Accumulation and Attrition:
How Schools and Student Background Influence Learning Opportunities*

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Abstract

This study investigated variation in students' learning opportunities in 110 high poverty elementary schools participating in the Study of Instructional Improvement (SII). We examined how school participation in one of three Comprehensive School Reform (CSR) models can influence students' access to literacy instruction in the upper elementary grades (3-5). Additionally, we examined the extent to which student and student body demographics were linked with students' accumulated opportunities to learn. Although students of lower SES (across all schools) accumulate fewer learning opportunities, the findings demonstrate the *potential* of highly-specified CSR programs to overcome these deficits. However, student mobility may severely constrain the extent to which these differences in accumulated instruction are realized for students. This may limit the extent to which student learning gains are realized via educational reform despite teachers' fidelity to program designs.

Since the Coleman Report, the gap in standardized achievement test scores by race and class in the United States has often been the focus of educational research. This scholarship has demonstrated that these achievement gaps not only exist, but have remained remarkably consistent over the past several decades (c.f. National Center for Education Statistics [NCES], 2003). Recently these test-score gaps have also been a direct target of policy. For example, one of the key goals of the No Child Left Behind Act (NCLB) of 2001 is to reduce these disparities by holding schools accountable for improving the achievement of subgroups of students in addition to the outcomes of the entire student population. However, approximately fifteen years after the introduction of early standards-based reform initiatives in a small number of states, and several years into NCLB (which is a later prototype of these models), the available empirical record on the implications of the reforms for poor and minority youth remains mixed (Carnoy and Loeb, 2002; Center for Education Policy, 2005; McNeil, 2000; Skrla, Scheurich, and Johnson, 2000). At a minimum, it appears that NCLB will not easily or alone eliminate social stratification.

Much scholarship has attempted to understand why these achievement gaps exist and appear to be so enduring. One reason offered for these differences in achievement is simply that they are due to differences in children's homes. In other words, students from poorer socio-economic backgrounds may arrive at the schoolhouse door with less background knowledge and smaller vocabularies (Lee and Burkam, 2002). That is, they may arrive with fewer of the resources necessary for building further knowledge necessary to achieve on standardized tests.

Others have suggested that the achievement gaps are due in large part to the fact that some groups of students are treated inequitably by the education system (Rist, 1970; Anyon, 1981; Oakes, 1992; Gamoran, Porter Smithson and White, 1997; Apple, 1991). For example, some researchers have examined how curriculum differentiation due to tracking influences students' opportunities to learn and achievement in high school (see. e.g., Gamoran, Porter, Smithson and White, 1997; Raudenbush, Rowan and Cheong, 1993), while others have examined how curriculum differentiation begins even in the earliest grade-levels (see, e.g., Rist, 1970; Anyon, 1981). Thus, some students receive fewer opportunities to learn the prescribed curriculum *in addition to* any other disadvantages they arrive at the classroom door with. Education theorists have come to label this "cultural" or "social" reproduction since it contradicts the myth of social mobility commonly thought to exist in America.

Still others have proposed that variation in students' opportunities to learn may be due to teachers' idiosyncratic decisions about what to teach. Some researchers, therefore, have examined the teacher's role in making curricular decisions in the classroom (Schwille et al., 1983). The prevailing theory is that teachers are essentially street-level bureaucrats (Lipsky, 1980) and make front-line decisions about what aspects of prescribed policy and curriculum to implement in their own classroom. Thus, teachers' decisions are driven by personal interpretation and belief as well as information obtained from various sources of instructional guidance, including state, district and school guidelines. This room for discretion may leave room for teachers to adjust their instruction in educationally responsible ways for the benefit of their students' learning,

but it may also leave room for teachers to distribute learning opportunities in inequitable ways (Lipsky, 1980).

This scholarship, together with institutional theorists' observation that the core function of schools – instruction – is seldom the focus of evaluation or intervention (e.g., Meyer and Rowan, 1978), has led to a wave of educational reforms attempting to influence instructional practice in schools. While many of these efforts have failed, planned change efforts that have provided adequate supports for teacher learning have provided insight into how interventions can be successful in enhancing teacher practice (Crandall et al., 1983; Peterson and Emerick, 1983; Correnti and Rowan, 2006).

While some attention has been devoted to teacher practice and the learning opportunities teachers provide to students, few empirical studies have examined *how students accumulate learning opportunities over time*. Through this type of research, we may begin to better understand the differentiated curriculum and the myriad factors influencing students' opportunities to learn. In this paper we make an initial attempt at such an empirical study. We examine the accumulation of literacy practices in comprehension and writing for students as they progress through grades 3 through 5. We use student background characteristics (e.g., measured ability, race, gender and SES) and institutional variables (e.g., grade level, day of the week, etc.) to account for differences in instruction between students. We also examine the extent to which planned change efforts via comprehensive school reforms (CSR) may be able to influence the accumulation of student learning opportunities in ways that may compensate for any disadvantages found for poor and minority students.

Theoretical Framework

The quantitative study of instructional practice in schools suffers from a curious paradox – while it is necessary for understanding the mechanisms through which curriculum differentiation may have effects on differences in student learning, it is also vulnerable to criticism for its oversimplification of practice (Gamoran, 1989). Despite the limitations associated with measuring instructional practice quantitatively, large-scale studies of teacher practice are important for advancing empirical support for theories of curriculum differentiation in schools. Thus, while qualitative studies strongly suggest that different groups of students are afforded different learning opportunities in some settings, there is a continued need to understand if those differences exist at scale, the magnitude of such differences and, simultaneously, to be able to describe the differences to policymakers, administrators and other interested parties.

Theorists have a long tradition of arguing for the centrality of education in the production and re-production of culture and class structure. From this perspective, educational opportunities both determine class position and are, simultaneously, determined by class struggles (Bourdieu and Passeron, 1977/1990; Bourdieu and Wacquant, 1992; Carnoy, 1982). Thus, Apple (1982) argues that the curriculum occurring in schools cannot be understood without also understanding the complexity of how schools contribute to or diminish inequality among classes, and how schools are determined by ideological, economic and social forces outside the schools. Therefore, our current modes of analysis are necessarily limited and could not possibly capture the true complexity of how cultural reproduction operates.[1]

[1] Apple also notes that education does not stand alone in reproducing class structure since it is only one among many aspects of culture, some of which are found outside the school. Furthermore, the

While it is taken for granted that schools are in some way responsible for some of the economic and cultural reproduction in America (Apple, 1982), it is also difficult to imagine the evidence necessary to prove this empirically. Some researchers may contribute to this line of work by examining the role schools and academic credentials play in determining economic outcomes (c.f. Autor, Katz, and Kearney, 2005; Finn, 2006); others may examine the role of schools in reproducing student beliefs about class structure and/or their own ability (c.f. Oakes et al., 1997). Both types of research, however, are likely to be conducted in isolation from the other. Furthermore, much of this work treats schooling as a "black box" by failing to understand how the economic or class reproduction outcomes are formed by the *process* of schooling. Thus, despite the limitations associated with quantifying instructional practice, it is important to begin to seriously entertain such studies to better understand not only how education might contribute to class formation, but how the education system can be used to combat such reproduction.

As previously stated, there are limitations to the quantitative study of instructional practice. In the past, Gamoran (1989) has discussed some of the limitations of studying social stratification systems in schools. In particular he points to three main problems. The first is selection bias—in order to understand the unique contribution of tracking it is necessary to distinguish between the effects of variables that determine track placement from the "treatment" students receive when placed into a track. Second, tracking

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study of the contribution of education to reproduction has concerned itself at times with the economic and political consequences, and at other times, with more imperialistic and ideological consequences. A serious analysis of education's role in reproducing culture, therefore, would take into account not only how education contributes to class formation, but also how it produces a stratified labor force. All the while, such research would also need to take into account power relationships as well as political struggles and the role of the state in contributing to reproduction through legitimization or by limiting counter-hegemonic forces (Apple, 1982).

practices vary greatly between schools (see, e.g., Garet and Delany (1988) for empirical validation of this idea). Therefore, placement practices as well as how students are treated within tracks is not uniform and does not readily lend itself to large-scale study. Third, it is important to understand the mechanism through which social stratification has its effects – namely differential instruction. Here the main questions concern: 1) what aspects of instruction relate to achievement and should be studied? 2) how should those aspects of instruction be quantified?

Previous studies of social stratification systems suggest there are at least two important aspects of instruction to be studied. One is simply the amount of academic content provided to students. Thus, examining students' opportunities to learn (OTL) and the variability in students' OTL provides compelling evidence that (large) differences exist in how schools "treat" students with respect to curriculum offerings. Moreover, these offerings differ largely in the pace at which instruction unfolds – with higher ability students being exposed to more content over time. Studies have shown, therefore, that low track students, who are more likely to be poor and minority students than their peers in higher tracks, have fewer opportunities to learn the content tested on international tests (McKnight et al., 1987) and have less access to advanced course offerings in mathematics in junior high school and high school (Oakes, 1990; Oakes, 1992). Other studies have shown that the mathematics instruction offered to different tracks of students accounts for differences in student learning rates over the instructional time period (Gamoran, Porter, Smithson and White, 1997).

While much of the literature on tracking has concentrated on junior and senior high school, where students are tracked formally, other researchers have been concerned

that tracking begins very early in elementary school (Oakes, Gamoran and Page, 1992). Indeed, empirical studies show wide variability in the amount of time spent teaching mathematics and literacy content in elementary schools. In the case of mathematics, fourth and fifth grade teachers spent anywhere from 6,000 to 9,000 minutes instructing in mathematics (Porter et al, 1986). In literacy, first grade reading teachers spent on average 80 minutes per day; teachers one standard deviation below the mean spent about 60 minutes daily, while teachers one standard deviation above the mean spent 100 minutes daily (Cooley and Leinhardt, 1980). In other words, 68% of the teachers were contained in the range from 11,400 minutes to 18,600 minutes across a full 180-day school year—the rest of the teachers fall outside that already broad range.

Similar variability is observed in studies examining differences among teachers in the pacing of academic content. Thus, Barr (1974) used the number of new words introduced to first graders as a measure of pace, though she notes that teachers had difficulty articulating reasons for their pacing decisions. Similarly, Good, Grouws and Beckerman (1978) examined pacing in fourth grade mathematics, noting that a set of teachers successful in raising student test scores, on average, covered about 90 pages of the mathematics textbook, while a group of less successful comparison teachers managed to cover only about 56 pages of the same textbook.

While these studies reveal a consistent trend in the variability of instructional practices, they also cover a limited range of grade levels and topic areas. Additionally, inherent in the assumption that instructional time is important is the notion that all such instruction is (equally) effective and that student learning rates are constant. Thus, while these studies reveal important differences and describe a great deal of variation, they also

oversimplify instructional practice, sample a limited range of instruction system-wide, and take for granted the assumption that instructional quality is also likely to differ across classrooms.

This suggests a second critical dimension of instructional practice is the complexity of the instructional material with which students and teachers work. Here, the concern is that students from different social class backgrounds are exposed to different types of instruction and knowledge in school; while some students may be groomed for higher education and professions such as law or medicine, other students may be given just enough knowledge to prepare them for blue-collar industrial labor. If this is indeed the case, then schools may be understood to act as a sorting mechanism. In fact, case studies of schools do reveal important differences between teachers and schools that could lead to cultural reproduction. These studies reveal important, but more subtle differences in how students are treated both within and across schools.

For example, Anyon (1981) examined five elementary schools located in neighborhoods representing different social classes. From observations and interviews of 2nd and 5th grade teachers and students, Anyon describes differences in student perceptions among the different schools in her sample about what knowledge is. She found, for instance, that there was a good deal of curriculum overlap in the schools she observed. However, she also found the schools reproduced the social order by contributing to large differences among children of different class backgrounds in terms of (a) how knowledge was viewed and (b) whether or not class conflict was taught. For example, some aspects of the working class and middle class schools led to cultural reproduction because knowledge was viewed as consisting of facts rather than as usable,

created or even contested, and because students were not taught about their own class history. Indeed, students in the working and middle class schools were not even made aware that a class struggle has persisted throughout modern societies. This is placed in contrast to students in the "affluent professional" and "executive elite" schools, who were explicitly taught about class differences and given access to a more constructivist view of knowledge and knowledge creation.

Rist (1970) provides different evidence of cultural reproduction *within* highly disadvantaged schools. He examined students as they progressed from Kindergarten through 2nd grade and studied the placement of students into learning groups within classrooms. He also focused on what those placements meant for subsequent teacher expectations and the ways in which students were treated. He found that students were provided differential treatment in kindergarten because of teacher judgments based, perhaps, on student appearance, background and characteristics of the parents. This treatment led to self-fulfilling prophecies whereby students achieved to the level they were expected and came to accept their hierarchy within the classroom. Moreover, differences in kindergarten treatment extended to treatment in subsequent years by both the first and second grade teachers. In this school there was very limited mobility between groups of students, and despite the fact that the entire school consisted of highly disadvantaged students, Rist found very few children were viewed by their teachers as having the opportunity to transcend their current social class placement.

These studies reveal important differences between schools and also between students within schools. Yet, while useful, these studies do not generalize beyond their local contexts. While we may believe that many teachers and schools have similar

instructional practices, we must be cautious in applying these assumptions broadly. For example, Rowan and Miracle (1983) examined two types of ability grouping in elementary classrooms—grouping between and within classrooms. They found that when students were grouped by ability into homogeneous classrooms, this practice was akin to tracking in high schools and higher ability students were exposed to more learning opportunities. However, when ability grouping existed within heterogeneous classrooms, higher ability students still scored higher on end of year achievement tests, but students in the lower ability groups benefited from a greater number of teacher-student interactions and also a faster paced curriculum. Thus, one reasonable conclusion is that teachers were actively working to reduce achievement gaps by ability in these heterogeneous classrooms.

To understand how curriculum differentiation contributes to differences in achievement, it is important to understand the causal pathway from grouping to instruction to achievement (Gamoran, 1989). In laying out a research agenda, Gamoran (1989) has recognized the need for both qualitative studies and quantitative studies in order to measure the *instruction* occurring in schools. This study attempts to build on this research agenda by examining content coverage in literacy instruction. While quantitative studies are limited in the aspects of instruction they can measure, they are necessary for understanding to what extent theories of cultural reproduction are supported on a large-scale and also the relative influence of student and school characteristics on such curriculum differentiation.

Summary and Research Questions

Given that few empirical studies have investigated the accumulation of learning opportunities for students longitudinally across years, our intention in this study is to understand the extent to which student background characteristics and other aspects of schooling explain variation in the accumulation of literacy instruction. Thus, we examined whether three categories of variables were indeed linked with students' access to literacy instruction during their upper elementary years.

First, we examined whether or not student characteristics (such as gender, race, socio-economic status and prior ability) as well as aggregate characteristics of the student body (such as percent of households in the community living in poverty and the percent of mobile students in the school) influenced the accumulation of literacy instruction. We use these student characteristics as proxies for understanding the extent to which cultural reproduction appears to operate through students' access to literacy content on a large-scale in our study. However, it is important to note that because the study focused on CSR programs serving highly disadvantaged schools, the full range of public schools and their students are not present in this sample. It is quite possible that if our sample were a nationally representative one, these student and student body characteristics might be more strongly related to students' access to literacy content. Nonetheless, despite the focus on highly disadvantaged schools, within our sample there remained significant variability between students and schools in the degree they could be considered disadvantaged.

Second, we investigated whether some institutional aspects of schooling contributed to the accumulation of instruction. Given that we are inclined to believe that

institutional theory offers a viable explanation for why instruction largely remains unregulated in schools, we also thought it was likely that informal norms would be influential in teachers' decision-making about instructional content and activities. Therefore, we hypothesized that teachers might be influenced by informal routines dictated by personal preference and perceptions of the expectations for their role in the school. We further hypothesized that these effects would be relatively small since they are carried out through informal means, subject to personal interpretation, and, therefore, likely to vary greatly between teachers and schools. In order to test this hypothesis, we examined whether institutional variables such as day of the week and the grade level of the student influences instructional accumulation.

The fact that instruction is seldom the focus of evaluation efforts in schools has also led to a number of efforts at planned change. While many of those efforts over the past forty years have failed, others have shown that when appropriate supports for teacher learning are present, instructional reform is possible (Loucks et al., 1982; Meyer, Gersten and Gutkin, 1983; Peterson and Emerick, 1983; Correnti and Rowan, 2006). Thus, the third focus of our analysis explores (a) whether planned change efforts in the form of CSRs influenced student accumulation of instructional opportunities, and (b) the likelihood that such efforts could offset any differences between student groups in their accumulated instruction. Thus, we wondered whether interventionist strategies could lead to non-reproductive forces in schools.

We examined, therefore, whether strategies for instructional improvement could potentially lead to the amelioration of achievement gaps by helping students accumulate greater instructional opportunities. However, in order for instruction to influence student

achievement in that manner, a number of conditions need to be satisfied. First, the instructional opportunities being accumulated must be more effective than the alternative instruction being replaced. Second, the instructional regime implemented through reform must be aligned to the assessments measuring student achievement. Third, students must have prolonged exposure to the instructional regime implemented in schools. Thus, students with greater exposure to the treatment over time are more likely to have their achievement influenced as a result of reform efforts. Though we are unable to comment on the first two conditions in this study, we do comment on the latter issue – the extent to which learning opportunities fail to be accumulated because of student mobility.

To better understand the relative influences of these three different kinds of variables—student and student body characteristics, institutional characteristics, and a school's participation in a planned change effort in the form of a CSR—we examined multiple outcomes in literacy instruction. We investigated (a) the frequency instruction occurred in reading comprehension and writing but also (b) specific aspects of comprehension and writing instruction ranging from garden variety instruction to more highly cognitively demanding content and activities in literacy instruction. High cognitive demand activities were indexed by the frequency of their occurrence, but were validated theoretically.

Given our theoretical framework, we derived a formal hypothesis about how cultural reproduction variables would interact with the range of instructional outcomes represented in this study. In particular, we hypothesized that cultural reproduction would be most prominent for high cognitive demand items – which is not to say cultural

reproduction would not exist for low cognitive demand items, but rather that differences between groups of students would be largest for the most difficult content and activities.

Data and Method

Data

To examine which student and school characteristics are linked to students' exposure to literacy instruction, we use data from the Study of Instructional Improvement (SII). SII is a large-scale quasi-experimental study of the design, implementation and effectiveness of three of America's most widely disseminated CSR programs—the Accelerated Schools Project (ASP), America's Choice (AC) and Success For All (SFA). Because of their interest in efforts to improve instruction in high poverty schools, SII researchers purposefully selected a sample of schools located in disadvantaged communities. Beginning with 53 elementary schools in AY 1999-2000 and adding 66 more elementary schools the following year, SII followed two cohorts of students in each school as they passed from grades K-2 and grades 3-5. Eight students were sampled per classroom beginning in Kindergarten[2] and grade 3, and those 8 students continued through the remainder of the study.[3] The data for SII were collected by the University of Michigan's Institute for Social Research (ISR).

In addition to collecting data on school and teacher level characteristics, three types of data relevant for our study were collected about cohort students as they progressed through the study: (a) ISR researchers collected demographic data for these sample students and their families; (b) they also measured their literacy achievement in

[2] Although students were randomly selected in Kindergarten, teachers were not asked to begin filling out daily logs for these students until they were in the 1st grade.
[3] Since student mobility was high in the study, student samples were "refreshed" annually by replacing students who left the school with a random sample of new students moving into the school.

the fall and spring of each school year using the *Terra Nova* Reading/Language Arts assessment published by CTB MCGraw Hill (with the exception of Kindergarten), and (c) SII researchers also collected information on the literacy instruction sample students received during their years in the study. These data were collected using a daily reading/language arts log that was administered to all teachers of cohort students during three logging periods evenly spaced across the school year (see www.sii.soe.umich.edu for a copy of the log).

The log is a survey instrument containing roughly 100 items that was used to document the literacy instruction offered to a single student on a given day during the logging periods. The opening section of the log asked teachers to report on the amount of time spent by the focal student on reading/language arts instruction on the reporting day, as well as the amount of emphasis given in the focal students' instruction to each of the following topics: word analysis, concepts of print, oral or reading comprehension, vocabulary, writing, grammar, spelling, and research strategies. Then, if teachers checked that word analysis, comprehension, or writing was an emphasis for a student on a given day, teachers completed additional items about the specific content that was taught in any of these focal domains, the methods used to teach that content, and the tasks and materials the focal student used that day. On average, teachers contributed about 45 logs per year. Individual students in our upper grades analyses have, on average, about 12 logs specifically indexing the instruction they received from the teacher[4].

[4] Students varied greatly in the number of logs teachers filled out for them. Within any given year teachers filled out between 1 and 10 logs per target student. Since some students left the sample after one year while other students were present in the sample all three years, the number of logs per student ranges from 1 to 30, with a mean slightly more than 12 and a standard deviation of 7.

In this study, we used detailed information on instruction in 110 logging schools to predict the probability that particular instructional opportunities in literacy were provided for 3,635 upper elementary students (grades 3-5) in CSR and comparison schools on a given occasion. We used 44,439 upper-grade logs to investigate which student and school characteristics appear to be most strongly associated with a student's probability of receiving specific types of literacy instruction in any given lesson during their upper elementary years.[5]

Handling of Missing Data

All of the analyses in this study accounted for the nested nature of the data by using hierarchical linear models (HLM). Rather than use listwise deletion of students with missing data, we used the SAS multiple imputation (MI) procedure to impute missing values for student-level variables in the data set. Peugh and Enders (2004) advocate for this approach to missing data since listwise deletion is only robust when one assumes data are missing completely at random (MCAR). The MI procedure used in this study, however, only assumes that data are missing at random (MAR). The MI procedure also assumes that data are multivariate normal but Peugh and Enders (2004) report that MI is often robust to failures of this latter assumption. In the MI procedure conducted here, more than 150 variables were used in the imputation phase. The wealth of available data increases the robustness of inferences to violations of the MAR assumption. The MI procedure creates several different data sets (in our case, five) each of which contain different plausible values of the missing data given the observed values on all variables and the underlying covariance matrix (for further discussion see Peugh and Enders,

[5] These probabilities are based on days when instruction could have occurred—including days when the teacher or student may have been absent.

2004). In the statistical analyses, effects of the independent variables were estimated using the statistical software package HLM 6.22 (Raudenbush, Bryk and Congdon, 2004) which automatically calculated the average estimates across the multiple data sets. In addition, the HLM program also calculated standard errors that accounted for the variance in parameter estimates within data sets and the variance in the parameter estimates between data sets.

Independent Variables

To determine what factors influence students' exposure to literacy instruction over time we included a variety of predictors at the school, student and lesson levels of our models. At the school level we examined instructional differences among CSR and comparison schools. In addition, we investigated whether literacy instruction differed in schools with higher average achievement, students from families with greater household poverty, and higher levels of student mobility. We also investigated whether student characteristics— including their racial/ethnic group, gender, socio-economic status, and prior achievement—had any bearing on their instructional opportunities. Finally, our models adjust for the grade level in which the lesson was offered and whether or not instruction was taking place on a Friday or holiday when, we hypothesized, instructional opportunities might differ from the norm. (See Table 1 for more detailed descriptions of these independent variables, and see Table 2 for descriptive statistics on each of the independent variables).

Insert Tables 1 and 2 About Here

Outcomes

In particular, we focused on which of these school, student and lesson characteristics influenced the *reading comprehension* and *writing* instruction to which students had access during their upper elementary years. We also looked within the broad categories and examined what variables were related to more or less cognitively demanding types of reading comprehension and writing instruction. For example, in the case of reading comprehension, we examined students' access to what we assume to be "basic" upper elementary grades literacy instruction. As previously noted, the cognitive demand of the items was indexed by the frequency they were taught, but were also validated theoretically. This included lessons with a focus on providing brief answers; literal comprehension; story structure; students' discussion of the text; teacher directed instruction, and pre-reading strategies. Furthermore, we analyzed what lesson, student and school characteristics seemed to predict access to what we imagined was more ambitious literacy instruction in grades 3-5, including the analysis and evaluation of text; providing extended answers; and the integration of writing in comprehension instruction. Finally, we examined whether or not some students and schools were more likely to use informational texts or chapter books in their work than others. Table 3 shows which log items contribute to those outcome measures.

Insert Table 3 About Here

Correspondingly, within the broad category of writing instruction, we investigated what influenced the probability a student would receive different types of writing lessons,

including those with a focus on different aspects of the writing process, including pre-writing; gaining practice in writing; revising, editing, sharing writing. We were also interested in whether or not some students and schools were more likely to engage in writing instruction that is less common in upper elementary literacy instruction including, the study of literary techniques or genre study; have a teacher comment on the students' writing; to have teacher directed instruction; or to have the integration of comprehension lessons within writing instruction. Finally, we investigate whether some students are more frequently asked to produce longer pieces of writing consisting of connected paragraphs. Table 4 shows which log items were used to construct these outcome measures.

Insert Table 4 About Here

Analyses

In the data analyses we present here, we use three-level hierarchical logistic regression models (Raudenbush and Bryk, 2002, Ch. 10) in which these upper grade literacy lessons are nested within students who, in turn, were nested in schools. In these models, we employ a Bernoulli distribution sampling model at level-1 and the following hierarchical logistic regression model:

Within each student, the models estimated the log odds of an instructional event occurring controlling for lesson level characteristics, a_{pijk}, such as day of the week, grade level of the student, and whether or not the day was on or near a holiday.

$$[1] \qquad \eta_{ijk} = \log [\varphi_{ijk} / 1 - \varphi_{ijk}] = \pi_{0jk}, + \sum_{p=1}^{P} \pi_{pik} a_{pijk},$$

Here, η_{ijk} is 1 if the instructional event occurred, 0 otherwise, π_{0jk} is the mean outcome for teacher j in school k, a_{pijk} are a set of lesson level characteristics and π_{pik} are the associated effects of the lesson level characteristics on the instructional event.

Across students within schools, the proportion of days an instructional event occurred varies as a function of student characteristics and a random student error.

$$[2] \qquad \pi_{0jk} = \beta_{00k} + \sum_{q=1}^{Q} \beta_{0qk}\, x_{jk} + r_{pjk},\ r_{pjk} \sim N(0, \tau_{\pi 00})$$

Here, β_{00k} is the average incidence of an instructional event in school k, x_{jk} are a set of student characteristics and β_{0qk} are the effects of x_{jk} on instruction. The random effect, r_{pjk}, is assumed normally distributed with mean 0 and variance τ_{π}.

Looking across schools we obtained the proportion of all days an instructional event occurred, on average, and examined whether school characteristics, including the CSR program the school belonged to, predicted a greater incidence of instructional events occurring.

$$[3a] \qquad \beta_{00k} = \gamma_{000} + \sum_{S=1}^{S} \gamma_{00s}\, W_{sk} + u_{00k}$$

and,

$$[3b] \qquad \beta_{0qk} = \gamma_{0q0} \quad \text{for } q=1\ldots..Q$$

Here, the intercept β_{00k} varies randomly between schools while the effects of the school characteristics β_{0qk} are fixed. In these models, the coefficient γ_{000} describes the frequency an instructional event occurred across all students adjusting for the student and lesson level characteristics, W_{sk} are a set of school-level characteristics predicting the

frequency of the instructional event and γ_{00s} are the associated coefficients for those school covariates, γ_{0q0} are coefficients for the effects of school characteristics on the frequency of an instructional event occurring and u_{00k} is a random error assumed to be normally distributed with variance τ_{00}.

Results

Looking across our various outcomes, we find there were large differences in the reading comprehension and writing instructional opportunities provided to students during their upper elementary school years. Although our analyses provided evidence that these differences in instruction were predicted by student characteristics or even sometimes the school's average student body characteristics, we find that the CSR program in which the school was involved was a much stronger influence on the literacy instruction students received in grades 3-5 than the other independent variables we tested. In particular, SFA schools offered much more instruction in reading comprehension than other schools. Similarly, AC schools provided much more instruction in writing to their students. We also found that these differences remained consistent whether we examined common instructional practice or more highly demanding practices. We found no evidence, therefore, that student and student body characteristics had a stronger influence on more challenging and less frequently covered literacy instruction, than they did on more basic literacy instruction.

These results are presented in Tables 5 and 7 where we report the log odds that a sample lesson will focus on a particular type of literacy instruction. Log odds are useful for comparing effect sizes across different outcomes, but they are also often difficult for readers to interpret. Therefore, throughout the results section we have tried to discuss the

results in terms of the probability that instruction was predicted to occur on a given day, using the formula $1/(1+e^{-(coefficient)})$ to convert the log odds into percentages. Below we expand on our results relative to the two research questions that drove our inquiry.

Research Q1: Which student or school characteristics are related to students' access to reading comprehension and writing instruction?

Reading comprehension instruction

The first column of Table 5 shows the effects of our independent variables on the incidence of reading comprehension instruction. While there were some differences based on student characteristics, these differences were small in magnitude. For example, our models predicted that students in comparison schools had a 49% chance of having a lesson focused on reading comprehension on a given logging day (γ_{000} = -.036).

Insert Table 5 About Here

Male students were slightly less likely than female students to receive comprehension instruction (γ_{050}=-.062, p<.05). Converting these log odds to probabilities, males received comprehension instruction in 48% of our sampled lessons. Additionally, students of higher socio-economic standing were predicted to receive more days of instruction in comprehension (γ_{060}=.050, p<.01). Table 6 shows that students 1 standard deviation above the mean in SES were predicted to receive comprehension instruction 50% of the time.

Insert Table 6 About Here

Thus, for each standard deviation increase in SES the probability of receiving comprehension instruction increases about 1 percent. There were no statistically significant differences by race or prior achievement. In contrast, Table 5 shows that the influence of attending an SFA school was much greater in magnitude (γ_{002}=.572, p<.001). As Table 6 shows, converting these log odds to probabilities, the average student in an SFA school received reading comprehension instruction 63% of the time.

In order to appreciate the magnitude of these findings it is useful to consider these differences in a different metric – in terms of days of instruction over the measured time period. Assuming an 180 day school year, we can determine the number of days of instruction a student would have received had they been present in the school all three years by multiplying the probabilities by 540 potential days of instruction. These calculations show that, on average, students in comparison schools in grades 3-5 were exposed to approximately 265 lessons in which reading comprehension was a focus of instruction. Male students, meanwhile, received approximately 5 fewer days of instruction in comprehension over three years, and students 1 standard deviation higher in SES were exposed to about 7 additional reading comprehension lessons. This means that students 2 standard deviations below the mean differed from students 2 standard deviations above the mean by about 28 reading comprehension lessons across three years. It is important to remember, however, that while this difference approaches about an 11% increase for highly advantaged versus highly disadvantaged students in our sample, that only a very limited portion of the students remain at either tail of the distribution.

Meanwhile, students in SFA schools, compared to students in the comparison schools, received an additional 76 days of reading comprehension instruction as they

progressed through their upper elementary years. This represents about a 28% increase in the number of days SFA students received comprehension instruction versus students in the comparison schools. These results are presented graphically in Figure 1, which shows the differences in accumulated instruction for students in SFA schools versus the average student in a comparison school and a student 1 SD higher in SES in a comparison school.

Insert Figure 1 About Here

The observant reader will also note that these differences in magnitude are similar when SFA students are compared to students in AC schools and students in ASP schools (See Table 5). While the difference between SFA and AC students is slightly smaller in magnitude, the finding remains highly significant. Additionally, the difference in magnitude between SFA and ASP students is even larger than the difference between SFA and comparison students.

Writing instruction

The estimates from our model predicting the probability of writing instruction, shown in the first column of Table 7, tell a story similar to that of reading comprehension. In comparison schools, there was a 36% chance that instruction on a given day was focused on writing (γ_{000} = -.573). As in the model predicting comprehension instruction, we found some fairly modest differences in accumulated instruction between students with different backgrounds. Higher ability students were marginally more likely to have received instruction in writing (γ_{070} = .028, p<.10), and students of higher SES also received more writing instruction (γ_{060} = .035, p<.05).

Similar to the results in reading comprehension, as shown in Table 8, students 1 standard deviation higher in SES received an additional percent of lessons in writing (37% versus 36%). Additionally, students attending schools where a high proportion of the students were mobile received less instruction in writing (γ_{006} = -.150, p<.05). There were no significant differences by gender, nor, again, were there any significant differences for race. The largest differences in writing come from students attending AC schools. As Table 7 shows, the influence of attending an AC school was much greater in magnitude than any other independent predictor (γ_{001}=.527, p<.01). Table 8 shows that the average student in an AC school received writing instruction about 49% of the time.

When these findings are translated into days of writing instruction, it is evident that interventions focusing on enhancing writing instruction in schools can have a meaningful influence on the amount of instruction students receive over time. The average student in a comparison school was provided with 194 lessons where writing was the focus over three years. Students attending schools one standard deviation higher in the percentage of mobile students received about 18 fewer writing lessons. Meanwhile, students 1 standard deviation higher in SES received about 5 additional writing lessons. Thus, proxies for measuring disadvantage at the school level (i.e., percentage of mobile students) were more of a factor in accumulating writing instruction than were proxies measuring disadvantage between students within schools (i.e., SES). Both of these covariates, however, paled in comparison to the accumulation of writing instruction attributable to being in an AC school. Students in AC schools received an additional 70 days of writing instruction over the course of three years – an additional 26% in the number of days of writing instruction. We portray these results graphically in Figure 2

which shows the differences in accumulated instruction for students in AC schools versus the average student, and a student 1 SD higher in SES in comparison schools.

Insert Figure 2 About Here

RQ2: Is access to more cognitively demanding or less frequently taught literacy skills driven more strongly by student or student body characteristics?

We hypothesized that student and student body characteristics might play a larger role in determining students' access to more challenging or infrequent types of literacy instruction because differential access to these particular types of instruction might be one of the channels through which social inequities come to be reproduced in schools. Here, we attempted to investigate this hypothesis by applying identical models to a variety of literacy outcomes.

Reading comprehension instruction

Table 5 presents our findings from these models on different facets of reading comprehension instruction and the kinds of text students were engaged in when doing work in comprehension. We find no systematic support for the hypothesis that student background influenced these outcomes differently (depending on the frequency with which they were taught and their assumed level of difficulty). In fact, in each of the comprehension outcomes we examined, we found patterns similar to those described in the last section: there were differences in exposure to instruction related to student and student body characteristics, but the largest differences were related to being in an SFA school (with the exception of the use of informational texts, which appear to be used with equivalent frequency across CSR and comparison schools).

The findings in Table 5 also show that particular aspects of student background were influential in accumulating comprehension instruction while other student background factors were negligible. Thus, effects of gender and race were infrequent and not very systematic. In contrast, in all but one of the comprehension outcomes, student SES was related to the incidence of instruction – where higher SES students acquired more instructional opportunities in nearly all facets of comprehension instruction. However, these differences were similar for both common instructional practices and more challenging, less frequent instructional practices. Thus, students 1 standard deviation higher in SES often experienced about a percentage point increase in the incidence of these outcomes (See Table 6). Finally, prior ability was not a factor for many of the comprehension outcomes, but did influence some outcomes in interesting ways. Students with higher ability received less teacher directed instruction, but more instruction in some of the more challenging comprehension outcomes – having students provide extended answers and integrating writing into reading comprehension. Additionally, students of higher ability were more likely to be reading a chapter book when they were working on comprehension.

Writing instruction

Table 7 presents a parallel story for a variety of instructional outcomes in writing. While there was some evidence to indicate effects of student background characteristics, the findings were somewhat inconsistent and there was a lack of obvious patterns emerging across the various outcomes. Again, we found no support for our hypothesis that student background had a greater influence on more challenging teacher practices in writing than on common instructional practices. In fact, with the exception of editing, at

least one of the proxies for student background was influential in each of the outcomes regardless of item difficulty. Instead of student background, what stood out in these models was the influence of being in an AC school on students' accumulation of all facets of writing instruction.

Similar to our examination of comprehension outcomes, some student background covariates were better predictors of writing instruction than other background variables. Thus, student gender and race were not predictive of writing instruction. However, student SES, prior ability and the percent of mobile students in the school were more frequently predictive of writing instruction – although none of these three variables alone were consistently predictive of *most* of the writing outcomes.

Table 8 once again presents the results of the models after converting the log odds coefficients for SES and AC into predicted probabilities. As was the case in comprehension, these tables show that students who come from families one standard deviation above the mean SES tend to get comparable or slightly more instruction across writing instructional outcomes. The largest differences in access to writing instruction, however, are clearly related to a schools' status as an AC school.

Findings on other covariates:

Though our focus was on the relative influences of student and student body characteristics versus school program, we also examined whether or not *when* a lesson took place influenced the likelihood of a particular type of literacy instruction occurring. We hypothesized that instruction might change somewhat as students progressed from third to fifth grade and that less literacy instruction might take place on Fridays or on or around a holiday. Tables 5 and 6 offer some support for these hypotheses. It appears that

on Friday, literacy instruction is less likely to occur than on the other days of the week. This result remains relatively consistent across most of the reading comprehension and writing instructional outcomes. Similarly, on or around holidays comprehension instruction of several kinds is less likely to occur.

There were limited changes in how literacy instruction changed as students moved through their upper elementary school years. Though most of the topics covered in reading comprehension received remarkably similar coverage during the upper elementary years, students were more likely to receive instruction in the analysis and evaluation of texts and in providing extended answers in the fourth and fifth grades than they were in the third grades. Fourth grade students were also more likely to use informational texts than their third grade peers, and fifth grade students used chapter books more frequently than the third graders. In writing, there were no differences in the probability that particular kinds of instruction were provided by grade, although students in the fourth and fifth grades were asked to do more writing involving connected paragraphs than third graders.

Attrition of Students in SII

The results presented in Figures 1 and 2 reveal the potential for students remaining in SFA and AC schools to accumulate lessons in comprehension and writing, respectively, at a faster rate than students in comparison schools. These differences accumulate over time, producing rather stunning differences over the course of just three years. However, students must remain in the school for three years in order for students in CSR schools to reap the benefits of such instruction. We examined, therefore, rates of attrition in our sample. Table 9 shows that 2,665 students were sampled for SII at the

beginning of 3rd grade. By the beginning of 4th grade 789 of those students are no longer in the same school they started in, and by the beginning of 5th grade another 642 have left the sample. In all, more than half of the students (nearly 54%) who were sampled at the beginning of 3rd grade have left the school they were in by 5th grade. The results are similar across subsets of schools in our sample. Thus, 52% of AC students and 55.5% of SFA students sampled at the beginning of the study are not present in their original school by the end of the study.

Given our focus on cultural reproduction in this paper, we also examined the extent to which student background characteristics predicted whether or not students remained in their original school throughout the course of our study. Table 10 provides the results of this hierarchical logistic regression, where students were coded "1" if they stayed for all three years, "0" otherwise. The results show that higher achieving students were more likely to remain in a school three years in a row. Additionally, students coming from families where the mother dropped out of high school, and students attending schools with a higher percent of students receiving free lunch, were less likely to remain in schools for three consecutive years. Thus, student background may moderate the potential for students to benefit from increased instructional opportunities provided in CSR schools.

Discussion

In this study, we investigated which student or school characteristics are related with students' access to instructional opportunities in reading comprehension and writing during their upper elementary years. Because of our interest in the mechanisms through which social reproduction might occur within elementary schools, we also explored

whether access to more cognitively demanding (or less frequently taught) instruction is driven more strongly by student or student body characteristics than access to less cognitively demanding (or more common) literacy instruction.

We found that the wide variation in instructional opportunities extended to students within schools could be explained somewhat by select student and student body characteristics, but that attendance in a school engaged in a CSR program had the greatest potential to influence the instruction students received. In particular, across a variety of reading comprehension outcomes, participation in SFA was linked to more instructional instances. Similarly, participation in AC was strongly associated with a greater number of instructional opportunities across a variety of writing instruction outcomes. When translated into the metric of days of instruction, these differences appear to be large and potentially quite meaningful for student learning.

We did not find any systematic evidence to suggest that student and student body characteristics were associated more strongly with access to kinds of literacy instruction that occur less frequently and are more cognitively demanding. This suggests to us that, at least within our sample of high-poverty schools, social reproduction is not occurring *through students' access to particular types of instruction in literacy in grades 3-5*. However, there are several important caveats to make with respect to this claim. Indeed, these caveats highlight a few key limitations to our study. First, it is important to note that using a representative sample of schools in the United States, and thus expanding the range of schools and students on the dimension of socio-economic status, could lend itself to different findings. In other words, in a more diverse sample of schools, we might find that access to specific kinds of literacy instruction *is* a mechanism through which

social reproduction in elementary schools might occur. Second, our measures of instruction, while useful, are also quite blunt. We can only detect differences in content coverage rather than getting at other deeply important aspects of instruction, including the quality and depth of student discourse as well as the interpersonal relationships between students and teachers. Third, the differences we detect are just differences. In the current study, we are unable to determine whether access to a greater number of lessons in a given topic is actually better for student learning. In this report, we do not examine whether or not the large changes SFA and AC engender are also related to student achievement.

Nonetheless, we think our study is at least suggestive of the *potential* for well-specified CSR programs, like SFA in comprehension and AC in writing, to alter the instructional profiles of the teachers in their schools in ways that can overcome small differences in instructional opportunities that might disadvantage certain groups of students, including those of lower SES or those attending schools with higher rates of student mobility. To the extent that exposure to instruction is related to student learning (see, for example, Cooley and Leinhardt, 1980), these results are encouraging when thinking about the potential for planned change efforts to gain leverage on the seemingly intractable achievement gaps by race and class in the United States by improving students' access to instruction.

However, despite our optimism about the potential for planned change efforts to bolster exposure to instruction and thus, possibly, to enhance student learning, there are three issues that might cause us to curb our optimism. First, our data also indicate that not all CSR programs are equally able to influence instructional outcomes in these ways.

Two of the three CSR programs were successful in enhancing targeted areas of literacy instruction, but each operated through different implementation strategies and each focused on different content areas within literacy (for an in-depth discussion see Correnti and Rowan, 2006). While there is cause for hope that planned change efforts can lead to enhanced instructional practice, this raises some real questions about what type(s) of literacy instruction are most effective for improving student learning at each grade level.

A second reason to be restrained in our optimism for the potential of planned change efforts is that, as we mentioned, the changes we observe are only changes in coverage. We are concerned that if these topical changes are not also linked with changes in the quality and depth of instruction, as well as the learning environments more broadly, such changes may prove to be superficial and limited in their ability to affect student achievement.

Finally, even if these changes in instruction are indeed linked with student learning, we are concerned that student mobility may severely constrain the extent to which the large differences in accumulated instruction linked with SFA and AC may be realized for students. In our sample, we find that only 44% of SFA and 48% of AC students who begin the study in third grade remain in their school for three consecutive years. These rates of attrition are consistent with those observed by other researchers focusing on urban schools (e.g. Kerbow, 1996) and with the other schools in our sample. Simply put, even if schools and/or CSR programs are successful at changing the instructional profiles their schools offer in ways that have the potential to be beneficial for student achievement, students may not be present to receive that "treatment."

In addition, our findings suggest that there are also school-level effects of student mobility, with schools with higher percentages of mobile students offering all of their students fewer chances to learn several kinds of literacy skills. Thus, student mobility has potentially serious consequences for an individual student's opportunities to learn; for schools with highly mobile student populations striving to meet adequate yearly progress (AYP) in the context of NCLB; and for formal evaluation efforts that seek to understand whether or not interventions aimed at instructional improvement and enhanced student achievement "work."

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Table 1: Description of independent variables included in prediction models

School characteristics	
Intervention Program	Set of 4 dummy variables indicating which intervention program, if any, the school is involved in. For example, America's Choice dummy is coded "1" if the school is participating in America's Choice, "0" otherwise.
Household poverty [a]	Average poverty index of households in the school community.
Average achievement [a]	Average scores on the Woodcock-Johnson Language Arts assessment, administered in the fall of each student's Kindergarten entry into the sample.
Upper grade mobility [a]	The school's average rates of mobility among the upper grade students in the sample.
Student characteristics	
White	Dummy variable coded "1" if the student is White "0" otherwise
Hispanic	Dummy variable coded "1" if the student is Hispanic "0" otherwise
Black	Dummy variable coded "1" if the student is Black "0" otherwise
Asian	Dummy variable coded "1" if the student is Asian "0" otherwise
Other	Dummy variable coded "1" if the student is Other race "0" otherwise
Male	Dummy variable coded "1" if the student is male "0" otherwise
Socioeconomic status [a]	Socioeconomic status reported by the student's family.
Fall of 3rd grade achievement [a]	Average scale score for the target student on the *Terra Nova* Reading subcomponent administered in the fall of the student's third grade year.
Lesson characteristics	
Friday	Dummy variable coded "1" if the log was completed on a Friday "0" otherwise
Holiday	Dummy variable coded "1" if the log was completed on a holiday or occurred immediately prior to a holiday weekend. These holidays include, Halloween, the day before Thanksgiving, Valentine's day, Friday before President's day weekend, Friday before St. Patrick's day weekend, Friday before Easter weekend, Monday after Easter weekend, Friday before Memorial day weekend, and Memorial day.
Grade 4	Dummy variable coded "1" if the log was completed for a student in the fourth grade "0" otherwise
Grade 5	Dummy variable coded "1" if the log was completed for a student in the fifth grade "0" otherwise

[a] These variables were standardized (mean=0, SD=1) but due to small amounts of missing data at the school and lesson levels, they are no longer perfectly standardized in our models. Please see Table 2 for the new means and standard deviations.

Table 2: Descriptive statistics for independent variables

	N	Mean	Standard Deviation
School characteristics			
AC	110	.26	-
SFA	110	.25	-
ASP	110	.25	-
Household poverty [a]	110	0	1.01
Average achievement [a]	110	-.03	.96
Upper grade mobility [a]	110	0	1
Student characteristics			
Black	3635	.51	-
Hispanic	3635	.19	-
Asian	3635	.04	-
Other	3635	.04	-
Male	3635	.48	-
Socioeconomic status [a]	3635	0	.99
Fall of 3rd achievement [a]	3635	.01	.99
Lesson characteristics			
Friday	44439	.19	-
Holiday	44439	.06	-
Grade 4	44439	.34	-
Grade 5	44439	.31	-

[a] These variables were standardized (mean=0, SD=1) but due to small amounts of missing data at the school and lesson levels, they are no longer perfectly standardized in our models.

Table 3: Reading Comprehension Measures

Measures	Components	Log Item
Comprehension	-To what extent was comprehension a focus of your instruction with the target student in language arts today? [A major focus or minor focus =1, touched on briefly or not a focus =0]	4a
Brief answers	-Answered brief oral questions	A3a
	-Answered multiple choice questions	A3e
	-Completed sentences filling in blanks	A3f
	-Wrote brief answers to questions	A3h
Literal comprehension	-Answering questions that have answers directly stated in the text	A1j
	-Answering questions that require inferences	A1k
	-Explaining how to find answers or information	A1l
Story structure	-Using concept maps, story maps or text structure frames	A1i
	-Sequencing information or events	A1m
	-Identifying story structure	A1n
	-Summarizing important details	A1q
Students discuss text	-Discussed text with peers	A3b
	-Did a think-aloud or explained how they applied a skill or strategy	A3c
	-Generated questions about text	A3d
Teacher directed instruction	-Teacher demonstrated or explained a skill	A4a
	-Teacher demonstrated or explained how to use a reading strategy	A4b
	-Teacher explained why or when to use a reading strategy	A4c
Activate knowledge	-Activating prior knowledge or making personal connections to text	A1a
	-Making predictions, previewing or Surveying	A1b
Analyze/ synthesize	-Comparing and/or contrasting information or texts	A1p
	-Analyzing and evaluating text	A1r
Extended answers	-Wrote extensive answers to questions	A3i
	-Worked on a literature extension project	A3j
Integrate writing	-examining literary techniques or author's style	A1s
	-written literature extension project	A1t
	-examined literary techniques or author's style in writing	B1c
	-teacher explained how to write, organize ideas, revise or edit using a published author's writing	B3c
Informational text	-Did the materials used by the target student in work on comprehension include…informational text	A2a
Chapter Books	-Did the materials used by the target student in work on comprehension include…chapter books	A2e

Table 4: Writing Measures

Measures	Components	Log Item
Writing	--To what extent was writing a focus of your instruction with the target student in language arts today? [A major focus or minor focus =1, touched on briefly or not a focus =0]	4b
Teacher directed instruction	-I demonstrated or did a think-aloud using my own writing	B3a
	-I explained how to write, organize ideas, revise or edit using st. writing	B3b
	-I explained how to write, organize ideas, revise or edit using a published author's writing	B3c
	-I led the student and his/her peers in a group composition	B3e
	-I commented on how the student could improve his/her writing	B3h
Pre-Writing	-generating ideas for writing	B1a
	-organizing ideas for writing	B1b
Teacher comments on writing	-I commented on what the student wrote not how	B3f
	-I described what the student did well in his/her writing	B3g
Writing Practice	-writing practice	B1e
Edit writing	-editing capitals, punctuation, or spelling	B1h
	-editing word use, grammar or syntax	B1i
Revise writing	-revision of writing-elaboration	B1f
	-revision of writing-refining or re-organizing	B1g
Integrate Comprehension	-examining literary techniques or author's style	A1s
	-written literature extension project	A1t
	-wrote extensive answers to questions	A3i
	-worked on a literature extension project	A3j
Literary techniques /genre study	-literary techniques or author's style	B1c
	-writing forms or genres (e.g. letter, drama, editorial, Haiku)	B1d
Share writing	-sharing writing with others	B1j
Connected paragraphs	-student's writing consisted of connected paragraphs	B2d

Table 5: Estimates of the log odds that a lesson will focus on reading comprehension, a particular type of comprehension instruction, or use a specific type of text (n=44,439 lessons).[6]

	Comprehension		Brief answers		Literal Comprehension		Story structure	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
School Characteristics								
Intercept	-.036	.092	-.376***	.089	-.626***	.095	-.855***	.079
AC	.061	.130	-.087	.124	-.209	.136	-.001	.126
SFA	.572***	.123	.664***	.113	.583***	.116	.273*	.105
ASP	-.247~	.128	-.332**	.128	-.293*	.135	-.244*	.116
Household Poverty	.003	.044	.030	.041	.064	.045	.111*	.038
Average Achievement	.030	.046	.049	.049	.033	.051	-.007	.043
Upper Grade Mobility	-.105~	.054	-.101~	.053	-.081	.059	-.081	.057
Student Characteristics								
Black	.000	.040	.002	.041	.059	.048	.016	.056
Hispanic	-.085	.065	-.049	.066	-.004	.066	-.049	.074
Asian	.016	.075	.143*	.065	.113	.082	.054	.092
Other	.000	.065	.039	.068	.135	.083	.017	.082
Male	-.062*	.027	-.048*	.023	-.053	.028	-.025	.030
Socioeconomic status	.050**	.014	.056**	.015	.054**	.014	.029*	.014
Fall of 3rd achievement	.004	.016	-.021	.015	-.005	.016	.001	.018
Lesson Characteristics								
Friday	-.164***	.026	-.150***	.026	-.120***	.027	-.100**	.030
Holiday	-.125**	.042	-.140**	.041	-.088*	.041	-.132**	.045
Grade 4	-.088	.067	-.070	.068	-.047	.072	.054	.081
Grade 5	-.063	.082	-.102	.081	.006	.091	.129	.088

~ <.1 * <.05 **<.01 ***<.001

Notes: The estimates shown in this table are based on the population-average model with robust standard errors.

[6] The exception is comprehension, for which 44,405 logs were available.

Table 5 continued

	Students discuss text		Teacher directed		Pre-reading activities		Analysis and evaluation	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
School Characteristics								
Intercept	-.857***	.094	-.860***	.075	-.876***	.069	-1.718***	.095
AC	-.011	.135	.158	.129	-.157	.135	-.010	.148
SFA	.953***	.117	.634***	.104	.345**	.106	.367**	.122
ASP	-.123	.131	-.317**	.115	-.284*	.116	-.152	.162
Household Poverty	.068~	.040	.073*	.036	.087*	.041	.190***	.047
Average Achievement	.020	.043	.000	.042	-.014	.044	-.022	.049
Upper Grade Mobility	-.123*	.057	-.093	.060	-.104	.065	-.013	.073
Student Characteristics								
Black	.024	.044	.056	.049	.028	.053	.004	.057
Hispanic	-.059	.058	.025	.062	-.021	.071	-.035	.079
Asian	.103	.074	.163~	.088	.239**	.090	.122	.093
Other	.051	.073	.066	.084	.038	.084	.001	.120
Male	-.031	.030	-.022	.030	-.025	.031	-.029	.037
Socioeconomic status	.032*	.016	-.041	.015	.043**	.016	.053**	.018
Fall of 3rd achievement	.012	.018	-.041*	.018	.003	.020	.039	.025
Lesson Characteristics								
Friday	-.271***	.033	-.301***	.034	-.210***	.026	-.093**	.029
Holiday	-.067	.048	-.166***	.045	-.076	.048	-.074	.054
Grade 4	.064	.078	-.036	.075	.022	.079	.256**	.097
Grade 5	.167~	.098	.006	.083	.159~	.088	.371 **	.111

Table 5 continued

	Extended answers		Integrate writing		Informational text		Chapter books	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
School Characteristics								
Intercept	-1.94***	.098	-2.25***	.102	-1.57***	.123	-1.652***	.175
AC	.024	.137	.519***	.172	-.216	.175	.140	.253
SFA	.525***	.119	.574***	.126	-.076	.157	.519*	.206
ASP	.017	.140	.085	.159	-.273	.189	.131	.224
Household Poverty	.127**	.044	.136**	.050	.106~	.053	-.060	.067
Average Achievement	-.006	.046	.020	.054	.044	.063	.054	.067
Upper Grade Mobility	.031	.053	-.183*	.085	-.142	.091	-.091	.096
Student Characteristics								
Black	-.030	.052	-.024	.060	.147*	.057	-.118*	.057
Hispanic	-.089	.071	-.085	.079	.029	.068	-.156~	.080
Asian	-.013	.105	.077	.129	.198~	.110	-.019	.097
Other	.003	.122	-.024	.138	.254*	.101	-.108	.107
Male	-.074*	.036	-.053	.042	-.014	.036	-.026	.036
Socioeconomic status	.043*	.018	.038~	.019	.032~	.019	.048*	.020
Fall of 3rd achievement	.075**	.022	.060*	.027	-.005	.019	.081**	.023
Lesson Characteristics								
Friday	-.011	.039	-.052	.037	-.078*	.034	-.123**	.037
Holiday	.004	.058	-.056	.055	-.159**	.053	-.049	.051
Grade 4	.226**	.087	.074	.100	.232*	.094	.179	.113
Grade 5	.317**	.107	.152	.114	.197	.120	.532***	.138

Table 6: Comparison of relative magnitude of effects of SES and SFA on probabilities of comprehension instruction

	Comparison school students	Comparison school students + 1 SD SES	Success for All students	Success for all students + 1 SD SES
Comprehension	0.49	0.50	0.63	0.64
Brief answers	0.41	0.42	0.57	0.59
Literal comprehension	0.35	0.36	0.49	0.50
Story structure	0.30	0.30	0.36	0.37
Students discuss text	0.30	0.30	0.52	0.53
Teacher directed	0.30	0.29	0.44	0.43
Pre-reading	0.29	0.30	0.37	0.38
Analysis and evaluation	0.15	0.16	0.21	0.21
Extended answers	0.13	0.13	0.20	0.20
Integrate writing	0.10	0.10	0.16	0.16
Informational text	0.17	0.18	0.16	0.17
Chapter books	0.16	0.17	0.24	0.25

The estimates shown in this table are based on the population-average model with robust standard errors. Coefficients were converted to a probability using the equation $1/(1+e^{-(coefficient)})$.

Table 7: Estimates of the log odds that a lesson will focus on writing instruction or a particular type of writing instruction (n=44,439 lessons).[7]

	Writing		Teacher led instruction		Prewriting		Teacher comments	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
School Characteristics								
Intercept	-.573***	.124	-.866	.117	-1.19	.112	-1.25	.118
AC	.527**	.164	.514**	.158	.284~	.155	.381*	.154
SFA	.219	.149	.199	.145	.098	.131	.010	.131
ASP	.088	.154	.056	.152	-.016	.138	.094	.151
Household Poverty	.007	.043	.066	.042	.056	.041	.098*	.040
Average Achievement	.040	.049	.020	.047	-.016	.047	.008	.051
Upper Grade Mobility	-.150*	.059	-.116~	.062	-.090	.056	-.095~	.055
Student Characteristics								
Black	-.021	.046	-.023	.049	-.011	.042	-.018	.046
Hispanic	-.037	.064	-.043	.064	.009	.063	-.053	.062
Asian	.023	.098	.016	.094	.082	.097	.060	.115
Other	-.097	.068	-.083	.075	-.112	.073	-.109	.087
Male	.013	.026	.000	.028	.012	.031	-.008	.031
Socioeconomic status	.035*	.014	.032*	.014	.027~	.014	.014	.015
Fall of 3rd achievement	.028~	.016	-.004	.016	.004	.017	.000	.016
Lesson Characteristics								
Friday	-.109**	.032	-.107**	.031	-.163***	.029	-.065*	.033
Holiday	-.055	.042	-.034	.040	.003	.047	-.057	.043
Grade 4	-.045	.058	-.013	.059	-.041	.071	-.019	.078
Grade 5	-.048	.080	-.002	.077	.038	.081	.007	.090

~ <.1 * <.05 **<.01 ***<.001

Notes: The estimates shown in this table are based on the population-average model with robust standard errors.

[7] The exception is writing, for which 44,403 logs were available

Table 7 continued

	Writing for practice		Editing		Revising		Integrate comprehension	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
School Characteristics								
Intercept	-1.44***	.105	-1.69***	.116	-1.78***	.113	-1.97***	.091
AC	.425**	.159	.129	.181	.327*	.150	.680***	.179
SFA	.078	.124	-.110	.144	.154	.138	.165	.113
ASP	-.105	.142	-.132	.149	.021	.154	-.081	.154
Household Poverty	.028	.042	.082	.050	.120*	.046	.122*	.050
Average Achievement	.025	.048	-.065	.055	.000	.054	-.048	.051
Upper Grade Mobility	-.133*	.060	-.099	.077	-.044	.055	-.170~	.091
Student Characteristics								
Black	-.029	.050	.033	.053	-.021	.049	-.083	.061
Hispanic	-.010	.068	.031	.067	.016	.077	-.104	.068
Asian	-.013	.108	-.026	.106	.116	.116	-.050	.132
Other	-.165~	.093	-.020	.113	-.111	.102	.002	.110
Male	.037	.029	-.013	.039	.029	.032	-.070*	.035
Socioeconomic status	.020	.014	-.003	.015	.037*	.017	.038*	.018
Fall of 3rd achievement	.012	.021	.024	.021	.035~	.019	.030	.025
Lesson Characteristics								
Friday	-.087**	.032	.012	.037	.042	.038	-.119**	.036
Holiday	-.008	.055	-.024	.056	-.027	.053	-.050	.059
Grade 4	.008	.085	-.055	.089	-.016	.088	-.026	.089
Grade 5	-.028	.112	.037	.101	.139	.094	.096	.097

Table 7 continued

	Literary genre study		Sharing writing		Connected paragraphs	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
School Characteristics						
Intercept	-2.02***	.101	-2.20***	.117	-1.61***	.127
AC	.597**	.189	.702***	.187	.542**	.185
SFA	-.456**	.145	.163	.144	-.288~	.152
ASP	-.058	.147	.064	.175	.068	.162
Household Poverty	.097~	.056	.122*	.052	.058	.055
Average Achievement	-.018	.052	-.073	.059	.067	.054
Upper Grade Mobility	-.157	.094	-.180*	.083	-.048	.056
Student Characteristics						
Black	-.024	.056	-.018	.064	.031	.063
Hispanic	-.044	.069	-.013	.088	.002	.074
Asian	.064	.118	.079	.103	.113	.114
Other	-.093	.116	-.249~	.132	-.039	.108
Male	.008	.033	.009	.044	-.037	.034
Socioeconomic status	.020	.019	.014	.020	.029~	.018
Fall of 3rd achievement	.042*	.020	.045~	.024	.126***	.022
Lesson Characteristics						
Friday	-.098*	.041	.034	.037	-.021	.032
Holiday	-.043	.059	.076	.062	-.056	.052
Grade 4	.014	.068	-.160	.104	.274**	.093
Grade 5	.116	.094	.035	.128	.406**	.123

Table 8: Comparison of relative magnitude of effects of SES and AC on probabilities of writing instruction

	Comparison school students	Comparison school students + 1 SD SES	America's Choice students	America's Choice students + 1 SD SES
Writing	0.36	0.37	0.49	0.50
Teacher directed	0.30	0.30	0.41	0.42
Prewriting	0.23	0.24	0.29	0.29
Teacher comments	0.22	0.22	0.29	0.30
Writing for practice	0.19	0.20	0.27	0.27
Editing	0.16	0.16	0.17	0.17
Revising	0.14	0.15	0.19	0.19
Integrate comprehension	0.12	0.13	0.22	0.22
Literary genre studies	0.12	0.12	0.19	0.20
Sharing	0.10	0.10	0.18	0.18
Connected paragraphs	0.17	0.21	0.26	0.31

The estimates shown in this table are based on the population-average model with robust standard errors. Coefficients were converted to a probability using the equation $1/(1+e^{-(\text{coefficient})})$.

Table 9: Attrition of Students Beginning SII in 3rd Grade (N=2,665)

Students Leaving Before:	# of Students	% of Total Students	Cumulative # of Students	Cumulative % of Students Leaving
4th Grade	789	29.6	789	29.6
5th Grade	642	24.1	1,431	53.7

Table 10: Covariate Predictors of Remaining in a High Poverty School Three Years in a Row

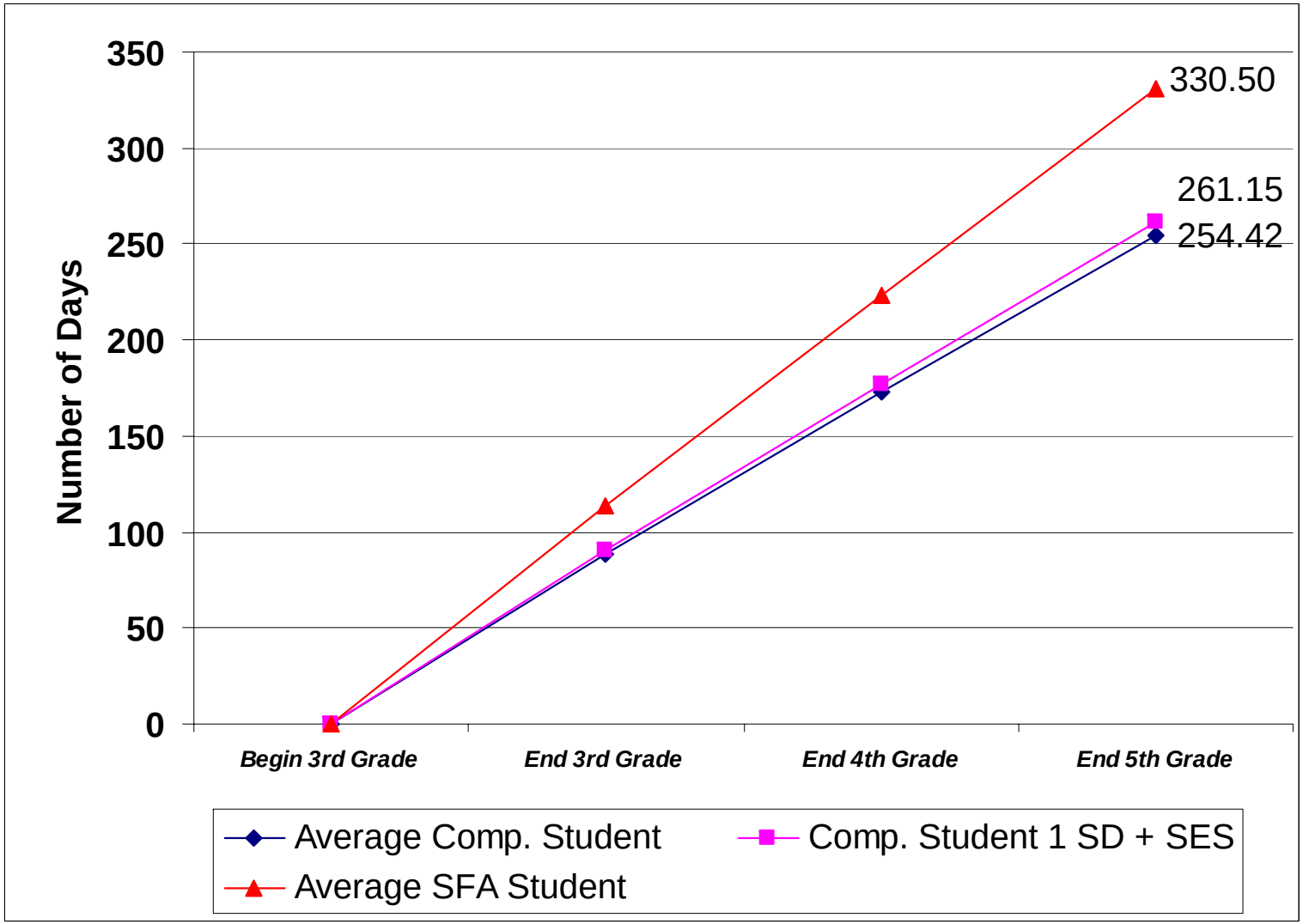
	Coefficient	SE
Intercept	-.159	.088
School Characteristics		
Household Poverty	.069	.092
Average Achievement	.044	.094
Percent Free-lunch	-.212*	.103
Student Characteristics		
Black	-.024	.062
Asian	.064	.057
Other	.016	.031
Male	-.033	.039
Socioeconomic status	-.030	.052
Fall of 3rd achievement	.109*	.045
Mother Dropped Out of High School	-.086~	.048

~p<.10, * p<.05

Figure Captions

Figure 1. Accumulation of Comprehension Instruction for Students in SFA Versus Comparison Schools

Figure 2. Accumulation of Writing Instruction for Students in AC Versus Comparison Schools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Number of Days
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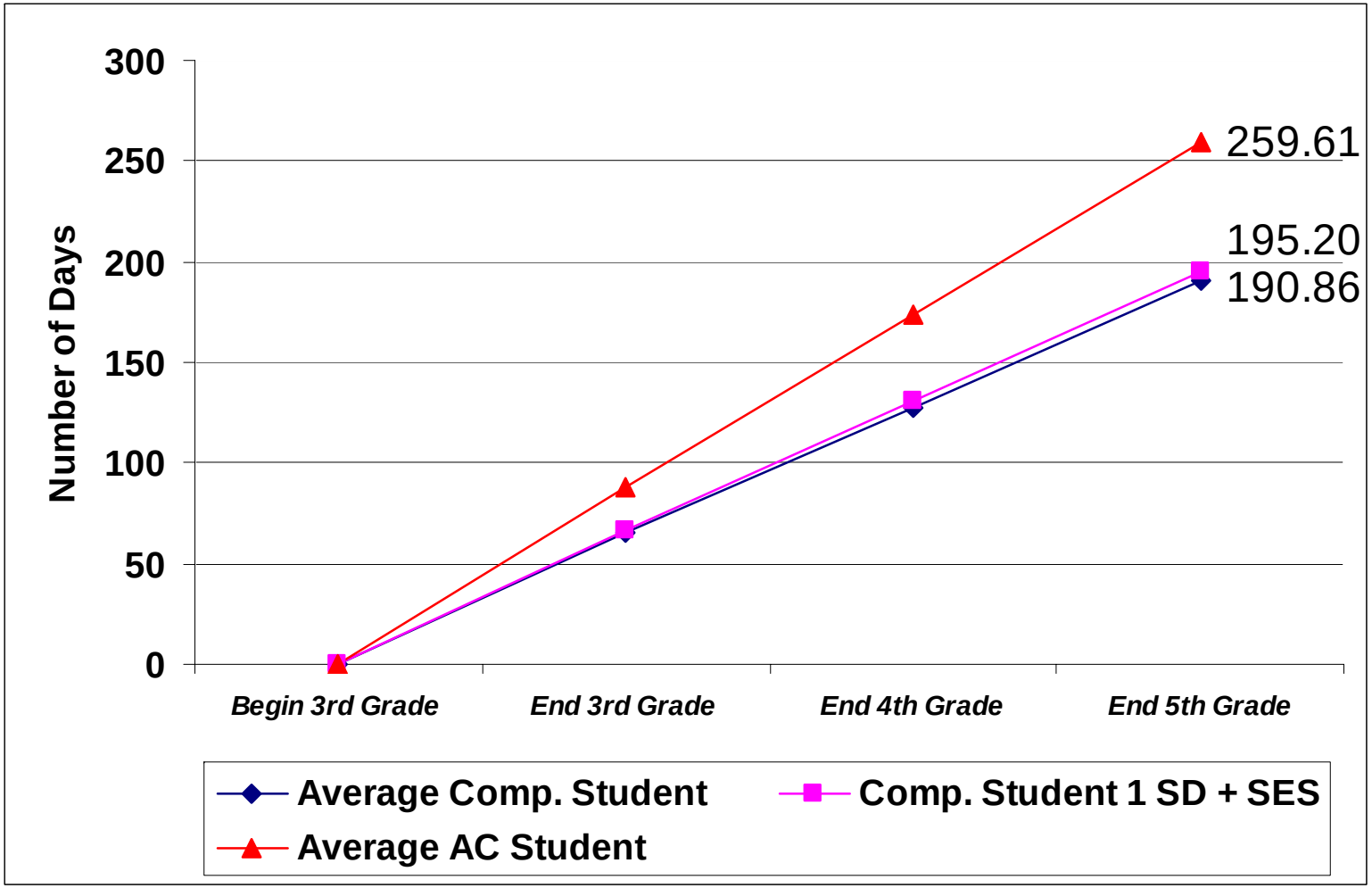
Begin 3rd Grade
End 3rd Grade
End 4th Grade
End 5th Grade
Average Comp. Student
Comp. Student 1 SD + SES
Average SFA Student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100
50
0
Number of Days
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195.20
190.86
Begin 3rd Grade
End 3rd Grade
End 4th Grade
End 5th Grade
Average Comp. Student
Comp. Student 1 SD + SES
Average AC Student