

The Spectacular Role of Libraries in Protecting Students from the Effects of Poverty
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Poverty is by far the most powerful predictor we have of school performance. This has been established in study after study over several decades. One of the best studies showing the impact of poverty comes from Australia: Perry and McConnery (2010) reported that both individual levels of poverty (socio-economic status, or SES) and the poverty level of the school have strong effects on performance, and the combination of the two is overwhelming. Table one presents the impact of both of these factors on performance on the PISA 2003 test of reading comprehension given to 15 year olds (math and science tests show a similar pattern). Note that students living in the worst poverty score 70 to 90 points lower than the most privileged students, and students attending low SES schools score about 50 to 60 points lower than those in wealthier schools. But low SES students in low SES schools score nearly 150 points lower than high SES students in high SES schools.

Table One: Influence of individual levels of socio-economic status and the socio-economic status of the school

| | SCHOOL SES | | | | |
|--------------------------|--------------------------|-----------------|-----------------|-----------------|-----------------|
| INDIVIDUAL SES | 1 st (lowest) | 2 nd | 3 rd | 4 th | 5 th |
| 1 st (lowest) | 459 (n=984) | 466 (n=690) | 472 (n=490) | 503 (n=231) | 516 (n=88) |
| 2 nd | 486 (n=591) | 496 (n=681) | 503 (n=596) | 531 (n=425) | 544 (n=195) |
| 3 rd | 498 (n=416) | 504 (n=492) | 515 (n=639) | 542 (n=568) | 561(n=348) |
| 4 th | 520 (n=213) | 525(n=377) | 530 (n=516) | 557 (n=682) | 577 (n=693) |
| 5 th | 548 (n=99) | 543 (n=199) | 549 (n=362) | 576 (n=602) | 602 (n=1212) |

SES = social economic status, based on parental occupational status, parental education, economic and cultural resources in the home.

The average PISA score is 500, standard deviation = 100.

From: Perry and McConnery (2010)

SES includes a number of factors that influence school performance. On the individual level, students living in poverty have inferior diets and health care (Coles, 2008/2009; Berliner, 2009; Rothstein, 2010) and low SES schools lack the facilities high SES schools do, and tend to have fewer qualified teachers. Both individual students and schools from low SES backgrounds, however, suffer from a lack of access to books. Students from low SES families have fewer books in the home and live in neighborhoods with inferior public libraries and fewer bookstores, and SES schools have inferior classroom and school libraries (Krashen, 2004).

The one source of books that can be easily improved is the school library. In recent years two studies have confirmed that investing in the school library can not only make a difference, it can actually offset the impact of poverty on reading achievement.

The California Study

Achterman's analysis (Achterman 2008) is based on scores on the California Standards Tests given in 2006-2007 provided by the State of California, the California Department of Education Library Survey, and other data provided by California schools. Achterman used three predictors of academic achievement: (1) "library quality," a combination of hours the school library is open, collection size, budget, total staff hours, total services, and total technology, (2) a "community factor," a combination of parent education, the percentage of students eligible free and reduced lunch, student ethnicity, and the percentage of English learners, and (3) a "school factor," the average teacher salary, which correlated with the percentage of teachers who hold teaching credentials.

Table two presents the results of a multiple regression analysis, a very useful statistical procedure that allows researchers to examine the impact of individual predictors holding other predictors constant. For example, it is likely that community factors and library factors are related: Schools in wealthier communities might spend more on libraries, especially in the US where local taxes are used to pay for schools. Multiple regression allows us to pretend that this isn't so, that each factor is independent of the others.

The numbers in table two are "betas." A larger beta means a greater impact, and betas from different predictors can be compared with each other. Table two tells us that for high school students in California, the impact of "community" was strong on tests of both language arts and history (beta = -.51 for language arts), consistent with the results of studies that show the impact of poverty on school achievement. The impact of school was positive but weak. Of great interest to us is the finding that the effect of school library quality was strong on both tests and nearly as strong as the effect of community, or poverty. This suggests that a strong school library can make up for the effect of poverty in several aspects of school achievement.

Table 2: Multiple regression analysis: Impact of community, school, and library quality on achievement, grade 11

| | Language Arts | US History |
|-----------|---------------|------------|
| Community | -0.51 | -0.47 |
| School | 0.14 | 0.16 |
| Library | 0.46 | 0.48 |

$r^2 = .57$ (Language Arts), $r^2 = .58$ (US History)

From: Achterman (2008)

Table two indicates that $r^2 = .57$ for Language Arts and $.46$ for History. This means that if we know the poverty level of a school (the community factor), the quality of the teaching staff (as reflected by salaries or credentialing), and the quality of the school

library, we have 57% of the information we need to predict Language Arts test scores for 11th graders at that school.

Confirming the effect of the library, Achterman reported clearly positive correlations between the size of the collection and test scores (for English language arts, $r = .44$) and between the number of hours the library was open and test scores (for English language arts, $r = .52$).

It must be noted that Achterman did not find similar results for grades 4 and 8: The effect of the library was much weaker than in grade 11. The weaker correlations found for younger students could be due to the lack of library services in lower grades in California, which results in limited variability and therefore lower correlations.

Achterman noted that only 1.2% of California elementary schools have a full-time clerk and full-time librarian. This improves to 8.5% at the middle school and 30.3% at the high school level.

The PIRLS Study

The PIRLS organization (Progress in International Reading Literacy Study) administers a reading test to fourth graders in many countries every few years. Students are tested in the language of the country, and all tests are of equal difficulty. We (Krashen, Lee and McQuillan, 2012) analyzed the 2006 PIRLS results for 40 countries.

Our analysis included countries for which complete data was available for all factors. Most countries tested about 4000 students from about 150 schools.

Table 3 presents one of our analyses, which examined the impact of factors considered to be related to reading achievement. As in Achterman's study, we used multiple regression, which allowed us to determine the impact of each predictor uninfluenced by the other predictors.

Table 3: Multiple Regression Analysis: predictors of achievement on the PIRLS reading test

| | Reading |
|---------------------|---------|
| SES | -.42 |
| Independent Reading | .19 |
| Library | .34 |
| Instruction | -.19 |

$r^2 = .63$

From: Krashen, Lee and McQuillan, 2012

According to table 3, the strongest predictor of reading achievement among ten-year olds is SES, socio-economic class, defined here as a combination of education, life expectancy and wealth in each country. In agreement with many other studies, we found that lower SES meant lower performance.

“Independent reading” in table 3 stands for the percentage of students in each country who participated in independent reading programs in school: Students in countries that provided time for independent reading in school every day or almost every day tended to do better in reading (beta = .19). This result fell just short of the usual standard for statistical significance, but the positive relationship between independent reading and reading proficiency is consistent with the results of in-school self-selected reading programs (Krashen, 2004).

“Library,” in table 3, means the percentage of school libraries in each country with over 500 books. This was a strong predictor of reading achievement. As was the case in Achterman’s study, the library predictor was nearly as strong as social class (similar to Achterman’s community factor).

The final predictor in table 5, instruction, means the average hours per week devoted to reading instruction in each country. According to our analysis, the effect of instruction was modest and negative, that is, more instruction tended to be related to lower performance on the reading test (beta = -.19). This predictor fell just short of statistical significance. It may be the case that a little reading instruction is beneficial, but after a point it is ineffective and counterproductive.

Table 5 indicates that $r^2 = .63$: The four variables considered here account for 63% of the variability in reading test scores. In other words, if we know the SES level of a country, the percentage of children who do independent reading in school, the percentage of children who have access to a library of 500 books or more, and the amount of instruction, this is 63% of the information we need to predict their reading score. This r^2 is quite high, and is similar to the r^2 reported by Achterman.

Both Achterman’s and our results are consistent with the results of other studies showing that access to books from other sources can make up for the effect of poverty (Evans, Kelley, Sikora, and Treiman, 2010; Schubert and Becker, 2010).

Conclusion

A plausible explanation for the results of these studies and others is:

Access > FVR > Literacy

There is very strong evidence supporting this formula: More access to books has been shown to lead to more self-selected reading and more self-selected reading leads to higher levels of literacy (Krashen, 2004). There is also substantial research connecting the ends of the formula: Better libraries are related to higher levels of literacy (Krashen, 2004; see especially studies by Keith Curry Lance and others at <http://www.lrs.org/impact.php>).

Those living in poverty have little access to books, which explains their low levels of literacy development. I suspect that this relationship will continue until ereaders and ebooks are far less expensive and far more available than they are now. The library can supply this access immediately.

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