

Supplement to  
“Estimating Average Treatment Effects  
When the Treatment is a Latent Class”

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# 1 Loglikelihood Derivatives

The loglikelihood function for the latent-class causal model is  $l_i(\boldsymbol{\theta}) = \log \sum_{c=1}^C \gamma_{ic} \mathcal{P}_{ic} g_{ic}$ , where

$$\mathcal{P}_{ic} = \prod_{m \in \text{obs}_i} \prod_{r=1}^{r_m} \rho_{mr|c}^{I(u_{im}=r)}$$

and

$$g_{ic} = \exp \left\{ -\frac{1}{2} \log(2\pi) - \frac{1}{2} \log \sigma_c^2 - \frac{1}{2\sigma_c^2} (y_{i,obs} - \mathbf{x}_i^T \boldsymbol{\beta}_c)^2 \right\}$$

if  $Y_{i,obs}$  is seen; if  $Y_{i,obs}$  is unseen, define  $g_{ic} = 1$ . This is the loglikelihood that is maximized by the procedure described in Section 2 of the main article.

Given the observed data, the posterior probability that subject  $i$  belongs to class  $T_i = c$  is

$$\eta_{ic} = \frac{\gamma_{ic} \mathcal{P}_{ic} g_{ic}}{\sum_{c'=1}^C \gamma_{ic'} \mathcal{P}_{ic'} g_{ic'}}. \quad (1)$$

To compute derivatives, it is convenient to work with the full set of item-response probabilities  $\rho_{mr|c}$  for  $r = 1, \dots, r_m$ , ignoring the fact that they are constrained by  $\sum_{r=1}^{r_m} \rho_{mr|c} = 1$ . Elements of this expanded set of parameters will be denoted by  $\rho_{mr|c}^*$ , and the functional dependence of the  $\rho^*$ 's on the  $\rho$ 's is given by

$$\rho_{mr|c}^* = \begin{cases} \rho_{mr|c} & \text{for } r = 1, \dots, r_m - 1, \\ 1 - \sum_{r'=1}^{r_m-1} \rho_{mr'|c} & \text{for } r = r_m. \end{cases}$$

We first differentiate with respect to the  $\rho^*$ 's, and then we compute the derivatives with respect to the  $\rho$ 's by a chain rule.

The basic parameters of this model are  $\boldsymbol{\theta} = (\boldsymbol{\rho}, \boldsymbol{\alpha}, \boldsymbol{\beta}, \boldsymbol{\Sigma})$ . Certain functions of the parameters and data, especially  $\mathcal{P}_{ic}$ ,  $\gamma_{ic}$ ,  $g_{ic}$  and  $\eta_{ic}$ , appear frequently in expressions for the loglikelihood and its derivatives, so it is helpful to first obtain the derivatives of these intermediate functions with respect to the basic parameters. Some of these derivatives are

$$\frac{\partial}{\partial \alpha_{jc}} \gamma_{ic'} = \gamma_{ic} [I(c = c') - \gamma_{ic'}] x_{ij}^{(\alpha)}$$

and

$$\frac{\partial}{\partial \rho_{mr|c}^*} \mathcal{P}_{ic'} = I(c = c') \mathcal{P}_{ic'} \rho_{mr|c}^{-1}$$

if  $u_{im} = r$  is observed, and 0 otherwise. Let us define

$$a_{ic} = \frac{1}{\sigma_c^2} (y_{i,obs} - \mathbf{x}_i^T \boldsymbol{\beta}_c)$$

if  $Y_{i,obs}$  is seen, and  $a_{ic} = 0$  otherwise; and

$$b_{ic} = -\frac{1}{2\sigma_c^2} + \frac{1}{2\sigma_c^4} (y_{i,obs} - \mathbf{x}_i^T \boldsymbol{\beta}_c)^2$$

if  $Y_{i,obs}$  is seen, and  $b_{ic} = 0$  otherwise. Then

$$\frac{\partial}{\partial \beta_{jc}} g_{ic'} = I(c = c') g_{ic} a_{ic} x_{ij}^{(\beta)},$$

and

$$\frac{\partial}{\partial \sigma_c^2} g_{ic'} = I(c = c') g_{ic} b_{ic}.$$

The derivatives of  $\eta_{ic}$  are

$$\frac{\partial}{\partial \alpha_{jc}} \eta_{ic'} = \eta_{ic} [I(c = c') - \eta_{ic'}] x_{ij}^{(\alpha)},$$

$$\frac{\partial}{\partial \beta_{jc}} \eta_{ic'} = \eta_{ic} [I(c = c') - \eta_{ic'}] a_{ic} x_{ij}^{(\beta)},$$

$$\frac{\partial}{\partial \sigma_c^2} \eta_{ic'} = \eta_{ic} [I(c = c') - \eta_{ic'}] b_{ic},$$

and

$$\frac{\partial}{\partial \rho_{mr|c}^*} \eta_{ic'} = \eta_{ic} [I(c = c') - \eta_{ic'}] \rho_{mr|c}^{-1}$$

if  $u_{im} = r$  is observed, and 0 otherwise.

Using the expressions above, the first derivatives of the loglikelihood are

$$\frac{\partial}{\partial \alpha_{jc}} l_i = (\eta_{ic} - \gamma_{ic}) x_{ij}^{(\alpha)},$$

$$\frac{\partial}{\partial \beta_{jc}} l_i = \eta_{ic} a_{ic} x_{ij}^{(\beta)},$$

$$\frac{\partial}{\partial \sigma_c^2} l_i = \eta_{ic} b_{ic},$$

and

$$\frac{\partial}{\partial \rho_{mr|c}^*} l_i = \eta_{ic} \rho_{mr|c}^{-1}$$

if  $u_{im} = r$  is observed, and 0 otherwise. Applying the chain rule, we get

$$\frac{\partial}{\partial \rho_{mr|c}} l_i = \sum_{r'=1}^{r_m} \left( \frac{\partial \rho_{mr'|c}^*}{\partial \rho_{mr|c}} \right) \left( \frac{\partial l_i}{\partial \rho_{mr'|c}^*} \right) = \begin{cases} \eta_{ic} \rho_{mr|c}^{-1} & \text{if } u_{im} = r \text{ is observed,} \\ -\eta_{ic} \rho_{mr_m|c}^{-1} & \text{if } u_{im} = r_m \text{ is observed,} \\ 0 & \text{otherwise} \end{cases}$$

for  $r = 1, \dots, r_m - 1$ .

Differentiating a second time gives

$$\begin{aligned} \frac{\partial^2}{\partial \rho_{mr|c}^* \partial \rho_{m'r'|c'}^*} l_i = & - \left\{ I(m = m') I(r = r') I(c = c') \eta_{ic} \rho_{mr|c}^{-2} \right. \\ & \left. - \eta_{ic} [I(c = c') - \eta_{ic'}] \rho_{mr|c}^{-1} \rho_{m'r'|c'}^{-1} \right\} \end{aligned}$$

if  $u_{im} = r$  and  $u_{im'} = r'$  are observed, and 0 otherwise;

$$\frac{\partial^2}{\partial \rho_{mr|c}^* \partial \alpha_{jc'}} l_i = \eta_{ic} [I(c = c') - \eta_{ic'}] \rho_{mr|c}^{-1} x_{ij}^{(\alpha)}$$

if  $u_{im} = r$  is observed, and 0 otherwise;

$$\frac{\partial^2}{\partial \rho_{mr|c}^* \partial \beta_{jc'}} l_i = \eta_{ic} [I(c = c') - \eta_{ic'}] \rho_{mr|c}^{-1} a_{ic'} x_{ij}^{(\beta)}$$

if  $u_{im} = r$  is observed, and 0 otherwise;

$$\frac{\partial^2}{\partial \rho_{mr|c}^* \partial \sigma_c^2} l_i = \eta_{ic} [I(c = c') - \eta_{ic'}] \rho_{mr|c}^{-1} b_{ic'}$$

if  $u_{im} = r$  is observed, and 0 otherwise;

$$\frac{\partial^2}{\partial \alpha_{jc} \partial \alpha_{j'c'}} l_i = - \left\{ I(c = c') (\gamma_{ic} - \eta_{ic}) + \eta_{ic} \eta_{ic'} - \gamma_{ic} \gamma_{ic'} \right\} x_{ij}^{(\alpha)} x_{ij'}^{(\alpha)},$$

$$\frac{\partial^2}{\partial \alpha_{jc} \partial \beta_{j'c'}} l_i = \eta_{ic} [I(c = c') - \eta_{ic'}] a_{ic'} x_{ij}^{(\alpha)} x_{ij'}^{(\beta)},$$

$$\frac{\partial^2}{\partial \alpha_{jc} \partial \sigma_c^2} l_i = \eta_{ic} [I(c = c') - \eta_{ic'}] b_{ic'} x_{ij}^{(\alpha)},$$

$$\frac{\partial^2}{\partial \beta_{jc} \partial \beta_{j'c'}} l_i = - \left\{ I(c = c') \left( \frac{\eta_{ic}}{\sigma_c^2} \right) - \eta_{ic} [I(c = c') - \eta_{ic'}] a_{ic} a_{ic'} \right\} x_{ij}^{(\beta)} x_{ij'}^{(\beta)},$$

$$\frac{\partial^2}{\partial \beta_{jc} \partial \sigma_c^2} l_i = - \left\{ I(c = c') \left( \frac{\eta_{ic}}{\sigma_c^2} \right) a_{ic} - \eta_{ic} [I(c = c') - \eta_{ic'}] a_{ic} b_{ic'} \right\} x_{ij}^{(\beta)},$$

and

$$\begin{aligned} \frac{\partial^2}{\partial \sigma_c^2 \partial \sigma_c^2} l_i = & I(c = c') \eta_{ic} \left\{ \frac{1}{2\sigma_c^4} - \frac{1}{\sigma_c^6} (y_{i,obs} - \mathbf{x}_i^T \boldsymbol{\beta}_c)^2 \right\} \\ & + \eta_{ic} [I(c = c') - \eta_{ic'}] b_{ic} b_{ic'}. \end{aligned}$$

Applying the chain rule gives

$$\frac{\partial^2}{\partial \rho_{mr|c} \partial \alpha_{jc'}} l_i = \begin{cases} \eta_{ic} [I(c = c') - \eta_{ic'}] \rho_{mr|c}^{-1} x_{ij}^{(\alpha)} & \text{if } u_{im} = r \text{ is observed,} \\ -\eta_{ic} [I(c = c') - \eta_{ic'}] \rho_{mr_m|c}^{-1} x_{ij}^{(\alpha)} & \text{if } u_{im} = r_m \text{ is observed,} \\ 0 & \text{otherwise;} \end{cases}$$

$$\frac{\partial^2}{\partial \rho_{mr|c} \partial \beta_{jc'}} l_i = \begin{cases} \eta_{ic} [I(c = c') - \eta_{ic'}] \rho_{mr|c}^{-1} a_{ic'} x_{ij}^{(\beta)} & \text{if } u_{im} = r \text{ is observed,} \\ -\eta_{ic} [I(c = c') - \eta_{ic'}] \rho_{mr_m|c}^{-1} a_{ic'} x_{ij}^{(\beta)} & \text{if } u_{im} = r_m \text{ is observed,} \\ 0 & \text{otherwise;} \end{cases}$$

and

$$\frac{\partial^2}{\partial \rho_{mr|c} \partial \sigma_{c'}^2} l_i = \begin{cases} \eta_{ic} [I(c = c') - \eta_{ic'}] \rho_{mr|c}^{-1} b_{ic'} & \text{if } u_{im} = r \text{ is observed,} \\ -\eta_{ic} [I(c = c') - \eta_{ic'}] \rho_{mr_m|c}^{-1} b_{ic'} & \text{if } u_{im} = r_m \text{ is observed,} \\ 0 & \text{otherwise.} \end{cases}$$

For the second derivatives with respect to  $\rho_{mr|c}$  and  $\rho_{m'r'|c'}$ , we apply the chain rule twice, obtaining

$$\begin{aligned} \frac{\partial^2 l_i}{\partial \rho_{m'r'|c'} \partial \rho_{mr|c}} &= \left( \frac{\partial^2 l_i}{\partial \rho_{m'r'|c'}^* \partial \rho_{mr|c}^*} \right) - \left( \frac{\partial^2 l_i}{\partial \rho_{m'r'|c'}^* \partial \rho_{mr_m|c}^*} \right) \\ &\quad - \left( \frac{\partial^2 l_i}{\partial \rho_{m'r_m|c'}^* \partial \rho_{mr|c}^*} \right) + \left( \frac{\partial^2 l_i}{\partial \rho_{m'r_m|c'}^* \partial \rho_{mr_m|c}^*} \right). \end{aligned}$$

## 2 Derivatives of Expected Estimating Functions

The contribution of individual  $i$  to the expected estimating function for  $E(Y_i(c)) = \mu(c)$  is

$$\omega_i(c) = \sum_{c'=1}^C \eta_{ic'} \hat{y}_i(c|c') - \mu(c).$$

Let  $\boldsymbol{\omega}_i = (\omega_i(1), \dots, \omega_i(C))^T$ . The derivatives of  $\boldsymbol{\omega}_i$  with respect to  $\boldsymbol{\mu} = (\mu(1), \dots, \mu(C))^T$  are  $\partial \boldsymbol{\omega}_i / \partial \boldsymbol{\mu}^T = -\mathbf{I}$ . To compute the derivatives of  $\boldsymbol{\omega}_i$  with respect to  $\boldsymbol{\theta}$ , note that

$$\frac{\partial}{\partial \beta_{jc}} \hat{y}_i(c'|d) = \begin{cases} 0 & \text{if } Y_{i,obs} \text{ is seen and } c' = d, \\ \left[ I(c = c') - I(c = d) \left( \frac{\sigma_{cc'}}{\sigma_c^2} \right) \right] x_{ij}^{(\beta)} & \text{if } Y_{i,obs} \text{ is seen and } c' \neq d, \\ I(c = c') x_{ij}^{(\beta)} & \text{if } Y_{i,obs} \text{ is unseen,} \end{cases}$$

and

$$\frac{\partial}{\partial \sigma_c^2} \hat{y}_i(c' | d) = \begin{cases} 0 & \text{if } Y_{i,obs} \text{ is seen and } c' = d, \\ -I(c = d) \left( \frac{\sigma_{cc'}}{\sigma_c^4} \right) (y_{i,obs} - \mathbf{x}_i^T \boldsymbol{\beta}_c) & \text{if } Y_{i,obs} \text{ is seen and } c' \neq d, \\ 0 & \text{if } Y_{i,obs} \text{ is unseen.} \end{cases}$$

Using these and formulas previously given, we get

$$\frac{\partial}{\partial \rho_{mr|c}} \boldsymbol{\omega}_i(d) = \eta_{ic} \left[ \hat{y}_i(d | c) - \sum_{c'=1}^C \eta_{ic'} \hat{y}_i(d | c') \right] \times \begin{cases} \rho_{mr|c}^{-1} & \text{if } u_{im} = r \text{ is observed,} \\ -\rho_{mr_m|c}^{-1} & \text{if } u_{im} = r_m \text{ is observed,} \\ 0 & \text{otherwise,} \end{cases}$$

$$\begin{aligned} \frac{\partial}{\partial \alpha_{jc}} \boldsymbol{\omega}_i(d) &= \eta_{ic} \left[ \hat{y}_i(d | c) - \sum_{c'=1}^C \eta_{ic'} \hat{y}_i(d | c') \right] x_{ij}^{(\alpha)}, \\ \frac{\partial}{\partial \beta_{jc}} \boldsymbol{\omega}_i(d) &= \eta_{ic} \left[ \hat{y}_i(d | c) - \sum_{c'=1}^C \eta_{ic'} \hat{y}_i(d | c') \right] a_{ic} x_{ij}^{(\beta)} \\ &\quad + \sum_{c'=1}^C \eta_{ic'} \left[ \frac{\partial}{\partial \beta_{jc}} \hat{y}_i(d | c') \right], \\ \frac{\partial}{\partial \sigma_c^2} \boldsymbol{\omega}_i(d) &= \eta_{ic} \left[ \hat{y}_i(d | c) - \sum_{c'=1}^C \eta_{ic'} \hat{y}_i(d | c') \right] b_{ic} \\ &\quad + \sum_{c'=1}^C \eta_{ic'} \left[ \frac{\partial}{\partial \sigma_c^2} \hat{y}_i(d | c') \right]. \end{aligned}$$

The contribution of individual  $i$  to the expected estimating function for  $E(Y_i(c) | T_i = d) = \mu(c | d)$  is

$$\omega_i(c | d) = \eta_{id} [\hat{y}_i(c | d) - \mu(c | d)].$$

Let  $\boldsymbol{\omega}_{i(d)} = (\omega_i(1 | d), \dots, \omega_i(C | d))^T$ . The derivatives of  $\boldsymbol{\omega}_{i(d)}$  with respect to  $\boldsymbol{\mu}_{(d)} = (\mu(1 | d), \dots, \mu(C | d))^T$  are  $\partial \boldsymbol{\omega}_{i(d)} / \partial \boldsymbol{\mu}_{(d)}^T = -\eta_{id} \mathbf{I}$ , and the derivatives of  $\boldsymbol{\omega}_{i(d)}$  with respect to  $\boldsymbol{\theta}$  are

$$\frac{\partial}{\partial \rho_{mr|c}} \boldsymbol{\omega}_i(c' | d) = \eta_{ic} [I(c = d) - \eta_{id}] [\hat{y}_i(c' | d) - \mu(c' | d)]$$

$$\times \begin{cases} \rho_{mr|c}^{-1} & \text{if } u_{im} = r \text{ is observed,} \\ -\rho_{mr_m|c}^{-1} & \text{if } u_{im} = r_m \text{ is observed,} \\ 0 & \text{otherwise,} \end{cases}$$

$$\frac{\partial}{\partial \alpha_{jc}} \omega_i(c' | d) = \eta_{ic} [I(c = d) - \eta_{id}] [\hat{y}_i(c' | d) - \mu(c' | d)] x_{ij}^{(\alpha)},$$

$$\begin{aligned} \frac{\partial}{\partial \beta_{jc}} \omega_i(c' | d) &= \eta_{ic} [I(c = d) - \eta_{id}] [\hat{y}_i(c' | d) - \mu(c' | d)] a_{ic} x_{ij}^{(\beta)} \\ &\quad + \eta_{id} \left[ \frac{\partial}{\partial \beta_{jc}} \hat{y}_i(c' | d) \right], \end{aligned}$$

$$\begin{aligned} \frac{\partial}{\partial \sigma_c^2} \omega_i(c' | d) &= \eta_{ic} [I(c = d) - \eta_{id}] [\hat{y}_i(c' | d) - \mu(c' | d)] b_{ic} \\ &\quad + \eta_{id} \left[ \frac{\partial}{\partial \sigma_c^2} \hat{y}_i(c' | d) \right]. \end{aligned}$$

### 3 List of Covariates

Descriptions of the baseline covariates used in the latent-class causal model, and the Add Health items from which they were derived, are given in Table 1.

**Table 1**

Baseline variables from Add Health, Wave I (1994–95) used in the latent-class causal model, with unweighted means and standard deviations (SD) in the sample of 6,679 girls, and Add Health codebook items from which they were derived.

	Description	Mean	SD	Add Health items
HISP	Hispanic (1=marked, 0=otherwise)	0.16	0.37	H1GI4
BLACK	Black (1=marked, 0=otherwise)	0.23	0.42	H1GI6B
GRADE	current grade in school	9.35	1.45	H1GI20
GRADE.MIS	0=grade present, 1=grade missing	0.02	0.14	H1GI20
HEALTH	general health (1=excellent, ..., 5=poor)	2.19	0.92	H1GH1
HEADACHE	headache (0=never, ..., 4=every day)	1.43	0.79	H1GH2
STOMACHE	stomach ache (0=never, ..., 4=every day)	1.17	0.68	H1GH4
WEAKTIRED	scale for feeling weak and tired	1.09	0.78	H1GH6, 8, 11
FEELSICK	feeling sick (0=never, ..., 4=every day)	0.61	0.63	H1GH10
POORAPP	poor appetite (0=never, ..., 4=every day)	0.78	0.92	H1GH17
TROUBSLEEP	trouble sleeping (0=never, ..., 4=every day)	1.02	1.06	H1GH18
MOODY	moodiness (0=never, ..., 4=every day)	1.50	1.05	H1GH20
SELFWEIGHT	weight (1=very under, ..., 5=very over)	3.31	0.79	H1GH28
MISSSCHOOL	miss school for health, emotional problems	0.46	0.67	H1GH48
LOGBMI	log body-mass index ( $\text{kg}/\text{m}^2$ )	3.08	0.18	H1GH59–60
TAUGHTEXER	taught importance of exercise	0.92	0.27	H1TS2
TAUGHTOVERWT	taught problems of being overweight	0.60	0.49	H1TS4
TAUGHTUNDERWT	taught problems of being underweight	0.59	0.49	H1TS16
ABSENT	absent school with excuse	1.67	0.85	H1ED1
SKIPPED	skipped school (0=never, 1=1-2 times, 2=3-10, 3=10+)	0.42	0.79	H1ED2
GRADES	composite grades in major subjects	2.12	0.75	H1ED11–14
GRADES.MIS	0=grades present, 1=grades missing	0.03	0.16	H1ED11–14
TEACHERS	trouble getting along with teachers	0.78	0.92	H1ED15
PAYATTENTION	trouble paying attention in school	1.13	0.97	H1ED16
HOMEWORK	trouble getting homework done	1.07	1.02	H1ED17
STUDENTS	trouble getting along with other students	0.84	0.95	H1ED18
FEELCLOSE	feel close to people at school	2.30	1.01	H1ED19
PARTOF	feel part of your school	2.15	1.00	H1ED20
COUNSELING	psychological counseling past year	0.13	0.34	H1HS3
DISTRESS	emotional distress score from feelings scale	0.64	0.43	H1FS1–18
NOMOTHER	0=mother's education observed, 1=missing	0.05	0.21	H1RM1
EDUCMOTHER	mother's education level	5.37	2.32	H1RM1
NOFATHER	0=father's education observed, 1=missing	0.31	0.46	H1RF1
EDUCFATHER	father's education level	5.53	2.03	H1RF1
DECIDEAT	make own decisions about what to eat	0.18	0.39	H1WP7
RELMOTHER	scale for relationship with mother	4.37	0.67	H1WP9–10, H1PF1, 4, 5
RELFATHER	scale for relationship with father	4.18	0.68	H1WP13–14, H1PF23–25
MOTHERINDEP	mother encourages you to be independent	1.79	0.85	H1PF2
WORKHARD	get what you want because you worked hard	2.14	0.91	H1PF8
SELFCONCEPT	scale for self-concept	2.02	0.67	H1PF30, 32–34
PHYSFIT	you are physically fit	2.29	0.94	H1PF31
ACCEPTED	you feel socially accepted	1.99	0.78	H1PF35
LOVED	you feel loved	1.75	0.76	H1PF36
INTELLIGENT	how intelligent are you	3.88	1.08	H1SE4
ROMANTIC	romantic relationship past 18 months	0.55	0.50	H1RR1
INTERCOURSE	ever had sexual intercourse	0.33	0.47	H1CO1
RELIGION	how important is religion to you	2.0	1.3	H1RE4
SUICIDE	think seriously about suicide past 12 months	0.16	0.37	H1SU1
DELINQ	composite score from delinquency scale	0.24	0.30	H1DS1–15
CAREABOUT	how much adults/parents/teachers/friends care about you	4.29	0.54	H1PR1–4
COLLEGE	how much want to/likely to go to college	4.41	0.93	H1EE1–2
PHYSDEVP	female physical development composite	3.29	0.84	H1PF1–2, 6
PERIOD	ever had menstrual period	0.91	0.29	H1PF3
PREGNANT	ever been pregnant	0.06	0.24	H1PF7
SMOKE	composite measure of tobacco use	0.90	1.00	H1TO1, 5, 7
DRINK	composite measure of alcohol use	0.89	0.98	H1TO12, 15–16
MARIJUANA	composite measure of marijuana use	0.27	0.51	H1TO30–32
OBESEMOTHER	biological mother obese (0=no, 1=yes)	0.15	0.36	PC49A2
OBESEFATHER	biological father obese (0=no, 1=yes)	0.08	0.27	PC49A2
DIABMOTHER	biological mother diabetes (0=no, 1=yes)	0.03	0.18	PC49F2
DIABFATHER	biological father diabetes (0=no, 1=yes)	0.04	0.19	PC49F3



## 4 PML estimates

### Summary of Latent-Class Causal Analysis

#### ===== Data and model information =====

Number of cases: 13568  
Number of cases in subpopulation: 6679

Number of sampling strata: 4  
Number of sampling clusters: 132  
Clusters per stratum - min.: 20  
Clusters per stratum - max.: 54  
Cases per cluster - min.: 19  
Cases per cluster - max.: 1151  
Cases per cluster in subpop. - min.: 0  
Cases per cluster in subpop. - max.: 561

Case weight in sample - total: 18824889.0042  
Case weight in sample - avg. : 1387.4476  
Case weight in sample - min. : 18.1956  
Case weight in sample - max. : 8246.0876  
Case weight in subpop. - total: 8945379.3070  
Case weight in subpop. - avg. : 1339.3291  
Case weight in subpop. - min. : 18.1956  
Case weight in subpop. - max. : 7952.9116

Number of measurement items: 8  
Number of categories per item: 4 3 3 3 3 3 3 3  
Number of latent classes: 4  
Reference class for treatment model: Class 4  
Number of predictors in treatment model:  
    (including a constant, if present): 62  
Number of predictors in outcome model:  
    (including a constant, if present): 74

Starting values for rhos: supplied by user  
Starting values for alphas: set to zero  
Starting values for betas: default OLS procedure  
Starting values for sigma2: default OLS procedure

Flattening constant for rhos: 1  
Stabilizing constant for alphas: 1  
Flattening constant for gammas: 1

Max. number of EM iterations: 5000  
Convergence criterion: 0.000001

#### ===== Fit statistics =====

The EM algorithm CONVERGED in: 109 iterations

Standard errors computed successfully.  
Standard-error method: SANDWICH

Number of free parameters estimated: 554.0000000  
Pseudo-loglikelihood: -11341.9269742  
Pseudo-loglikelihood + penalty: -11606.0354590  
Design-effect trace: 882.1996393

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=====
Parameter estimates
=====
```

```
Class prevalences (marginal gammas):
Class:      1      2      3      4
           0.3601 0.2497 0.191 0.1992
```

```
Item-response probabilities (rhos):
Response category 1
Class:      1      2      3      4
TRYWEIGHT  0.9301 0.3203 0.1815 0.0002
DIETED      0.5578 0.0426 0.0003 0.0003
EXERCISED   0.7652 0.9995 0.0003 0.0003
VOMITED     0.0173 0.0004 0.0003 0.0003
DIETPILLS   0.0476 0.0007 0.0003 0.0003
LAXATIVES   0.0111 0.0002 0.0003 0.0003
OTHER       0.0976 0.0101 0.0003 0.0003
NONE        0.0002 0.0002 0.9995 0.0003
```

```
Response category 2
Class:      1      2      3      4
TRYWEIGHT  0.0001 0.0001 0.0002 0.3377
DIETED      0.4420 0.9572 0.9995 0.0003
EXERCISED   0.2346 0.0003 0.9995 0.0003
VOMITED     0.9825 0.9994 0.9995 0.0003
DIETPILLS   0.9522 0.9991 0.9995 0.0003
LAXATIVES   0.9887 0.9996 0.9995 0.0003
OTHER       0.9022 0.9897 0.9995 0.0003
NONE        0.9996 0.9996 0.0003 0.0003
```

```
Response category 3
Class:      1      2      3      4
TRYWEIGHT  0.0697 0.6794 0.8181 0.0002
DIETED      0.0001 0.0002 0.0003 0.9995
EXERCISED   0.0001 0.0002 0.0003 0.9995
VOMITED     0.0001 0.0002 0.0003 0.9995
DIETPILLS   0.0001 0.0002 0.0003 0.9995
LAXATIVES   0.0001 0.0002 0.0003 0.9995
OTHER       0.0001 0.0002 0.0003 0.9995
NONE        0.0001 0.0002 0.0003 0.9995
```

```
Response category 4
Class:      1      2      3      4
TRYWEIGHT  0.0001 0.0001 0.0002 0.6619
DIETED      NA      NA      NA      NA
EXERCISED   NA      NA      NA      NA
VOMITED     NA      NA      NA      NA
DIETPILLS   NA      NA      NA      NA
LAXATIVES   NA      NA      NA      NA
OTHER       NA      NA      NA      NA
NONE        NA      NA      NA      NA
```

```
Treatment model coefficients (alphas):
```

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, , Class 1/4
```

	Estimate	Std.Err	Z.ratio	Signif
(Intercept)	-18.4700000	1.838900	-10.044	0.0000
HISP	-0.1311500	0.166420	-0.788	0.4307
BLACK	-0.5737900	0.164490	-3.488	0.0005
GRADE	-0.0884830	0.049553	-1.786	0.0742
GRADE.MIS	-1.1270000	0.522310	-2.158	0.0309

HEALTH	0.0022728	0.072343	0.031	0.9749
HEADACHE	-0.0227290	0.088171	-0.258	0.7966
STOMACHE	-0.0305760	0.097223	-0.314	0.7531
WEAKTIRED	-0.0834530	0.103390	-0.807	0.4196
FEELSICK	0.1574500	0.108950	1.445	0.1484
POORAPP	0.1121000	0.066413	1.688	0.0914
TROUBSLEEP	0.0196760	0.058871	0.334	0.7382
MOODY	-0.0521740	0.069828	-0.747	0.4550
SELFWEIGHT	1.1999000	0.136060	8.819	0.0000
MISSCHOOL	-0.0143610	0.090493	-0.159	0.8739
LOGBMI	4.3336000	0.534330	8.110	0.0000
TAUGHTEXER	0.5099700	0.232570	2.193	0.0283
TAUGHTOVERWT	-0.1364400	0.138160	-0.988	0.3234
TAUGHTUNDERWT	0.0740300	0.126240	0.586	0.5576
ABSENT	-0.0389290	0.071250	-0.546	0.5848
SKIPPED	0.0629650	0.091195	0.690	0.4899
GRADES	-0.0371430	0.102670	-0.362	0.7175
GRADES.MIS	0.7370100	0.475810	1.549	0.1214
TEACHERS	-0.0227910	0.082053	-0.278	0.7812
PAYATTENTION	0.0335790	0.086233	0.389	0.6970
HOMEWORK	0.0019384	0.064523	0.030	0.9760
STUDENTS	0.0614360	0.074849	0.821	0.4118
FEELCLOSE	-0.1782500	0.062883	-2.835	0.0046
PARTOF	0.1458700	0.079457	1.836	0.0664
COUNSELING	-0.0345610	0.158810	-0.218	0.8277
DISTRESS	0.5031900	0.180020	2.795	0.0052
NOMOTHER	0.1229800	0.288140	0.427	0.6695
EDUCMOTHER	-0.0181860	0.026218	-0.694	0.4879
NOFATHER	0.2214300	0.134660	1.644	0.1001
EDUCFATHER	-0.0229530	0.032820	-0.699	0.4843
DECIDEAT	0.2970100	0.192900	1.540	0.1236
RELMOTHER	0.2218400	0.111910	1.982	0.0475
RELFATHER	-0.0625340	0.098339	-0.636	0.5248
MOTHERINDEP	0.0804410	0.070883	1.135	0.2564
WORKHARD	-0.0173270	0.069997	-0.248	0.8045
SELFCONCEPT	0.3354900	0.152960	2.193	0.0283
PHYSFIT	0.0088606	0.083837	0.106	0.9158
ACCEPTED	-0.1688400	0.097425	-1.733	0.0831
LOVED	-0.1001500	0.108290	-0.925	0.3550
INTELLIGENT	0.0144760	0.066728	0.217	0.8283
ROMANTIC	0.2019400	0.137020	1.474	0.1405
INTERCOURSE	-0.0808500	0.140650	-0.575	0.5654
RELIGION	-0.1505300	0.048026	-3.134	0.0017
SUICIDE	0.0267970	0.152600	0.176	0.8606
DELINQ	-0.3156700	0.214220	-1.474	0.1406
CAREABOUT	-0.0130770	0.127230	-0.103	0.9181
COLLEGE	0.0615350	0.066608	0.924	0.3556
PHYSDEVP	0.3287400	0.074316	4.424	0.0000
PERIOD	-0.0452570	0.197600	-0.229	0.8188
PREGNANT	-0.4825200	0.280920	-1.718	0.0859
SMOKE	-0.2097700	0.083077	-2.525	0.0116
DRINK	0.2302300	0.073382	3.137	0.0017
MARIJUANA	-0.0872460	0.125840	-0.693	0.4881
OBESEMOTHER	0.3677400	0.146480	2.511	0.0121
OBESEFATHER	-0.1906000	0.180970	-1.053	0.2923
DIABMOTHER	-0.1654200	0.436860	-0.379	0.7049
DIABFATHER	-0.3214300	0.254780	-1.262	0.2071

, , Class 2/4

	Estimate	Std.Err	Z.ratio	Signif
(Intercept)	-3.5509000	1.969800	-1.803	0.0714
HISP	-0.6891100	0.203240	-3.391	0.0007
BLACK	-0.3963300	0.168130	-2.357	0.0184

GRADE	-0.1008600	0.051460	-1.960	0.0500
GRADE.MIS	0.0724620	0.670780	0.108	0.9140
HEALTH	-0.0750820	0.079070	-0.950	0.3423
HEADACHE	-0.0681830	0.076140	-0.895	0.3705
STOMACHE	0.0441610	0.089431	0.494	0.6214
WEAKTIRED	-0.0385000	0.102820	-0.374	0.7081
FEELSICK	0.1087600	0.098461	1.105	0.2693
POORAPP	-0.0888000	0.069842	-1.271	0.2036
TROUBSLEEP	-0.0122510	0.064010	-0.191	0.8482
MOODY	-0.1259800	0.060078	-2.097	0.0360
SELFWEIGHT	0.4357200	0.099865	4.363	0.0000
MISSCHOOL	-0.0231920	0.084273	-0.275	0.7832
LOGBMI	1.1019000	0.594260	1.854	0.0637
TAUGHTEXER	0.5558600	0.211390	2.629	0.0086
TAUGHTOVERWT	-0.0681810	0.125360	-0.544	0.5865
TAUGHTUNDERWT	0.1409800	0.138710	1.016	0.3095
ABSENT	0.0337680	0.079459	0.425	0.6709
SKIPPED	-0.1953400	0.115150	-1.696	0.0898
GRADES	-0.2447700	0.114740	-2.133	0.0329
GRADES.MIS	-0.2965500	0.654450	-0.453	0.6505
TEACHERS	0.1340400	0.070511	1.901	0.0573
PAYATTENTION	0.0907950	0.067155	1.352	0.1764
HOMEWORK	-0.0062869	0.074525	-0.084	0.9328
STUDENTS	-0.1063900	0.074243	-1.433	0.1519
FEELCLOSE	-0.1448600	0.065332	-2.217	0.0266
PARTOF	0.0171730	0.087558	0.196	0.8445
COUNSELING	-0.2853100	0.182160	-1.566	0.1173
DISTRESS	0.0796400	0.178400	0.446	0.6553
NOMOTHER	0.0140700	0.278440	0.051	0.9597
EDUCMOTHER	-0.0046642	0.029701	-0.157	0.8752
NOFATHER	0.1383300	0.127430	1.086	0.2777
EDUCFATHER	-0.0157210	0.030719	-0.512	0.6088
DECIDEEAT	-0.2044900	0.166750	-1.226	0.2201
RELMOTHER	0.2296800	0.100940	2.275	0.0229
RELFATHER	-0.0245540	0.106310	-0.231	0.8173
MOTHERINDEP	0.1618800	0.069725	2.322	0.0202
WORKHARD	-0.0320360	0.059681	-0.537	0.5914
SELFCONCEPT	0.1421600	0.155780	0.913	0.3615
PHYSFIT	-0.3325800	0.094555	-3.517	0.0004
ACCEPTED	0.0479550	0.091879	0.522	0.6017
LOVED	-0.1546600	0.132150	-1.170	0.2419
INTELLIGENT	-0.0773050	0.066278	-1.166	0.2435
ROMANTIC	0.1506800	0.128670	1.171	0.2416
INTERCOURSE	0.0307930	0.147540	0.209	0.8347
RELIGION	-0.0441980	0.051795	-0.853	0.3935
SUICIDE	-0.0507040	0.170570	-0.297	0.7663
DELINQ	0.1876900	0.206300	0.910	0.3629
CAREABOUT	-0.1001500	0.128990	-0.776	0.4375
COLLEGE	0.0605130	0.077896	0.777	0.4373
PHYSDEVP	0.2442200	0.077029	3.170	0.0015
PERIOD	0.2551700	0.164360	1.553	0.1205
PREGNANT	-0.5561600	0.231780	-2.399	0.0164
SMOKE	-0.1423200	0.073979	-1.924	0.0544
DRINK	0.0497690	0.067702	0.735	0.4623
MARIJUANA	-0.0203480	0.139040	-0.146	0.8836
OBESEMOTHER	-0.0656210	0.168290	-0.390	0.6966
OBESEFATHER	0.1661900	0.203360	0.817	0.4138
DIABMOTHER	-0.3182100	0.348300	-0.914	0.3609
DIABFATHER	-0.7370600	0.395880	-1.862	0.0626

, , Class 3/4

	Estimate	Std.Err	Z.ratio	Signif
(Intercept)	-4.1518000	1.795600	-2.312	0.0208

HISP	-0.4575400	0.177130	-2.583	0.0098
BLACK	0.0919010	0.152170	0.604	0.5459
GRADE	-0.0715580	0.054370	-1.316	0.1881
GRADE.MIS	-1.1723000	0.543160	-2.158	0.0309
HEALTH	-0.0059357	0.072522	-0.082	0.9348
HEADACHE	-0.0926810	0.071605	-1.294	0.1956
STOMACHE	0.0056631	0.093892	0.060	0.9519
WEAKTIRED	-0.1243300	0.096470	-1.289	0.1975
FEELSICK	-0.0307500	0.086208	-0.357	0.7213
POORAPP	0.0838880	0.066101	1.269	0.2044
TROUBSLEEP	-0.0403200	0.059938	-0.673	0.5011
MOODY	0.0208570	0.065141	0.320	0.7488
SELFWEIGHT	0.4718700	0.085515	5.518	0.0000
MISSCHOOL	0.0732710	0.081340	0.901	0.3677
LOGBMI	0.6198500	0.512310	1.210	0.2263
TAUGHTEXER	0.3924900	0.207770	1.889	0.0589
TAUGHTOVERWT	-0.1827500	0.134370	-1.360	0.1738
TAUGHTUNDERWT	0.0715290	0.126570	0.565	0.5720
ABSENT	-0.0081363	0.064179	-0.127	0.8991
SKIPPED	0.0093531	0.078634	0.119	0.9053
GRADES	0.1651500	0.103150	1.601	0.1094
GRADES.MIS	0.6600300	0.430390	1.534	0.1251
TEACHERS	-0.0181020	0.074219	-0.244	0.8073
PAYATTENTION	0.0912790	0.073458	1.243	0.2140
HOMEWORK	0.0199470	0.062335	0.320	0.7490
STUDENTS	-0.0546190	0.071204	-0.767	0.4430
FEELCLOSE	-0.0852350	0.062591	-1.362	0.1733
PARTOF	0.1212400	0.060951	1.989	0.0467
COUNSELING	-0.1613900	0.166110	-0.972	0.3313
DISTRESS	-0.0084984	0.188140	-0.045	0.9640
NOMOTHER	0.2171200	0.253550	0.856	0.3918
EDUCMOTHER	-0.0301580	0.027057	-1.115	0.2650
NOFATHER	0.1975900	0.105080	1.880	0.0601
EDUCFATHER	-0.0348680	0.032203	-1.083	0.2789
DECIDEEAT	0.0212300	0.139100	0.153	0.8787
RELMOTHER	0.0367260	0.129510	0.284	0.7767
RELFATHER	-0.0255490	0.105170	-0.243	0.8081
MOTHERINDEP	0.1095100	0.083103	1.318	0.1876
WORKHARD	0.0399660	0.056254	0.710	0.4774
SELFCONCEPT	0.0185080	0.137120	0.135	0.8926
PHYSFIT	0.0446960	0.075882	0.589	0.5558
ACCEPTED	-0.0330450	0.090959	-0.363	0.7164
LOVED	-0.0629610	0.097807	-0.644	0.5198
INTELLIGENT	0.0258830	0.062845	0.412	0.6804
ROMANTIC	0.1593100	0.128080	1.244	0.2135
INTERCOURSE	-0.0217480	0.153250	-0.142	0.8872
RELIGION	-0.0361710	0.039289	-0.921	0.3572
SUICIDE	-0.1083800	0.150020	-0.722	0.4700
DELINQ	-0.4480700	0.237000	-1.891	0.0587
CAREABOUT	0.0700970	0.122650	0.572	0.5676
COLLEGE	0.0235680	0.053842	0.438	0.6616
PHYSDEVP	0.1968100	0.069451	2.834	0.0046
PERIOD	-0.0256950	0.196220	-0.131	0.8958
PREGNANT	-0.4134200	0.222880	-1.855	0.0636
SMOKE	-0.1058500	0.076159	-1.390	0.1646
DRINK	0.0535390	0.071454	0.749	0.4537
MARIJUANA	0.1075000	0.117520	0.915	0.3603
OBESEMOTHER	0.1805500	0.155920	1.158	0.2469
OBESEFATHER	0.0187200	0.198760	0.094	0.9250
DIABMOTHER	-0.1182900	0.342730	-0.345	0.7300
DIABFATHER	-0.5454800	0.283350	-1.925	0.0542

, , Class 4/4

	Estimate	Std.Err	Z.ratio	Signif
(Intercept)	0	0	NaN	NaN
HISP	0	0	NaN	NaN
BLACK	0	0	NaN	NaN
GRADE	0	0	NaN	NaN
GRADE.MIS	0	0	NaN	NaN
HEALTH	0	0	NaN	NaN
HEADACHE	0	0	NaN	NaN
STOMACHE	0	0	NaN	NaN
WEAKTIRED	0	0	NaN	NaN
FEELSICK	0	0	NaN	NaN
POORAPP	0	0	NaN	NaN
TROUBSLEEP	0	0	NaN	NaN
MOODY	0	0	NaN	NaN
SELFWEIGHT	0	0	NaN	NaN
MISSCHOOL	0	0	NaN	NaN
LOGBMI	0	0	NaN	NaN
TAUGHTEXER	0	0	NaN	NaN
TAUGHTOVERWT	0	0	NaN	NaN
TAUGHTUNDERWT	0	0	NaN	NaN
ABSENT	0	0	NaN	NaN
SKIPPED	0	0	NaN	NaN
GRADES	0	0	NaN	NaN
GRADES.MIS	0	0	NaN	NaN
TEACHERS	0	0	NaN	NaN
PAYATTENTION	0	0	NaN	NaN
HOMEWORK	0	0	NaN	NaN
STUDENTS	0	0	NaN	NaN
FEELCLOSE	0	0	NaN	NaN
PARTOF	0	0	NaN	NaN
COUNSELING	0	0	NaN	NaN
DISTRESS	0	0	NaN	NaN
NOMOTHER	0	0	NaN	NaN
EDUCMOTHER	0	0	NaN	NaN
NOFATHER	0	0	NaN	NaN
EDUCFATHER	0	0	NaN	NaN
DECIDEEAT	0	0	NaN	NaN
RELMOTHER	0	0	NaN	NaN
RELFATHER	0	0	NaN	NaN
MOTHERINDEP	0	0	NaN	NaN
WORKHARD	0	0	NaN	NaN
SELFCONCEPT	0	0	NaN	NaN
PHYSFIT	0	0	NaN	NaN
ACCEPTED	0	0	NaN	NaN
LOVED	0	0	NaN	NaN
INTELLIGENT	0	0	NaN	NaN
ROMANTIC	0	0	NaN	NaN
INTERCOURSE	0	0	NaN	NaN
RELIGION	0	0	NaN	NaN
SUICIDE	0	0	NaN	NaN
DELINQ	0	0	NaN	NaN
CAREABOUT	0	0	NaN	NaN
COLLEGE	0	0	NaN	NaN
PHYSDEVP	0	0	NaN	NaN
PERIOD	0	0	NaN	NaN
PREGNANT	0	0	NaN	NaN
SMOKE	0	0	NaN	NaN
DRINK	0	0	NaN	NaN
MARIJUANA	0	0	NaN	NaN
OBESEMOTHER	0	0	NaN	NaN
OBESEFATHER	0	0	NaN	NaN
DIABMOTHER	0	0	NaN	NaN
DIABFATHER	0	0	NaN	NaN

Outcome model coefficients (betas):

, , Class 1

	Estimate	Std.Err	Z.ratio	Signif
(Intercept)	1.16330000	0.3278100	3.549	0.0004
HISP	-0.01823000	0.0197670	-0.922	0.3564
BLACK	0.01988900	0.0193820	1.026	0.3048
GRADE	-0.01051800	0.0040661	-2.587	0.0097
GRADE.MIS	0.03796600	0.0493130	0.770	0.4414
HEALTH	0.00854620	0.0073820	1.158	0.2470
HEADACHE	-0.00266010	0.0075501	-0.352	0.7246
STOMACHE	0.00486220	0.0084804	0.573	0.5664
WEAKTIRED	-0.00971400	0.0091649	-1.060	0.2892
FEELSICK	0.00502080	0.0101730	0.494	0.6216
POORAPP	-0.00963950	0.0071841	-1.342	0.1797
TROUBSLEEP	0.00126780	0.0051660	0.245	0.8061
MOODY	0.00204150	0.0063813	0.320	0.7490
SELFWEIGHT	-0.01544300	0.0184140	-0.839	0.4017
MISSCHOOL	-0.00426460	0.0085629	-0.498	0.6185
LOGBMI	0.71904000	0.0762620	9.429	0.0000
TAUGHTEXER	-0.00467890	0.0203320	-0.230	0.8180
TAUGHTOVERWT	-0.00152850	0.0120550	-0.127	0.8991
TAUGHTUNDERWT	0.01337000	0.0124990	1.070	0.2847
ABSENT	-0.00453080	0.0079422	-0.570	0.5684
SKIPPED	-0.00986300	0.0103160	-0.956	0.3390
GRADES	0.01694400	0.0125210	1.353	0.1760
GRADES.MIS	-0.06992700	0.0398760	-1.754	0.0795
TEACHERS	-0.00124230	0.0078294	-0.159	0.8739
PAYATTENTION	0.00478660	0.0065812	0.727	0.4670
HOMEWORK	-0.00023734	0.0091435	-0.026	0.9793
STUDENTS	-0.00379320	0.0073481	-0.516	0.6057
FEELCLOSE	-0.00113680	0.0061422	-0.185	0.8532
PARTOF	0.00644310	0.0080739	0.798	0.4249
COUNSELING	-0.01416800	0.0158290	-0.895	0.3707
DISTRESS	-0.01870300	0.0213590	-0.876	0.3812
NOMOTHER	0.04683100	0.0338710	1.383	0.1668
EDUCMOTHER	-0.00015167	0.0035065	-0.043	0.9655
NOFATHER	0.00723720	0.0124260	0.582	0.5603
EDUCFATHER	-0.00386180	0.0028298	-1.365	0.1724
DECIDEEAT	-0.03781100	0.0163930	-2.307	0.0211
RELMOTHER	-0.00210150	0.0105820	-0.199	0.8426
RELFATHER	-0.00515440	0.0077151	-0.668	0.5041
MOTHERINDEP	-0.01287400	0.0086377	-1.490	0.1361
WORKHARD	-0.00305130	0.0057881	-0.527	0.5981
SELFCONCEPT	-0.01244400	0.0117030	-1.063	0.2877
PHYSFIT	-0.01513400	0.0115710	-1.308	0.1909
ACCEPTED	0.00680690	0.0090138	0.755	0.4501
LOVED	-0.00496140	0.0110400	-0.449	0.6531
INTELLIGENT	-0.00857610	0.0063435	-1.352	0.1764
ROMANTIC	0.00675950	0.0109080	0.620	0.5355
INTERCOURSE	0.04079500	0.0170100	2.398	0.0165
RELIGION	-0.00657610	0.0040996	-1.604	0.1087
SUICIDE	0.02230400	0.0108540	2.055	0.0399
DELINQ	-0.01577700	0.0262510	-0.601	0.5478
CAREABOUT	0.02007900	0.0130380	1.540	0.1236
COLLEGE	-0.00365010	0.0069542	-0.525	0.5997
PHYSDEVP	0.01636600	0.0075948	2.155	0.0312
PERIOD	0.00870810	0.0207980	0.419	0.6754
PREGNANT	0.04453600	0.0228480	1.949	0.0513
SMOKE	-0.00178950	0.0077440	-0.231	0.8172
DRINK	-0.02202500	0.0088529	-2.488	0.0129
MARIJUANA	0.00108060	0.0137730	0.078	0.9375
OBESEMOTHER	0.02246100	0.0180090	1.247	0.2123

OBESEFATHER	0.03815200	0.0175440	2.175	0.0297
DIABMOTHER	0.00834440	0.0259730	0.321	0.7480
DIABFATHER	0.05736900	0.0388020	1.479	0.1393
LOGIT12.1	-0.05684500	0.0649860	-0.875	0.3817
LOGIT12.2	0.17319000	0.1636300	1.058	0.2899
LOGIT12.3	-0.14679000	0.1481300	-0.991	0.3217
LOGIT12.4	0.02942600	0.0448650	0.656	0.5119
LOGIT13.1	0.11822000	0.1287300	0.918	0.3584
LOGIT13.2	-0.13694000	0.2779000	-0.493	0.6222
LOGIT13.3	-0.01085000	0.1729800	-0.063	0.9500
LOGIT13.4	0.02670600	0.0338000	0.790	0.4295
LOGIT23.1	-0.06091600	0.2035100	-0.299	0.7647
LOGIT23.2	0.09499400	0.4939500	0.192	0.8475
LOGIT23.3	-0.01608700	0.3730900	-0.043	0.9656
LOGIT23.4	-0.01312500	0.1246600	-0.105	0.9161

, , Class 2

	Estimate	Std.Err	Z.ratio	Signif
(Intercept)	1.16170000	0.2152100	5.398	0.0000
HISP	0.06377800	0.0280950	2.270	0.0232
BLACK	0.10974000	0.0242590	4.524	0.0000
GRADE	-0.00959290	0.0047609	-2.015	0.0439
GRADE.MIS	-0.01024200	0.0597970	-0.171	0.8640
HEALTH	-0.00164180	0.0073865	-0.222	0.8241
HEADACHE	0.01146200	0.0077483	1.479	0.1391
STOMACHE	-0.01371700	0.0070586	-1.943	0.0520
WEAKTIRED	-0.01938000	0.0083613	-2.318	0.0205
FEELSICK	-0.00156170	0.0093126	-0.168	0.8668
POORAPP	0.00780920	0.0082356	0.948	0.3430
TROUBSLEEP	-0.00536060	0.0057936	-0.925	0.3548
MOODY	0.00607260	0.0069011	0.880	0.3789
SELFWEIGHT	-0.00406070	0.0112220	-0.362	0.7175
MISSCHOOL	0.02640800	0.0097056	2.721	0.0065
LOGBMI	0.61454000	0.0794050	7.739	0.0000
TAUGHTEXER	-0.00830570	0.0266720	-0.311	0.7555
TAUGHTOVERWT	0.00054992	0.0101870	0.054	0.9569
TAUGHTUNDERWT	-0.01643500	0.0123120	-1.335	0.1819
ABSENT	0.01207000	0.0062362	1.935	0.0529
SKIPPED	0.01504800	0.0100530	1.497	0.1344
GRADES	0.01689100	0.0146920	1.150	0.2503
GRADES.MIS	0.07722900	0.0574670	1.344	0.1790
TEACHERS	-0.00893010	0.0068485	-1.304	0.1923
PAYATTENTION	-0.00053318	0.0058934	-0.090	0.9279
HOMEWORK	-0.00808910	0.0061588	-1.313	0.1890
STUDENTS	0.00424760	0.0058051	0.732	0.4644
FEELCLOSE	0.00771190	0.0090005	0.857	0.3915
PARTOF	0.00032797	0.0099653	0.033	0.9737
COUNSELING	0.02252600	0.0160950	1.400	0.1616
DISTRESS	0.01470400	0.0208960	0.704	0.4816
NOMOTHER	-0.00876160	0.0277520	-0.316	0.7522
EDUCMOTHER	-0.00316530	0.0022145	-1.429	0.1529
NOFATHER	-0.00080406	0.0114200	-0.070	0.9439
EDUCFATHER	-0.00384170	0.0026741	-1.437	0.1508
DECIDEEAT	0.00865230	0.0098978	0.874	0.3820
RELMOTHER	-0.00587660	0.0121050	-0.485	0.6273
RELFATHER	0.01679000	0.0099865	1.681	0.0927
MOTHERINDEP	-0.00418070	0.0065579	-0.637	0.5238
WORKHARD	0.00571290	0.0068558	0.833	0.4047
SELFCONCEPT	-0.03433100	0.0153830	-2.232	0.0256
PHYSFIT	0.03326700	0.0170770	1.948	0.0514
ACCEPTED	0.00433100	0.0115380	0.375	0.7074
LOVED	0.02593400	0.0126230	2.054	0.0399
INTELLIGENT	0.00642580	0.0054206	1.185	0.2358



ROMANTIC	0.02231800	0.0106070	2.104	0.0354
INTERCOURSE	0.01101900	0.0156970	0.702	0.4827
RELIGION	0.00426000	0.0037317	1.142	0.2536
SUICIDE	-0.02611500	0.0122720	-2.128	0.0333
DELINQ	-0.04366600	0.0293920	-1.486	0.1374
CAREABOUT	0.00521700	0.0140240	0.372	0.7099
COLLEGE	-0.00451950	0.0058335	-0.775	0.4385
PHYSDEVP	0.00107720	0.0077919	0.138	0.8900
PERIOD	-0.01982700	0.0187020	-1.060	0.2891
PREGNANT	0.00224360	0.0252310	0.089	0.9291
SMOKE	0.00293990	0.0059567	0.494	0.6216
DRINK	0.00102260	0.0079804	0.128	0.8980
MARIJUANA	-0.01458900	0.0149390	-0.977	0.3288
OBESEMOTHER	0.02390100	0.0170180	1.405	0.1602
OBESEFATHER	0.04194000	0.0215350	1.948	0.0515
DIABMOTHER	0.02751400	0.0468150	0.588	0.5567
DIABFATHER	-0.00907140	0.0272350	-0.333	0.7391
LOGIT12.1	-0.05227100	0.0393190	-1.329	0.1837
LOGIT12.2	0.16658000	0.1153300	1.444	0.1486
LOGIT12.3	-0.14958000	0.1382300	-1.082	0.2792
LOGIT12.4	0.01175700	0.0787640	0.149	0.8813
LOGIT13.1	0.06341300	0.0760630	0.834	0.4045
LOGIT13.2	-0.10798000	0.1866500	-0.579	0.5629
LOGIT13.3	-0.00027485	0.1602000	-0.002	0.9986
LOGIT13.4	0.07140400	0.0847930	0.842	0.3997
LOGIT23.1	0.22615000	0.1943800	1.163	0.2446
LOGIT23.2	-0.37189000	0.4085500	-0.910	0.3627
LOGIT23.3	0.16081000	0.2710700	0.593	0.5530
LOGIT23.4	0.02316100	0.0833890	0.278	0.7812

, , Class 3

	Estimate	Std.Err	Z.ratio	Signif
(Intercept)	0.80344000	0.2136800	3.760	0.0002
HISP	0.02418800	0.0159600	1.516	0.1296
BLACK	0.01893100	0.0207160	0.914	0.3608
GRADE	-0.00531320	0.0058030	-0.916	0.3599
GRADE.MIS	-0.06813300	0.0726290	-0.938	0.3482
HEALTH	0.01222600	0.0085915	1.423	0.1547
HEADACHE	0.01315600	0.0071127	1.850	0.0644
STOMACHE	-0.00281930	0.0088730	-0.318	0.7507
WEAKTIRED	-0.00128080	0.0094617	-0.135	0.8923
FEELSICK	0.01842300	0.0098335	1.873	0.0610
POORAPP	-0.01405200	0.0073355	-1.916	0.0554
TROUBSLEEP	-0.00874700	0.0054958	-1.592	0.1115
MOODY	0.01450900	0.0081857	1.773	0.0763
SELFWEIGHT	0.00156780	0.0125090	0.125	0.9003
MISSCHOOL	-0.00895830	0.0082990	-1.079	0.2804
LOGBMI	0.78377000	0.0588540	13.317	0.0000
TAUGHTEXER	0.02498500	0.0238670	1.047	0.2952
TAUGHTOVERWT	-0.01958400	0.0135000	-1.451	0.1469
TAUGHTUNDERWT	0.00773420	0.0138750	0.557	0.5772
ABSENT	-0.01171100	0.0071075	-1.648	0.0994
SKIPPED	-0.00030270	0.0093722	-0.032	0.9742
GRADES	0.00755370	0.0116040	0.651	0.5151
GRADES.MIS	-0.03251300	0.0490190	-0.663	0.5072
TEACHERS	-0.00594740	0.0062702	-0.949	0.3429
PAYATTENTION	-0.00354140	0.0071516	-0.495	0.6205
HOMEWORK	-0.01583400	0.0065327	-2.424	0.0154
STUDENTS	0.00054890	0.0062022	0.089	0.9295
FEELCLOSE	0.01188700	0.0068104	1.745	0.0809
PARTOF	-0.00845720	0.0070450	-1.200	0.2300
COUNSELING	-0.01285800	0.0201660	-0.638	0.5237
DISTRESS	0.01513400	0.0216340	0.700	0.4842

NOMOTHER	0.00493260	0.0275930	0.179	0.8581
EDUCMOTHER	0.00314020	0.0025935	1.211	0.2260
NOFATHER	0.01048400	0.0136800	0.766	0.4434
EDUCFATHER	-0.00381280	0.0034166	-1.116	0.2644
DECIDEAT	-0.01099000	0.0133090	-0.826	0.4090
RELMOTHER	-0.00051258	0.0103800	-0.049	0.9606
RELFATHER	0.00882640	0.0088745	0.995	0.3199
MOTHERINDEP	-0.00406680	0.0061966	-0.656	0.5116
WORKHARD	-0.00661780	0.0075856	-0.872	0.3830
SELFCONCEPT	0.00174120	0.0131710	0.132	0.8948
PHYSFIT	-0.00696780	0.0079071	-0.881	0.3782
ACCEPTED	0.01934300	0.0102230	1.892	0.0585
LOVED	-0.00823280	0.0099195	-0.830	0.4066
INTELLIGENT	0.00830060	0.0052885	1.570	0.1165
ROMANTIC	-0.01486500	0.0125070	-1.189	0.2346
INTERCOURSE	0.01335000	0.0143910	0.928	0.3536
RELIGION	-0.00560150	0.0047230	-1.186	0.2356
SUICIDE	-0.02361000	0.0190280	-1.241	0.2147
DELINQ	0.05549100	0.0312610	1.775	0.0759
CAREABOUT	-0.00574200	0.0126820	-0.453	0.6507
COLLEGE	-0.00460390	0.0058862	-0.782	0.4341
PHYSDEVP	-0.00079827	0.0072586	-0.110	0.9124
PERIOD	-0.02624500	0.0193300	-1.358	0.1745
PREGNANT	-0.01163000	0.0254690	-0.457	0.6479
SMOKE	-0.00171560	0.0073414	-0.234	0.8152
DRINK	-0.00310510	0.0074638	-0.416	0.6774
MARIJUANA	-0.01900300	0.0128540	-1.478	0.1393
OBESEMOTHER	0.02612600	0.0171250	1.526	0.1271
OBESEFATHER	0.04001600	0.0267910	1.494	0.1353
DIABMOTHER	-0.01944300	0.0473660	-0.410	0.6814
DIABFATHER	-0.02679700	0.0323180	-0.829	0.4070
LOGIT12.1	0.08725000	0.0459210	1.900	0.0574
LOGIT12.2	-0.19225000	0.1416700	-1.357	0.1748
LOGIT12.3	0.12800000	0.1471700	0.870	0.3844
LOGIT12.4	-0.01103100	0.0507470	-0.217	0.8279
LOGIT13.1	0.01615000	0.0782320	0.206	0.8364
LOGIT13.2	0.10169000	0.2074100	0.490	0.6239
LOGIT13.3	-0.20197000	0.1694200	-1.192	0.2332
LOGIT13.4	0.06807900	0.0502940	1.354	0.1759
LOGIT23.1	-0.23079000	0.2148200	-1.074	0.2827
LOGIT23.2	0.53775000	0.4950500	1.086	0.2774
LOGIT23.3	-0.34866000	0.3347400	-1.042	0.2976
LOGIT23.4	0.04550000	0.1044900	0.435	0.6632

, , Class 4

	Estimate	Std.Err	Z.ratio	Signif
(Intercept)	1.1453e+00	0.1784900	6.416	0.0000
HISP	-8.0049e-04	0.0138630	-0.058	0.9540
BLACK	9.0737e-03	0.0173210	0.524	0.6004
GRADE	3.4760e-03	0.0046033	0.755	0.4502
GRADE.MIS	9.5889e-02	0.0541880	1.770	0.0768
HEALTH	-1.9806e-03	0.0069551	-0.285	0.7758
HEADACHE	8.8330e-03	0.0066131	1.336	0.1817
STOMACHE	-3.5636e-03	0.0082928	-0.430	0.6674
WEAKTIRED	1.0925e-02	0.0082504	1.324	0.1855
FEELSICK	-1.6776e-02	0.0094497	-1.775	0.0758
POORAPP	-2.7309e-03	0.0065426	-0.417	0.6764
TROUBSLEEP	2.5540e-03	0.0053324	0.479	0.6320
MOODY	-1.2294e-02	0.0063942	-1.923	0.0545
SELFWEIGHT	2.3621e-02	0.0095912	2.463	0.0138
MISSCHOOL	1.6177e-05	0.0084119	0.002	0.9985
LOGBMI	6.0900e-01	0.0553490	11.003	0.0000
TAUGHTEXER	4.3432e-04	0.0191050	0.023	0.9819

TAUGHTOVERWT	-4.8695e-03	0.0119360	-0.408	0.6833
TAUGHTUNDERWT	-2.0519e-03	0.0105530	-0.194	0.8458
ABSENT	9.0813e-03	0.0056382	1.611	0.1072
SKIPPED	-3.0334e-03	0.0066289	-0.458	0.6472
GRADES	1.5358e-02	0.0097053	1.582	0.1135
GRADES.MIS	-4.9758e-02	0.0406490	-1.224	0.2209
TEACHERS	6.4513e-03	0.0070136	0.920	0.3577
PAYATTENTION	-7.1084e-03	0.0070977	-1.002	0.3166
HOMEWORK	2.5925e-05	0.0062505	0.004	0.9967
STUDENTS	1.3562e-03	0.0050682	0.268	0.7890
FEELCLOSE	-1.5061e-03	0.0067917	-0.222	0.8245
PARTOF	5.8944e-03	0.0068340	0.863	0.3884
COUNSELING	-3.6695e-02	0.0160390	-2.288	0.0222
DISTRESS	-1.8388e-02	0.0198610	-0.926	0.3545
NOMOTHER	-1.3665e-02	0.0229810	-0.595	0.5521
EDUCMOTHER	-4.6616e-04	0.0021294	-0.219	0.8267
NOFATHER	2.9662e-02	0.0150790	1.967	0.0492
EDUCFATHER	5.5931e-03	0.0026201	2.135	0.0328
DECIDEAT	-2.2782e-02	0.0135750	-1.678	0.0933
RELMOTHER	-9.6264e-03	0.0121930	-0.790	0.4298
RELFATHER	1.2312e-02	0.0089620	1.374	0.1695
MOTHERINDEP	6.4964e-03	0.0106660	0.609	0.5425
WORKHARD	-9.2261e-03	0.0060781	-1.518	0.1290
SELFCONCEPT	3.5012e-03	0.0115380	0.303	0.7615
PHYSFIT	-2.7945e-03	0.0079427	-0.352	0.7250
ACCEPTED	1.2054e-02	0.0084614	1.425	0.1543
LOVED	-4.6664e-03	0.0096991	-0.481	0.6304
INTELLIGENT	-1.0739e-02	0.0051726	-2.076	0.0379
ROMANTIC	7.2644e-03	0.0115850	0.627	0.5306
INTERCOURSE	2.8967e-02	0.0181700	1.594	0.1109
RELIGION	2.7453e-03	0.0043417	0.632	0.5272
SUICIDE	3.2732e-02	0.0164000	1.996	0.0459
DELINQ	-7.5180e-03	0.0239400	-0.314	0.7535
CAREABOUT	2.3692e-03	0.0135300	0.175	0.8610
COLLEGE	-2.0565e-03	0.0066067	-0.311	0.7556
PHYSDEVP	1.2286e-02	0.0054959	2.236	0.0254
PERIOD	-3.5352e-02	0.0165890	-2.131	0.0331
PREGNANT	-4.9362e-02	0.0256120	-1.927	0.0539
SMOKE	7.4019e-03	0.0074321	0.996	0.3193
DRINK	-3.1973e-02	0.0069203	-4.620	0.0000
MARIJUANA	1.0050e-02	0.0122070	0.823	0.4104
OBESEMOTHER	2.8173e-02	0.0156970	1.795	0.0727
OBESEFATHER	2.5452e-02	0.0192820	1.320	0.1868
DIABMOTHER	9.3135e-03	0.0323940	0.288	0.7737
DIABFATHER	2.7254e-02	0.0265290	1.027	0.3043
LOGIT12.1	7.8762e-02	0.0446320	1.765	0.0776
LOGIT12.2	-1.4457e-01	0.1328900	-1.088	0.2766
LOGIT12.3	9.5866e-02	0.1364500	0.703	0.4823
LOGIT12.4	-3.1551e-02	0.0460180	-0.686	0.4929
LOGIT13.1	-4.8824e-02	0.0785870	-0.621	0.5344
LOGIT13.2	1.7204e-01	0.2067500	0.832	0.4053
LOGIT13.3	-1.8608e-01	0.1695300	-1.098	0.2724
LOGIT13.4	8.0683e-02	0.0492480	1.638	0.1014
LOGIT23.1	2.7490e-01	0.2027000	1.356	0.1750
LOGIT23.2	-7.1937e-01	0.4619300	-1.557	0.1194
LOGIT23.3	6.2672e-01	0.3036800	2.064	0.0390
LOGIT23.4	-2.8066e-01	0.0917140	-3.060	0.0022

Outcome model residual variances (sigma2):

	Estimate	Std.Err
Class 1	0.0244050	0.0015468
Class 2	0.0093358	0.0007522
Class 3	0.0166650	0.0010537
Class 4	0.0145700	0.0009191

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Estimated potential-outcome means
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Average potential outcomes:

	Estimate	Std.Err
Class 1	3.2308	0.0083966
Class 2	3.1710	0.0136900
Class 3	3.2021	0.0080034
Class 4	3.1936	0.0081932

Average potential outcomes within classes:

, , Class 1

	Estimate	Std.Err
Class 1	3.3297	0.0091775
Class 2	3.2324	0.0276430
Class 3	3.3023	0.0131320
Class 4	3.2994	0.0129180

, , Class 2

	Estimate	Std.Err
Class 1	3.1787	0.0131210
Class 2	3.1343	0.0094594
Class 3	3.1469	0.0114340
Class 4	3.1317	0.0110940

, , Class 3

	Estimate	Std.Err
Class 1	3.1930	0.0104870
Class 2	3.1515	0.0123630
Class 3	3.1637	0.0088290
Class 4	3.1550	0.0086843

, , Class 4

	Estimate	Std.Err
Class 1	3.1536	0.0126610
Class 2	3.1250	0.0118390
Class 3	3.1271	0.0088036
Class 4	3.1168	0.0088942

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Estimated average treatment effects
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Average treatment effects:

	Estimate	Std.Err	Z.ratio	Signif
Class 2 minus Class 1	-0.0597730	0.0149540	-3.997	0.0001
Class 3 minus Class 1	-0.0286830	0.0081911	-3.502	0.0005
Class 3 minus Class 2	0.0310900	0.0154270	2.015	0.0439
Class 4 minus Class 1	-0.0372280	0.0093888	-3.965	0.0001
Class 4 minus Class 2	0.0225450	0.0147820	1.525	0.1272
Class 4 minus Class 3	-0.0085452	0.0091291	-0.936	0.3493

Average treatment effects within classes:

, , Class 1

	Estimate	Std.Err	Z.ratio	Signif
Class 2 minus Class 1	-0.0973390	0.0281510	-3.458	0.0005

Class 3 minus Class 1	-0.0273630	0.0108470	-2.523	0.0116
Class 3 minus Class 2	0.0699770	0.0298390	2.345	0.0190
Class 4 minus Class 1	-0.0302710	0.0099698	-3.036	0.0024
Class 4 minus Class 2	0.0670680	0.0279070	2.403	0.0162
Class 4 minus Class 3	-0.0029087	0.0142620	-0.204	0.8384

, , Class 2

	Estimate	Std.Err	Z.ratio	Signif
Class 2 minus Class 1	-0.0444150	0.0125430	-3.541	0.0004
Class 3 minus Class 1	-0.0318020	0.0117850	-2.699	0.0070
Class 3 minus Class 2	0.0126130	0.0102570	1.230	0.2188
Class 4 minus Class 1	-0.0469860	0.0125370	-3.748	0.0002
Class 4 minus Class 2	-0.0025707	0.0105020	-0.245	0.8066
Class 4 minus Class 3	-0.0151840	0.0098866	-1.536	0.1246

, , Class 3

	Estimate	Std.Err	Z.ratio	Signif
Class 2 minus Class 1	-0.0414960	0.0134710	-3.080	0.0021
Class 3 minus Class 1	-0.0293220	0.0087161	-3.364	0.0008
Class 3 minus Class 2	0.0121730	0.0124690	0.976	0.3289
Class 4 minus Class 1	-0.0380110	0.0105070	-3.618	0.0003
Class 4 minus Class 2	0.0034849	0.0119520	0.292	0.7706
Class 4 minus Class 3	-0.0086886	0.0089711	-0.969	0.3328

, , Class 4

	Estimate	Std.Err	Z.ratio	Signif
Class 2 minus Class 1	-0.0286400	0.0149710	-1.913	0.0557
Class 3 minus Class 1	-0.0265450	0.0117380	-2.261	0.0237
Class 3 minus Class 2	0.0020950	0.0117860	0.178	0.8589
Class 4 minus Class 1	-0.0368190	0.0125590	-2.932	0.0034
Class 4 minus Class 2	-0.0081792	0.0113000	-0.724	0.4692
Class 4 minus Class 3	-0.0102740	0.0074745	-1.375	0.1693