

# Repeated measurements in R

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## R-bugs and innoymments

- Bug in getVarCov with inhomogeneous variances.
- Bug in normalized residuals.
- No small sample correction to degrees of freedom with gls.
- Time variable in Cor-functions supplied to gls has to be 1, 2, 3, ...
- Code for summary statistics is lengthy/technical.
- Code for predictions is lengthy/technical.
- Code for baseline adjustment is lengthy/technical.
- Code for extracting results is lengthy/technical.
- No option for group-specific covariance parameters - ?
- Not possible to have random effects and residual correlation pattern at the same time - ?
- Need to supply starting value for continuous time correlation patterns.
- Code for multiple imputations is very lengthy and very technical.

## ... and what we can improve on

Make functions to:

- compute summary statistics.
- compute predicted values for covariate combinations.
- compute different kinds of residuals
- extract results in publish style.
- extract variance parameters.
- make a constrained interaction

If we have time for it, we could also make functions for plotting:

- to visualize correlation matrices (heatmap, ellipses)
- that mimics pairs.plot, only with nicer coloring etc.
- residuals against predicted, against covariates, and in qqplots.

## Further ideas

Considering unbalanced longitudinal data, it would be nice to be able to:

- choose between more correlation patterns.
- make variograms and derive starting values for fitting the correlation patterns.
- plot cumulated residuals for diagnostics.
- make plots of estimated means and correlation over time.

But this is **no way urgent** as most students have data from balanced designs....

Some kind of wrapper for the multiple imputations would be nice too.

## Perspective: Why is PROC MIXED so nice?

- Large and flexible selection of covariance patterns.
- The numerical optimisation seems to almost always work.
- DDFM option.
- The scaled residuals.
- LSMEANS including options to control FWER.
- ESTIMATE and CONTRAST statements.
- REF option to set the reference groups.
- Easy to save output with ODS.
- Easy to repeat analysis for subgroups or different outcomes with BY.

## ...and what is annoying any way

- Too much default output.
- How are the rows/columns in the estimated R-matrix ordered? Order of appearance in the data?!?
- Hard to make predicted values for covariate combinations that are not in the data.
- ... and the default predicted values have to be sorted before you plot them.
- No of the shelf options for visualizing estimated correlation.
- Post processing of segregated and redundant output data (impossible to avoid).
- No default plots of residuals against covariates (I forget to do them).