Coding

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6.18

$test^{ha}$

```
library("VGAM")

Alligators = read.table("Alligators2.txt", header = TRUE)

fit <- vglm(formula = cbind(y2,y3,y4,y5,y1) ~ size + gender + factor(lake) + size*gender,
            family = multinomial, data = Alligators)

summary(fit)
```

```
##
## Call:
## vglm(formula = cbind(y2, y3, y4, y5, y1) ~ size + gender + factor(lake) +
##     size * gender, family = multinomial, data = Alligators)
##
##
## Pearson residuals:
##                          Min      1Q   Median     3Q   Max
## log(mu[,1]/mu[,5]) -1.3508 -0.6589  0.11239 0.3178 1.440
## log(mu[,2]/mu[,5]) -0.6353 -0.5548 -0.27199 0.1543 1.364
## log(mu[,3]/mu[,5]) -1.0602 -0.6385 -0.21730 0.3099 6.569
## log(mu[,4]/mu[,5]) -1.2112 -0.4415  0.02013 0.8578 1.714
##
## Coefficients:
##                  Estimate Std. Error z value Pr(>|z|)
## (Intercept):1    -2.4632     0.7339  -3.356  0.00079 ***
## (Intercept):2    -2.5433     1.0279      NA       NA
## (Intercept):3    -1.5475     0.8636  -1.792  0.07315 .
## (Intercept):4    -0.3987     0.5759  -0.692  0.48870
## size:1            0.8166     0.6253   1.306  0.19157
## size:2            0.6168     1.0377   0.594  0.55227
## size:3           -0.0782     0.9661  -0.081  0.93549
## size:4           -0.5111     0.6781  -0.754  0.45098
## gender:1         -1.1833     0.5713  -2.071  0.03833 *
## gender:2          0.2836     0.8829   0.321  0.74800
## gender:3         -0.3050     0.9758  -0.313  0.75461
## gender:4         -0.9578     0.6826  -1.403  0.16056
## factor(lake)2:1   3.0493     0.7197   4.237 2.27e-05 ***
## factor(lake)2:2   1.4233     0.8956   1.589  0.11200
## factor(lake)2:3  -1.0970     1.2156  -0.902  0.36682
## factor(lake)2:4  -0.8055     0.7692  -1.047  0.29499
## factor(lake)3:1   3.0609     0.6988   4.380 1.19e-05 ***
## factor(lake)3:2   1.8631     0.8539   2.182  0.02911 *
## factor(lake)3:3   0.7119     0.8580   0.830  0.40672
```

```
## factor(lake)3:4   0.8849     0.6056   1.461  0.14393
## factor(lake)4:1   1.7742     0.6318   2.808  0.00498 **
## factor(lake)4:2  -0.9251     1.2107  -0.764  0.44480
## factor(lake)4:3  -0.4735     0.8039  -0.589  0.55586
## factor(lake)4:4  -0.8569     0.5747  -1.491  0.13594
## size:gender:1     0.7130     0.7625   0.935  0.34975
## size:gender:2    -1.8749     1.4733  -1.273  0.20318
## size:gender:3    -0.4418     1.3375  -0.330  0.74119
## size:gender:4     1.0796     0.8919   1.211  0.22608
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Number of linear predictors:  4
##
## Names of linear predictors:
## log(mu[,1]/mu[,5]), log(mu[,2]/mu[,5]), log(mu[,3]/mu[,5]), log(mu[,4]/mu[,5])
##
## Residual deviance: 49.8536 on 36 degrees of freedom
##
## Log-likelihood: -73.117 on 36 degrees of freedom
##
## Number of iterations: 6
##
## Warning: Hauck-Donner effect detected in the following estimate(s):
## '(Intercept):2'
##
## Reference group is level  5  of the response
```