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The Abdul Latif Jameel Poverty Action Lab (J-PAL) at the MIT Department of Economics is dedicated to fighting poverty by ensuring that policy decisions are based on scientific evidence. We achieve this objective by undertaking, promoting the use of, and disseminating the results of randomized evaluations of poverty programs. If you would like to be added to our mailing list, please contact us at povertyactionlab@mit.edu or 617 324 0108.

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Making Schools Work for Marginalized Children:

Evidence from an inexpensive and effective program in India

With more and more children now attending school, policymakers are increasingly focusing their attention on making sure that children in school are actually learning. All too often, the poor and marginalized are failed by education systems. Schools often have inappropriate curricula or do not accommodate the learning needs of children who fall behind. Many children cannot manage regular attendance or have difficulty learning because they are hungry or sick. Others get promoted from grade to grade without successfully mastering basic skills, leaving them lost and unprepared for the lessons being taught. Improving general school quality—by having more teachers or textbooks, improving incentives for teachers and students, etc.—may not necessarily help these children if they lack the basic skills needed to take advantage of the opportunities offered.

This briefcase examines how a large-scale remedial education program that provided tutors (balsakhis) for marginalized children dramatically increased learning by focusing on improving basic math and reading skills. The intervention, called the Balsakhi Program, was designed and implemented by Pratham, an Indian organization whose aim is to have "Every child in school…and learning well." A randomized evaluation of the program was conducted in Vadodara and Mumbai from 2001 to 2002. This briefcase is based on the findings of that evaluation as reported in Banerjee et al. (2005).

Results of the program show that in its second year (when everyone was familiar with the program), 8 to 13 percent more of the particularly marginalized children were able to do one- and two-digit subtraction, two- and three-digit addition, division, multiplication, and simple word problems, among many other gains. These second-year results make the program one of the most effective education interventions to have been evaluated using a randomized approach thus far. The cost of the program was just US$2.25 per year for every child who received the remedial assistance compared to the average expenditure on education in India of US$78 per year.

The lesson from this research is that strategies designed to deliver basic skills to marginalized children can have substantial payoffs in terms of increased learning at low cost. More generally, these results raise important questions about the appropriateness of curricula and teaching methods for poor schools.

THE NEED FOR REMEDIAL EDUCATION PROGRAMS

Schools in many developing countries have not adopted specific strategies to meet the needs of at-risk children who typically make up a sizeable proportion of their students. In India, for example, teachers, along with the stronger pupils, often proceed with the regular curriculum while weaker pupils are promoted from standard (grade) to standard with little regard to how much material they are actually absorbing. At the beginning of the study, many children in Grades 3 and 4 in Mumbai had not achieved the competencies they should have attained in first grade: 25 percent could not recognize letters, and 35 percent could not recognize basic numbers. In Vadodara in 2002, the average Grade 3 pupil scored 16 percent in math, meaning that he or she could only manage to put two numbers together in order of size and add two single-digit numbers together.

On a national level, the large number of children falling behind the curricula is reflected in the finding from a Pratham survey of 13,000 children in 17 states that 45 percent of 11- to 14-year-olds attending government schools could not read simple words (Pratham Resource Center, 2004). The Public Report on Basic Education (PROBE) in India (The PROBE Team, 1999) provides vivid illustrations of how incomprehensible and out of touch most textbooks and curricula are for even the average child in most poor schools in India.

The problem is not limited to India, however. An evaluation in Kenya of a program that provided textbooks to disadvantaged schools found that only those students scoring well on the pre-test appeared to benefit from the program (Glewwe et al., 2002). This may be the case because only more advanced pupils were able to benefit from the textbooks (which are written in English, the third language for most students). There is clearly an urgent need for interventions to ensure that all children in school are being taught in a way that meets their needs and that they are actually learning.

The Balsakhi Program provided tutoring in basic skills

Pratham hired and trained tutors for at-risk children

Pratham (Box 1) launched the Balsakhi Program (Box 2) to provide children who had fallen behind with the basic skills needed to participate fully in the classroom. The program targeted children who had reached Grades 3 and 4 without mastering Grade 1 and 2 competencies; they could not spell simple words, read simple paragraphs, recognize numbers, count up to 20, or do one-digit addition and subtraction. For half of each four-hour school day, children who had been identified by the teacher as lagging behind their peers were pulled out of the regular class in groups of 20 and sent for remedial instruction with a tutor provided by Pratham. The instruction followed a special curriculum tailored to helping these children attain Grade 1 and 2 competencies.

Box 1: Pratham is a large organization dedicated to universal education in India

The Balsakhi Program was one of the first programs implemented by Pratham, a large Indian organization dedicated to improving the quality of elementary education in India. Established in Mumbai in 1994 with support from UNICEF, Pratham has since expanded to urban and rural areas in 13 Indian states and reaches about 200,000 children a year. Pratham programs now include *Read India*, which uses local volunteers to give basic reading instruction to children in the community and helps communities build a supply of books for circulation among children. The purpose of the program is to strengthen children's reading skills and to foster a culture of learning through self-study. *Read India* has reached over 160,000 children since late 2002. Pratham recently established the Pratham Resource Center, formalizing its role as a research and assessment hub for education in India. Through the Center, Pratham undertakes key educational research and assessment tasks for various organizations and state governments. For example, they run a nation-wide reading assessment under the ASER campaign.

Box 2: Balsakhi Program highlights

- Provided tutors who helped marginalized children in urban government schools attain the basic math and reading skills needed to learn effectively.
- Launched in response to evidence that a large proportion of students in Grades 3 and 4 lacked very basic math skills (number recognition, counting up to 20, ordering one-digit numbers, one-digit addition, and subtraction) and reading skills (word recognition and understanding simple sentences).
- Targeted children in Grades 2, 3, and 4 who had not attained Grade 1 and 2 math and reading competencies.
- Tutors were hired from the community to keep costs low and to foster a friendly learning environment.
- Tutors had high turnover rates, so it is unlikely that program success depended on a few good balsakhis.
- Smaller classes allowed more individualized attention.
- Low overhead and capital costs since tutors used whatever space was available.
- Program has been shown to be easily replicable and implementable on a large scale.

Tutors were hired from the community and were paid a small fraction of a teacher's salary

To keep costs low and to foster a non-threatening learning environment, the tutor, called a balsakhi, or "child's friend," was typically a young woman hired from the local community and paid 500-750 rupees (US$10-15 at the official exchange rate), per month. The balsakhis had all completed at least secondary education. They received two weeks of training at the beginning of the school year and ongoing reinforcement during the year.

The program also impacted class size more generally

The Balsakhi Program may have impacted children in three possible ways. First, for those sent to the balsakhi, instruction was tailored to an appropriate level by focusing on basic skills. Second, by dividing the class into two streams, the program reduced class size for half the school day. The effect of smaller classes, if any, should have impacted both streams. Third, a tracking or peer effect may have arisen from placing the 20 weakest pupils with the balsakhi. For half the school day, a pupil in the regular class (the higher-ability group) temporarily had peers at an equal or more advanced learning level.

Evaluating the Balsakhi Program

A randomized rollout

In 2000, Pratham began to expand the Balsakhi Program from Mumbai, where it was first implemented in 1994, to a new city, Vadodara, in the state of Gujarat. At the beginning of the 2000 school year, 123 eligible Vadodara schools were not yet covered. In order to evaluate the impact of the program, Pratham decided to extend coverage to these schools in random order.

Informed by the results of a one-year pilot carried out in 2000 and extensive consultation with local authorities, the researchers adopted a randomization strategy that ensured all participating schools, both treatment and comparison, received program assistance in both years. In 2001 (Year 1), program coverage was extended to almost all Vadodara schools, but half the schools were given a remedial tutor for Grade 3, and the other half were given one for Grade 4. In 2002 (Year 2), the schools were given a tutor for the alternate grade. In determining program impact, Grade 3 pupils at schools that had balsakhis for Grade 3 (treatment group) were compared to Grade 3 pupils at schools that had balsakhis for Grade 4 (comparison group).

Testing in different contexts

In order to assess the extent to which the results from the Vadodara study could be generalized, a similar program was simultaneously implemented in one school district in Mumbai, a city where the program had been running since 1994. In the first year in Mumbai, half the schools were given a balsakhi for Grade 2 and half were given one for Grade 3. In the second year, the schools that had had balsakhis for Grade 2 switched to having balsakhis for Grade 3, and those that had had them for Grade 3 switched to having them for Grade 4.

Measuring success

Since the objective of the program was to improve basic competencies, the outcome measure was basic math and reading capabilities using scores on math and language achievement tests designed by Pratham with the help of education experts. The skills that were measured included basic number recognition, counting, ordering one- and two-digit numbers, and solving basic word problems. Three tests were given: a pre-test at the beginning of the year, a mid-test, and a post-test at the end of the year. Each test was administered by local enumerators hired for the research; neither the children's regular teacher nor the balsakhi was allowed in class during the tests. Because the program might have impacted dropout rates, all children enrolled in classes covered by the research at the beginning of the year, including those who had dropped out, were tracked. Data were also collected on attendance and participation, as well as on the process itself—the characteristics of balsakhis, the allocation of balsakhis to schools, the allocation of children to balsakhis, and the program costs.

Results: intensive remedial instruction improves basic skills at low cost

Initial learning levels were very low

Pre-test scores showed that across cities and grades, children in both the treatment and comparison groups had poor math and reading capabilities at the beginning of the program (Table 1). For example, at the beginning of the second year of the program, only 65 percent of children in Grades 3 and 4 could add single-digit numbers, and only 52 percent could subtract single-digit numbers.

The Balsakhi Program substantially improved test scores

Scores on the post-test showed that in both cities and in both years, the program improved overall test scores (Table 2). The biggest gains were in math, and generally, the greatest gains were in the more difficult competencies.

Program impact was greatest for marginalized children

The program was designed to help those originally falling behind, and the evidence shows that this target group was indeed the group that benefited most from the program. Table 3 shows that the proportion of pupils in the bottom third of program classes passing basic competencies increased by nearly 8 percent. The proportion of pupils in the top third of program classes passing basic competencies, however, increased by only 4 percent. This means that it was the balsakhi curriculum (which tailored lessons to the needs of the marginalized and focused on basic skills) rather than the general reduction in class size that was responsible for the program gains. In discussing the results in more detail, we therefore concentrate on the test scores of the bottom third of the class at the beginning of the year—the group most likely to be assigned to the balsakhi and the target of the program.

Table 4 shows the percentage of children in the bottom third of the classes (both program and non-program classes) who achieved basic competencies at the beginning and end of the second year in both cities. For example, at the beginning of the second year only 5 to 6 percent of children could add two-digit numbers. By the end of the year, however, 51 percent of those who had balsakhis could do so, compared to 39 percent

TABLE 1: Initial learning levels were very low

SUBJECT	COMPETENCY	PROPORTION OF CHILDREN WITH APTITUDE AT START OF YEAR 1	PROPORTION OF CHILDREN WITH APTITUDE AT START OF YEAR 2
Math	Separating into tens and ones	34.6%	34.8%
	Addition of one-digit numbers	68.0%	64.6%
	Addition of two-digit numbers	40.8%	31.6%
	Subtraction of one-digit numbers	59.5%	51.9%
	Division	18.2%	18.8%
Verbal	Reading comprehension	27.1%	24.3%
	Writing a one-word label for a picture	53.7%	-
	Inserting a correctly spelled word	39.5%	-

TABLE 2: Balsakhi Program substantially improved learning levels

SUBJECT	COMPETENCY	TEST SCORE GAINS DUE TO BALSAKHI PROGRAM IN YEAR 1 (PERCENTAGE POINTS)	TEST SCORE GAINS DUE TO BALSAKHI PROGRAM IN YEAR 2 (PERCENTAGE POINTS)
Math	Separating into tens and ones	6.0	7.1
	Addition of one-digit numbers	3.9*	2.6*
	Addition of two-digit numbers	6.6	7.0
	Subtraction of one-digit numbers	6.2	6.2
	Division	5.7	11.1
Verbal	Reading comprehension	1.2*	3.2*
	Writing a one-word label for a picture	4.2*	-
	Inserting a correctly spelled word	4.4	-
		* = Not statistically significant	

of those who did not have balaskhis. In other words, about a third of the more marginalized children had achieved this competency in balsakhi classes. The gain from a balsakhi is also equivalent to more than a third of the improvement in learning seen among marginalized children over the school year. Taking another example, only between 2 and 3 percent of children in the bottom third could do division at the beginning of the year. By the end of the year, 40 percent in balsakhi classes could, relative to 28 percent in non-balsakhi classes. This program gain is also more than a third of all gains made by students in regular classes during the year, and is in addition to these regular gains. Averaging over all competencies, the gain due to the balsakhi is equivalent to about one-fourth of what is learned by the average child during the year, and is in addition to this general gain. Though the absolute number of children acquiring different competencies varies by competency, the pattern of substantial gains holds for most competencies.

When this same analysis is repeated using a regression technique—to adjust for other characteristics of the children—the gains due to the balsakhi are somewhat larger, but the general results are very similar (Banerjee et al., 2005).

Program was highly cost-effective

Compared to other successful educational programs in developing countries, the Balsakhi Program was highly cost-effective. Table 5 shows results from randomized evaluations of other programs that aimed to improve test scores in poor schools in developing countries. For comparability, the test scores have been converted to a common scale, the "standard deviation," which tells us the extent to which the children in the treatment groups progressed relative to children in the comparison groups. For example, an increase of 2 standard deviations would move someone from being an average student to being in the top 5 percent of a class. The Balsakhi Program is the least expensive of all the programs for which this type of rigorous evidence is available, although all of the programs shown here are quite cost-effective. For comparison, we also include the results of a randomized evaluation of Project STAR, a famous class-size-reduction program in the U.S., which is considered to be highly successful (Krueger and Whitmore, 2001; Mosteller, 1995; Pate-Bain et al., 1999). Using 2002 prices and official exchange rates,

TABLE 3: Balsakhi Program benefited target children

PRE-TEST PLACEMENT	SUBJECT	INCREASE IN THE PROPORTION OF CHILDREN PASSING BASIC COMPETENCIES DUE TO THE BALSAKHI PROGRAM
In Bottom Third	Math	9.5%
	Verbal	5.9%
	Overall	7.7%
In Middle Third	Math	8.1%
	Verbal	3.8%
	Overall	6.0%
In Top Third	Math	4.5%
	Verbal	3.5%
	Overall	4.0%

TABLE 4: Learning for bottom third of class in Year 2 for balsakhi and regular class

	PROPORTION OF CHILDREN WITH SPECIFIED COMPETENCY ON PRE-TEST			PROPORTION OF CHILDREN WITH SPECIFIED COMPETENCY ON POST-TEST			INCREASE IN PROPORTION OF CHILDREN WITH COMPETENCY OVER THE COURSE OF THE YEAR			REGRESSION RESULTS
	Balsakhi	No Balsakhi	Difference (% points)	Balsakhi	No Balsakhi	Difference (% points)	Balsakhi	No Balsakhi	Difference (% points)	Impact of Balsakhi
One-digit subtraction	20%	18.7%	1.2	61.3%	50.8%	10.5	41.3	32.0	9.3	11.1
Two-digit addition	5.7%	5.0%	0.7	51.4%	38.6%	12.8	45.7	33.5	12.1	14.6
Two-digit subtraction	2.1%	2.2%	0.0	36.6%	27.5%	9.1	34.5	25.4	9.1	11.0
Multiplication	11.7%	11.3%	0.4	54.9%	46.6%	8.3	43.2	35.3	7.9	9.5
Word problems	1.2%	0.7%	0.6	25.2%	16.4%	8.8	24.0	15.7	8.2	9.9
Three-digit addition	2.0%	1.8%	0.2	29.1%	19.1%	10.0	27.1	17.4	9.8	11.7
Division	2.7%	2.1%	0.6	40.3%	28.4%	11.9	37.6	26.3	11.3	13.6
Spelling	41.7%	41.7%	0.0	74.9%	72.0%	2.9	33.2	30.3	2.9	3.5
Reading comprehension	6.5%	5.2%	1.3	28.2%	24.8%	3.4	21.7	19.6	2.1	2.6

TABLE 5: Hiring tutors from the community is highly cost-effective

PROGRAM	SERVICE PROVIDED; LOCATION; YEAR	COST (USD per child per year)	COST (2002 PPP exchange rate per child per year)	TEST SCORE INCREASE (standard deviation)
Balsakhi	Remedial education tutoring; urban India; 2001-2002	2.25	12.2	0.27
Pratham CAL[1]	Computer-aided learning; urban India; 2001-2003	3.53	19.1	0.54
Scholarships for Girls[2]	Provided merit scholarships for secondary school to girls in upper primary school; rural Kenya; 2001-2002	3.41	8.8	0.17
Teacher Incentives[3]	Auxiliary teacher performance rewards for teachers; rural Kenya; 1997-1999	3.53	10.1	0.10
External Monitoring[4]	Reduced teacher absence; rural India; 2003-2004	3.58	18.8	0.17
Tennessee's Project STAR[5]	Reduced class size and provided teachers' aides; USA; 1985-1989	370.00[6]	370.0	0.21

[1]Banerjee et al. (2005)
[2]Kremer et al. (2004)
[3]Glewwe et al. (2002)
[4]Duflo and Hanna (2005)
[5]See Mosteller (1995), Krueger and Whitmore (2001), and Pate-Bain et al. (1999) for more on PROJECT STAR impact.
[6]According to HEROS, Inc., an NGO founded by Helen Pate-Bain (the principal investigator), the Tennessee legislature appropriated US$12 million for the study, and of that, $9,679,879 was used for teacher and teacher aide salaries (http://www.heros-inc.org/new-fact.pdf). Moesteller (1995), the Tennessee Department of Education, Krueger and Whitmore (2001), and Pate-Bain et al. (1999) give numbers of children participating over four years that range from 6,000 to 6,500. Using these numbers, the cost per child per year is between US$370 and US$400.

the U.S. program is over 240 times more expensive than the Balsakhi Program for similar results. Even adjusting for the different cost of living in the U.S., the Balsakhi Program remains over 40 times more cost-effective than Project STAR for similar gains.[1]

[1]According to the 2005 *World Development Indicators*, the 2002 official exchange rate (INR/USD) was 48.61, and the Purchasing Power Parity conversion factor was 8.8 (The World Bank Group, 2005).

POLICY LESSON:
General school-quality improvements must be complemented by specific strategies to improve the performance of marginalized children

Marginalized and weaker students too often get lost in the current school systems in developing countries. Previous studies, discussed above, have shown that curricula are often inappropriate to the needs of the poorest students. This leaves them less able to benefit from general improvements in the quality of education than students with better preparation.

Giving the weakest pupils intensive training in the basic skills they need to keep up with regular classes can help them get back on track. In urban India, hiring remedial tutors from the community appears to be a remarkably cost-effective way of delivering this result (although the availability of suitable tutors may vary in different settings). Children who worked with the balsakhi improved their achievement test scores by 0.27 standard deviations in the second year (Table 5). In the second year, for example, 8 to 13 percent more children could do simple word problems, multiplication, division, one- and two-digit subtraction, and two- and three-digit addition (Table 4). On average, about a quarter more children passed a range of competency tests in balsakhi classes compared to non-balsakhi classes (i.e. if 10 percent of pupils passed in non-balsakhi classes, then 12.5 percent passed in balsakhi classes). Across a wide range of competencies, the extra improvement from having a balsakhi was equivalent to about a quarter of the improvement experienced by non-balsakhi children in regular classes during a year (while the cost of the balsakhi was a tiny fraction of the total cost of an additional year of regular schooling). The program continued for an extended period of time and produced similar results in two very different contexts: it had low costs, and as Pratham demonstrated, it could be implemented on a large scale. Considered together, these factors and the above results support a recommendation to scale up the Balsakhi Program in India and to investigate similar approaches in other countries.

In addition to expanding the Balsakhi Program, Pratham has used the same methodology—training people from the local community to provide intensive help to children falling behind—to implement a new intensive literacy program, *Read India*, in rural areas. They are also training parateachers in the same methodology in states such as Bihar. Scaling up and replicating remedial and basic education programs in this way could help give every child the opportunity to acquire the basic skills he or she needs to learn in school. If the most disadvantaged children are to harness the potential of education to overcome poverty, education systems must focus on their needs and provide them with the skills to succeed.

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