

# The multiway data

April 6, 2011

The data:

```
politician male scifi 15
politician male spy 15
politician female scifi 10
politician female spy 15
administrator male scifi 10
administrator male spy 30
administrator female scifi 5
administrator female spy 10
bellydancer male scifi 5
bellydancer male spy 5
bellydancer female scifi 10
bellydancer female spy 25
```

The SAS code and output:

```
data small;
  infile "multiway.dat";
  input profession $ sex $ readtype $ freq;

proc catmod;
  weight freq;
  model profession*sex*readtype=_response_;
  loglin profession sex readtype profession*sex profession*readtype sex*readtype profession;

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proc catmod;
  weight freq;
  model profession*sex*readtype=_response_;
  loglin profession sex readtype profession*sex;
```

The CATMOD Procedure

Data Summary			
Response	profession*sex*readtype	Response Levels	12
Weight Variable	freq	Populations	1
Data Set	SMALL	Total Frequency	155
Frequency Missing	0	Observations	12

Population Profiles  
Sample      Sample Size

-----	-----
1	155

Response Profiles			
Response	profession	sex	readtype
-----	-----	-----	-----
1	administ	female	scifi
2	administ	female	spy
3	administ	male	scifi
4	administ	male	spy
5	bellydan	female	scifi
6	bellydan	female	spy
7	bellydan	male	scifi
8	bellydan	male	spy
9	politici	female	scifi
10	politici	female	spy
11	politici	male	scifi
12	politici	male	spy

Maximum Likelihood Analysis  
Maximum likelihood computations converged.

Maximum Likelihood Analysis of Variance			
Source	DF	Chi-Square	Pr > ChiSq
-----	-----	-----	-----
profession	2	3.46	0.1777
sex	1	0.01	0.9256
readtype	1	7.61	0.0058
profession*sex	2	17.58	0.0002
profession*readtype	2	2.62	0.2691
sex*readtype	1	0.66	0.4168
profession*sex*readtype	2	1.89	0.3894
Likelihood Ratio	0	.	.

The CATMOD Procedure

Analysis of Maximum Likelihood Estimates  
Standard      Chi-

Parameter		Estimate	Error	Square	Pr > Chi
-----					
profession	administ	0.00538	0.1337	0.00	0.96
	bellydan	-0.2135	0.1417	2.27	0.13
sex	female	0.00878	0.0940	0.01	0.92
readtype	scifi	-0.2595	0.0940	7.61	0.00
profession*sex	administ female	-0.4567	0.1337	11.67	0.00
	bellydan female	0.5669	0.1417	15.99	<.00
profession*readtype	administ scifi	-0.1885	0.1337	1.99	0.15
	bellydan scifi	0.0304	0.1417	0.05	0.83
sex*readtype	female scifi	-0.0764	0.0940	0.66	0.42
profession*sex*readtype	administ female scifi	0.1777	0.1337	1.77	0.18
	bellydan female scifi	-0.1527	0.1417	1.16	0.28

#### The CATMOD Procedure

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#### Population Profiles

Sample      Sample Size

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1	155

Response Profiles			
Response	profession	sex	readtype
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7	bellydan	male	scifi
8	bellydan	male	spy
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10	politici	female	spy
11	politici	male	scifi
12	politici	male	spy

Maximum Likelihood Analysis  
Maximum likelihood computations converged.

Maximum Likelihood Analysis of Variance

Source	DF	Chi-Square	Pr > ChiSq
profession	2	3.58	0.1674
sex	1	0.00	0.9453
readtype	1	13.02	0.0003
profession*sex	2	23.00	<.0001
profession*readtype	2	4.32	0.1155
sex*readtype	1	0.62	0.4321
Likelihood Ratio	2	1.85	0.3969

The CATMOD Procedure

Analysis of Maximum Likelihood Estimates					
Parameter		Estimate	Standard Error	Chi-Square	Pr > ChiSq
profession	administ	-0.0181	0.1370	0.02	0.8948
	bellydan	-0.2022	0.1441	1.97	0.1606
sex	female	-0.00649	0.0945	0.00	0.9453
readtype	scifi	-0.3104	0.0860	13.02	0.0003
profession*sex	administ female	-0.5192	0.1275	16.58	<.0001
	bellydan female	0.6111	0.1376	19.71	<.0001
profession*readtype	administ scifi	-0.2154	0.1306	2.72	0.0991
	bellydan scifi	0.00334	0.1358	0.00	0.9803
sex*readtype	female scifi	-0.0733	0.0933	0.62	0.4321

The CATMOD Procedure

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Population Profiles

Sample      Sample Size

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Maximum Likelihood Analysis  
Maximum likelihood computations converged.

Maximum Likelihood Analysis of Variance			
Source	DF	Chi-Square	Pr > ChiSq
profession	2	2.90	0.2348
sex	1	0.03	0.8686
readtype	1	12.68	0.0004
profession*sex	2	22.79	<.0001
Likelihood Ratio	5	6.56	0.2557

Analysis of Maximum Likelihood Estimates					
Parameter		Estimate	Standard Error	Chi-Square	Pr > ChiSq
profession	administ	0.0526	0.1257	0.18	0.6753
	bellydan	-0.2169	0.1374	2.49	0.1144
sex	female	0.0149	0.0903	0.03	0.8686

The CATMOD Procedure

Analysis of Maximum Likelihood Estimates					
Parameter		Estimate	Standard Error	Chi-Square	Pr > ChiSq
readtype	scifi	-0.2989	0.0839	12.68	0.0004
profession*sex	administ female	-0.5053	0.1257	16.17	<.0001
	bellydan female	0.6114	0.1374	19.82	<.0001