

## Notes about MIXOR Version 2 usage

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MIXOR Version 2 is an extended version of MIXOR written by Don Hedeker. Note that the manual for the original version of MIXOR (by Hedeker and Robert Gibbons) was published in 1996 in the journal *Computer Methods and Programs in Biomedicine*, volume 49:157-176.

The four examples described below highlight the new features of MIXOR. To run any of these examples copy the DEF file to MIXOR.DEF and then type MIXORB at the DOS prompt. Make sure that the program MIXORB.EXE and the datafiles are in the same directory (or found via the PATH statement). Alternatively, you can use the Windows interface, written by Dave Patterson of Discerning Systems, to aid in creation of the MIXOR.DEF file.

If you have questions about MIXOR usage, send a note to [hedeker@uic.edu](mailto:hedeker@uic.edu)

Happy Mixing!

## 1) Mixed-effects Partial Proportional Odds Model

Hedeker, D., & Mermelstein, R.J. (1998).

A multilevel thresholds of change model for analysis of stages of change data. *Multivariate Behavioral Research*, 33:427-455.

To illustrate this feature, we've used published data that represent ordinal responses from subjects on three items concerning attitudes towards sex. Item responses (level-1) are nested within subjects (level-2).

DATASET: NORCAG.DAT

FIELDS: 1 PATTERN ID  
2 ORDINAL ITEM RESPONSE (1 to 4)  
3 INTERCEPT  
4 ITEM 2 vs ITEM 1 (dummy-coded variable)  
5 ITEM 3 vs ITEM 1 (dummy-coded variable)  
6 FREQUENCY WEIGHT OF PATTERN

DEF FILES: NORCAG.DEF

random intercepts model assuming proportional odds  
for differences in item responses

NORCAG2.DEF

random intercepts model allowing partial proportional odds  
for differences in item responses

DATA FROM: Agresti, A., & Lang, J.B. (1993).

A proportional odds model with subject-specific effects  
for repeated ordered categorical responses.  
*Biometrika*, 80, 527-534.  
(this article lists the data found in NORCAG.DAT)

## 2) Mixed-effects Grouped-Time Survival Analysis Model

Hedeker, D., Siddiqui, O., & Hu, F.B. (under review).

Random-effects regression analysis of correlated grouped-time survival data.

The data represent smoking experimentation onset in a sample of seventh grade students measured at four timepoints (baseline, immediate post-intervention, 1 year follow-up, and 2 year follow-up). Students (level-1) are nested within classrooms (level-2) and schools (level-3). Since MIXOR can only handle two levels of nesting, the example analyses consider students within classrooms. CC and TV are school-level intervention variables. Sex is a student-level variable.

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DATASET:  SMKCCLC.DAT
          FIELDS: 1 SCHOOL ID
                  2 CLASS ID
                  3 SUBJECT ID
                  4 SMOKING EVENT/CENSOR TIME INTERVAL (1 to 4)
                  5 SMOKING EVENT/CENSOR INDICATOR (0=CENSOR 1=EVENT)
                  6 INTERCEPT
                  7 SEX (0=f 1=m)
                  8 CC INTERVENTION CONDITION (0=no 1=yes)
                  9 TV INTERVENTION CONDITION (0=no 1=yes)
                 10 CC * TV

DEF FILES: SMC05A.DEF
           proportional hazards model ignoring data clustering
           (yields same results as SAS PROC PHREG with TIES=EXACT option)
           SMC15A.DEF
           proportional hazards model with a random classroom effect
           SMC15A.DEF
           partial proportional hazards model with a random classroom effect
           the effect of SEX is allowed to vary across the grouped-time
           intervals

DATA FROM: Flay, B. et. al. (1988).
           The Television School and Family Smoking Prevention and Cessation
           Project: I. Theoretical basis and program development.
           Preventive Medicine, 17, 585-607.
           (This article describes the dataset).
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3) Mixed-effects Probit Model with Varying Level-2 Variance by Level-2 Grouping Variable

The data represent responses from twins on a dichotomous TROUBLE CONCENTRATING outcome. Each twin sibling (level-1) is nested within the twin pair (level-2). Twin pairs are either monozygotic or dizygotic.

DATASET: CONCEN.DAT

FIELDS: 1 PATTERN ID  
2 TROUBLE CONCENTRATING (0=absent 1=present)  
3 INTERCEPT  
4 MZ TWIN INDICATOR VARIABLE (1=MZ 0=DZ)  
5 DZ TWIN INDICATOR VARIABLE (1=DZ 0=MZ)  
6 FREQUENCY WEIGHT OF PATTERN

DEF FILES: CONCEN.DEF

random intercepts model assuming the same intraclass correlation for both twin pair types (MZ and DZ)

CONCEN2.DEF

random intercepts model assuming different intraclass correlations for twin pair types (MZ and DZ)

DATA FROM: Ramakrishnan, V., et. al. (1992).

Elementary methods for the analysis of dichotomous outcomes in unselected samples of twins.

Genetic Epidemiology, 9, 273-287.

(this article lists the data found in CONCEN.DAT)

- 4) 2-parameter Item Response Theory (IRT) Model as a Mixed-effects Logistic Model with Varying Level-2 Variance (i.e. the effect of subject's ability) by Level-1 ``Grouping'' Variable (i.e., the item)

The data represent four item responses from subjects. Each item (level-1) is nested within subjects (level-2). The subject's sex (level-2) is also given.

DATASET: ASVABEX.DAT

FIELDS: 1 PATTERN ID  
2 ITEM RESPONSE (0=incorrect 1=correct)  
3 INTERCEPT  
4 ITEM 1 INDICATOR VARIABLE (0=no 1=yes)  
5 ITEM 2 INDICATOR VARIABLE (0=no 1=yes)  
6 ITEM 3 INDICATOR VARIABLE (0=no 1=yes)  
7 ITEM 4 INDICATOR VARIABLE (0=no 1=yes)  
8 SEX (0=male 1=female)  
9 SEX \* ITEM 1  
10 SEX \* ITEM 2  
11 SEX \* ITEM 3  
12 SEX \* ITEM 4  
13 FREQUENCY WEIGHT OF PATTERN

DEF FILES: ASVMODA.DEF

2-parameter logistic item response theory (irt) model

ASVMODB.DEF

2-parameter model including an overall SEX effect

ASVMODC.DEF

2-parameter model including a separate SEX effect on each item intercept

ASVMODD.DEF

2-parameter model including a separate SEX effect on each item intercept plus an overall SEX effect on the item slopes

ASVMODE.DEF

2-parameter model including a separate SEX effect on each item intercept plus a separate SEX effect on each item slope

DATA FROM: Mislevy, R.J. (1985)

Estimation of latent group effects.

Journal of the American Statistical Association, 80, 993-997.

(this article lists the data found in ASVABEX.DAT)