

Biostatistics 537: Longitudinal Data Analysis - Fall 2009

Problem Set 6 - Due: Tuesday, November 24, 2009

The data for this problem are from the Riesby *et al.*, article that we have discussed in class. This study examined the relationship in depressed inpatients between the drug plasma levels - the antidepressant imipramine (IMI) and its metabolite desimipramine (DMI) - and clinical response as measured by the Hamilton Depression Rating Scale (HDRS). In class, I mentioned that the study investigators treated the HDRS as a trichotomous outcome:

```
if hdrs lt 8 then hdrs3 = 0;
if hdrs ge 8 and hdrs le 15 then hdrs3 = 1;
if hdrs gt 15 then hdrs3 = 2;
```

Thus, 0 can be thought of as “normal,” 1 as “mild depression,” and 2 as “definite depression.” The dataset (RIESORD3.RRM) which is available on the class website (<http://www.uic.edu/classes/bstt/bstt513> - towards the bottom of the page) contains the following variables:

field 1: Patient ID - `id`
field 2: continuous HDRS score - *ignore this variable*
field 3: dichotomized HDRS score - *ignore this variable*
field 4: trichotomized HDRS score - `hdrs3`
field 5: a field of ones - *ignore this variable*
field 6: Week - from 0 (week 2) to 3 (week 5) - `week`
field 7: dichotomized (median split) Desimipramine (DMI) plasma levels - `dmi2`
field 8: dichotomized Desimipramine (DMI) plasma levels \times Week - *ignore this variable*
field 9: centered Desimipramine (DMI) plasma levels - *ignore this variable*
field 10: centered Desimipramine (DMI) plasma levels \times Week - *ignore this variable*

Note that -9 indicates a missing observation; these should be removed in your analyses of these data.

1. Using `hdrs3` as the outcome, estimate a random-intercepts ordinal logistic regression model with the predictors of `week` and `dmi2`. Interpret the effects of these two independent variables. Provide an estimate of the intraclass correlation.
2. Now, still including `week` and `dmi2` as predictors, fit a model with random subject intercepts and week effects (and allow for the covariance of these two random effects). Is this model significantly better than the random-intercepts model? Interpret the effects of the `week` and `dmi2` in this model.
3. Test the proportional odds assumption for `dmi2` only. Is this assumption satisfied or violated? What do you conclude about the effect of `dmi2` on `hdrs3`?