Random-effect modeling of sociolinguistic stratification

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Residualization of collinear predictors and random effects (Pinheiro and Bates, 2000) are two new ways of analyzing social stratification with regression. Application of these tools produce novel results concerning social variation in the LCV Philadelphia survey (Labov, 2001, henceforth PLC2, *inter alia*).

Collinearity (positive correlations between predictors) can lead to Type II errors and spurious counter-directed effects when collinear predictors are included in a regression model. This occurred for some PLC2 models, e.g. the finding of a negative effect of subject occupation on negative concord, (neg), in casual speech, but (spuriously) a positive one in careful speech (p. 117). Individualization produces orthogonal predictors by subtracting out the collinear components; such a residualized model demonstrates that, contra PLC2, occupation, residence value, and the education of both subject and the subject’s father, all measures of community prestige, each make an incremental contribution to lower usages of stable variables. Similar results obtain for apparent-time changes exhibiting a curvilinear pattern, like (ay0), the centralization of /ay/ before voiceless consonants. /ay/ before voiceless consonants.

Different rates of variable usage across subjects can swamp the regularities common to the whole subject pool, in the worst case (Yule, 1903) producing a counter-directed result; this is avoided by including a per-subject random intercept in the models. Random effects models take into account the probability of the findings being true of to a hypothetical sample with the same variance as the original sample. These models do not overfit uncertain subject biases, as does F-analysis, and account for subject differences with fewer effective parameters. The random-effects model discards the contributions of age or social mobility to rates of (neg) in the LCV data. Outlier analysis of the subject effects identifies adolescent non-conformists as outliers in stable variation, and the established leaders of change as outliers in new-and-vigorous changes.

References