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The Effectiveness of Special Interventions in Latin American Public Primary Schools

Joan B. Anderson

In pursuit of improved quality and more equity in education, public primary schools in Latin America have utilized several compensatory educational policies that include special interventions such as food aid programs, distribution of free textbooks, classroom libraries, in-service teacher training, extra classes and extra school sessions, tutors and mentors, and scholarships. Using data on children and schools in Argentina, Brazil, Chile, and Mexico, this paper presents the results of cross-country, empirical estimates of the effects of these interventions on language and math achievement and on the likelihood of promotion, both at the school level and at the level of individual children. Language and math achievement was measured by scores on UNESCO-developed language and math examinations administered to each of the 2,048 children in the sample. In addition, the paper addresses whether a particular intervention is equally effective in poor and non-poor environments and whether these compensatory interventions in fact target those who need them most. Empirical findings suggest that the most effective programs are classroom libraries, distribution of textbooks, distribution of food, and teacher training. For programs to be compensatory, the research indicates that better targeting of scarce resources toward low-income schools and children is needed.

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Joan B. Anderson

Introduction

Beginning in the 1970s, educational policy in most Latin American countries began to focus on the goals of universal access to basic education and literacy. By 1997, the gross enrollment rate had increased to 113.6 percent of primary school-aged children in Latin America. The gross enrollment rate for secondary school had risen to 62 percent (United Nations Development Program 1999). However, by the 1990s, many ministries of education began to recognize that the quality of basic education was insufficient. Though the statistics showed improvement, 15 percent still repeated the first grade, and 23 percent dropped out before the fifth grade. Wolff, Schiefelbein, and Valenzuela (1994, 2) charged that Latin American countries "do significantly worse in terms of achievement than the developed world, and also do worse than many developing countries in Asia." With the goal of universal coverage for primary school basically met, the emphasis in policy for educational improvement now is shifting from achievement of universal coverage to improvement of quality and assurance of greater equitability. A large gap in educational attainment remains between the rich and the poor in Latin America. For example, the Economic Commission for Latin America and the Caribbean (Comisión Económica para América Latina y el Caribe – CEPAL) (1999) reports that in Argentina the average education of the poorest 25 percent is 7 years, while that of the richest 25 percent is 13 years. Since modern production requirements have been increasing the financial returns of those with more education, the education gap between rich and poor translates to an even greater inequality of income distribution. The combined needs for improved quality and more equity in education have led to a series of compensatory or positively discriminatory educational policies. These policies include several experimental interventions. This paper presents empirical results showing the effectiveness of some of these interventions in raising language and math scores and in increasing the probability of promotion. A second key issue addressed in this paper is whether a particular intervention is equally effective in poor and non-poor environments. Do schools in poor neighborhoods need a different set of interventions than schools in non-poor neighborhoods? A third issue addressed is whether these compensatory interventions are in fact targeted toward those who need them most.

Special Compensatory Interventions

Throughout the 1990s and beyond, concerns with equity in education in Latin America have increased. An outgrowth of these concerns has been the development of a series of programs and interventions designed to discriminate in favor of those with fewer resources. An increasing number of these compensatory programs attempt to favor the poor. This study considered separately specific interventions including free food distribution (breakfast, lunch, and/or snack programs); free distribution of textbooks; classroom libraries; additional, mainly in-service teacher training; tutors; extra

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classes for children who have fallen behind and /or extra school sessions (summer school); and cash subsidies or scholarships. Each of these interventions was expected to increase student achievement, both for intuitive reasons and because of reports describing and evaluating such programs in various countries.

Food Aid Programs

School lunch, breakfast, and snack programs have long been viewed as important compensatory programs. In Peru, Santiago Cueto and colleagues (2000) reported on a three-year experiment in which some children received a school breakfast and a control group did not. The results indicated that the school breakfast program had no positive effects on height for age, body mass index, memory, or achievement, but did have positive effects on attendance. In addition, the authors found that the dropout rate was higher in the no-breakfast control group during the three years of this experiment.

In Brazil, all school children receive school lunches. However, in Brazil, the recipients are not necessarily poor. Fernando Reimers (2000, 97) reported that half of the recipients come from families in the upper 30 percent of the income distribution, while 32 percent of the beneficiaries come from families in the lowest 30 percent of the income distribution.

Distribution of Textbooks

Mexico, Brazil, and Chile all have policies providing for free textbook distribution in public primary schools. Several programs in Latin America have included revision and/or distribution of textbooks, especially to schools in poor neighborhoods; these programs include the Mexican Compensatory Program to Combat Educational Failure (Programa para Abatir el Rezago Educativo – PARE) and National Program for Strengthening Reading and Writing (Programa Nacional de Leer y Escribir – PRONALEES) and Jamaica's Reform of Secondary Education (ROSE) program. PARE includes the development and distribution of textbooks, including texts in eight indigenous languages (Winkler 2000). The study evaluating PARE found a negative relationship between the distribution of texts in urban schools and gains in language between fourth and sixth grades (Muñoz Izquierdo et al. 1995). The PRONALEES program in Mexico, which was developed to improve literacy and reading skills in public schools, involved a rewriting of reading textbooks and teacher's guides along with free distribution of these texts to all Mexican public schools (Gómez Palacio 1999). An empirical study on factors affecting achievement in Northeast Brazil found that a significant increase in achievement was associated with availability of textbooks (Harbison and Hanushek 1992). Though Chile has free distribution of texts, Ernesto Schiefelbein and Paulina Schiefelbein (2000) charge that textbooks and teacher's guides are of poor quality. They assert that development of effective instructional material is one of the most cost-effective short-term investments that can be made to improve the quality of teaching and learning. An extensive empirical literature survey by Bruce Fuller and Preme Clarke (1994) cited 19 out of 26 empirical studies that found positive significant correlation between distribution of textbooks and student achievement.

Classroom Libraries

A study of the Mexican program, PARE, found a negative relationship between creation of classroom libraries in urban schools and gains in language between fourth and sixth grades (Muñoz Izquierdo et al. 1995). N. Postlethwaite and K. Ross (1992) found that libraries in conjunction with supplementary reading materials and notebooks had significant positive results in Venezuela, Trinidad and Tobago, and Indonesia, but not in Hungary.

Teacher Training

The Mexican PARE program, operating in Mexico's poorest and most indigenous states, provides teacher-training sessions on Saturdays and during summers in order to improve the quality of teaching and includes monetary incentives for teachers to take the training (Winkler 2000). The three-year study evaluating PARE found that teacher training was positive and significant in two rural strata, but not in the large urban centers. However, training supervisors were found to be positive and significant. In explaining their results, the researchers asserted that the training classes given to the teachers were not always taught by qualified personnel and courses were not designed carefully to provide the materials needed by teachers; in particular, they were not oriented toward explaining how to compensate for the situation in poor schools (Muñoz Izquierdo et al. 1995).

In Chile, Schiefelbein and Schiefelbein (2000) found teachers in workshops predisposed to use traditional teaching methods, but open to change if they expected to learn techniques, gain experience, and have appropriate materials. These authors concluded that training is greatly needed to help teachers transition from traditional, teacher-centered techniques focused on the average student to a more individualized, interactive approach to teaching. Emilio Tenti Fanfani (1999) charged that teacher training in Argentina does not take into account the needs of students from different social groups. Though teachers have monetary and advancement incentives to take additional courses and short classes, the training often fails to relate to their teaching needs.

Teacher in-service training was found to have a positive effect within the Colombian *Escuela Nueva* rural school improvement program (Psacharopoulos, Rojas, and Velez 1993). The United Nations' UNESCO study of third- and fourth-grade achievement in 13 Latin American countries estimated a positive, but insignificant (at the 5 percent level) effect of teacher training on language and math achievement, though the coefficient for math achievement was twice that for language achievement. The authors did find a significant effect for teachers' education (Casassus et al. 2000).

Extra Classes and Extra School Sessions

Chile has two "extra session" programs. One program is a one-week summer camp for high-risk children. The other is an after-school program (TAP) that is part of Chile's P-900 program of extra aid for the lowest-performing 10 percent of schools. An evaluation of this program concluded that it improved achievement of children who were identified as having the greatest difficulties in the educational system (García-Huidobro 2000). Brazil has experimented with accelerated summer school sessions to help at-risk students close the achievement gap (Reimers 2000, 96).

Tutors and Mentors

TAP, the Chilean after-school program, is a successful example of the use of tutors, who in this case are called "community monitors." These community monitors are young people, 18 or older, who attended the local secondary school and were chosen by their principal and former teachers. They are trained and supported by technical supervisors. Their role is to conduct after-school workshops twice a week for third and fourth graders who perform below grade level. Evaluation of this program suggests that not only have the participating children improved their school performance, but also the program has had a positive impact on the lives of the adolescents who work as monitors (García-Huidobro 2000).

Cash Payments/Scholarships

The largest scholarship programs designed to keep children from poor families in school are Mexico's Program for Health, Education, and Food (Programa de Educación, Salud y Alimentación – PROGRESA) and the Bolsa Escola (School Aid) program in the city of Brasilia, Brazil. Both programs offer cash to low-income families if the children remain in school and attend regularly. Included in the Bolsa Escola program is a school savings program in which the program deposits one annual minimum wage into a savings account for each eligible child on promotion to each new grade. The child may withdraw half of the funds after graduating from eighth grade and receive the balance upon graduation from high school. Indications are that both programs have had a positive impact in keeping children in school (Reimers 2000, 95; Winkler 2000, 126-127). Preceding PROGRESA in Mexico was the Children in Solidarity (Niños en Solidaridad) program, in which communities elected 12 to 24 of their most needy children to receive the equivalent of $40 per month plus a basic basket of food staples for the family. At its peak, the program aided about 600,000 children. In evaluating the program, it was found that selecting a maximum of only 24 students per school in very poor areas created problems since differences between those selected and not selected were very small, resulting in a tendency for the selected children to be teased. In tests, though the differences in scores were not significant statistically, those receiving aid always scored lower than those not receiving aid. To correct this, the new PROGRESA program chooses whole communities instead of singling out the poorest children (Schmelkes 1999). In Argentina, a National Student Scholarship Program was started in 1997 to keep poor children in school (Aguerrondo 2000). Other cash incentive programs, such as Guatemala's Endorsement of the Child (Enduque a la Niña) and El Salvador's Community Education (Educación Comunitaria – EDUCO), also apparently have improved performance and decreased dropout rates (Winkler 2000).

Empirical Estimations of the Effectiveness of Interventions

Now let us examine empirical estimates of the cross-country effects of these interventions on language and math achievement and on the likelihood of promotion, both at the school level and at the level of individual children. Language and math achievement is measured by scores on UNESCO-developed language and math examinations administered to each of the 2,048 children in the sample. This allows for a cross-country comparison of results. To make language and math scores comparable,

the raw scores were transformed into normalized standard scores (T-scores) with a mean of 50 and a standard deviation of 10 (Green 1991, 34). Promotion is measured by whether or not the child was promoted at the end of the fourth grade. Data were obtained through the use of questionnaires submitted to (1) the parents of the 2,048 children, (2) the 96 teachers of these children, and (3) school principals/administrators, and through researcher observation of classrooms. The sampling universe is limited to fourth-grade children in public schools in large urban settings: Buenos Aires, Argentina; Belo Horizonte, Brazil; Santiago, Chile; and León, Guanajuato, Mexico. The data used are from 96 schools, one classroom per school and 24 schools from each country. To address the question of whether interventions applied in poor neighborhoods have the same impact as when they are applied in non-poor neighborhoods, half of the sample is drawn from schools in neighborhoods classified as poor and half from non-poor neighborhood schools. To insure that the sample contained sufficient programs and interventions, the sample also was stratified according to schools participating or not in programs. For each country, six schools are from poor neighborhoods with programs and six from poor neighborhoods without; six are from non-poor neighborhoods with programs and six from non-poor neighborhoods without.

Fourth grade was chosen for two reasons. First, pedagogically, it is the time when children transition from learning to read to reading to learn. Next, as a practical matter, the UNESCO math and language exams that were used to get comparable cross-country results were developed for the fourth grade.

School Level Results

Among the 96 schools sampled, the number of schools with an intervention by country is shown in Table 1. Of note is the fact that despite rhetoric favoring positive discrimination (policies that attempt to decrease the disadvantages of poor neighborhood schools), all but two of the interventions, financial aid and added teacher training, are more prevalent in schools in non-poor neighborhoods than in schools in poor neighborhoods. The most common intervention is distribution of free textbooks, done by 74 of the 96 schools. This intervention is universal in Brazil and Mexico and almost so in Chile, but is not common among the sampled schools in Argentina. Textbook distribution is the longest-standing intervention, with 49 years as the maximum. Food distribution and added teacher training are the second- and third-most common interventions. A school lunch program is universal in Minas Gerais, Brazil, and is available in two-thirds of the Chilean schools. This intervention also has been around a long time. One school in the sample has had a program for 45 years, and 11 schools have had one for more than 25 years. In eight schools, the program is ranked as very effective, and in the rest, it is rated effective. Although one might expect that a food program would be weighted in the direction of poor neighborhood schools, the opposite is true. Food programs are present in 32 schools in non-poor neighborhoods, compared with 21 schools in poor neighborhoods. Teacher training has not been around as long. While the maximum number of years is 18 (in a non-poor school), the median for the program is three years. All but four schools rank it as effective or very effective.

Table 1
Number of Schools with Special Interventions by Country

Schools Receiving:	Total	Argentina	Brazil	Chile	Mexico	Poor	Non-poor
Financial Aid	29	2	18	6	3	19	10
Free Food	53	12	24	16	1	21	32
Free Texts	74	3	24	23	24	37	37
Added Teacher Training	43	6	17	13	7	24	19
Tutors	19	1	9	9	0	10	9
Class Library	36	8	8	6	14	16	20
Free Uniforms	28	8	16	3	1	8	20
Extra Classes	30	2	4	14	10	13	17
Extra School Session	5	1	0	1	3	3	0

Classroom libraries are found in 36 of the 96 schools, most commonly in Mexico, where creation of classroom libraries is part of the national program, PRONALEES. According to the program, a library should be found in all classrooms; however, within our sample, libraries are found in only 14 of the 24 Mexican schools, with 8 of the 14 in poor neighborhoods. In the other countries, this intervention is more prevalent in non-poor neighborhood schools.

Slightly fewer than one-third of the schools offer financial aid and free uniforms for needy students; both those programs are aimed primarily at lowering the dropout rate. Financial aid is relatively new as 18 of the schools have had the program for two years or less and the maximum time with the program is seven years. Though distribution of free uniforms is a program that might be expected to be directed toward the poor, 20 of the 28 schools with that intervention are in non-poor neighborhoods. The median number of years of the program is six, and the median effectiveness ranking is 2 (effective, but not very effective).

Thirty of the 96 schools offer extra classes for students who are having problems. However, only five schools in the sample have extra sessions (for example, summer school); of those schools, three also have extra classes. Both are relatively new interventions. The median number of years for offering extra classes is three, and all but one school rank the program as effective or very effective. Nineteen schools in the sample have tutors, 10 schools in poor neighborhoods and 9 in non-poor. For schools in poor neighborhoods, the maximum number of years for a tutoring program is 10, and the median is 5, while for the non-poor neighborhood schools, the maximum is 18 years, and the median is 6. All but four of these schools rank the interventions as effective or very effective.

Table 2
Years and Effectiveness of Interventions

	Years of Intervention		Effectiveness
	Median	**Maximum**	**% Very**
Financial Assistance	**2**	**7**	**55%**
Free meals	**8**	**47**	**23%**
Distribution of Texts	**10**	**49**	**21%**
Teacher Training	**3**	**18**	**40%**
Tutors	**5**	**18**	**26%**
Free Uniforms	**6**	**40**	**43%**
Additional Classes	**3**	**17**	**33%**
Additional School Session	**3**	**4**	**40%**

Empirical estimation of the effects of special interventions on children's learning achievement, controlling for individual differences as well as for key school and classroom variables, involves the use of data at two levels. The first level is that of individual children in the classroom, with different data for each of the 2,048 children. The second level concerns classroom variables, which are the same for each child in a class, but different for each of the 96 classes. In the first level, language score is a function of a proxy for the child's ability, the child's gender, and a socioeconomic index of the child's family. For the math equation, the first-level math score is estimated as a function of the child's ability

and the average education of all adults in the family over 15 years of age. The first level of the promotion equation is estimated as a function of the child's ability and the family socioeconomic status. The effects of classroom variables, including the special interventions and other significant classroom variables that were used as control variables, are estimated in the second stage. The intervention variables used are dummy variables equal to one if the intervention is present, zero otherwise. In some cases in which the duration of the program could make a difference, the number of years the program has been at the school is used. Particularly for teacher training, a larger number of years can have a cumulative effect on the quality of teaching. A more technical description of the multilevel modeling technique, as well as the estimated equations and definitions of the control variables, can be found in the appendix.

Figure 1 graphs the values of the second-level coefficients for the intercept (mean) equations for the total sample. (The corresponding estimated equation is presented in the appendix as Table A.2). For increasing language score, the only statistically significant interventions are the existence of a classroom library and the years of textbook distribution. Having a classroom library on average adds more than 2 points to the standardized language score, while 10 years of textbook distribution at a school adds 0.75. The classroom library adds approximately 1.75 points to the standardized math score, as does free distribution of textbooks. A distribution of food (lunch and/or breakfast) at a school adds almost 3.5 points to the math score. The likelihood of promotion is increased significantly with the existence of a classroom library, a teacher-training program, additional classes or school sessions for children having difficulties, and distribution of free uniforms. Since the coefficients for the promotion equations measure the logarithm of the odds of promotion, the size of these coefficients is not comparable to the coefficients for language and math scores.

Figure 2 graphs all the significant coefficients of interventions for the poor subsample, reflecting the coefficients of the estimated equations reported in Table A.3 in the appendix. Language achievement is significantly and positively increased by more years of textbook distribution, by tutors, and by free distribution of uniforms. In the poor subsample, provision of additional classes for students with problems is associated negatively with language achievement, the opposite of the result hypothesized. However, the negative result may be attributable to the intervention's preventing some low-performing students from dropping out entirely. The Peruvian food aid study by Cueto et al. (2000), described above, supports this notion. Studying the effects of food aid on a group of children along with a control group not receiving the aid over a period of three years, these authors found a reduction in dropout rates in the group receiving aid. Food aid appeared to keep the poorer, Quechua-speaking children in school, while their equivalents in the control group dropped out. At the end of the three-year period, the sample in the group receiving aid was poorer and more bilingual than the control group that did not receive free breakfast, even though previous socioeconomic indicators for the two groups were very similar. The poorer children in the group receiving aid may have brought down the means in the achievement tests, accounting for the negative relationship between food aid and achievement, but the program does seem to have contributed to a reduction in dropout rates in rural areas of Peru

Figure 1
Effects of Compensatory Intervention:
Total Sample

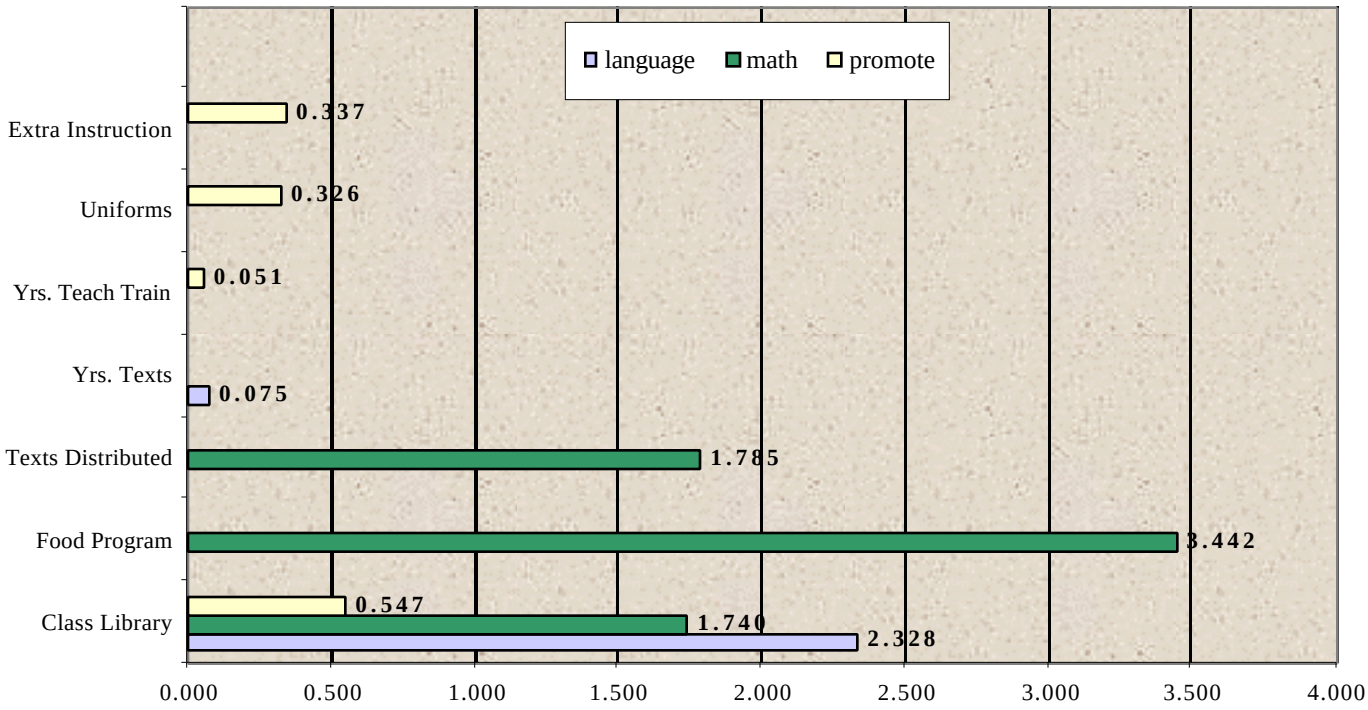
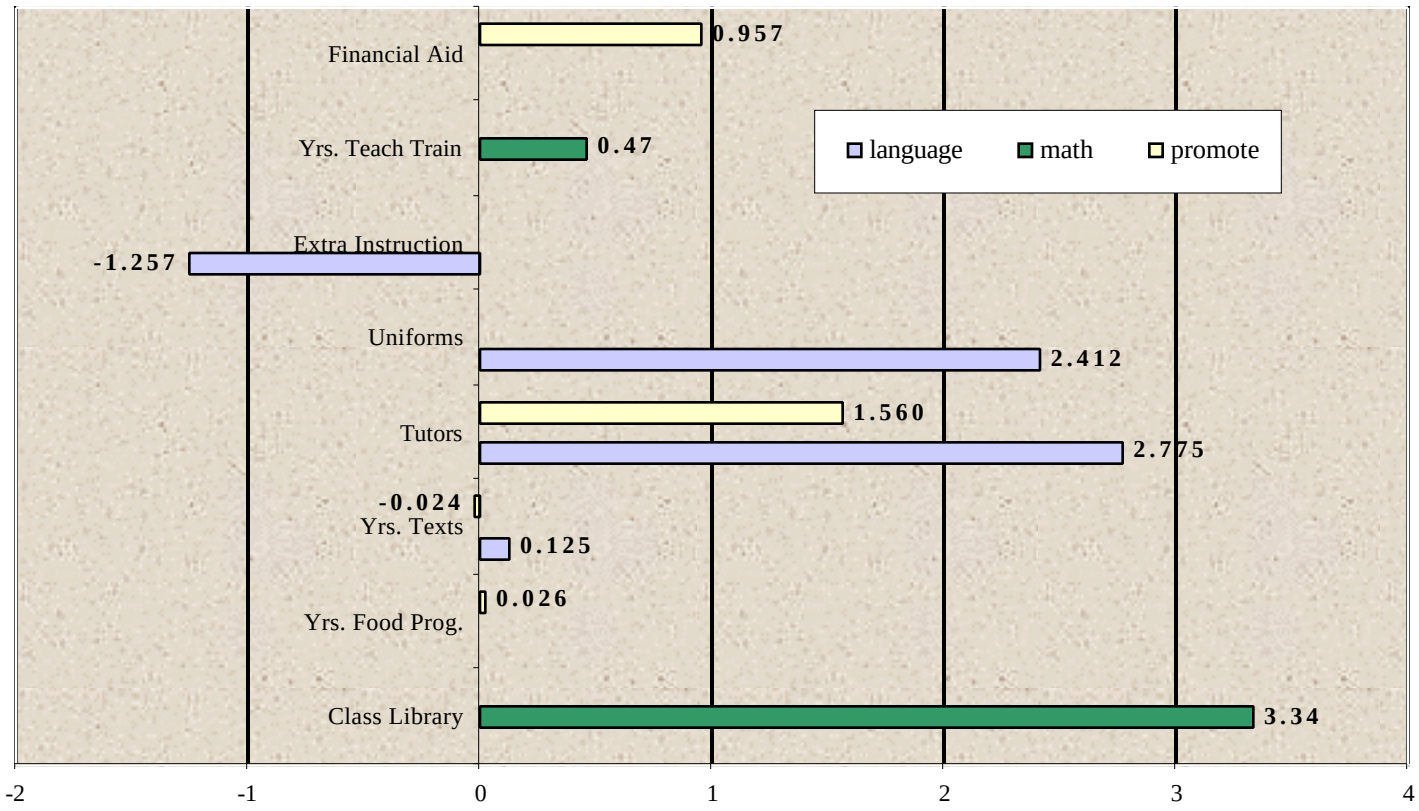


Figure 2
Effects of Compensatory Interventions:
Poor Subsample



The poorer children in the group receiving aid may have brought down the means in the achievement tests, accounting for the negative relationship between food aid and achievement, but the program does seem to have contributed to a reduction in dropout rates in rural areas of Peru.

In math, in the poor subsample, the two significant variables are classroom library, which raises the math score by approximately 3.33 points, and years of teacher training, providing a point increase of 0.5 for each additional year of teacher training at a school. The probability of promotion is increased for children in poor neighborhood schools, in order of importance, by tutors, by a program of financial aid for needy children, and by a food program. More years of textbook distribution have a negative association with the probability of promotion.

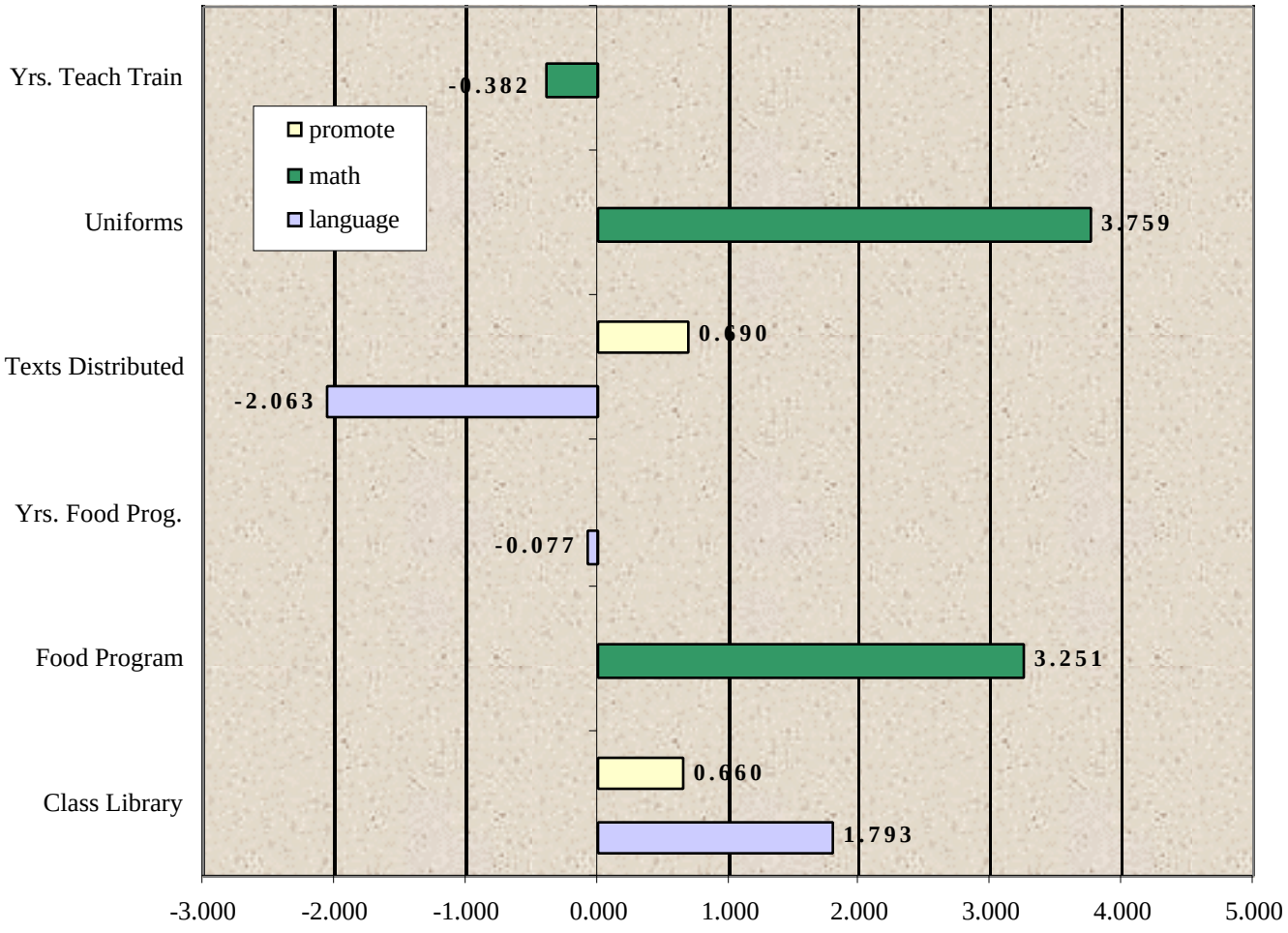
For the non-poor subsample, shown in Figure 3 (and Table A.4 in the appendix), classroom library is positive and significant in the language equation, raising the language score by almost 1.8 points. For the non-poor subsample, years of distribution of free food and free textbooks are negatively related, though the coefficient on the food variable is very small and the text variable is only significant at the 10 percent level. In the non-poor subsample's math equation, both food and uniform distribution programs are estimated to raise the average math score by more than 3 points. However, years of teacher training are related negatively to math achievement. Both classroom libraries and textbook distribution increase the likelihood of promotion.

Besides affecting the mean score, some interventions also affect how individual child variables, such as ability, gender, and socioeconomic status, affect learning and promotion. Variables that have a negative coefficient in the ability slope equation are interpreted as decreasing the learning gap between students of low ability and high ability, which is the result one would hope to attain from these interventions (see appendix for tables). For the total sample, a free uniform distribution program decreases the effect of ability on language achievement and on promotion. With more years of teacher training, the ability gap for promotion also decreases, suggesting that teacher training improves the ability of teachers to aid lower-ability children to pass the grade. The food distribution program increases the gender gap for language achievement. However, importantly, food distribution aids those in lower economic status by decreasing the gap between children of high and low socioeconomic status for both language score and promotion. Distribution of free textbooks also is effective in narrowing the socioeconomic performance gap, again for both language score and promotion. In contrast, the financial aid program increases the socioeconomic gap in the language equation and the family education gap in the math equation. One reason for this may be that at least within this sample, in Argentina and Chile, this program tends to have provided aid to more families of higher, rather than lower, socioeconomic status. The lack of targeting may be reflected in these coefficients.

In the poor subsample, years of in-service teacher training significantly decrease the gap in performance due to ability for both language achievement and promotion. For math achievement, the ability gap is decreased by both the food and textbook distribution programs, as well as by extra classes and/or summer school sessions for students having difficulties. Financial aid programs appear to increase the ability gap and the family education gap in math scores. Use of tutors is significant in decreasing the gender gap in language achievement in this subsample. Food and textbook distribution programs

decrease the socioeconomic status performance gap in both language achievement and promotion. Food distribution also decreases the family education gap in math performance in the poor subsample.

Figure 3
Effects of Compensatory Interventions:
Non-Poor Subsample



In the non-poor subsample, teacher training decreases the ability and the socioeconomic gaps in the likelihood of promotion, and it decreases the gender gap for language achievement. Financial aid programs also decrease the ability gap for promotion, but these programs increase the family education gap for math. Distribution of textbooks increases the ability gap for both language achievement and promotion, but decreases the family education gap for math. Food programs are significant in decreasing the socioeconomic gap in language achievement. However, free uniform distribution appears to increase the socioeconomic gap for promotion.

Individual Child Level Results

The previous section presented the effects of interventions present within the schools. This section presents estimates of the effects of "first-level" (direct) interventions on individual children who actually receive the benefits of the interventions, as opposed to merely attending a school that has the interventions. For example, a school may have a financial aid program, but the benefits of that program are actually experienced by very few specific children in the school. Interventions such as teacher training and classroom library are experienced by all the children in a class. Four subsidies that a student may receive were included in the survey administered to parents: food, financial aid (scholarships), transportation, and/or uniforms. Since these interventions are at the first level, that of the individual, results are estimated with ordinary least squares. As before, estimates are presented for the total sample and for poor and non-poor subsamples.

If these interventions are, in fact, meant to be compensatory, an additional empirical question is how well they are targeted toward those in the most financial need. At the school level, it has been noted that most of the interventions occur more frequently in schools classified as non-poor than in schools classified as poor, with teacher training and financial aid the only exceptions. However, we do know that within each school, a considerable range of socioeconomic status exists among the students. So the programs possibly may still be well targeted at the individual level, even if not at the school level, and vice versa. To test this, the individual students' family socioeconomic index (SES)[2], developed in this study, was matched against the receipt of interventions by individual students. In the total sample, 21 percent of the children are in families in which the SES is greater than 2, roughly the upper quintile, and 20.3 percent are in families with SES less than -2.5, the lower quintile.[3] In evaluating these results, is must be remembered that some of these interventions are meant to be universal, rather than compensatory. This is true of textbook distribution in Brazil, Mexico, and Chile, and true of food distribution in Brazil.

Of the 2,048 students participating in this study, slightly fewer than 900 received some type of subsidy. The most common subsidy is food. In the total sample, 16 percent of the children receiving a

[2] The index is a standardized index composed of the family's reported income, proportion of income expended on food, quality of housing, number of people in household per bedroom, number of books in the household, and average years of education of all household members over 15 years of age.

[3] Since the quintiles are formed from this sample of children attending public schools, the upper quintile is very likely lower than that of the society as a whole; members of the upper quintile of the population in the countries sampled are not likely to send their children to public schools.

food subsidy are in the upper SES quintile, while 21 percent are in the lowest quintile. The number (832) is large since in Brazil all students receive a free lunch, an intervention that appears fairly equally distributed among income groups, with 17 percent of the children receiving food in the upper quintile and 20 percent in the bottom quintile. In Argentina, 8 percent of those receiving food are in the upper quintile, while 27 percent are in the bottom quintile. Chile, less compensatory than Argentina, has 15 percent in the upper quintile and 21 percent in the bottom quintile. Mexico, whose traditional school day ends at lunchtime, has done very little with school lunches or breakfasts. The programs that do exist in Mexico have been targeted toward rural areas, so only one school in the sample has a school lunch program. Seven students in the sample are recipients, all of them from the bottom SES quintile.

Financial aid appears to be well targeted as a compensatory program in Brazil and Mexico, but not in Argentina and Chile. Seventy-six students in the sample received financial aid. Of the 12 in the sample receiving aid in Argentina, 17 percent are in the bottom and 42 percent in the top quintile. In Chile, with 33 recipients, 18 percent are in the bottom and 18 percent in the top quintiles. In Brazil, this program is well targeted, with 19 of 20 recipients below the mean income and the remaining one just at the mean. Fifty percent of the recipients are in the bottom quintile, none in the top. The Mexican sample has only 11 recipients, but 55 percent of those are in the lowest quintile, with only one recipient (9 percent) in the top quintile. Of the 92 students in the sample receiving free uniforms, 10 percent are in the upper quintile and 27 percent in the bottom quintile. Fifty-nine percent of the recipients have SES below the mean. Argentina has the most recipients with 59, of which 8 percent are in the upper quintile and 24 percent in the lowest quintile, with 58 percent of the recipients having SES below the mean. In the Brazilian sample, only 10 students received free uniforms, 30 percent in the lowest quintile and 70 percent below the mean. No student in the upper quintile received a free uniform. In Chile, 20 students in the sample received uniforms, 20 percent in the upper quintile and 25 percent in the bottom quintile. Fifty percent of the recipients had SES below the mean. Only three students in the sample in Mexico received free uniforms, and all three have family SES in the bottom quintile.

Table 3 presents ordinary least squares estimates of the effects of the interventions experienced by individual children on their language and math scores and whether or not they were promoted. Children receiving the food subsidy have significantly higher language and math scores, true for the total sample and both subsamples. In the promotion equation, only children in the non-poor subsample have a significantly higher probability of promotion associated with receiving a free lunch and/or breakfast. Children who receive financial aid do not have significantly better or worse scores in any of the language or promotion equations. However, math scores for children in the poor subsample are significantly higher when they receive

Table 3
Child Level Effects of Interventions and Programs

VARIABLE	EQ 1 Language* Total	EQ 2 Language* Poor	EQ 3 Language* Non-Poor	EQ 4 Math* Total	EQ 5 Math* Poor	EQ 6 Math* Non-Poor	EQ 7 Promotion** Total	EQ 8 Promotion** Poor	EQ 9 Promotion** Non-Poor
Child's Ability	**4.329**	**3.562**	**5.374**	**4.279**	**3.813**	**5.166**	**2.672**	**2.522**	**2.972**
	18.035	11.236	15.313	16.796	10.983	13.808	10.672	8.187	6.581
Gender	**1.508**	**1.456**	**1.296**						
	3.750	2.611	2.345						
Ave. School in Family	**0.872**	**0.406**	**0.851**	**0.435**	**0.229**	**0.340**	**0.053**	**0.033**	**0.104**
	13.582	3.850	10.147	6.384	1.959	3.807	1.233	0.506	1.683
Freq. Of Homework				**1.131**	**1.754**	**-0.034**	**0.209**	**0.194**	**0.048**
				4.005	4.431	-0.085	1.222	0.808	0.181
Reading Program 4th	**2.612**	**-0.585**	**3.043**				**-0.986**	**-0.668**	**-0.539**
	2.359	-0.352	1.642				-2.410	-1.005	-0.828
Reading Program Past	**-2.942**	**-1.986**	**-4.019**				**0.553**	**-0.046**	**0.532**
	-2.771	-1.287	-2.581				1.276	-0.071	0.792
Program Natl	**-2.087**	**-1.734**	**-1.885**	**-0.230**	**-0.805**	**0.411**	**-0.688**	**1.342**	**-2.547**
	-4.142	-2.635	-2.093	-0.448	-1.053	0.528	-1.312	1.200	-3.266
Math Prog 4th				**2.251**	**2.276**	**1.675**			
				1.802	1.092	0.937			
Math Program Past				**-1.482**	**0.288**	**-2.314**			
				-1.248	0.163	-1.264			
Food distribution	**3.238**	**5.189**	**1.473**	**3.949**	**5.019**	**2.708**	**0.334**	**-0.267**	**1.567**
	7.339	9.139	2.167	8.493	7.986	3.906	1.220	-0.771	3.039
Financial Aid	**1.310**	**1.822**	**-0.088**	**0.944**	**3.286**	**-2.223**	**1.574**		**-0.882**
	1.185	1.122	-0.061	0.803	1.817	-1.475	1.356		-0.743
Uniform Distribution	**-3.894**	**-4.483**	**-0.326**	**-1.855**	**-0.860**	**-2.399**	**-0.553**	**-0.836**	
	-3.848	-3.773	-0.168	-1.736	-0.643	-1.228	-0.806	-1.110	
Transportation	**3.231**	**1.905**	**14.942**	**-5.366**	**-5.546**	**-4.665**			
	1.012	0.558	1.855	-1.708	-1.588	-0.562			
Intercept	**27.740**	**31.377**	**26.394**	**28.406**	**28.483**	**30.429**	**-4.669**	**-3.997**	**-5.451**
	29.591	24.185	19.994	23.483	16.444	18.140	-5.859	-3.899	-4.227
R-squared	0.297	0.251	0.376	0.206	0.200	0.242	0.354	0.364	0.395
Adj. R-squared	0.293	0.243	0.369	0.201	0.192	0.233			
Schwarz Criterion	7.137	7.137	7.079	7.239	7.340	7.141	0.283	0.336	0.262
Sample Size	1781	912	869	1778	907	871	1816	919	901

Coefficients in bold if significant at 10% or less
* t scores below bolded coefficients
** z scores below bolded coefficients; R-squared is McFadden R-squared

financial aid, underlining the importance of targeting financial aid towards poor children. Children who receive free uniforms have significantly lower scores in the total and poor language equations, but no significant difference is found for the non-poor. In the math equation, scores are also significantly lower for the total sample, but are not significantly different for either the poor or non-poor subgroups. Free uniforms have no significant effect on promotion. The negative effect of free uniforms might be explained because uniform subsidies tend to go to the poorest, most at-risk students, who already may be low in achievement. Uniforms by themselves will not improve math or language scores, but may prevent a student from dropping out of the system. The transportation subsidy variable was insignificant for language achievement for all but the non-poor subsample, in which children who receive the subsidy do better. For math achievement, however, receiving the transportation subsidy is associated with lower performance for the total. It has no apparent effect on promotion. The transportation subsidy appears to be rare. In the entire sample, only 12 students, including 9 from two schools in Chile, receive transportation subsidies; their rarity may explain their insignificance.

No child in the sample receives all four subsidies offered, and only five children get three out of the four. Thirty-six students receive food subsidies and scholarships. However, only five receive food and transportation subsidies. A larger number of children (61) receive food and uniform subsidies. Ten receive scholarships and uniform subsidies. Three receive transportation and uniform subsidies.

In addition to gathering data on the specific interventions, our survey collected data on whether children participated in a special learning program, either at the time of the survey or in past grades; whether that program was for math, reading, both, or something else; and whether the child's program was part of a national program. Five percent of the surveyed children were participating in a math program, and 7.5 percent were in a reading program, or both, in the fourth grade. Five percent had participated in a math program in a previous grade, and 7 per cent had been in a language program. Five per cent had participated in a national program. For the total sample, children participating in a language program or a math program averaged more than 2 points higher language and math scores, respectively. The language program also is significant for the non-poor subsample. However, neither the language nor the math program is significant for the poor subsample. Having participated in a language program in the past has a significant, negative effect on language score for the total and non-poor samples, but has no significant impact on the poor subsample. Children participating in a national program have significantly lower language scores, true for the total sample and both subsamples. Participation in a national program does not significantly affect either math scores or promotion, except for a lower likelihood of promotion for the non-poor subsample. Since the data on programs were derived from simply asking whether the child participated in a program, without distinguishing the specific characteristics of the program, these latter results should be treated lightly; not all programs are equally effective. These data suggest that more intensive investigation is needed, using control groups over time and including more details on specific elements of these programs and their effects on individual children.

Concluding Remarks

In summary, statistical estimates suggest that not all interventions are equally effective. The most important programs for all schools, both in poor and non-poor neighborhoods, are as follows:

- **Classroom libraries**
  Classroom libraries/reading corners are related strongly to both math and language learning achievement for the total and both subsamples. When children are in a classroom with a library or reading corner, average language scores are more than 2 points higher, average math scores are 1.75 points higher, and a greater probability of promotion exists.

- **Distribution of textbooks**
  Providing texts appears to increase achievement and promotion for the total sample as well as for both poor and non-poor subsamples. Textbook distribution also is important for decreasing the learning gap between high-ability and low-ability children in the poor subsample.

- **Distribution of food**
  This program has important positive results, with higher average scores in the total and non-poor subsamples and greater likelihood of promotion in the poor subsample. In all three groups studied, this program decreases the achievement gap between children from families of high and low socioeconomic status. At the individual child level, children who receive food have significantly higher math and language scores in all three sample groups and have increased likelihood of promotion in the non-poor group.

Two additional programs are especially effective for the poor subsample:

- **In-service teacher training**
  Teacher training programs also appear to be most effective in increasing the ability of teachers to educate lower-performing students; they also increase the ability to teach math, a subject that appears to require more education to teach well. While this program is important for schools in both poor and non-poor neighborhoods, it appears to be most important in poor neighborhood schools. One reason is that it may be more difficult to attract well-educated, experienced teachers to these schools, making in-service training even more important.

- **Tutors**
  Tutors have a very significant effect on raising language scores and on promotion in poor neighborhood schools, as well as on decreasing the achievement gap between girls and boys. Though within the sample schools those with tutors are divided almost equally between poor and non-poor, this program is statistically significant only in poor schools.

Where choices must be made in the face of limited resources, the remaining three programs – distribution of free uniforms, additional class sessions for children having difficulties, and financial aid –

appear less effective than the programs mentioned above, although they are associated with some positive results. *Uniform distribution* is associated with higher language achievement in poor schools and higher math achievement in non-poor schools. Estimations at the level of individual children receiving uniforms show no positive results. *Extra class sessions* are associated with an increase in the probability of promotion for the total sample, and they decrease the ability gap of children in poor neighborhood schools. *Financial aid* increases the likelihood of promotion at the school level and at the individual child level is associated with an increase of more than 3 points in the math score for the poor subsample. Its effects on slopes in the school level estimates is mixed: It increases the performance gap due to socioeconomic status for the whole sample, and for math, it increases the gap due to family education in the non-poor subsample, all contrary to what one might hope. At the same time, financial aid is associated with a decrease in the ability gap for the non-poor. Two things might be operating here. Financial aid is a relatively new program. In addition, although financial aid programs normally are established to help poor families keep children in school, they have not been well targeted toward low SES children in Chile and Argentina, at least in this sample. Recipients of *transportation aid* are insufficient for making any firm judgment on that program, but this study provides no statistical support for its effectiveness.

While this study has not dealt directly with the relative costs of the special interventions tested in this study, a study by Schiefelbein, Wolff, and Schiefelbein (1998, 11) does provide some estimates of the percentage increase in unit (per pupil) costs for a group of possible interventions. The percentage increase is based on the authors' estimate of $200 per unit. According to their estimates, providing classrooms with standard texts raises the per unit cost by 1.5 percent, and providing a small classroom library raises the cost by 1.4 percent. This suggests that these two interventions are relatively inexpensive and cost effective. On the other hand, the most expensive program in the study is the providing of a free lunch to 100 percent of the students, an intervention estimated to raise the unit cost by 36 percent. Doing some targeting of students and providing a free lunch to 50 percent of the students would raise costs by 18 percent. Less expensive is providing a snack to 50 percent of the students, which would increase costs by 6.8 percent. On the other hand, in-service teacher training, which is especially effective in poor schools, raises unit cost by 2.3 percent when the training concerns the use of materials or cooperative learning. The authors estimate that in-service teacher training without follow-up materials increases the unit cost by 10 percent. No estimate is provided of costs for tutors. This cost data suggest that texts and classroom libraries are very cost-effective interventions. In-service teacher training also appears to be a very cost-effective intervention, especially in poor neighborhood schools. Lunch programs, while effective for learning, are expensive. Furthermore, our study indicates that these programs are much more effective in schools in poor neighborhoods. Where educational budgets are tight, targeting poor neighborhood schools and poor children in those schools for free lunches is a more cost-effective approach.

Although this study presents some significant results concerning the effectiveness of some special interventions, several limitations suggest the need for further research. One issue raised in this paper is the effective targeting of the programs. The sample sizes of students actually receiving an intervention, especially within a country, were too small for any definitive analysis. Country-specific studies could contribute to our understanding. Other limitations of the study include the confinement of results to schools in large urban areas and the fact that the study uses cross-section data. While cross-

section data yields one type of valuable analysis, that of comparison over space, it does not incorporate a time dimension to measure whether the same children are do better or worse as a result of the intervention. We can see only the effects on those receiving an intervention, compared to those not receiving it. The results show which interventions have the strongest positive statistical results, indicating that those who receive an intervention are performing better than those without it. (This does not constitute proof of causation.) Negative and significant results therefore might not mean that the programs are ineffective. If programs are directed at very low-performing, high-risk children, a negative coefficient may mean simply that the intervention has not yet brought these children up to the level of those not receiving the intervention.

Overall, little evidence suggests that these interventions are operating as compensatory programs. Classroom libraries, food, extra class sessions, and uniform distributions, at least in this sample, are being directed more toward non-poor than toward poor neighborhood schools. Textbooks and tutors are evenly divided between poor and non-poor neighborhoods. Even though financial aid is directed toward poorer neighborhood schools, children with higher socioeconomic status within those schools in Argentina and Chile appear to be selected for it, so this program also is not well-targeted.

To achieve positive discrimination, food programs and classroom library programs should be expanded and redirected to target poor children more consistently. Teacher training already tends to be aimed more toward poor schools, but it needs to be expanded. Distribution of texts already is widely done, except in Argentina, where expanding the program, especially among poor neighborhood schools, would be beneficial. Financial aid appears to be effective for the poorest, most at-risk children, perhaps more for preventing dropout than for improving achievement per se. However, at least based on the small sample of aid recipients in this study, indications are that this intervention may not be well targeted toward the poorest children, except in Brazil and perhaps Mexico. Where resources are scarce, more careful direction of aid funds toward low-income families and schools could increase the positive impact of these expenditures on public primary school interventions.

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Appendix

This appendix presents a more technical description of the estimation technique used and the estimated equations from which the analysis in the text is derived.

The data for the study were collected on the basis of a stratified random sampling. Twenty-four schools within each country, or 96 schools in all, were selected so that half of the schools are from poor neighborhoods and half from non-poor. To insure that we would have an adequate amount of data on programs and interventions, the sampling also was stratified so that half the schools within each poor and non-poor subsample participate in a special learning enhancement program and half do not. Within each strata, the sampling of schools was random, with approximately 20 individual students per school were included in the study.

This hierarchical structure in the data requires the use of a two-level hierarchical linear modeling (HLM) estimation technique. This multilevel modeling technique is used to estimate the equations. This maximum likelihood technique applies a two-stage estimation process. The first stage involves estimating a separate regression of the test score or promotion of each individual child in the classroom on personal characteristics. In the first stage of the language equation, gender, a proxy variable for the child's ability, and an index of the family's socioeconomic status are the child level independent variables. The ability proxy is composed of the child's grade point during the third and fourth grades in both language and math, weighted by two-thirds, and the teacher's opinion of the child's ability, weighted by one-third. For the math and promotion equations, since gender is not significant, only ability appears on the right hand side of the equation, along with family socioeconomic status in the promotion equation and the average education of adult members of the child's family in the math equation. A separate regression is done for each classroom, making 96 in all, each with at least 20 children. For the promotion variable, which is binary, a logit estimation is used in the first stage.

The second stage of the HLM estimation technique uses the intercept terms and coefficients estimated in the first stage as the dependent variables in the second stage. The intercept term represents the mean, and each coefficient represents a slope term. This means that the independent interventions are run first as a function of the estimated mean values of test scores for each school/classroom to see their effects, and then as functions of the slopes to see how they alter the effects of ability, SES, family education, and gender on learning. In addition to the interventions, some previously determined significant classroom and school variables are included in the equations. This is done in order to get a net effect of the interventions after taking into account such significant factors as the teacher's experience, teaching style, classroom pedagogic equipment, and so on.[4] Given the two-stage nature of

[4]As in ordinary least squares, the t statistics provide a measure for the significance of the variables. Given the large number of variables in this model and the potentially large amount of multicollinearity, care must be used in deciding when a small t value really means that the variable is not significant, instead of just collinear with another variable.

this estimation technique, there is no coefficient of determination. However, we have calculated the decrease in the unexplained variance due to additional variables in the equation.[5]

The first table in this appendix presents a list of the classroom and school control variables used in the equations. These control variables are the most significant explanatory classroom and school variables found in the larger study from which the paper is derived. Included among the classroom variables are those from classroom observation of a language lesson and a math lesson. In reading the list of variables, those labeled L or lang. are from the language lesson observation, and those labeled M or math are from the math lesson. Also included are some indices to indicate measures of teaching style, thought development, participation, and classroom atmosphere (incidences of discipline, amount of praise, and so on). Table A.1 presents a list and definitions of the control variables, along with their means for the total and for subsamples. Tables A.2 to A.4 present the estimated HLM equations for the total and both subsamples.

[5]The decrease reported is the "total" percentage decrease, or the change in the variance between the current equation and the equation with no independent variables. The smaller the variance, the more that is explained (Bryk and Raubenbush 1992).

Table A.1
Definitions and Means of Control Variables

School Variables	Definitions	Total Mean	Poor Mean	Non-poor Mean
Teacher's room	Existence and condition of teacher's room	0.70	0.63	0.77
Sports center	Existence and condition of sports center	0.88	0.71	0.74
Blackboards per class	No. blackboards per class	0.83	0.81	0.85
Copiers per class	No. photocopiers per class	0.04	0.03	0.04
Computers per class	No. computers per class	0.51	0.36	0.66
TVs/VCRs per class	No. TVs and VCRs per class	0.14	0.12	0.16
Total school hours	Total hours per year in school	943.46	917.28	969.64
School size	Number of children in the school	749.29	786.67	711.92
% female teachers	Percentage women teachers in 1-4	92.63	91.79	93.46
Prin yrs. at school	Number of years principal at school	7.92	7.59	8.25
Prin. community rel.	Principal functions: relate to community	2.30	2.33	2.27
Prin. plan events	Principal functions: community events	1.66	1.54	1.77
Prin. evaluates	Principal functions: evaluate students	2.31	2.25	2.38
Prin. parent relations	Principal functions: relate to parents	2.55	2.58	2.52
Lack parent participation	Obstacles: low parent participation	0.69	0.79	0.58
Lack teacher quality	Obstacles: low teacher qualifications	0.27	0.29	0.25
T meet maintenance	In meetings discuss school maintenance	1.64	1.92	1.35
Auto promote, fourth	Automatic promotion in fourth grade	0.27	0.21	0.33
Teacher/Class Variables				
Yrs. teaching fourth	Years experience teaching fourth grade	4.49	4.52	4.46
Teacher education	Level of schooling of teacher	3.70	3.85	3.54
% time teach	% class time actually spent teaching	0.61	0.65	0.57
Teacher other job	Other employment besides teaching	0.41	0.08	0.73
Hrs. per wk. on reading	Class hours/wk on language	2.27	2.35	2.20
Hrs. per wk. on math	Class hours/wk on mathematics	5.58	5.61	5.55
L quest. to confirm	T questions: to reaffirm concepts	1.50	1.50	1.50

L praise	Teacher praised students in lang. lesson	1.53	1.56	1.50
M praise	Teacher praised students in math lesson	1.61	1.69	1.54
M diverse materials	Math lesson: diverse material	0.88	0.71	1.04
L notebook use	Language lesson: use student notebooks	1.28	1.29	1.27
M notebook use	Math lesson: use student notebooks	1.44	1.40	1.48
Hrs. discussing stud.	Time discuss children with teachers	1.70	1.79	1.61
Aide in class	Hours/mo. a teacher's aide in class	0.80	1.00	0.60
% both parents	% of class with both parents in home	0.78	0.81	0.76
Av. yrs. preschool	Average yrs. preschool in class	1.46	1.28	1.65
Class av. SES	Average family SES in class	0.00	-0.79	0.78
Class av. GPA	Class average GPA	3.20	3.19	3.20
SD language score	Class standard deviation of lang. score	4.60	4.44	4.75
L transactions index	Index of transactions teaching style	11.23	10.88	11.58
L thought devel. Index	Index of thought development	4.19	3.96	4.42
L participation index	Index of student participation-lang.	12.82	12.64	13.00
M participation index	Index of student participation-math	12.63	12.47	12.79
M class atmosphere	Index of class morale-math	3.85	3.98	3.73
L class atmosphere	Index of class morale-lang.	3.90	3.92	3.88

Table A.1 — Continued.
Definitions and Means of Control Variables

	Argentina	**Brazil**	**Chile**	**Mexico**
School Variables	**Mean**	**Mean**	**Mean**	**Mean**
Teacher's room	0.67	0.92	0.92	0.29
Sports center	0.75	0.71	0.74	0.71
Blackboards per class	0.89	0.85	0.86	0.71
Copiers per class	0.03	0.04	0.08	0.01
Computers per class	0.56	0.33	1.10	0.04
TVs/VCRs per class	0.11	0.14	0.26	0.06
Total school hours	828.33	868.46	1151.51	925.54
School size	741.54	1113.46	740.13	402.04
% female teachers	99.13	99.96	84.32	87.10
Prin yrs. at school	6.54	12.52	7.75	4.88
Prin. community rel.	2.17	2.50	2.17	2.38
Prin. plan events	1.46	2.00	1.38	1.79
Prin. evaluates	2.50	1.79	2.04	2.92
Prin. parent relations	2.67	2.63	2.33	2.58

Lack parent participation	0.54	0.75	0.83	0.63
Lack teacher quality	0.63	0.25	0.00	0.21
T meet maintenance	1.25	2.17	1.83	1.29
Auto promote, fourth	0.04	0.92	0.00	0.13
Teacher/Class Variables				
Yrs. teaching fourth	3.29	6.50	4.58	3.58
Teacher education	3.00	3.29	4.75	3.75
% time teach	0.64	0.51	0.66	0.65
Teacher other job	0.13	0.08	1.29	0.13
Hrs. per wk. on reading	1.75	4.55	1.36	1.32
Hrs. per wk. on math	5.25	5.05	6.21	5.52
L quest. to confirm	1.67	1.54	1.33	1.46
L praise	1.83	1.25	1.75	1.29
M praise	1.63	1.08	2.67	1.08
M diverse materials	0.83	0.67	1.13	0.88
L notebook use	1.67	0.79	1.21	1.46
M notebook use	1.75	1.13	1.38	1.50
Hrs. discussing stud.	1.92	1.23	3.00	0.77
Aide in class	0.96	0.00	0.83	1.10
% both parents	0.82	0.68	0.77	0.86
Av. yrs. preschool	1.89	1.71	1.00	1.26
Class av. SES	0.60	-0.14	0.76	-1.24
Class av. GPA	3.40	3.10	3.12	3.16
SD language score	4.80	4.23	4.90	4.46
L transactions index	12.00	11.46	11.17	10.29
L thought devel. index	4.46	4.83	3.71	3.75
L participation index	13.38	13.23	13.38	11.33
M. participation index	12.92	13.26	13.33	11.04
M class atmosphere	4.00	3.46	4.54	3.42
L class atmosphere	3.96	3.58	4.25	3.79

Table A.2
Total Sample HLM Estimates of School Level Effects of Interventions

VARIABLE	EQUATION 1 LANGUAGE		EQUATION 2 MATH		EQUATION 3 PROMOTION		EQUATION 4 PROMOTION	
	b_i	*t*	b_i	*t*	b_i	*t*	b_i	*t*
INTRCPT1, B0								
INTRCPT2	**24.682**	***6.251***	**27.262**	***5.993***	**1.228**	***3.546***	**1.167**	***3.274***
Class Library	**2.328**	***3.020***	**1.740**	***1.703***	**0.547**	***3.089***	**0.565**	***3.144***
Food Program			**3.442**	***3.028***				
Texts Distributed			**1.785**	***1.940***				
Yrs. Texts	**0.075**	***2.496***						
Yrs. Teach Train					**0.051**	***2.850***	**0.008**	***0.611***
Uniforms							**0.326**	***2.048***
Extra Instruction					**0.337**	***2.065***	**0.331**	***1.966***
control variables								
Teacher's Room			**0.915**	***1.915***				
Copiers per class			**15.247**	***1.628***				
Sports Center					**-0.205**	***-2.146***	**-0.209**	***-2.126***
School size	**0.033**	***1.018***			**0.017**	2.543	**0.016**	***2.189***
School size, squared	**-0.00001**	***-0.094***			**-0.0001**	***-2.076***	**-0.0001**	***-1.891***
Prin Yrs. At School	**0.140**	***2.197***						
Prin. Community Rel.			**1.311**	***2.623***				
Prin. Evaluates	**0.818**	***2.075***						
Yrs. Teaching 4th	**0.206**	***1.792***						
% Time Teach	**6.063**	***2.723***						
Av. Yrs. Preschool	**1.445**	***1.662***						
Hrs. per Wk on Reading	**0.225**	***1.548***						
TS Participation Index	**1.232**	***4.321***						
TMMAINTN			**-1.214**	***-2.535***				
% Both Parents			**9.396**	***2.199***				
Auto Promote, 4th					**0.166**	***0.832***	**0.140**	***0.663***
L. Notebook Use					**0.468**	***3.860***	**0.473**	***3.796***
L. Quest. To Confirm					**0.193**	***1.314***	**0.208**	***1.356***
LTS Thought Devel Index					**-0.121**	***-2.404***	**-0.117**	***-2.234***
Class ave. SES	**1.771**	***7.053***	**0.824**	***3.377***	**0.140**	***2.903***	**0.150**	***2.915***
Diverse Materials-math			**-1.484**	***-2.668***				
TS Transactions Index			**0.527**	***3.270***				
Teacher Other Job			**-0.178**	***-3.118***				
CHABILIT slope, B1								
INTRCPT2	**8.393**	***8.739***	**10.383**	***6.464***	**1.218**	***6.617***	**1.118**	***6.093***
Yrs. Teach Train							**-0.041**	***-3.285***
Uniforms	**-0.952**	***-1.579***			**-0.490**	***-3.027***	**-0.329**	***-2.071***
Total School Hours			**-0.003**	***-1.694***				
Computers per class			**-1.207**	***-1.851***				
M.Class Atmosphere			**-0.330**	***-1.455***				
Teacher Education	**-0.745**	***-3.144***	**-0.496**	***-2.203***				
Hrs. discussing stud.	**-0.229**	***-3.860***						
LTS Thought Devel Index					**-0.136**	***-3.204***	**-0.121**	***-2.992***
GENDER slope, B2								
INTRCPT2	**2.155**	***1.930***						
Food Program	**0.983**	***1.614***						
Lack teacher quality	**1.593**	***2.298***						
L Class Atmosphere	**-0.569**	***-2.149***						
SES6 slope, B3								
INTRCPT2	**0.479**	***2.260***			**0.027**	***1.024***	**0.028**	***1.127***
Financial Aid	**0.179**	***1.518***						
Food Program	**-0.204**	***-1.769***			**-0.051**	***-2.719***	**-0.050**	***-2.801***
Texts Distributed	**-0.339**	***-1.535***			**-0.059**	***-2.202***	**-0.054**	***-2.082***
TVs/VCRs per class	**0.505**	***1.628***			**0.241**	***3.862***	**0.223**	***3.739***
RELAVSKL slope, B4								
INTRCPT2			**-0.183**	***-0.781***				
Financial Aid			**0.304**	***1.725***				
Texts Distributed			**-0.234**	***-1.212***				
Hrs. per Wk on Math			**0.069**	***1.882***				
VARIANCE COMPONENTS								
VARIANCE	**var**	**df**	**var**	**df**	**var**	**df**	**var**	**df**
INTRCPT1	12.791	74	19.778	78	4.681	77	5.208	76
CHABILIT slope	3.256	83	4.024	87	1.316	86	1.455	85
GENDER slope	0.397	83						
SES6 slope	0.005	82			0.001	85	0.001	85
RELAVSKL slope			0.081	88				
level-1	43.302		49.438					
Deviance	11404.721		11845.829					
Likelihood					-1870.200		-1879.001	
Variance Decrease	65.54%		35.06%					

Table A.3
Poor Subsample HLM Estimates of School Level Effects of Interventions

VARIABLE	EQUATION 1 LANGUAGE		EQUATION 2 MATH		EQUATION 3 PROMOTION	
	b_i	*t*	b_i	*t*	b_i	*t*
INTRCPT1, B0						
INTRCPT2	**17.151**	***3.122***	**29.475**	***6.024***	**-4.097**	***-2.848***
Class Library			**3.338**	***2.664***		
Yrs. Food Prog.					**0.026**	***2.667***
Yrs. Texts	**0.125**	***3.848***			**-0.024**	***-3.466***
Tutors	**2.775**	***2.336***			**1.560**	***5.585***
Uniforms	**2.412**	***2.432***				
Extra Instruction	**-1.257**	***-6.641***				
Yrs. Teach Train			**0.465**	***1.658***		
Financial Aid					**0.957**	***2.839***
control variables						
Blackboards per class	**5.808**	***3.553***				
Yrs. Teaching 4th	**0.548**	***6.338***				
Prin Yrs. At School					**-0.058**	***-3.049***
% Time Teach	**9.406**	***3.075***			**1.378**	***2.364***
Av. Yrs. Preschool	**4.379**	***4.071***			**1.077**	***4.118***
L. Notebook Use	**-1.892**	***-3.327***			**0.641**	***5.804***
Hrs. per Wk on Reading					**-0.125**	***-3.254***
% Both Parents	**15.313**	***3.222***			**7.240**	***5.322***
Sports Center			**0.866**	***1.344***		
Copiers per class			**40.054**	***2.663***		
Class ave. SES			**1.389**	***3.293***		
Hrs. per Wk on Math			**0.816**	***1.831***		
M. Participation Index			**0.957**	***2.909***		
M. Notebook Use			**1.809**	***2.063***		
M. Praise			**-1.810**	***-2.063***		
Teacher Other Job			**3.754**	***1.464***		
CHABILIT slope, B1						
INTRCPT2	**2.010**	***1.063***	**10.617**	***7.886***	**3.828**	***8.851***
Yrs. Teach Train	**-0.340**	***-2.547***			**-0.230**	***-3.539***
Food Program			**-2.949**	***-4.243***		
Uniforms					**0.714**	***1.821***
Financial Aid			**2.375**	***3.377***		
Extra Instruction			**-1.307**	***-3.387***		
Yrs. Texts			**-0.036**	***-1.529***		
Hrs. discussing stud.	**-0.202**	***-5.594***			**0.095**	***4.818***
SD Language Score	**0.929**	***2.257***				
M.Class Atmosphere			**-0.402**	***-2.610***		
Teacher Education	**-0.380**	***-1.316***	**-0.838**	***-3.053***		
Aide in class			**0.269**	***6.465***		
L Thought Devel Index					**-0.365**	***-3.655***
GENDER slope, B2						
INTRCPT2	**0.611**	***0.900***				
Tutors	**-3.215**	***-2.283***				
Hrs. per Wk on Reading	**0.392**	***2.947***				
SES6 slope, B3						
INTRCPT2	**-0.867**	***-1.367***			**-0.111**	***-3.454***
Yrs. Food Prog.	**-0.021**	***-2.303***			**-0.006**	***-3.731***
Texts Distributed	**-0.545**	***-2.495***				
Yrs. Texts					**-0.003**	***-2.691***
L Participation Index	**0.180**	***2.218***				
TVs/VCRs per class					**1.570**	***5.749***
RELAVSKL slope, B4						
INTRCPT2			**0.461**	***2.237***		
Financial Aid			**0.353**	***1.629***		
Food Program			**-0.327**	***-1.235***		
Computers per class			**-0.846**	***-2.445***		
VARIANCE COMPONENTS						
VARIANCE	**var**	**df**	**var**	**df**	**var**	**df**
INTRCPT1	9.925	34	21.109	33	0.372	33
CHABILIT slope	3.626	40	1.308	36	1.988	39
GENDER slope	2.953	42				
SES6 slope	0.055	41			0.0002	40
RELAVSKL slope			0.113	40		
level-1	42.221		51.576			
Deviance	5659.817		5752.479			
Likelihood					-882.685	
Variance Decrease	65.41%		42.40%			

Table A.4
Non Poor Subsample HLM Estimates of School Level Effects of Interventions

VARIABLE	EQUATION 1 LANGUAGE		EQUATION 2 MATH		EQUATION 3 PROMOTION		EQUATION 4 PROMOTION	
	b_i	*t*	b_i	*t*	b_i	*t*	b_i	*t*
INTRCPT1, B0								
INTRCPT2	**38.297**	***13.156***	**5.310**	***0.959***	**0.537**	***0.678***	**1.008**	***2.005***
Class Library	**1.793**	***2.412***			**0.660**	***2.030***		
Food Program			**3.251**	***4.458***				
Yrs. Food Prog.	**-0.077**	***-3.304***						
Texts Distributed	**-2.063**	***-1.829***			**0.690**	***1.729***	**0.885**	***5.525***
Uniforms			**3.759**	***2.616***				
Yrs. Teach Train			**-0.382**	***-3.552***				
control variables								
Teacher's Room	**1.911**	***4.496***						
School size	**0.050**	***5.627***			**0.034**	3.006	**0.016**	***1.817***
School size, squared					**-0.0002**	***-2.671***	**-0.0001**	***-1.777***
Lack Parent Participate	**-4.132**	***-4.849***						
% Time Teach	**3.074**	***1.575***						
TVs/VCRs per class					**-1.036**	***-1.583***	**-0.546**	***-1.328***
Prin. Plan Events					**-0.271**	***-1.250***	**-0.205**	***-1.452***
Yrs. Teaching 4th					**0.070**	***1.295***	**0.047**	***1.304***
Quest. To Confirm	**1.728**	***2.696***					**0.332**	***2.217***
Hrs. per Wk on Reading	**0.605**	***2.511***						
L Class Atmosphere	**1.245**	***4.439***						
Computers per class			**1.199**	***4.518***				
Prin Yrs. At School			**0.173**	***1.917***				
Prin. Evaluates			**1.422**	***2.603***				
Prin. Parent Relations			**-1.538**	***-2.670***				
% Both Parents			**18.533**	***8.933***				
Class Ave. GPA			**8.599**	***5.653***				
Hrs. per Wk on Math			**0.250**	***1.570***				
M. Diverse Materials			**-1.038**	***-2.396***				
Teacher Education			**0.469**	***1.792***				
M. Notebook Use			**-0.554**	***-1.491***				
CHABILIT slope, B1								
INTRCPT2	**5.632**	***3.776***	**10.012**	***6.042***	**1.197**	***6.992***	**0.733**	***3.606***
Financial Aid							**-0.442**	***-2.265***
Texts Distributed	**1.783**	***2.263***					**0.754**	***3.249***
Yrs. Teach Train					**-0.052**	***-2.899***	**-0.050**	***-2.844***
Computers per class			**-1.432**	***-1.992***				
Hrs. discussing stud.			**-0.541**	***-1.895***			**0.013**	***0.192***
M.Class Atmosphere			**-0.534**	***-1.734***				
Teacher Education	**-0.901**	***-3.855***	**-0.526**	***-1.405***				
SD Language Score	**1.050**	***4.201***						
L Class Atmosphere	**-0.746**	***-3.406***						
L Praise					**-0.284**	***-2.603***		
GENDER slope, B2								
INTRCPT2	**-5.383**	***-3.283***						
Yrs. Teach Train	**-0.150**	***-2.188***						
% Female Teachers	**0.070**	***3.779***						
SES6 slope, B3								
INTRCPT2	**0.141**	***1.704***			**-0.008**	***-0.567***	**-0.081**	***-3.469***
Yrs. Food Prog.	**-0.015**	***-1.696***						
Yrs. Teach Train					**-0.007**	***-3.320***	**-0.010**	***-4.842***
Uniforms					**0.037**	***1.951***	**0.094**	***5.347***
Teacher's Room	**0.143**	***1.749***					**0.040**	***2.513***
RELAVSKL slope, B4								
INTRCPT2			**-0.164**	***-0.479***				
Financial Aid			**0.478**	***2.042***				
Texts Distributed			**-0.445**	***-1.847***				
Hrs. per Wk on Math			**0.072**	***1.419***				
VARIANCE COMPONENTS								
VARIANCE	**var**	**df**	**var**	**df**	**var**	**df**	**var**	**df**
INTRCPT1	6.679	29	6.345	33	6.864	36	6.841	36
CHABILIT slope	0.582	35	6.065	42	0.373	41	0.056	39
GENDER slope	0.547	37						
SES6 slope	0.024	37			0.002	41	0.004	40
RELAVSKL slope			0.088	43				
level-1	42.681		46.174					
Deviance	5390.936		5970.792					
Likelihood					-898.414		-889.938	
Variance Decrease	80.10%		73.41%					