

Psych 6136: Models for Ordinal Factors

Mental health and SES

This exercise examines the fitting of various `glm()` models for the `Mental` data treating the factors as ordered variables in the model. As you can see, `ses` and `mental` have been created as ordered factors in the data frame.

```
> data(Mental, package="vcdExtra")
> str(Mental)
'data.frame':    24 obs. of  3 variables:
 $ ses   : Ord.factor w/ 6 levels "1"<"2"<"3"<"4"<..: 1 1 1 1 2 2 2 2 3 3 ...
 $ mental: Ord.factor w/ 4 levels "Well"<"Mild"<..: 1 2 3 4 1 2 3 4 1 2 ...
 $ Freq  : int   64 94 58 46 57 94 54 40 57 105 ...
```

It may be helpful to print this as a table:

```
(Mental.tab <- xtabs(Freq ~ mental + ses, data=Mental))
```

1. For a quick view of the associations here, carry out a correspondence analysis on the table. What do you see?

```
mental.ca <- ca(Mental.tab)
plot(mental.ca, lines=TRUE)
```

2. Begin by fitting the independence model. Note: this is a Poisson model for frequency. Examine the goodness of fit of the model using `car::Anova()` and `vcdExtra::LRstats()`.

```
indep <- glm(Freq ~ mental+ses, family = poisson, data = Mental)
```

3. Produce a mosaic plot showing the pattern of association that remains from the independence model.
4. Now create integer scores for the `ses` and `mental` factors

```
Mental$Cscore <- as.numeric(Mental$ses)
Mental$Rscore <- as.numeric(Mental$mental)
```

5. Fit the row effects and column effects models, using the `Cscore` and the `Rscore` respectively in the association term. Also, fit the linear x linear model treating both of these as ordinal

```
roweff <- update(indep, . ~ . + ???)
colleff <- update(indep, . ~ . + ???)
linlin <- update(indep, . ~ . + ???)
```

6. Compare the three models you have fit using `anova()` and `LRstats()`. What do you conclude is the best model so far?
7. Produce a mosaic plot showing the residuals from the linear x linear model.