 ***
## caused_by2        0.63648   0.15142   4.203  2.63e-05 ***
## caused_by3        1.10688   0.15603   7.094  1.30e-12 ***
## gender2           0.60454   0.09084   6.655  2.83e-11 ***
## age2              0.02985   0.11474   0.260   0.7947

```

```

## age3          -0.17229    0.10792   -1.596    0.1104
## age4          -0.87859    0.16463   -5.337  9.47e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors:  2
##
## Names of linear predictors: loge(P[Y=2]/P[Y=1]), loge(P[Y=3]/P[Y=2])
##
## Residual deviance: 152.6377 on 128 degrees of freedom
##
## Log-likelihood: -215.8586 on 128 degrees of freedom
##
## Number of iterations: 4
##
## No Hauck-Donner effect found in any of the estimates
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action +
##      caused_by + gender + age, family = cratio(parallel = TRUE),
##      data = round8_2)
##
##
## Pearson residuals:
##              Min        1Q        Median        3Q        Max
## logit(P[Y>1|Y>=1]) -3.220 -0.6733  8.785e-02 0.6597 1.451
## logit(P[Y>2|Y>=2]) -2.233 -0.5611 -2.992e-06 0.7199 2.780
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept):1    0.88994    0.23637   3.765 0.000166 ***
## (Intercept):2   -0.83398    0.23532  -3.544 0.000394 ***
## government_action2 0.62689    0.15468   4.053 5.06e-05 ***
## government_action3 1.00723    0.16182   6.224 4.83e-10 ***
## caused_by2       0.80459    0.19047   4.224 2.40e-05 ***
## caused_by3       1.44165    0.19394   7.434 1.06e-13 ***
## gender2          0.69507    0.10704   6.493 8.39e-11 ***
## age2             0.06905    0.13691   0.504 0.614011
## age3            -0.15076    0.12963  -1.163 0.244820
## age4            -1.00337    0.20406  -4.917 8.79e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors:  2
##
## Names of linear predictors: logit(P[Y>1|Y>=1]), logit(P[Y>2|Y>=2])
##
## Residual deviance: 159.0633 on 128 degrees of freedom
##
## Log-likelihood: -219.0714 on 128 degrees of freedom
##
## Number of iterations: 5
##
## No Hauck-Donner effect found in any of the estimates

```

```
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action +
##      caused_by + gender + age, family = cumulative(link = probit,
##      parallel = TRUE), data = round8_2)
##
##
## Pearson residuals:
##           Min      1Q   Median     3Q      Max
## probit(P[Y<=1]) -1.440 -0.7000 -0.03504 0.590 2.678
## probit(P[Y<=2]) -2.682 -0.7239  0.07042 0.719 2.476
##
## Coefficients:
##           Estimate Std. Error z value Pr(>|z|)
## (Intercept):1    -0.41495    0.14866  -2.791  0.00525 **
## (Intercept):2     0.65742    0.14851   4.427 9.56e-06 ***
## government_action2 -0.41765    0.09667  -4.321 1.56e-05 ***
## government_action3 -0.63075    0.09981  -6.320 2.62e-10 ***
## caused_by2        -0.51318    0.12391  -4.141 3.45e-05 ***
## caused_by3        -0.86725    0.12450  -6.966 3.26e-12 ***
## gender2           -0.42602    0.06385  -6.672 2.52e-11 ***
## age2              -0.02774    0.08175  -0.339  0.73432
## age3               0.11993    0.07828   1.532  0.12548
## age4               0.66572    0.12945   5.143 2.71e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: probit(P[Y<=1]), probit(P[Y<=2])
##
## Residual deviance: 153.8237 on 128 degrees of freedom
##
## Log-likelihood: -216.4516 on 128 degrees of freedom
##
## Number of iterations: 5
##
## No Hauck-Donner effect found in any of the estimates
##
## Exponentiated coefficients:
## government_action2 government_action3      caused_by2
##           0.6585944           0.5321903           0.5985886
##      caused_by3           gender2           age2
##           0.4201067           0.6531004           0.9726370
##           age3           age4
##           1.1274206           1.9458994
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action +
##      caused_by + gender + age, family = cumulative(link = cloglog,
##      parallel = TRUE), data = round8_2)
##
##
## Pearson residuals:
```

```

##               Min       1Q   Median     3Q      Max
## cloglog(P[Y<=1]) -1.583 -0.6540 -0.158372 0.7912 3.343
## cloglog(P[Y<=2]) -3.083 -0.6838  0.001681 0.7019 2.245
##
## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept):1      -1.16984    0.19650  -5.953 2.63e-09 ***
## (Intercept):2       0.56665    0.18160   3.120  0.00181 **
## government_action2  -0.53158    0.12916  -4.116 3.86e-05 ***
## government_action3  -0.87214    0.13651  -6.389 1.67e-10 ***
## caused_by2         -0.65411    0.14941  -4.378 1.20e-05 ***
## caused_by3         -1.22830    0.15411  -7.970 1.58e-15 ***
## gender2            -0.60460    0.09424  -6.415 1.41e-10 ***
## age2               -0.06494    0.12044  -0.539  0.58975
## age3               0.11522    0.11317   1.018  0.30861
## age4               0.80262    0.16727   4.798 1.60e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: cloglog(P[Y<=1]), cloglog(P[Y<=2])
##
## Residual deviance: 163.0013 on 128 degrees of freedom
##
## Log-likelihood: -221.0403 on 128 degrees of freedom
##
## Number of iterations: 6
##
## No Hauck-Donner effect found in any of the estimates
##
## Exponentiated coefficients:
## government_action2 government_action3      caused_by2
##      0.5876754      0.4180576      0.5199068
##      caused_by3      gender2      age2
##      0.2927894      0.5462919      0.9371230
##      age3      age4
##      1.1221192      2.2313712
##
##               AIC      BIC Deviance LogLikelihood
## Cumulative logit      456.2725 478.6135 157.1930      -218.1362
## Adjacent-categories logit 451.7171 474.0582 152.6377      -215.8586
## Continuation-Ratio logit 458.1428 480.4838 159.0633      -219.0714
## Cumulative probit      452.9032 475.2442 153.8237      -216.4516
## Cumulative clog-log      462.0807 484.4218 163.0013      -221.0403
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action +
##      caused_by + gender + age, family = acat(parallel = TRUE),
##      data = round8_2)
##
##
## Pearson residuals:
##               Min       1Q   Median     3Q      Max

```

```

## loge(P[Y=2]/P[Y=1]) -2.735 -0.5455 0.04930 0.7526 1.617
## loge(P[Y=3]/P[Y=2]) -2.551 -0.7828 -0.05219 0.7271 2.781
##
## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept):1    -0.02528   0.19429  -0.130   0.8965
## (Intercept):2    -0.47921   0.19802  -2.420   0.0155 *
## government_action2 0.57674   0.12515   4.608 4.06e-06 ***
## government_action3 0.87078   0.13238   6.578 4.76e-11 ***
## caused_by2        0.63648   0.15142   4.203 2.63e-05 ***
## caused_by3        1.10688   0.15603   7.094 1.30e-12 ***
## gender2           0.60454   0.09084   6.655 2.83e-11 ***
## age2              0.02985   0.11474   0.260   0.7947
## age3             -0.17229   0.10792  -1.596   0.1104
## age4             -0.87859   0.16463  -5.337 9.47e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: loge(P[Y=2]/P[Y=1]), loge(P[Y=3]/P[Y=2])
##
## Residual deviance: 152.6377 on 128 degrees of freedom
##
## Log-likelihood: -215.8586 on 128 degrees of freedom
##
## Number of iterations: 4
##
## No Hauck-Donner effect found in any of the estimates
## [1] 451.7171
## [1] 474.0582
## [1] 152.6377
## [1] -215.8586
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action +
##      caused_by + gender + age + caused_by * age, family = acat(parallel = TRUE),
##      data = round8_2)
##
##
## Pearson residuals:
##               Min       1Q   Median       3Q      Max
## loge(P[Y=2]/P[Y=1]) -2.067 -0.7845 -0.131787 0.7441 1.460
## loge(P[Y=3]/P[Y=2]) -1.633 -0.5621  0.008601 0.5024 2.242
##
## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept):1     0.12379   0.27683   0.447   0.6548
## (Intercept):2    -0.37806   0.27732  -1.363   0.1728
## government_action2 0.61035   0.12764   4.782 1.74e-06 ***
## government_action3 0.90618   0.13474   6.725 1.75e-11 ***
## caused_by2        0.26687   0.27279   0.978   0.3279
## caused_by3        1.15020   0.27351   4.205 2.61e-05 ***

```



```

## gender2          0.58087    0.09151    6.348 2.18e-10 ***
## age2             -0.64393    0.36317   -1.773  0.0762 .
## age3             -0.16184    0.36194   -0.447  0.6548
## age4             -0.66648    0.44663   -1.492  0.1356
## caused_by2:age2   0.96545    0.40192    2.402  0.0163 *
## caused_by3:age2   0.58133    0.40450    1.437  0.1507
## caused_by2:age3   0.28219    0.39118    0.721  0.4707
## caused_by3:age3  -0.33751    0.39882   -0.846  0.3974
## caused_by2:age4   0.40382    0.50961    0.792  0.4281
## caused_by3:age4  -1.00637    0.50877   -1.978  0.0479 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: loge(P[Y=2]/P[Y=1]), loge(P[Y=3]/P[Y=2])
##
## Residual deviance: 127.2337 on 122 degrees of freedom
##
## Log-likelihood: -203.1566 on 122 degrees of freedom
##
## Number of iterations: 4
##
## No Hauck-Donner effect found in any of the estimates
## [1] 438.3131
## [1] 474.0588
## [1] 127.2337
## [1] -203.1566
## [1] 0.000287368
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action +
##      caused_by + gender + age + caused_by * age + government_action:caused_by,
##      family = acat(parallel = TRUE), data = round8_2)
##
##
## Pearson residuals:
##              Min      1Q   Median      3Q      Max
## loge(P[Y=2]/P[Y=1]) -2.312 -0.6640 -0.09342  0.7433  1.438
## loge(P[Y=3]/P[Y=2]) -2.213 -0.7027  0.01096  0.4543  2.288
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept):1   -0.34389    0.44625   -0.771  0.440936
## (Intercept):2   -0.85559    0.45195   -1.893  0.058344 .
## government_action2  1.14153    0.49727    2.296  0.021700 *
## government_action3  1.71290    0.52424    3.267  0.001085 **
## caused_by2       0.70644    0.48428    1.459  0.144635
## caused_by3       1.70628    0.47337    3.605  0.000313 ***
## gender2          0.58410    0.09194    6.353  2.11e-10 ***
## age2             -0.73956    0.38790   -1.907  0.056575 .
## age3             -0.29916    0.39099   -0.765  0.444198

```

```

## age4 -0.89053 0.47971 -1.856 0.063400 .
## caused_by2:age2 1.06334 0.42436 2.506 0.012219 *
## caused_by3:age2 0.68202 0.42710 1.597 0.110299
## caused_by2:age3 0.42238 0.41828 1.010 0.312588
## caused_by3:age3 -0.18541 0.42670 -0.435 0.663907
## caused_by2:age4 0.62941 0.53925 1.167 0.243133
## caused_by3:age4 -0.77121 0.53917 -1.430 0.152616
## government_action2:caused_by2 -0.46657 0.53386 -0.874 0.382145
## government_action3:caused_by2 -0.80561 0.56002 -1.439 0.150283
## government_action2:caused_by3 -0.65090 0.52873 -1.231 0.218302
## government_action3:caused_by3 -0.90865 0.55778 -1.629 0.103307
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: loge(P[Y=2]/P[Y=1]), loge(P[Y=3]/P[Y=2])
##
## Residual deviance: 123.8691 on 118 degrees of freedom
##
## Log-likelihood: -201.4743 on 118 degrees of freedom
##
## Number of iterations: 4
##
## No Hauck-Donner effect found in any of the estimates
## [1] 0.4987669
## [1] 442.9486
## [1] 487.6307
## [1] 123.8691
## [1] -201.4743
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action +
## caused_by + gender + age + caused_by * age + government_action:age,
## family = acat(parallel = TRUE), data = round8_2)
##
##
## Pearson residuals:
## Min 1Q Median 3Q Max
## loge(P[Y=2]/P[Y=1]) -2.099 -0.6989 0.03350 0.7244 1.460
## loge(P[Y=3]/P[Y=2]) -1.756 -0.4996 0.05313 0.4219 1.986
##
## Coefficients:
## Estimate Std. Error z value Pr(>|z|)
## (Intercept):1 0.29998 0.29778 1.007 0.31375
## (Intercept):2 -0.21547 0.29573 -0.729 0.46626
## government_action2 0.47164 0.20318 2.321 0.02027 *
## government_action3 0.57157 0.21379 2.673 0.00751 **
## caused_by2 0.29776 0.27109 1.098 0.27205
## caused_by3 1.13896 0.27111 4.201 2.66e-05 ***
## gender 0.58239 0.09192 6.336 2.36e-10 ***
## age2 -0.80504 0.44136 -1.824 0.06815 .

```

```

## age3                -0.55924    0.44827   -1.248   0.21220
## age4                -1.34539    0.70976   -1.896   0.05802 .
## caused_by2:age2      0.93564    0.40100    2.333   0.01963 *
## caused_by3:age2      0.59346    0.40418    1.468   0.14203
## caused_by2:age3      0.26231    0.39188    0.669   0.50326
## caused_by3:age3     -0.30635    0.39987   -0.766   0.44360
## caused_by2:age4      0.42187    0.51398    0.821   0.41177
## caused_by3:age4     -0.92912    0.51431   -1.807   0.07083 .
## government_action2:age2 0.11728    0.32067    0.366   0.71455
## government_action3:age2 0.34614    0.33897    1.021   0.30719
## government_action2:age3 0.31911    0.31607    1.010   0.31268
## government_action3:age3 0.66842    0.32988    2.026   0.04274 *
## government_action2:age4 0.63084    0.59006    1.069   0.28502
## government_action3:age4 0.85567    0.59457    1.439   0.15011
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: loge(P[Y=2]/P[Y=1]), loge(P[Y=3]/P[Y=2])
##
## Residual deviance: 121.535 on 116 degrees of freedom
##
## Log-likelihood: -200.3072 on 116 degrees of freedom
##
## Number of iterations: 4
##
## No Hauck-Donner effect found in any of the estimates
## [1] 0.4577788
## [1] 444.6145
## [1] 493.7648
## [1] 121.535
## [1] -200.3072
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action +
##      caused_by + gender + age + caused_by * age + gender:age,
##      family = acat(parallel = TRUE), data = round8_2)
##
## Pearson residuals:
##               Min       1Q   Median       3Q      Max
## loge(P[Y=2]/P[Y=1]) -1.925 -0.6465 -0.21333  0.7273  1.619
## loge(P[Y=3]/P[Y=2]) -1.499 -0.7266 -0.06135  0.5062  2.120
##
## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept):1    0.05062   0.28123   0.180   0.8572
## (Intercept):2   -0.45810   0.28267  -1.621   0.1051
## government_action2 0.60735   0.12791   4.748 2.05e-06 ***
## government_action3 0.90427   0.13497   6.700 2.08e-11 ***
## caused_by2        0.26266   0.27604   0.952   0.3413

```

```

## caused_by3      1.14002    0.27652    4.123 3.74e-05 ***
## gender2         0.86366    0.16519    5.228 1.71e-07 ***
## age2            -0.54106    0.36972   -1.463  0.1433
## age3            -0.03480    0.36841   -0.094  0.9247
## age4            -0.54657    0.46627   -1.172  0.2411
## caused_by2:age2  0.98915    0.40486    2.443  0.0146 *
## caused_by3:age2  0.61193    0.40747    1.502  0.1332
## caused_by2:age3  0.30665    0.39285    0.781  0.4350
## caused_by3:age3 -0.30105    0.40059   -0.752  0.4523
## caused_by2:age4  0.42643    0.51273    0.832  0.4056
## caused_by3:age4 -0.99608    0.50892   -1.957  0.0503 .
## gender2:age2     -0.38730    0.24814   -1.561  0.1186
## gender2:age3     -0.44910    0.22507   -1.995  0.0460 *
## gender2:age4     -0.37719    0.33467   -1.127  0.2597
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: loge(P[Y=2]/P[Y=1]), loge(P[Y=3]/P[Y=2])
##
## Residual deviance: 122.5739 on 119 degrees of freedom
##
## Log-likelihood: -200.8267 on 119 degrees of freedom
##
## Number of iterations: 4
##
## No Hauck-Donner effect found in any of the estimates
## [1] 0.1984761
## [1] 439.6534
## [1] 482.1014
## [1] 122.5739
## [1] -200.8267
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action +
##      caused_by + gender + age + caused_by * age + caused_by:gender,
##      family = acat(parallel = TRUE), data = round8_2)
##
##
## Pearson residuals:
##              Min      1Q   Median      3Q      Max
## loge(P[Y=2]/P[Y=1]) -2.125 -0.6259 -0.07597 0.7178 1.452
## loge(P[Y=3]/P[Y=2]) -1.553 -0.6148 -0.10202 0.5842 2.230
##
## Coefficients:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept):1    0.03472   0.29032   0.120  0.9048
## (Intercept):2   -0.47229   0.29258  -1.614  0.1065
## government_action2 0.61232   0.12779   4.792 1.65e-06 ***
## government_action3 0.90505   0.13487   6.710 1.94e-11 ***
## caused_by2        0.35432   0.29141   1.216  0.2240

```

```

## caused_by3      1.27181    0.29398    4.326 1.52e-05 ***
## gender2         0.91178    0.32406    2.814 0.0049 **
## age2            -0.62574    0.36872   -1.697 0.0897 .
## age3            -0.15449    0.36745   -0.420 0.6742
## age4            -0.71267    0.45832   -1.555 0.1200
## caused_by2:age2  0.94657    0.40692    2.326 0.0200 *
## caused_by3:age2  0.56709    0.40944    1.385 0.1660
## caused_by2:age3  0.27418    0.39634    0.692 0.4891
## caused_by3:age3 -0.33928    0.40385   -0.840 0.4008
## caused_by2:age4  0.44600    0.52128    0.856 0.3922
## caused_by3:age4 -0.95509    0.51886   -1.841 0.0657 .
## caused_by2:gender2 -0.31673    0.34782   -0.911 0.3625
## caused_by3:gender2 -0.41188    0.35206   -1.170 0.2420
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: loge(P[Y=2]/P[Y=1]), loge(P[Y=3]/P[Y=2])
##
## Residual deviance: 125.7971 on 120 degrees of freedom
##
## Log-likelihood: -202.4383 on 120 degrees of freedom
##
## Number of iterations: 4
##
## No Hauck-Donner effect found in any of the estimates
## [1] 0.4875938
## [1] 440.8766
## [1] 481.0905
## [1] 125.7971
## [1] -202.4383
##
## Call:
## vglm(formula = cbind(Freq.1, Freq.2, Freq.3) ~ government_action +
##      caused_by + gender + age + caused_by * age + government_action:gender,
##      family = acat(parallel = TRUE), data = round8_2)
##
##
## Pearson residuals:
##               Min       1Q   Median       3Q      Max
## loge(P[Y=2]/P[Y=1]) -2.002 -0.7487 -0.10647  0.7494  1.472
## loge(P[Y=3]/P[Y=2]) -1.668 -0.5166  0.04558  0.4592  2.274
##
## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept):1      0.13672    0.28671   0.477 0.633452
## (Intercept):2     -0.36622    0.28731  -1.275 0.202443
## government_action2   0.57127    0.16129   3.542 0.000397 ***
## government_action3   0.91560    0.16997   5.387 7.17e-08 ***
## caused_by2          0.27085    0.27295   0.992 0.321048
## caused_by3          1.15307    0.27362   4.214 2.51e-05 ***

```

```

## gender2                0.54148    0.22210    2.438 0.014768 *
## age2                   -0.63815    0.36359   -1.755 0.079235 .
## age3                   -0.15598    0.36224   -0.431 0.666766
## age4                   -0.66070    0.44657   -1.480 0.139006
## caused_by2:age2        0.96070    0.40223    2.388 0.016921 *
## caused_by3:age2        0.57379    0.40492    1.417 0.156468
## caused_by2:age3        0.27808    0.39144    0.710 0.477450
## caused_by3:age3       -0.34526    0.39920   -0.865 0.387106
## caused_by2:age4        0.39872    0.50964    0.782 0.434004
## caused_by3:age4       -1.01912    0.50907   -2.002 0.045293 *
## government_action2:gender2 0.10283    0.25732    0.400 0.689441
## government_action3:gender2 -0.02608    0.26743   -0.098 0.922319
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors: 2
##
## Names of linear predictors: loge(P[Y=2]/P[Y=1]), loge(P[Y=3]/P[Y=2])
##
## Residual deviance: 126.7741 on 120 degrees of freedom
##
## Log-likelihood: -202.9268 on 120 degrees of freedom
##
## Number of iterations: 4
##
## No Hauck-Donner effect found in any of the estimates
## [1] 0.7947066
## [1] 441.8536
## [1] 482.0675
## [1] 126.7741
## [1] -202.9268
##      loge(P[Y=2]/P[Y=1]) loge(P[Y=3]/P[Y=2])
## 1      3.783521e-01      -1.541251e+00
## 2      1.028023e+00      3.301918e-01
## 3     -6.112827e-01      -1.076315e+00
## 10     -6.806754e-01      3.437286e-01
## 11      6.999667e-01      -5.055202e-01
## 12      6.173290e-01      -5.030383e-01
## 19     -6.285793e-01      5.509446e-01
## 20     -7.074468e-01      1.644384e-02
## 21     -4.912956e-01      -5.279430e-02
## 28      1.359551e+00      -2.495683e-01
## 29      5.872364e-01      7.148423e-01
## 30      1.057735e+00      -1.091470e-02
## 37     -1.604241e-05      1.861846e+00
## 38      1.061701e+00      -1.286741e-02
## 39      3.068666e-01      -1.456992e-01
## 46     -2.118021e-01      3.012973e-01
## 47     -6.350770e-02      1.006177e-01
## 48      1.233426e+00      -2.512267e-01
## 55     -1.808368e+00      1.016725e-05
## 56     -3.447677e-01      -2.298601e-01

```

## 57	1.285191e+00	1.577979e-01
## 64	-7.073471e-01	4.227509e-01
## 65	7.147868e-01	-3.520745e-01
## 66	-3.284580e-01	3.348798e-01
## 73	-7.018121e-02	6.650523e-01
## 74	-3.588155e-01	3.739483e-02
## 75	-1.116796e+00	2.025329e-01
## 82	2.584395e+00	-2.584400e+00
## 83	8.985078e-01	6.187396e-01
## 84	-3.908332e+00	9.334709e-01
## 91	9.533993e-02	-1.000251e-01
## 92	1.240592e+00	-2.631537e-01
## 93	1.478340e+00	-5.456710e-01
## 100	-3.002258e+00	3.906352e-01
## 101	-5.004731e-01	1.506867e-01
## 102	-1.944468e+00	6.282646e-04
## 109	-2.523720e+00	6.531398e-06
## 110	-9.804206e-01	1.745060e-01
## 111	8.177317e-01	5.996261e-01
## 118	-2.027787e-04	-2.253568e-01
## 119	6.425678e-01	-2.597764e-01
## 120	-8.296201e-01	4.232941e-01
## 127	-4.636669e-01	1.112280e+00
## 128	-8.808833e-02	1.467301e-02
## 129	-2.383856e-01	4.012166e-01
## 137	1.293471e+00	-2.819399e-01
## 138	1.525243e+00	-6.379141e-01
## 145	7.047182e-01	-1.164131e+00
## 146	8.119156e-02	7.477468e-02
## 147	-6.468032e-01	7.873084e-02
## 154	-1.559587e+00	-1.458416e-01
## 155	-1.250788e-01	-3.430615e-01
## 156	-7.068122e-01	2.629241e-01
## 164	-9.813022e-01	-8.607847e-01
## 165	1.283013e+00	1.903909e-01
## 172	-1.753332e-01	-1.283967e+00
## 173	3.920913e-01	1.465005e+00
## 174	2.038935e+00	-1.440278e+00
## 181	-3.303540e-01	-9.654631e-01
## 182	7.520704e-01	-1.390338e-01
## 183	-8.636604e-01	2.318850e-01
## 191	-1.223402e+00	-1.340400e+00
## 192	7.363714e-01	6.828332e-01
## 199	-1.448505e-05	2.213164e+00
## 200	-3.487153e-01	-6.849240e-01
## 201	-2.295957e-01	1.337835e-01
## 208	-2.555014e-01	-1.279931e+00
## 209	-1.369280e+00	1.622838e+00
## 210	1.567097e+00	-6.952298e-01
##	Freq.1 Freq.2 Freq.3 Freq.1 Freq.2 Freq.3	
## 1	0.400 0.600 0.000 0.344 0.389 0.267	
## 2	0.000 0.375 0.625 0.175 0.365 0.460	
## 3	0.250 0.500 0.250 0.117 0.328 0.555	
## 10	0.364 0.273 0.364 0.263 0.389 0.348	

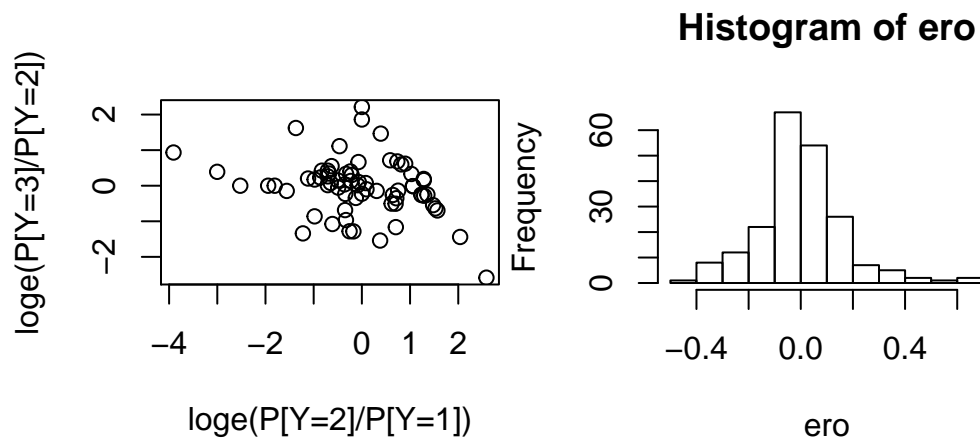
## 11	0.081	0.452	0.468	0.122	0.332	0.546
## 12	0.059	0.392	0.549	0.078	0.287	0.635
## 19	0.100	0.175	0.725	0.081	0.290	0.628
## 20	0.050	0.188	0.762	0.030	0.195	0.776
## 21	0.027	0.160	0.813	0.017	0.155	0.828
## 28	0.000	0.500	0.500	0.182	0.368	0.450
## 29	0.000	0.167	0.833	0.076	0.284	0.640
## 30	0.000	0.250	0.750	0.047	0.236	0.716
## 37	0.000	0.000	1.000	0.127	0.336	0.537
## 38	0.000	0.256	0.744	0.050	0.241	0.710
## 39	0.024	0.220	0.756	0.030	0.196	0.774
## 46	0.030	0.152	0.818	0.031	0.199	0.770
## 47	0.010	0.111	0.879	0.010	0.122	0.868
## 48	0.000	0.116	0.884	0.006	0.094	0.900
## 55	1.000	0.000	0.000	0.553	0.329	0.118
## 56	0.455	0.364	0.182	0.355	0.388	0.257
## 57	0.000	0.500	0.500	0.264	0.389	0.347
## 64	0.250	0.250	0.500	0.180	0.367	0.453
## 65	0.043	0.362	0.596	0.075	0.283	0.642
## 66	0.050	0.175	0.775	0.047	0.235	0.718
## 73	0.059	0.176	0.765	0.089	0.300	0.610
## 74	0.043	0.196	0.761	0.033	0.204	0.763
## 75	0.038	0.132	0.830	0.020	0.163	0.818
## 82	0.000	1.000	0.000	0.364	0.387	0.249
## 83	0.000	0.333	0.667	0.190	0.371	0.439
## 84	0.500	0.000	0.500	0.128	0.336	0.536
## 91	0.077	0.308	0.615	0.079	0.287	0.634
## 92	0.000	0.238	0.762	0.029	0.192	0.779
## 93	0.000	0.225	0.775	0.017	0.152	0.831
## 100	0.125	0.125	0.750	0.035	0.208	0.757
## 101	0.016	0.111	0.873	0.012	0.129	0.860
## 102	0.020	0.098	0.882	0.007	0.099	0.894
## 109	1.000	0.000	0.000	0.396	0.381	0.222
## 110	0.364	0.273	0.364	0.214	0.379	0.407
## 111	0.000	0.286	0.714	0.147	0.349	0.504
## 118	0.250	0.417	0.333	0.230	0.383	0.387
## 119	0.059	0.382	0.559	0.102	0.314	0.584
## 120	0.097	0.177	0.726	0.065	0.267	0.668
## 127	0.143	0.143	0.714	0.166	0.360	0.473
## 128	0.073	0.268	0.659	0.068	0.273	0.659
## 129	0.039	0.157	0.804	0.042	0.225	0.733
## 137	0.000	0.400	0.600	0.098	0.309	0.593
## 138	0.000	0.400	0.600	0.062	0.262	0.676
## 145	0.111	0.556	0.333	0.107	0.319	0.575
## 146	0.035	0.211	0.754	0.040	0.222	0.737
## 147	0.038	0.165	0.797	0.024	0.179	0.797
## 154	0.182	0.273	0.545	0.071	0.277	0.651
## 155	0.036	0.232	0.732	0.026	0.183	0.791
## 156	0.022	0.111	0.867	0.015	0.145	0.840
## 164	0.667	0.333	0.000	0.362	0.387	0.251
## 165	0.000	0.500	0.500	0.271	0.390	0.339
## 172	0.500	0.500	0.000	0.343	0.389	0.268
## 173	0.000	0.143	0.857	0.174	0.364	0.462
## 174	0.000	0.667	0.333	0.116	0.327	0.557

## 181	0.667	0.333	0.000	0.514	0.345	0.140
## 182	0.167	0.500	0.333	0.316	0.391	0.292
## 183	0.364	0.273	0.364	0.231	0.383	0.386
## 191	0.500	0.500	0.000	0.195	0.373	0.432
## 192	0.000	0.250	0.750	0.132	0.339	0.528
## 199	0.000	0.000	1.000	0.181	0.367	0.452
## 200	0.133	0.400	0.467	0.076	0.283	0.641
## 201	0.053	0.211	0.737	0.047	0.236	0.717
## 208	0.500	0.500	0.000	0.326	0.391	0.284
## 209	0.222	0.000	0.778	0.162	0.358	0.479
## 210	0.000	0.500	0.500	0.107	0.319	0.573

##	government_action	caused_by	gender	Freq.1	Freq.2	Freq.3	Freq.1.1	
## 1		1	1	0.400	0.600	0.000	0.34	
## 2		2	1	0.000	0.375	0.625	0.18	
## 3		3	1	0.250	0.500	0.250	0.12	
## 10		1	2	0.364	0.273	0.364	0.26	
## 11		2	2	0.081	0.452	0.468	0.12	
## 12		3	2	0.059	0.392	0.549	0.08	
## 19		1	3	0.100	0.175	0.725	0.08	
## 20		2	3	0.050	0.188	0.762	0.03	
## 21		3	3	0.027	0.160	0.813	0.02	
## 28		1	1	2	0.000	0.500	0.500	0.18
## 29		2	1	2	0.000	0.167	0.833	0.08
## 30		3	1	2	0.000	0.250	0.750	0.05
## 37		1	2	2	0.000	0.000	1.000	0.13
## 38		2	2	2	0.000	0.256	0.744	0.05
## 39		3	2	2	0.024	0.220	0.756	0.03
## 46		1	3	2	0.030	0.152	0.818	0.03
## 47		2	3	2	0.010	0.111	0.879	0.01
## 48		3	3	2	0.000	0.116	0.884	0.01
## 55		1	1	1	1.000	0.000	0.000	0.55
## 56		2	1	1	0.455	0.364	0.182	0.35
## 57		3	1	1	0.000	0.500	0.500	0.26
## 64		1	2	1	0.250	0.250	0.500	0.18
## 65		2	2	1	0.043	0.362	0.596	0.08
## 66		3	2	1	0.050	0.175	0.775	0.05
## 73		1	3	1	0.059	0.176	0.765	0.09
## 74		2	3	1	0.043	0.196	0.761	0.03
## 75		3	3	1	0.038	0.132	0.830	0.02
## 82		1	1	2	0.000	1.000	0.000	0.36
## 83		2	1	2	0.000	0.333	0.667	0.19
## 84		3	1	2	0.500	0.000	0.500	0.13
## 91		1	2	2	0.077	0.308	0.615	0.08
## 92		2	2	2	0.000	0.238	0.762	0.03
## 93		3	2	2	0.000	0.225	0.775	0.02
## 100		1	3	2	0.125	0.125	0.750	0.03
## 101		2	3	2	0.016	0.111	0.873	0.01
## 102		3	3	2	0.020	0.098	0.882	0.01
## 109		1	1	1	1.000	0.000	0.000	0.40
## 110		2	1	1	0.364	0.273	0.364	0.21
## 111		3	1	1	0.000	0.286	0.714	0.15
## 118		1	2	1	0.250	0.417	0.333	0.23
## 119		2	2	1	0.059	0.382	0.559	0.10
## 120		3	2	1	0.097	0.177	0.726	0.06

## 127	1	3	1	0.143	0.143	0.714	0.17
## 128	2	3	1	0.073	0.268	0.659	0.07
## 129	3	3	1	0.039	0.157	0.804	0.04
## 137	2	1	2	0.000	0.400	0.600	0.10
## 138	3	1	2	0.000	0.400	0.600	0.06
## 145	1	2	2	0.111	0.556	0.333	0.11
## 146	2	2	2	0.035	0.211	0.754	0.04
## 147	3	2	2	0.038	0.165	0.797	0.02
## 154	1	3	2	0.182	0.273	0.545	0.07
## 155	2	3	2	0.036	0.232	0.732	0.03
## 156	3	3	2	0.022	0.111	0.867	0.02
## 164	2	1	1	0.667	0.333	0.000	0.36
## 165	3	1	1	0.000	0.500	0.500	0.27
## 172	1	2	1	0.500	0.500	0.000	0.34
## 173	2	2	1	0.000	0.143	0.857	0.17
## 174	3	2	1	0.000	0.667	0.333	0.12
## 181	1	3	1	0.667	0.333	0.000	0.51
## 182	2	3	1	0.167	0.500	0.333	0.32
## 183	3	3	1	0.364	0.273	0.364	0.23
## 191	2	1	2	0.500	0.500	0.000	0.20
## 192	3	1	2	0.000	0.250	0.750	0.13
## 199	1	2	2	0.000	0.000	1.000	0.18
## 200	2	2	2	0.133	0.400	0.467	0.08
## 201	3	2	2	0.053	0.211	0.737	0.05
## 208	1	3	2	0.500	0.500	0.000	0.33
## 209	2	3	2	0.222	0.000	0.778	0.16
## 210	3	3	2	0.000	0.500	0.500	0.11
##	Freq.2.1	Freq.3.1	loge.P.Y.2..P.Y.1..	loge.P.Y.3..P.Y.2..			
## 1	0.39	0.27	0.38	-1.54			
## 2	0.36	0.46	1.03	0.33			
## 3	0.33	0.56	-0.61	-1.08			
## 10	0.39	0.35	-0.68	0.34			
## 11	0.33	0.55	0.70	-0.51			
## 12	0.29	0.63	0.62	-0.50			
## 19	0.29	0.63	-0.63	0.55			
## 20	0.19	0.78	-0.71	0.02			
## 21	0.15	0.83	-0.49	-0.05			
## 28	0.37	0.45	1.36	-0.25			
## 29	0.28	0.64	0.59	0.71			
## 30	0.24	0.72	1.06	-0.01			
## 37	0.34	0.54	0.00	1.86			
## 38	0.24	0.71	1.06	-0.01			
## 39	0.20	0.77	0.31	-0.15			
## 46	0.20	0.77	-0.21	0.30			
## 47	0.12	0.87	-0.06	0.10			
## 48	0.09	0.90	1.23	-0.25			
## 55	0.33	0.12	-1.81	0.00			
## 56	0.39	0.26	-0.34	-0.23			
## 57	0.39	0.35	1.29	0.16			
## 64	0.37	0.45	-0.71	0.42			
## 65	0.28	0.64	0.71	-0.35			
## 66	0.24	0.72	-0.33	0.33			
## 73	0.30	0.61	-0.07	0.67			
## 74	0.20	0.76	-0.36	0.04			

## 75	0.16	0.82	-1.12	0.20
## 82	0.39	0.25	2.58	-2.58
## 83	0.37	0.44	0.90	0.62
## 84	0.34	0.54	-3.91	0.93
## 91	0.29	0.63	0.10	-0.10
## 92	0.19	0.78	1.24	-0.26
## 93	0.15	0.83	1.48	-0.55
## 100	0.21	0.76	-3.00	0.39
## 101	0.13	0.86	-0.50	0.15
## 102	0.10	0.89	-1.94	0.00
## 109	0.38	0.22	-2.52	0.00
## 110	0.38	0.41	-0.98	0.17
## 111	0.35	0.50	0.82	0.60
## 118	0.38	0.39	0.00	-0.23
## 119	0.31	0.58	0.64	-0.26
## 120	0.27	0.67	-0.83	0.42
## 127	0.36	0.47	-0.46	1.11
## 128	0.27	0.66	-0.09	0.01
## 129	0.23	0.73	-0.24	0.40
## 137	0.31	0.59	1.29	-0.28
## 138	0.26	0.68	1.53	-0.64
## 145	0.32	0.57	0.70	-1.16
## 146	0.22	0.74	0.08	0.07
## 147	0.18	0.80	-0.65	0.08
## 154	0.28	0.65	-1.56	-0.15
## 155	0.18	0.79	-0.13	-0.34
## 156	0.14	0.84	-0.71	0.26
## 164	0.39	0.25	-0.98	-0.86
## 165	0.39	0.34	1.28	0.19
## 172	0.39	0.27	-0.18	-1.28
## 173	0.36	0.46	0.39	1.47
## 174	0.33	0.56	2.04	-1.44
## 181	0.35	0.14	-0.33	-0.97
## 182	0.39	0.29	0.75	-0.14
## 183	0.38	0.39	-0.86	0.23
## 191	0.37	0.43	-1.22	-1.34
## 192	0.34	0.53	0.74	0.68
## 199	0.37	0.45	0.00	2.21
## 200	0.28	0.64	-0.35	-0.68
## 201	0.24	0.72	-0.23	0.13
## 208	0.39	0.28	-0.26	-1.28
## 209	0.36	0.48	-1.37	1.62
## 210	0.32	0.57	1.57	-0.70



4 Tulosten tulkinta ja johtopäätökset

Tutustukaa myös tiedostoon "Guide to weighting of ESS data".