

# Teacher collaboration attenuating the school composition effect? An exploratory analysis for francophone Belgium

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## **EQUOP data set**

Data collection beginning school year 2014-2015

2<sup>nd</sup> year of Secondary education, Francophone schools in Belgium

Sample of 164 secondary schools contacted (=1/3 of total number of schools),  
106 participated

12570 pupils

620 classes

398 mathematics teachers

106 schools

Merged on individual level with test scores on national tests CEB (end of primary school) and CE1D (end of 2<sup>nd</sup> year of secondary education)

Integrated (and usable) dataset:

10395 pupils

589 classes

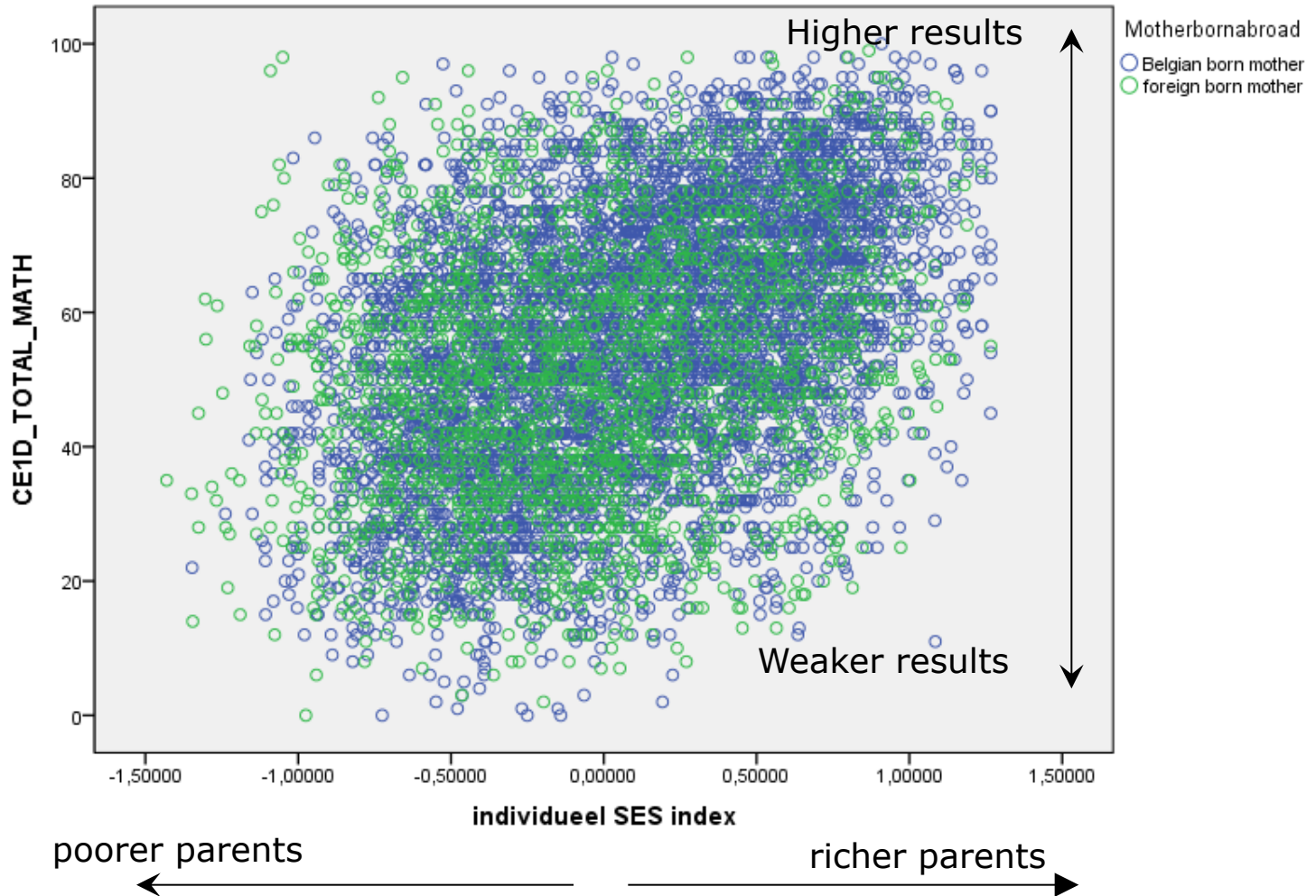
388 mathematics teachers

103 schools

Procedure of opt-out by parents and pupils (570 did so)

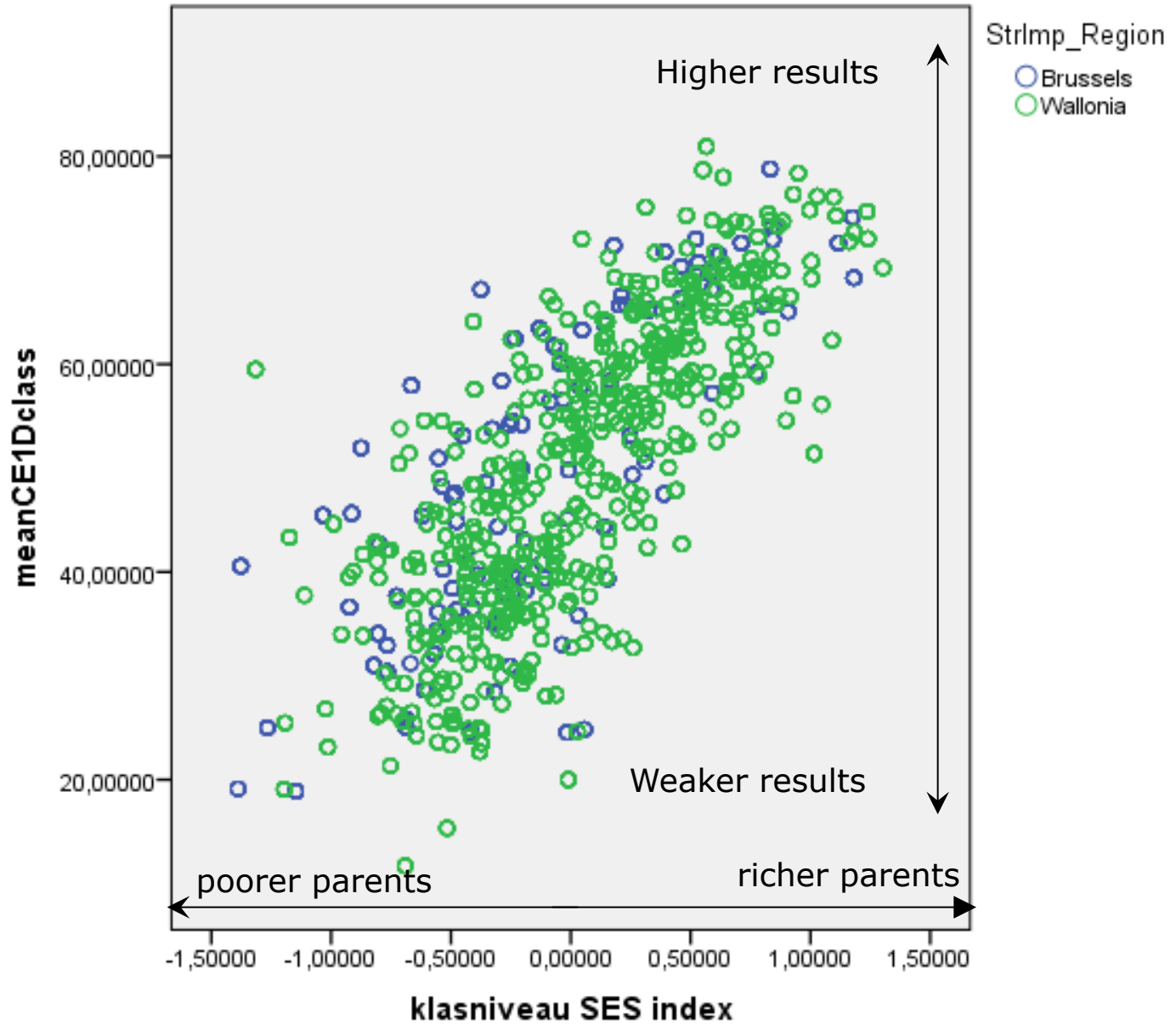
Results on  
standardized  
national  
mathematics test  
at the end of the  
2<sup>nd</sup> year of  
secondary  
education  
(n=10.395)

$R=0.406^{***}$   
 $R^2=0.165$



Index Socio-Economic Position, calculated in a factor analyses  
using the variables: highest educational level parents, highest  
professional status parents, home possessions and number of books  
at home

Results on  
standardized  
national  
mathematics  
test at the end  
of the 2<sup>nd</sup> year  
of secondary  
education,  
Class mean  
result  
(n=608)



Index Socio-Economic Position, class means, calculated in a factor analyses using the variables:  
highest educational level parents, highest professional status parents, home possessions and  
number of books at home

## Model 0: Variance explained by 3 levels (school, class, pupils) ICC

53% pupils, 14% classes, 33% schools

### Model 1a: Variance at pupil level, without prior achievement

#### RESULTS

##### Fixed part

| Parameter               | Est      | Sd     | Print             |
|-------------------------|----------|--------|-------------------|
| [F] Const (Lev:1)       | 476.5098 | 5.6498 | 476.51 (5.65) *** |
| [F] Male (Lev:1)        | 1.3376   | 1.5151 | 1.34 (1.52)       |
| [F] SESFactor (Lev:1)   | 24.8742  | 2.0717 | 24.87 (2.07) ***  |
| [F] AllochtFGEN (Lev:1) | -18.1838 | 2.6693 | -18.18 (2.67) *** |
| [F] AllochtSGEN (Lev:1) | -11.3698 | 1.7957 | -11.37 (1.8) ***  |

No significant  
gender effect

Disadvantaged  
pupils score  
worse, richer  
children better

##### Random part

| Parameter         | Est     | Sd       | Print                |
|-------------------|---------|----------|----------------------|
| [R] Const (Lev:3) | 2886.01 | 457.1036 | 2886.01 (457.1) ***  |
| [R] Const (Lev:2) | 1266.29 | 101.7295 | 1266.29 (101.73) *** |
| [R] Const (Lev:1) | 5324.49 | 76.8029  | 5324.49 (76.8) ***   |

First and second  
generation  
immigrants  
score worse

##### Goodness of fit

| Parameter              | Print     |
|------------------------|-----------|
| [Fit] Deviance (Lev:0) | 119883.15 |
| [Fit] P (Lev:0)        | 8         |
| [Fit] AIC (Lev:0)      | 119899.15 |
| [Fit] BIC2 (Lev:0)     | 119934.3  |
| [Fit] BIC1 (Lev:0)     | 119957.15 |
| [Fit] R2Var3 (Lev:0)   | 15.87     |
| [Fit] R2Var2 (Lev:0)   | 12.87     |
| [Fit] R2Var1 (Lev:0)   | 2.18      |

## Model 1b: Variance at pupil level, with prior achievement

### Fixed part

| Parameter               | Est      | Sd     | Print             |
|-------------------------|----------|--------|-------------------|
| [F] Const (Lev:1)       | 492.6426 | 2.5494 | 492.64 (2.55) *** |
| [F] MathEquop (Lev:1)   | 0.6004   | 0.0000 | 0.6 (0) ***       |
| [F] GradeRep (Lev:1)    | -28.0782 | 1.3681 | -28.08 (1.37) *** |
| [F] Male (Lev:1)        | -5.2460  | 1.1184 | -5.25 (1.12) ***  |
| [F] SESFactor (Lev:1)   | 16.1556  | 1.6084 | 16.16 (1.61) ***  |
| [F] AllochtFGEN (Lev:1) | 2.7094   | 2.0650 | 2.71 (2.07)       |
| [F] AllochtSGEN (Lev:1) | -0.3680  | 1.3192 | -0.37 (1.32)      |

### Random part

| Parameter         | Est     | Sd      | Print               |
|-------------------|---------|---------|---------------------|
| [R] Const (Lev:3) | 523.07  | 92.0744 | 523.07 (92.07) ***  |
| [R] Const (Lev:2) | 417.98  | 37.7847 | 417.98 (37.78) ***  |
| [R] Const (Lev:1) | 2881.93 | 41.7631 | 2881.93 (41.76) *** |

### Goodness of fit

| Parameter              | Print     |
|------------------------|-----------|
| [Fit] Deviance (Lev:0) | 113218.81 |
| [Fit] P (Lev:0)        | 10        |
| [Fit] AIC (Lev:0)      | 113238.81 |
| [Fit] BIC2 (Lev:0)     | 113282.74 |
| [Fit] BIC1 (Lev:0)     | 113311.3  |
| [Fit] R2Var3 (Lev:0)   | 84.75     |
| [Fit] R2Var2 (Lev:0)   | 71.24     |
| [Fit] R2Var1 (Lev:0)   | 47.05     |

Once checking for prior achievement (beginning of year) and grade repetition:

- Boys do slightly worse than girls
- No longer a significant effect of migrant background (due to fact that migrants make more progress in course of year)
- Impact of SES diminishes but still important

## Model 2: Composition effect

| Parameter                   | Est      | Sd     | Print             |
|-----------------------------|----------|--------|-------------------|
| [F] Const (Lev:1)           | 498.9282 | 1.8730 | 498.93 (1.87) *** |
| [F] MathEquop (Lev:1)       | 0.5844   | 0.0000 | 0.58 (0) ***      |
| [F] GradeRep (Lev:1)        | -26.6184 | 1.3642 | -26.62 (1.36) *** |
| [F] Male (Lev:1)            | -4.9592  | 1.1137 | -4.96 (1.11) ***  |
| [F] SESFactor (Lev:1)       | 14.0342  | 1.6421 | 14.03 (1.64) ***  |
| [F] AllochtFGEN (Lev:1)     | 3.6976   | 2.0417 | 3.7 (2.04)        |
| [F] AllochtSGEN (Lev:1)     | 0.2156   | 1.3118 | 0.22 (1.31)       |
| [F] ClaMathEquop<br>(Lev:2) | 0.1890   | 0.0316 | 0.19 (0.03) ***   |
| [F] ClaSESFactor (Lev:2)    | 19.1042  | 3.5081 | 19.1 (3.51) ***   |

### Random part

| Parameter         | Est      | Sd      | Print               |
|-------------------|----------|---------|---------------------|
| [R] Const (Lev:3) | 228.986  | 47.1621 | 228.99 (47.16) ***  |
| [R] Const (Lev:2) | 330.303  | 31.9413 | 330.3 (31.94) ***   |
| [R] Const (Lev:1) | 2878.835 | 41.6895 | 2878.83 (41.69) *** |

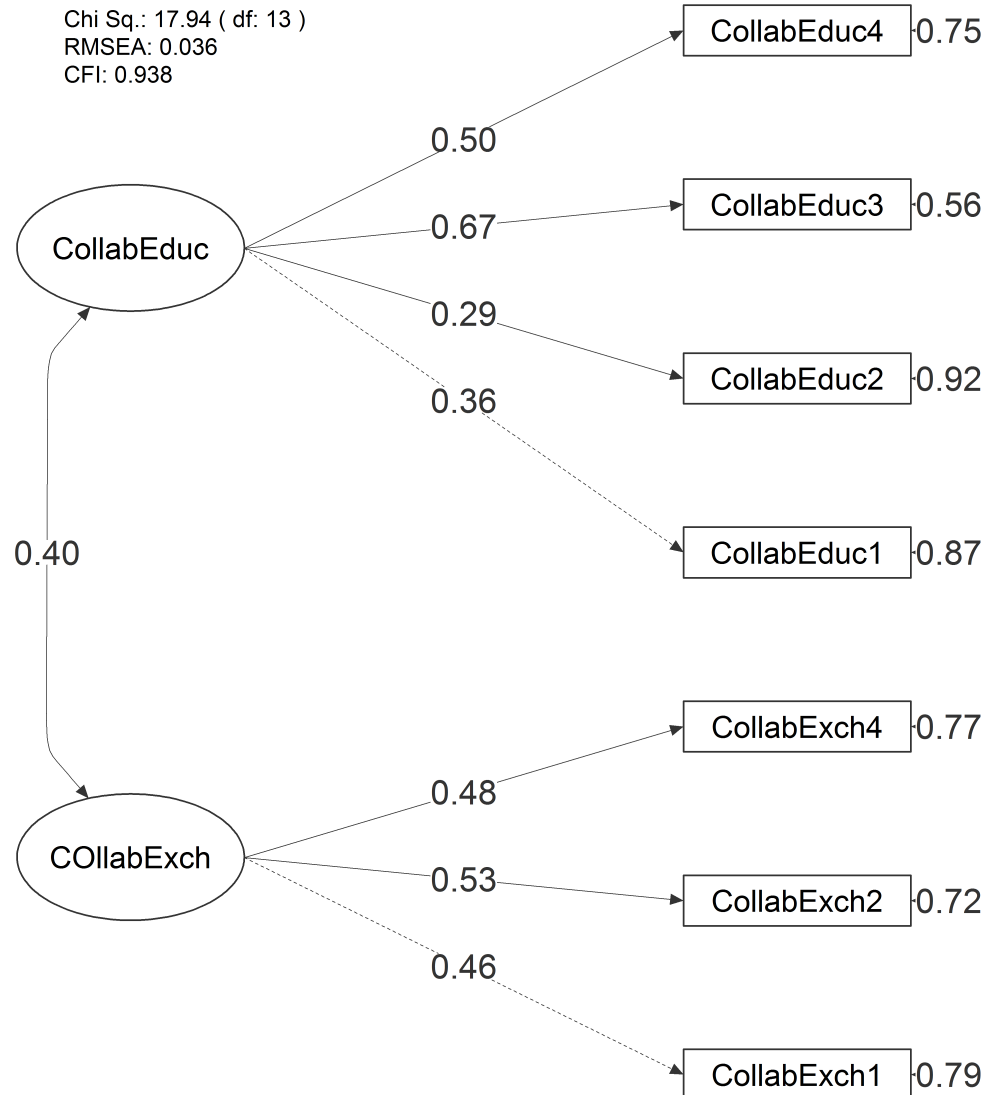
### Goodness of fit

| Parameter              | Print     |
|------------------------|-----------|
| [Fit] Deviance (Lev:0) | 113062.96 |
| [Fit] P (Lev:0)        | 12        |
| [Fit] AIC (Lev:0)      | 113086.96 |
| [Fit] BIC2 (Lev:0)     | 113139.68 |
| [Fit] BIC1 (Lev:0)     | 113173.95 |
| [Fit] R2Var3 (Lev:0)   | 93.33     |
| [Fit] R2Var2 (Lev:0)   | 77.27     |
| [Fit] R2Var1 (Lev:0)   | 47.11     |

Both academic  
class  
composition as  
socio-economic  
class  
composition  
have a  
significant effect

## Teacher collaboration (TALIS-items)

Unsatisfactory CFA solution, Acceptable fit but limited factor loadings



## Professional collaboration

- take part in collaborative professional learning? (CollabEduc4)
- engage in joint activities across different classes and age groups (eg. projects) (CollabEduc3)
- observe other teachers's classes and provide feedback? (CollabEduc2)
- teach jointly as a team in the same class? (CollabEduc1)

## Exchange and coordination

- attend team conferences? (CollabExch4)
- engage in discussions about the learning development of specific students? (CollabExch2)
- exchange teaching material with colleagues? (CollabEXch1)

### Fixed part

| Parameter                   | Est      | Sd     | Print             |
|-----------------------------|----------|--------|-------------------|
| [F] Const (Lev:1)           | 498.9162 | 1.8619 | 498.92 (1.86) *** |
| [F] MathEquop (Lev:1)       | 0.5844   | 0.0000 | 0.58 (0) ***      |
| [F] GradeRep (Lev:1)        | -26.6262 | 1.3632 | -26.63 (1.36) *** |
| [F] Male (Lev:1)            | -4.9552  | 1.1132 | -4.96 (1.11) ***  |
| [F] SESFactor (Lev:1)       | 14.0328  | 1.6376 | 14.03 (1.64) ***  |
| [F] AllochtFGEN (Lev:1)     | 3.6922   | 2.0415 | 3.69 (2.04)       |
| [F] AllochtSGEN (Lev:1)     | 0.2098   | 1.3119 | 0.21 (1.31)       |
| [F] ClaMathEquop<br>(Lev:2) | 0.1898   | 0.0316 | 0.19 (0.03) ***   |
| [F] ClaSESFactor (Lev:2)    | 19.0906  | 3.5073 | 19.09 (3.51) ***  |
| [F] CollabEduc (Lev:2)      | 0.8312   | 1.2447 | 0.83 (1.24)       |
| [F] CollabExch (Lev:2)      | -0.2516  | 0.8970 | -0.25 (0.9)       |

### Model 3: Impact of Teacher Collaboration (factors)?

Hypothesis rejected: No (attenuating) effect of teacher collaboration

### Random part

| Parameter         | Est      | Sd      | Print               |
|-------------------|----------|---------|---------------------|
| [R] Const (Lev:3) | 225.038  | 46.8204 | 225.04 (46.82) ***  |
| [R] Const (Lev:2) | 330.334  | 31.9785 | 330.33 (31.98) ***  |
| [R] Const (Lev:1) | 2878.881 | 41.6842 | 2878.88 (41.68) *** |

### Goodness of fit

| Parameter              | Print     |
|------------------------|-----------|
| [Fit] Deviance (Lev:0) | 113061.95 |
| [Fit] P (Lev:0)        | 14        |
| [Fit] AIC (Lev:0)      | 113089.95 |
| [Fit] BIC2 (Lev:0)     | 113151.46 |
| [Fit] BIC1 (Lev:0)     | 113191.44 |
| [Fit] R2Var3 (Lev:0)   | 93.44     |
| [Fit] R2Var2 (Lev:0)   | 77.27     |
| [Fit] R2Var1 (Lev:0)   | 47.11     |

« On average, in your school, how often do your work with other teachers to ensure common standards in evaluations for assessing student progress? »

**Model 3b:  
Impact of  
Teacher  
Collaboration  
(items)?**

**Estimates of Fixed Effects<sup>a</sup>**

| Parameter      | Estimate   | Std. Error | df       | t       | Sig. | 95% Confidence Interval |             |
|----------------|------------|------------|----------|---------|------|-------------------------|-------------|
|                |            |            |          |         |      | Lower Bound             | Upper Bound |
| Intercept      | 534,632708 | 2,837017   | 363,651  | 188,449 | ,000 | 529,053689              | 540,211727  |
| Male           | -9,621316  | 1,533047   | 5238,685 | -6,276  | ,000 | -12,626728              | -6,615905   |
| gmSES          | 21,542685  | 1,683096   | 4928,903 | 12,799  | ,000 | 18,243067               | 24,842303   |
| AllochtFGEN    | 4,845742   | 2,763231   | 5198,827 | 1,754   | ,080 | -,571352                | 10,262836   |
| AllochtSGEN    | ,757715    | 1,790172   | 5159,819 | ,423    | ,672 | -2,751780               | 4,267210    |
| GradeRep       | -23,093828 | 1,883995   | 5249,352 | -12,258 | ,000 | -26,787242              | -19,400415  |
| gmMathEquop    | ,606963    | ,009675    | 4975,029 | 62,738  | ,000 | ,587997                 | ,625929     |
| gmCollabEduc1  | ,211981    | 1,103873   | 381,892  | ,192    | ,848 | -1,958449               | 2,382411    |
| gmCollabEduc2  | -1,652165  | 3,889242   | 308,446  | -,425   | ,671 | -9,304967               | 6,000637    |
| gmCollabEduc3  | -,531806   | 1,561426   | 388,591  | -,341   | ,734 | -3,601706               | 2,538094    |
| gmCollabEduc4  | 3,896367   | 2,248304   | 385,108  | 1,733   | ,084 | -,524120                | 8,316854    |
| gmCollabExch1  | -1,075954  | ,926360    | 393,769  | -1,161  | ,246 | -2,897184               | ,745276     |
| gmCollabExch2  | -1,380584  | 1,360591   | 416,151  | -1,015  | ,311 | -4,055071               | 1,293903    |
| gmCollabExch3  | 1,786768   | ,905456    | 399,803  | 1,973   | ,049 | ,006718                 | 3,566818    |
| gmCollabExch4  | 2,237017   | 1,570563   | 361,068  | 1,424   | ,155 | -,851583                | 5,325617    |
| gmClaSESFactor | 13,118270  | 4,301416   | 478,642  | 3,050   | ,002 | 4,666277                | 21,570263   |
| ClaMathEquop   | ,200198    | ,033810    | 505,089  | 5,921   | ,000 | ,133773                 | ,266624     |



a. Dependent Variable: (( (CE1D\_TOTAL\_MATH - 68.29)/26.023) \* 100)+500..

### Estimates of Covariance Parameters<sup>a</sup>

| Parameter                                |          | Estimate    | Std. Error | Wald Z | Sig. | 95% Confidence Interval |             |
|------------------------------------------|----------|-------------|------------|--------|------|-------------------------|-------------|
|                                          |          |             |            |        |      | Lower Bound             | Upper Bound |
| Residual                                 |          | 2736,565706 | 55,540126  | 49,272 | ,000 | 2629,845716             | 2847,616428 |
| Intercept [subject = IDSchool]           | Variance | 185,544147  | 49,750425  | 3,729  | ,000 | 109,701463              | 313,821069  |
| Intercept [subject = IDClass * IDSchool] | Variance | 296,844107  | 41,735441  | 7,113  | ,000 | 225,347064              | 391,025391  |

a. Dependent Variable: (( (CE1D\_TOTAL\_MATH - 68.29)/26.023) \* 100)+500..

### Information Criteria<sup>a</sup>

|                                      |           |
|--------------------------------------|-----------|
| -2 Log Likelihood                    | 57293,812 |
| Akaike's Information Criterion (AIC) | 57333,812 |
| Hurvich and Tsai's Criterion (AICC)  | 57333,971 |
| Bozdogan's Criterion (CAIC)          | 57485,275 |
| Schwarz's Bayesian Criterion (BIC)   | 57465,275 |