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Resources, Learning, and Policy: The Relative Effects of Social and Financial Capital on Student Learning in Schools

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ABSTRACT

In this paper, we note the contrasting positions occupied by social and financial capital in state and federal education policy and compare their relative impacts on student learning. To make such a comparison, we analyzed data from a representative sample of Michigan's elementary schools using multilevel structural equation modeling to examine the relationships among social capital, instructional expenditures, and student achievement. We found that the level of social capital characterizing schools was not a function of instructional expenditures. We also found that both social and financial capital had a positive and significant relationship with reading and mathematics student achievement. However, the effect of social capital was three and five times larger than that of financial capital on mathematics and reading, respectively. We discuss the implications of these findings for education policy and programs that might improve student learning by strengthening social relationships.

On December 10, 2015, President Obama signed into law the Every Student Succeeds Act (ESSA). This most recent reauthorization of the Elementary and Secondary Education Act made several important changes in education policy, including calls for new funding dedicated to the lowest performing schools identified by each state. This funding provision underscores a longstanding belief that money can make a difference to student learning and the equity of its distribution among schools, an assertion that is among several we empirically test in this paper.

It is important to remember that, aside from compensatory federal funding, one area of responsibility that has always been reserved for the states is school funding policy. With this responsibility has come over 40 years of litigation across the states challenging the equity and adequacy of funding for local schools. At the center of the debates over differences in the fiscal resources to which schools have access are questions of whether money itself matters to student learning, and ESSA implies a belief that money can be used in ways that make a difference to the learning of students in underperforming schools. Importantly, money (i.e. financial capital) is but one form of capital that is

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employed in the production of student learning (i.e. human capital); other forms include manufactured capital (e.g. school buildings), natural capital (e.g. energy), and social capital (e.g. social relationships). Among all of these forms of capital, social and financial are the forms most widely presumed to matter to children's learning. From a policy perspective, however, financial capital occupies a far more prominent position, perhaps largely because of the relative ease with which it can be understood and distributed. We offer this paper to revisit the potential link between financial capital and student learning and to consider whether social capital might warrant a larger role in our thinking about cost effective ways to support vulnerable youth. To do so, we consider the relative effects of social and financial capital in support of student learning in a representative sample of elementary schools in Michigan. The choice of Michigan is important because, despite a longstanding state policy put in place to improve funding equity (Kearney, 1995), there is still wide inconsistency among schools in the amount of funding available to support instruction, providing a useful context in which to study the link between this variability and learning.

The purpose of this paper is to examine the relationships among social capital, instructional expenditures, and the learning of children in Michigan. To do so, we draw heavily on social capital theory to explain the importance of supportive relational networks, norms, and trust to student learning. Social capital resides in the quality of social relations; the quantity of social capital to which a student may have access has been shown to vary considerably with school membership (Salloum, Goddard, & Larsen, 2017). One contribution of this paper is to ask whether this variation is a function of school context (i.e. percent of students living in poverty) or funding levels that are a function of state policy. Another contribution is that we ask how these resources—social capital that can be developed in theory without money, and another that is strictly monetary, instructional per pupil expenditures—matter to student performance on state assessments of learning. Because we conducted this research working with a representative sample of Michigan elementary schools, we accomplish several important purposes.

First, we estimate the degree to which social capital matters to student learning after holding constant schools funding levels. Second, we investigate whether the amount of funding a school receives matters to student achievement after accounting for the level of social capital characterizing it. Third, we examine the degree to which social capital is a function of important school contextual factors such as poverty and racial composition. Fourth, we ask whether the level of instructional expenditures to which schools have access is a predictor of social capital. Finally, the nature of our analysis permits a comparison of the relative effects of social and financial capital on student achievement. We begin by drawing upon literature about both social and financial capital, followed by a description of the method, including the policy context in Michigan. We conclude with our results, followed by a discussion and implications for policy.

Literature review

To situate our study, we focus on the foundations of social capital theory, research on the outcomes of school spending, and a rationale for the hypotheses that drive this inquiry.

Definition of social capital

The concept of social capital draws on an economic analogy. The notion of capital suggests that investment can confer a benefit; in the case of social capital, investments in social relationships can be profitable for an individual or groups of individuals. Thus, social capital theory assumes that the resources embedded in relationships have value. Social capital can be defined as "investment and use of embedded resources in social relations for expected returns" (Lin, 2000, p. 786). The sociological concept of social capital has become one of the most popular exports into everyday language (Portes, 1998). Notably, this notion is attractive to researchers because it provides a conceptual link between outcomes for individual actors and their social contexts. As such, many educational leaders and researchers have suggested improving social capital as a means to address persistent education problems.

James Coleman developed one of the most cited frameworks for social capital. In Coleman's (1988) conception of social capital, he identified three critical components of the construct: (1) trust–obligations and expectations, (2) networks–the information-flow capability of the social structure, and (3) norms accompanied by sanctions. Social capital is created when the relationships among people change in ways that produce action and build human capital. In turn, human capital is formed when people accumulate unique skills and capabilities that enable the most efficient use of physical capital (Coleman, 1990). When the relationships between the actors in schools are characterized by trust, these relationships are more efficient. Each of these components of social capital have been linked to positive outcomes. Outside of education, for example, Granovetter (1973) showed that relations among people are indispensable to individuals' opportunities for integration into communities and personal outcomes such as career advancement. Within education, several researchers have indicated that social trust is significantly related to academic outcomes (Bank, Slavings, & Biddle, 1990; Bryk & Schneider, 2002; Goddard, Salloum, & Berebitsky, 2009; Goddard, Tschannen-Moran, & Hoy, 2001; Jones & Maloy, 1988; Lareau, 1987; Lee & Croninger, 1994). Notably, research on relational trust has a strong emphasis on trust placed in students and parents, which indicates the value connections between the school and family. This demonstrates that as a form of social capital, trust can meaningfully strengthen the networks connecting families and communities to schools and in particular that the social capital of potential benefit to students is not constrained to the physical location of schools but rather resides wherever relevant actors connected to the school (such as parents and community members) take steps to support children and their learning. In addition to social trust and social structure, norms promoting learning—both those at schools and those reinforced at home—are related to academic achievement (Goddard, Hoy, & Woolfolk Hoy, 2000; Hoy, Smith, & Sweetland, 2002).

Schools occupy a unique position in society for providing access to social capital, particularly for those children least likely to experience it in their home lives (Stanton-Salazar, 1997). This perspective conceptualizes social capital not just as an individual possession but also as a social good that can benefit all members of a group. One prominent example of research on the effects of group-level social capital is that of Putnam (1993) who linked differences in social capital across the Northern and Southern regions of Italy to differences in economic prosperity. Following this line of reasoning, we turn

next to theory and research on differences among schools in the social capital characterizing them and the implications of these differences for students' educational outcomes.

School Social Capital. Extending social capital theory to the school level provides an important framework for understanding educational opportunities. The importance of school-level factors that matter to student learning was reinforced by the passage of ESSA, which provides political pressures that hold schools accountable for student proficiency in mathematics and language arts. To this end, research that illuminates ways to make school environments more productive for all students is particularly critical. We address this need by asking whether the level of social capital schools provide facilitates students' academic outcomes. In the next section, we examine research that unpacks the processes through which social capital may make a difference to the learning of children.

Stanton-Salazar (1997) presented a theoretical argument to explain the socialization process of working class immigrant and minority students. He examined the role that school agents had in the experience of such youth. In Stanton-Salazar's words, "there is no available research that provides substantial evidence that academically immigrant youth 'make it' without significant institutional support from school-based institutional agents" (p. 33). Such school agents include trusted teachers and counselors who provide students and their families access to the knowledge necessary to navigate schooling. Thus, building relationships with families is an essential aspect of facilitating students' success in schools (Epstein, 2001). Indeed, previous research demonstrates that schools heavily influence the degree to which families become formally involved in children's schooling; if families feel that the school needs and welcomes their participation, they are more likely to engage (Epstein & Dauber, 1991). Thus, school personnel need to consider how to engage families to facilitate education for all students.

Successful socialization often entails teaching low-income students and families to decode the educational system. For example, if a student is the first from their family wanting to pursue higher education, they must have knowledge of the courses they should take in high school, while also understanding the admissions process, application requirements, deadlines and more. Thus, high schools can provide "college-linking" strategies (Farmer-Hinton & Adams, 2006; Hill, 2008). It is unlikely that this type of knowledge would come from familial social capital connections for a first generation college student. Stanton-Salazar argued that we need this pedagogical commitment on the part of researchers and educators in order to democratize schools and society so that educational outcomes are not a sole product of social class or demography. This powerfully illustrates that schools can choose to organize their environments in ways that allow students access to social capital that helps improve outcomes for vulnerable youth.

As an example, Croninger and Lee (2001) conceived of teachers as social capital resources, investigating the number of times students reported "student-teacher talks," as forms of institutional support. They suggested that student-teacher relationships would be linked to positive educational outcomes such as high school graduation. Using NELS: 88 data and logistic regression, the researchers found that students who had access to teacher time outside of class were half as likely to drop out of school. This study also underscores Stanton-Salazar's argument that students are unlikely to "make it" without institutional support.

Like Croninger and Lee, Goddard (2003) conceptualized schools as social capital resources for students and examined how these resources would enable positive educational outcomes such as student achievement. Goddard utilized hierarchical generalized linear modeling with survey data from teachers to show that student's odds of passing state mandated assessments in urban elementary schools were positively associated with the levels of social capital characterizing schools. One benefit of this work is that it provided a measure of school-level social capital consistent with Coleman's framework upon which we draw for this study. This contrasts with research on social capital using national data sets (Dika & Singh, 2002) that, while generalizing to the entire population, often rely on incidental measures that can make inferences more difficult because of weak mapping to the underlying theoretical framework.

Salloum et al. (2017) examined different ways in which social capital has been conceptualized as well as prior theory and research on its formation and consequences. While some theoretical and empirical work conceptualizes social capital as a mechanism for prosocial outcomes (e.g. Croninger & Lee, 2001; Goddard, 2003), other scholars address it as an apparatus that maintains social status (e.g. Ream, 2003). Using data collected from 96 Midwestern high schools, Salloum et al. found variance in social capital was significantly related to school membership. However, more than half of the variance in social capital was unrelated to social class, and social capital was a positive predictor of academic achievement after holding constant measures of social class. In other words, schools demonstrated natural variation in social capital that was both unrelated to social class and positively linked to student learning.

Taken together, these articles illustrate that higher levels of social capital were statistically associated with positive student outcomes. Social capital is present in schools, and it is a productive way to connect students to knowledge and resources. Moreover, schools can provide valuable social capital to students, but they vary in the degree to which they do so regardless of their social composition. However, none of the aforementioned studies considered how the financial resources made available to the school could impact social capital. When funding conditions are less than ideal, relationships between teachers and students could suffer. With constrained instructional resources, for example, teachers could be in survival mode, more concerned with curricular materials to execute lessons rather than focusing on how students are engaging with learning tasks. As Stanton-Salazar (1997) points out, it is in contexts serving low-income and minority students where social capital is most pivotal. Despite this, social resources are often neglected in the consideration of school reform. Rather, financial resources are often sought in the interest of raising student achievement. Thus, we also consider fiscal resources in our study of social capital, as money is an additional form of capital with the potential to improve student achievement. Therefore, we turn next to a discussion of financial capital in schools and research on its link to student learning.

Financial capital

The education of American students represents a substantial human capital investment, as 4.6% of the U.S. GDP, or more than $600 billion dollars, was spent during the 2014-2015 school year (NCES, 2015). In general, many Americans assume a connection

between spending and educational outcomes; according to this argument, by spending more money on education, educational quality will improve, thus bolstering student achievement. In practice, however, it is not so simple. "The effects of resources depend on both access and use: students and teachers cannot use resources they don't have, but the resources they do have are not self-acting" (Cohen, Raudenbush, & Ball, 2003, p. 122).

Given the magnitude of the American investment in schools, many legislators and policy makers may question if resources *cause* student achievement gains while taxpayers need assurance that these dollars are well spent. As stated by Baker:

> The typical storyline is that spending per pupil has increased dramatically and pupil-to-teacher ratios have declined, at the same time that scores on national assessments have stagnated, and scores on international assessments have fallen behind the rest of the developed world. The conclusion: we're spending more and more, and not getting results, so it's clear that money doesn't make a difference (Baker, 2016, p. 1).

To better understand American investments in schools, the production function emerged as a prominent research tool used to estimate the relationship between expenditures and various indicators of school effectiveness. In this form of inquiry, researchers quantitatively model which variables are important to students' educational outcomes (Verstegen & King, 1998). Public policy literature abounds with studies of the relation between financial resources and student achievement (see Baker, 2016 for a review).

In a controversial assessment of typical production function research, Hanushek (1989) conducted a meta-analysis of various production function studies that provided 187 estimates of the statistical links between resources and student achievement. Hanushek engaged in vote-counting[1] and tabulated study results according to inputs (e.g. teacher pupil ratio). From this analysis he found no obvious consistency, leading him to conclude: "There is no strong, systematic relationship between school expenditures and student performance" (p. 47).

Such a contentious finding prompted investigation by additional researchers. Hedges, Laine, and Greenwald (1994) refuted Hanushek's methods and results, and through a more rigorous meta-analysis of the same data, concluded the results "suggest that since there are positive relations between outcomes and per pupil expenditures (PPE), and teacher experience, and teacher/pupil ratio, but no negative relations between outcomes and these resource inputs, the typical relation is positive" (p. 10). Furthermore, their analysis produced a median coefficient for PPE across all studies of .0014; this coefficient suggested that a $500 increase in PPE was associated with a .7 standard deviation (SD) increase in student achievement.

Neither of these meta-analyses, however, considered whether other school factors, such as social capital, might improve learning. The problem is that focusing only on money ignores both how funds are spent and put into practice. In contrast, this study considers both the independent and conjoint contributions of social and financial capital on student learning.

[1]Hanushek counted each estimate of resources separately to arrive at the conclusion that money has no impact on student achievement. Others have argued that it would be more appropriate to count each publication as a separate estimate (see for example, Hedges et al., 1994).

The impacts of social and financial capital on learning: a rationale for hypotheses

Given the vast financial investments Americans make in their local schools, a great deal of empirical research has explored the relationship between resources invested in schools and student performance. Generally, financial investments are a controversial and longstanding concern in American educational policy with debate focused on the degree to which schools translate fiscal resources into educational gains for students. Unlike most industrialized countries, local revenue sources partially fund schools in the United States due to fiscal federalism (McKinsey & Company, 2007; Odden & Picus, 2007); such local control sets the stage for grave inequities between students in more and less privileged communities (Heuer & Stullich, 2011). While we recognize that money alone will not necessarily improve student achievement nor make schools more equitable, we also acknowledge that the adequacy and equity of funding increases the probability of higher and more equitably distributed student outcomes (Berliner, 2013). Colloquially, if money doesn't matter, why worry about who has it? While recognizing the possibility that financial resources may assist schools in achieving their educational goals, we also believe there are non-fiscal investments that can benefit students' learning. A non-monetary investment teachers can make is in relationships among themselves and with students and families. Such efforts can develop social capital, which can facilitate or impede the conversion of resources to students (e.g. Coleman, 1988, 1990; Goddard, 2003; Lin, 2000; Portes, 1998; Putnam, 1993, 1995; Salloum et al., 2017; Small, 2010). Unlike financial capital, social capital is intangible and embodied in relationships among individuals. In practice, if a student has a stronger relationship with her teacher, she might be more likely to ask for assistance. Therefore, this student's relationship with her teacher, or social capital, gives her an advantage in better understanding and accessing content knowledge.

This study comes at a time when K-12 schools seem to be in continual budgetary crisis. According to The Center on Budget and Policy Priorities, 35 out of 48 states report school funding decreases to PPE when comparing fiscal year 2013 to 2008 (Oliff, Mai, & Leachman, 2012). Given the shrinking budgets K-12 schools are facing, it is important to revisit the relationship between financial capital and achievement, while also considering the contribution of non-monetary investments to students' learning. Our approach offers potentially policy-relevant input for policy makers who regularly search for cost-effective ways to improve learning outcomes for traditionally disadvantaged students.

We find this inquiry particularly germane to the state of Michigan. Michigan's Proposal A, a profound change in the distribution of PPE, dramatically transformed school finance in 1994. This landmark reform shifted school funding sources from the local to the state level. Many scholars agree that Proposal A made school funding more equitable among districts across the state (e.g. Arsen & Plank, 2003; Courant & Loeb, 1997; Kearney, 1995). In addition, test scores improved after the passage of Proposal A (Papke, 2005). Yet, gaps in achievement still remain between more and less privileged students. Papke acknowledges unobserved factors may have a relationship with student outcomes, and we respond to Papke's call by examining if one such unobserved factor, social capital, is related to student performance.

The theoretical work of Coleman illustrates that social capital is not just a property of the elite; rather, to some degree, social capital—both in the school and the community—can compensate for the lack of other forms of capital. According to Coleman, "like physical capital and human capital, social capital is not completely fungible but may be specific to certain activities. A given form of social capital that is valuable in facilitating certain actions may be useless or even harmful for others" (p. S98). Based on our review, we designed this study to address the following research questions:

1. Holding constant schools funding levels, is social capital positively and significantly related to student achievement?
2. Does the amount of funding a school receives matter to student achievement after accounting for the level of social capital characterizing it?
3. To what degree is social capital a function of important school contextual factors such as poverty and racial composition?
4. To what degree does the level of instructional expenditures to which schools have access predict the level of social capital they provide? That is, does financial capital appear to be converted by schools into social capital?
5. What are the relative effects of social and financial capital on student achievement?

Method

To address our research questions, we collected data from a representative sample of elementary schools in Michigan. In this section, we explain the context, sampling procedure, variables, and analytic method employed to test the hypotheses that guide this investigation.

Context

In 1993, Proposal A dramatically altered the funding of K-12 schools in Michigan (Papke, 2005). This law reconfigured school finances, eliminating local property taxes as the main source of funding for Michigan public schools (for a history, see Vergari, 1995). The five point plan included: "(a) a new state property tax, (b) an increase in sales tax rate from 4 to 6 percent, (c) a redirection of about $400 million in state funds from non-educational to K-12 spending, (d) a large increase in the state cigarette tax, and (e) several other revenue measures" (Prince, 1997, p. 395). Proposal A both shifted and cut taxes as the system became highly centralized.

Arsen and Plank (2003) argued that Proposal A had three major impacts. First, it was quite successful in providing a tax balance. While it was nearly impossible to eliminate property taxes altogether, Michigan drastically reduced the dependence on local sources for school funding. Second, in using sales tax, Michigan created a guaranteed tax base and assured a minimum level of spending on schools. Moreover, the state shifted the locus of taxation toward a more centralized system. Third, and most relevant to this paper, Proposal A made funding more equitable (Kearney, 1995; Prince, 1997). The law equalized spending by bringing the lowest spending districts up to the level of the basic

foundation allowance, while preserving the minimal difference between that level and actual spending of other districts. Overall, Proposal A increased average spending and reduced the variance across districts and students (Courant & Loeb, 1997). It also weakened the relationship between general operating expenditures and district property wealth. Papke (2005) also identified a fourth impact, as the passage of Proposal A had a nontrivial, statistically significant relationship with increased test pass rates.

Though Proposal A narrowed the school finance gap and improved student achievement following its implementation, disparity was not eliminated. Spending per pupil substantially increased in districts (generally relatively poor) where it had been lowest; however, spending was approximately unchanged from pre-reform levels in most other districts. In sum, Michigan is an example of a state that has demonstrated a commitment to equalizing funding sources but in which serious funding disparities nevertheless still exist. Thus, it provides a compelling context in which to examine whether the differences in funding that remain after policy-driven improvements to the equity of per pupil expenditures are related to student learning.

Sample

In collaboration with researchers at the University of Michigan Institute for Social Research, a stratified random sample of all Michigan public elementary schools were selected based upon prior achievement, school demographics, school size, and geographic location. Using public data from the Michigan Department of Education, eligible non-charter, public schools containing both 4th and 5th grade classrooms were randomly selected, because when these data were collected, state testing began in 4th grade. A total of 130 schools were contacted and 78 schools agreed to participate in the study by completing surveys (60% response rate). Analyses were conducted on the stratifying variables for school selection and the schools in the sample were not statistically different from the schools that declined participation. Weights were created to adjust for nonresponse at the school level.[2] Thus, the sample is representative of the elementary school population of the state of Michigan for the study year of 2004-2005. In addition to the school-level measures, individual student achievement data and demographic information were collected on the 4th grade students in each school from the Michigan Department of Education.

Data collection

Two levels of data were collected in this study: data about elementary schools and data about the students who populate these schools. To gather information about each school, survey data were obtained from teachers in sampled schools. Schools were mailed surveys, and principals were directed to administer the instruments during regular staff meetings. During these meetings, other data beyond the scope of this study

[2]The weights were computed as the inverse of the estimated response propensities from a logistic regression, using the stratification variables as controls. Two of the seventy-eight schools had excessively large weights, and after acknowledging negligible effects on point estimates for survey variables, the two outlier school weights were trimmed down to the next highest school weight. Weights were employed in all analyses.

Table 1. Social Capital Items and Item Loadings.

Items	Loadings
Parents in this school are reliable in their commitments.	.938
Parent involvement supports learning here.	.923
Teachers in this school trust the parents to support them.	.917
Parents of students in this school encourage good habits of schooling.	.907
Community involvement facilitates learning here.	.854
Teachers in this school trust their students.	.841
Students in this school can be counted on to do their work.	.840
Teachers in this school have frequent contact with parents.	.767
Students are caring toward one another.	.758

were collected. For this reason, we employed two surveys. Teachers responded to one of two versions of a survey (form A or form B); one form contained all of the social capital items. When the surveys were sent to the school, the forms were shuffled such that every other survey was a form A or B. Therefore, it was random to which survey form a teacher responded. Half of the teachers present were given a survey with questions that assessed the level of social capital in the school.

Measures

Because social capital resides in relationships, it is a difficult construct to measure. To this end, the existing scholarship operationalizes social capital in a variety of ways. Many researchers rely upon national data sets to study social capital. The strength of such an approach is that results generalize to the national population. However, theoretically these studies suffer because the operational measure of social capital is limited to the variables included in national datasets; often, social factors that may or may not coherently fit together are operationalized as social capital (Dika & Singh, 2002).

In contrast, the scale employed to measure social capital in this study is consistent with the conceptual framework work of Coleman (1988, 1990). This study considers teachers' perception of social capital in the school, in particular how the teacher estimates the trust, social networks, and norms amongst the collective teaching staff, students, and parents. Teachers' collective responses were used to create a measure of the level of social capital characterizing schools. Social capital was operationalized by nine items developed by Goddard (2003). See Table 1 for the items. Teachers responded to each on a five-point Likert scale (from 1 = strongly disagree to 5 = strongly agree). Although in the literature review we have discussed trust, networks, and norms separately in places, social capital is a complex construct and social structure and function are not easy to disentangle (Goddard, 2003). Thus, as a review of these items demonstrates, some clearly span more than one facet of social capital, reflecting the complexity of the construct. This is because the normative orientation of a social network helps one understand whether the network constitutes a form a social capital that is useful in the pursuit of valued outcomes[3]. Given this, items such as "parent involvement supports learning here" indicate not only teachers' view regarding social network activity connecting parents to the school but also that the activity is normatively valuable to

[3]For example, gangs can be characterized by strong social networks and high levels of solidarity and trust among members but their normative orientations generally do not lead them to promote prosocial outcomes.

student learning. Likewise, when teachers report trusting students and parents (e.g. "Teachers in this school trust their students,"), they are reporting not only about trust but also providing some evidence that teachers and students are connected by a relational network.

In addition, while there is some evidence that student perceptions of school environment are similar to those of teachers insofar as they predict learning outcome differences among schools (Gietz & McIntosh, 2014), there is also evidence that teacher and student perceptions about instructional practice differ in significant ways (Brown, 2009) and that student and teacher perceptions of overall school climate are statistically unrelated (Mitchell, Bradshaw, & Leaf, 2010). Therefore, although the work of Gietz and McIntosh provides some evidence that student perceptions of school environment are predictive of their learning outcomes and we examine student learning outcomes, we make no claim that teachers' perceptions of social capital match those of their students. Instead, we take the approach of the vast majority of social capital studies reviewed here by relying on teacher reports regarding the degree to which social capital is present in their schools.

To explore the relationships between social capital, instructional expenditures, and student achievement, we aggregated each of the social capital survey items to the school level and then employed confirmatory factor analysis to operationalize the latent school-level trait as a single factor. The nine items had a Cronbach's alpha of 0.96, which indicates a very high level of internal consistency for the scale.

As a proxy for the resources spent on students, we employ instructional expenditures per pupil as our measure of financial capital in each school. We chose to use instructional expenditures per pupil[4] over the broader per pupil expenditure measures that include other expenses such as capital outlays, transportation, and administrative costs because this measure provides a more accurate depiction of the investment districts make in instruction. These data were obtained from the state, and we report instructional expenditures in $1000 increments for ease of interpreting the coefficients. Though we include instructional expenditures in the school level of our model, the actual outlay per pupil is set at the district level. Our sampling procedure resulted in a small proportion of multiple schools appearing in the same district, but rarely were there more than two schools in any one district. Though this distribution leads to some issues of independence, the best analytic choice given our sample and power was to include instructional expenditures at the district level.

In addition, student achievement, school demographics, and individual student data were collected from the Michigan Department of Education. Our measures of student achievement are scaled scores of student performance on the 4th grade reading and mathematics assessments administered in 2005. At the student level, we include control variables for minority status (defined here as African-American, Hispanic, Native American or "Other" categories), poverty status (if the student was eligible for free/reduced priced lunch), special education (SE) status, and if a child was an English

[4]In operationalizing financial capital, we experimented with a variety of finance variables (i.e. class size, per pupil expenditures, and the like). However, other than instructional expenditures per pupil, none had a significant relationship with student achievement.

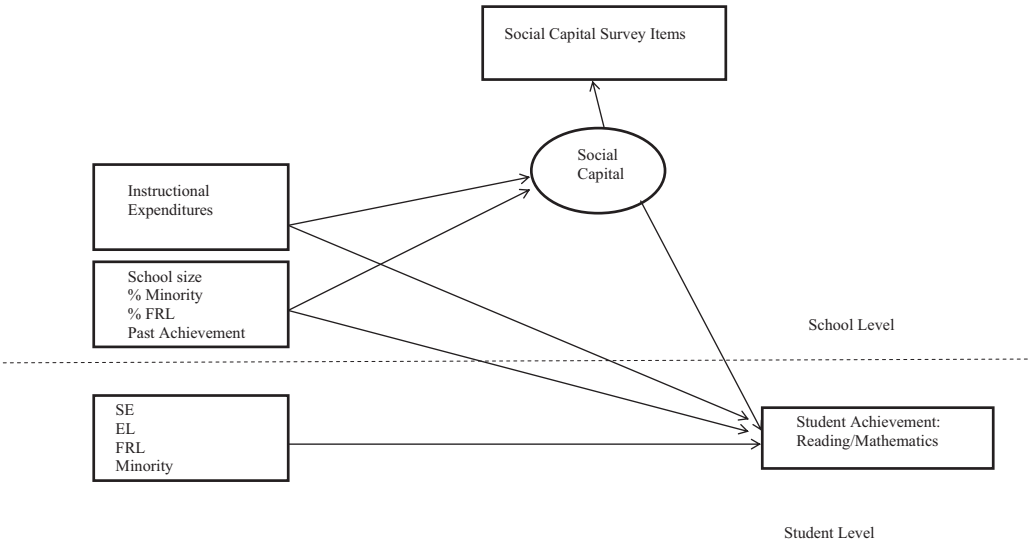

Figure 1. MSEM model.

Learner (EL)[5]. All of these measures have historically been associated with student achievement, and thus, are important to account for in our model. Further, we included school-level measures for percent of minority students, percent of students eligible for free/reduced priced lunch, and school size. These three measures could potentially influence instructional expenditures, social capital, and student achievement. When data were collected, students were first tested on mathematics and reading in the 4th grade, and thus, there was no student level measure of prior achievement. In order to control for prior achievement in some way, the proportion of students passing the 4th grade mathematics and reading assessments in each school one year earlier served as controls. Therefore, the prior achievement scores reflect previous levels of achievement in the sampled schools. To facilitate interpretation of the results, all continuous variables employed in the analyses were standardized ($mean = 0$, $SD = 1$) for the final analysis.

Analytic method

Given our research question and the nested nature of the data, multilevel structural equation modeling (MSEM) was the most appropriate method. MSEM allowed us to first examine how instructional expenditures correlate with the level of social capital in a school, while controlling for school-level demographics. Second, we estimated the relationships from social capital and instructional expenditures to student achievement, again controlling for student and school demographics. Specifically, we conducted two MSEMs, one with mathematics achievement as an outcome and one with reading achievement as an outcome. The general path model is shown in Figure 1. In both models, the nine social capital items load on a single factor through confirmatory factor

[5]At the time these data were collected, the state used the deficit term Limited English Proficiency (LEP) but we choose to use the more resource-orientated term, English Learner (EL), throughout this paper.

analysis, and the path lines indicate how the student level and school level variables associate with social capital and student achievement.

Results

The investigation began with a descriptive analysis of student and school level variables, the results of which are reported in Table 2. Prior to generating this information, and all subsequent analyses, we conducted listwise deletion at the student level to manage missing data. Our final sample resulted in 5003 students nested in 78 schools. We had no missing data at the school level. In our sample, about 22% of students were a racial/ethnic minority, and about a third were eligible for free or reduced-price lunch (FRL), which mirrored the 4th grade state population at the time data were collected. With regard to special needs, roughly 12% of students were identified in special education (SE), and 5% were classified as English Language Learners (ELs). The average student scored 549.4 on the mathematics assessment and 562.0 on the reading assessment.

At the school level, the average level of instructional expenditures per student was $5150, which ranged from $4030 to $7150 (recall this is *not* total expenditures). The average school in our sample served a student body with 39% of students eligible for free or reduced priced lunch. On average, just over 371 students were served in grades K-6, with a low of 82 and high of 676 students. Finally, approximately 78% and 83% of students in the average school passed the mathematics and reading assessments respectively. In regards to the level of social capital in the school, we constructed a histogram to examine the distribution of the variable. While the histogram (see Figure 2) indicates a negative skew to the data, the distribution does approximate normality sufficiently enough to proceed with our analyses.

To test whether or not to include the four student-level variables (SE, EL, FRL, and minority) in the MSEMs, we compared mean scores for both mathematics and reading achievement using independent samples t-tests. SE students, FRL students, and minority students tended to score significantly lower on both assessments. EL students scored significantly lower on the reading assessment, but there was no difference in

Table 2. Descriptive Statistics (n = 5,014 Students, 78 Schools).

Variable	Min	Max	Mean	SD
Student Level:				
Special Education	0	1	0.12	–
English Learner	0	1	0.05	–
Minority	0	1	0.22	–
Free/Reduced Lunch (FRL)	0	1	0.35	–
2005 Math Achievement[a]	439	732	549.4	29.26
2005 Read Achievement[a]	391	776	562.0	34.03
School Level:				
Instruc. Expenditures (per $1000)[a]	4.03	7.15	5.12	0.79
Social Capital[a]	−2.27	1.86	0	1
% FRL Students[a]	0.01	0.98	0.39	0.25
% Minority Students[a]	0.00	1.00	0.20	0.28
School Size (K-6)[a]	82	676	371.2	112.0
2004 Math Pass Rate[a]	23.4	100	77.95	13.31
2004 Read Pass Rate[a]	43.8	100	82.27	11.26

[a]Variables are standardized to a mean of 0 and standard deviation of 1 for analyses.

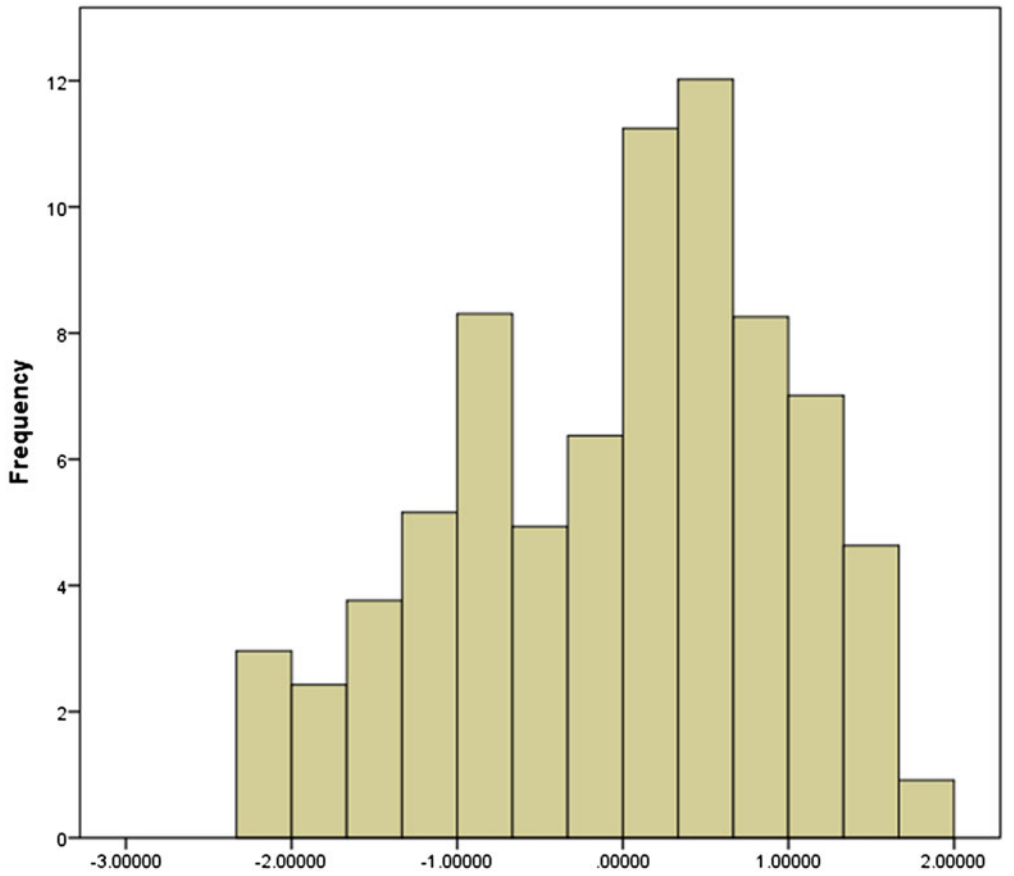

Figure 2. Histogram of social capital.

performance on the mathematics assessment. Given these findings, we included all four variables in the models.

At the school level, we constructed a correlation matrix to examine relationships among instructional expenditures and control variables (see Table 3). The percent of minority students and social capital were the only variables to significantly correlate with instructional expenditures ($r = 0.381$, $p < .01$ and $r = -.225$, $p < .05$ respectively). In addition, social capital significantly correlated with all of the control variables (except school size). The percent of minority students and percent of FRL students were positively correlated and each demographic characteristic had a negative relationship with student achievement. School size did not significantly correlate with any of our other measures; however, we kept the variable in our model because it may be important to understanding the level of social capital in a school.

To address our research questions, we conducted two MSEMs with mathematics achievement and reading achievement as outcomes respectively. As stated earlier, we weighted all analyses at the school level to adjust for nonresponse. Table 4 contains the model fit parameters for both the reading and mathematics achievement models. The root mean square error of approximation (RMSEA) for the reading and mathematics models were 0.012 and 0.014 respectively, which can be considered indications of good

Table 3. Correlation Matrix of School Level Variables (n = 78).

	Instruc. Exp.	Social Capital	School Size	% Minority	% FRL	% Pass Read	% Pass Math
Instruc Exp.	1						
Social Cap.	-.225*	1					
School Size	-.010	-.143	1				
% Minority	.381**	-.657***	-.003	1			
% FRL	.101	-.757***	-.159	.573***	1		
% Pass Read	-.039	.563***	.061	-.431***	-.578***	1	
% Pass Math	-.063	.513***	.091	-.383**	-.444***	.789***	1

$\sim p < .1$
$^{*}p < .05$
$^{**}p < .01$
$^{***}p < .001$.

Table 4. Model Fit Statistics.

	Reading Model	Mathematics Model
RMSEA	0.012	0.014
CFI	0.959	0.947
SRMR Within	0.010	0.010
SRMR Between	0.071	0.091

fit (Browne & Cudeck, 1993). In addition, the comparative fit index (CFI) for each model (CFI reading = 0.959; CFI mathematics = 0.947) denoted a good to relatively good fit (Hu & Bentler, 1999). Finally, the standardized root mean square residuals (SRMR) within and between schools for both models also indicated that models fit acceptably. Overall, these models provide good approximations for the relationships between demographics, instructional expenditures, social capital, and student achievement.

The results of the MSEM with 4th grade reading achievement as an outcome can be found in Table 5. Prior to running the full model, we calculated the intraclass correlation coefficient, which is 7.4%. First, we examined what school characteristics influence a school's level of social capital. Larger schools had significantly lower social capital scores (b = −0.131, $p < .001$), and schools with higher percentages of students eligible for free/reduced price lunch also had lower levels of social capital (b = −0.317, $p < .001$). Schools with a higher ratio of racial/ethnic minority students tended to have lower social capital, but the coefficient was only marginally significant (b = −0.104, $p < .10$). Prior achievement was also significantly related to social capital with each standard deviation increase associated with an increase in the level of social capital of 0.084 standard deviations ($p < .05$). Finally, the instructional expenditures of a school were not significantly linked to social capital in our sample of schools. According to the R^2, the variables in our model explained 69.6% of the variation in social capital among schools.

Second, we illuminated how the variables in the model were associated with the reading achievement outcome. Within schools, all four of the student characteristics were significantly associated with student's achievement on the state mandated reading assessment. SE students (b = −0.784, $p < .001$), ELs (b = −0.420, $p < .001$), students eligible for free/reduced price lunch (b = −0.282, $p < .001$), and ethnic/racial minority students (b = −0.347, $p < .001$) scored significantly lower on average on the assessment than their peers. Between schools, instructional expenditures had only a marginal

Table 5. Reading Model Results.

Variable	Estimate	Standard Error
Within:		
SE → Read Ach.	−0.784***	0.053
EL → Read Ach.	−0.420***	0.130
FRL → Read Ach.	−0.282***	0.036
Minority → Read Ach.	−0.347***	0.041
Between:		
Inst. Exp. → Social Capital	−0.048	0.037
Size → Social Capital	−0.131***	0.037
% Minority → Social Capital	−0.104∼	0.056
% FRL → Social Capital	−0.317***	0.059
Prior Read Ach.→ Social Capital	0.084*	0.042
Social Capital → Read Ach.	0.253*	0.109
Inst. Exp. → Read Ach.	0.054∼	0.030
Size → Read Ach.	0.009	0.037
% Minority → Read Ach.	0.029	0.046
% FRL → Read Ach.	0.073	0.054
Prior Read Ach. → Read Ach.	0.165***	0.041

∼$p < .1$
*$p < .05$
**$p < .01$
***$p < .001$.

relationship with reading achievement ($b < 0.054$, $p < .10$); however, the level of social capital in a school was positively and significantly related to students' performance on the 4th grade reading assessment with each standard deviation increase in social capital associated with a 0.253 standard deviation increase in a student's score ($p < .05$). A school's past performance on reading assessments was also predictive of current reading achievement ($b = 0.165$, $p < .001$) but notably less so than social capital. None of the other controls (school size, percent of minority students, and percent of FRL students) were significantly linked with reading achievement. Overall, the R^2 indicates that our model explained 12.7% of the variance in reading achievement within schools and 49.1% of the variance between schools.

The results of the SEM with 4th grade mathematics achievement as an outcome are reported in Table 6. The intraclass correlation coefficient for the mathematics was 0.111. As in the reading model, school size ($b = -0.133$, $p < .001$), percent of FRL students ($b = -0.325$, $p < .001$), and prior achievement ($b = 0.106$, $p < .05$) were significantly linked to social capital with a marginal relationship between percent of minority students and the outcome ($b = -0.098$, $p < .10$). Again, instructional expenditures were not linked to the measure of social capital. Overall, this model explained 71.1% of the variance in social capital, according to the R^2.

When we turn to the mathematics achievement outcome portion of the model, whether or not a student is identified as SE ($b = -0.637$, $p < .001$), whether or not the student is eligible for free/reduced lunch ($b = -0.308$, $p < .001$), and whether or not the student is a racial/ethnic minority ($b = -0.393$, $p < .001$) all had significant, negative relationships with mathematics assessment scores. However, ELs did not perform significantly different from their counterparts, as in the reading model. At the school level, social capital was again linked to achievement with each standard deviation increase in the measure associated with, on average, a 0.306 standard deviation increase in adjusted mean student performance on the 4th grade mathematics assessment ($p < .05$). In this model, instructional expenditures were significantly and positively linked to students'

Table 6. Mathematics model results.

Variable	Estimate	Standard Error
Within:		
SE → Math Ach.	−0.637***	0.073
EL → Math Ach.	−0.150	0.116
FRL → Math Ach.	−0.308***	0.034
Minority → Math Ach.	−0.393***	0.040
Between:		
Inst. Exp. → Social Capital	−0.050	0.034
Size → Social Capital	−0.133***	0.037
% Minority → Social Capital	−0.098∼	0.054
% FRL → Social Capital	−0.325***	0.054
Prior Math Ach.→ Social Capital	0.106*	0.042
Social Capital → Math Ach.	0.306*	0.142
Inst. Exp. → Math Ach.	0.093*	0.042
Size → Math Ach.	0.032	0.038
% Minority → Math Ach.	0.015	0.050
% FRL → Math Ach.	0.138	0.087
Prior Math Ach. → Math Ach.	0.173***	0.033

$\sim p < .1$
$^{*}p < .05$
$^{**}p < .01$
$^{***}p < .001$.

achievement in mathematics (b = 0.093, $p < .05$). As in the reading SEM, prior achievement was significantly and positively related to the outcome (b = 0.173, $p < .001$), while school size, percent of minority students, and percent of FRL students did not have significant relationships with mathematics achievement. Based on the R^2 output, the model explained 11.1% of the variation within schools and 39.5% of the variation among schools in mathematics achievement, and similar to the reading model, social capital was the strongest school level predictor of achievement.

Discussion

This study illustrates that social capital has a positive and significant relationship with both elementary reading and mathematics achievement after controlling for instructional resources and school demographic characteristics. In other words, when taking other factors into consideration, social capital makes a difference to student achievement. In fact, social capital was not only more important to achievement than instructional expenditures (three to five times more important) but also more important than the schools' poverty, ethnic makeup, or prior achievement. Because these data generalize to the population of elementary schools in Michigan, these findings lend considerable support to research indicating social capital matters to student achievement (e.g. Goddard, 2003; Hao & Bonstead-Bruns, 1998; Salloum et al., 2017; Sui-Chu & Willms, 1996). This research illustrates that trust, networks, and norms—three key forms of social capital theorized by Coleman (1988)—provide fundamental support for student learning. While seemingly obvious, the trust teachers place in the students and the families they serve, and the relationships they form with them appear to be critical to how much students learn and in turn how well schools perform on high stakes accountability measures. This is consistent with related, past research supporting the importance of trust to academic achievement (Bryk & Schneider, 2002; Goddard et al., 2001, 2009). Schools need to consider how trust fosters social relationships between home and school

in an effort to facilitate educational outcomes. In addition, productive normative environments, both inside and outside of school, which support academic achievement, are essential pieces to consider in the building of social capital.

We examined the construct of social capital through this work. We learned that social capital itself is not equitably distributed across Michigan's elementary schools. On average, as poverty levels increase, the social capital available to students decreases. Importantly, however, more than half of the variation in social capital was unrelated to school demographic composition and instructional expenditures. This implies that even after accounting for the influence of the SES, ethnic composition, and instructional expenditures characterizing the communities schools serve, some schools are better than others at developing social capital. Thus, the trust, relational networks, and norms present in a school are potentially malleable in part regardless of demographic composition or funding levels. Perhaps most importantly, we learned that instructional expenditures did not predict social capital, implying that social capital is not easily purchased; perhaps social relationships require a different type of investment.

A secondary finding is that instructional expenditures were related to academic achievement in both reading and mathematics. However, this effect, while statistically significant, was modest for mathematics and was marginally significant for reading (i.e. $p < .10$). It seems that the dollars allocated to instruction do have some relationship with student achievement. However, it is important to note that when comparing resources, the effect of social capital is about 3 to 5 times greater than that of instructional expenditures for mathematics and reading respectively. This analysis also illustrates the greater the minority concentration in schools, the greater the instructional resources, which may be a reflection of compensatory education funding policy. We also observed that the larger the concentration of impoverished students served by the schools in our sample, the lower the level of social capital to which students had access. Thus, while minority students may have access to similar levels of instructional resources as their peers, it is clear that minority students do not have access to the same school-based social capital.

This analysis also illustrates that financial capital and social capital are independent of one another. That is, the amount of funding a school has for instruction does not have a relationship with social capital. In addition, financial capital does not appear to be converted by schools into social capital. This means schools of low levels of funding are not penalized because social capital appears to develop independently of financial capital. Given the relative size of their effects, investments in social capital could yield improvements in learning for vulnerable youth.

Perhaps the more important and unanswered question in this study is how to cultivate social capital. The MSEMs for both reading and mathematics reveal a strong negative relationship between subsidized lunch, minority status, EL status, and SE status and student achievement. Thus, this study replicates the vast literature documenting the achievement gap. However, within the state of Michigan, an opportunity gap surfaces; there is a strong negative correlation between school-level social capital and the proportion of students receiving free and reduced price lunch, as well as school-level social capital and the proportion of minority students. The inequity of the distribution of social capital is particularly important given that the analyses revealed that it is a more

important predictor of achievement than instructional expenditures, to which minority students had greater access. As reviewed earlier, school funding has a long history of policy and litigation aimed at improving the adequacy and equity of its distribution. Thus, the finding that social capital—which predicted achievement 3-5 more strongly than instructional expenditures in the State of Michigan—was negatively related to school-wide measures of social disadvantage raises important policy questions about its distribution. Moreover, the differing levels of social capital and student achievement according to the demographic make-up of schools suggests that schools are not serving all students in the same ways and thus, students have vastly different experiences in school due to the complicated relationship between school-level social capital and student demographics.

Policy implications

In a state that worked on equalizing funding, instructional expenditures do not appear to be predictors of social capital. Through this analysis, we have learned that fiscal resources do not predict achievement as well as social resources. It might be that schools do not use money to purchase social capital or that social capital is independent of monetary investments. The policy implication is not that money does not matter. Schools clearly would not operate as they do in the absence of money, which is a long-standing school foundation and adequacy argument. A policy implication instead is how to strengthen social relations in ways that better support student learning, particularly in schools serving our most disadvantaged students. It might be that social relations between students, teachers, and families need serious consideration.

Future research

The results of our study suggest that our operational measure of social capital, which was based on teacher perceptions, was predictive of student achievement differences but a limitation of our study is that we did not consider student or parent perceptions of social capital. Future researchers may wish to examine the differences in predictive validity among teacher, student and parent perceptions of social capital. Our results also suggest that gains in student achievement may be more likely to flow from efforts to develop trusting school communities with a normative press for academics and strong community support than from simple increases in instructional expenditures. This is particularly important in an era of national economic struggle that made revenue growth difficult. This study suggests that although financial capital does matter to student achievement, it is likely not the most important variable in the production function equation. Therefore, to accurately estimate the relationship between per pupil expenditures and student achievement, future researchers should take care to develop well-specified models that do not omit important educational variables also known to influence student achievement. Our study is a step in this direction. Based on our results we believe future studies that include educational variables such organizational climate, leadership, and instructional practice are more likely to place the relative importance of per pupil expenditures in perspective.

This analysis considered schools as contexts for building social capital. We have the ability through educational policy to make alterations to social capital in schools (e.g. Kahne & Bailey, 1999). In fact, it is socially acceptable and desirable for schools to accommodate the clientele that they serve. Notably many studies ignore teachers as potential resources to their students and families. This is a particularly salient point, as students spend a great deal of time in school and consequently, with teachers. Therefore, future research might investigate teachers as institutional agents of schools (Stanton-Salazar, 1997, 2011) to shed more light on the ways in which they provide positive experiences for children and their families. Teacher attitudes are essential to consider if we have any hope of improving social capital, particularly in schools serving poor and minority students.

Given the positive association between social capital and student achievement differences among schools, it is important to learn how educators can foster social capital. Because of its importance, we offer a researchable question, how might we strengthen social capital in schools, particularly those serving disadvantaged youth? However, the literature is limited in offering such examples. Perhaps more school-based mentoring programs (Smith, 2007) connecting children to adults in their community might be a means of developing social capital that supports students' learning (Kahne & Bailey, 1999). However, research suggests that minority students tend to be less engaged in formal school sponsored activities (Ream & Rumberger, 2008) so targeting such opportunities may be necessary. Further research that provides insight into the building and cultivation of social capital in low-income communities is warranted. In addition, future researchers might want to examine whether programs designed to increase school-based social capital, such as those that connect parents and families to schools, lead to greater academic achievement in disadvantaged schools. At a minimum, the results of this study suggest that social capital makes an independent contribution, beyond instructional expenditures, to differences among schools in 4th grade students' reading and mathematics achievement.

Disclosure statement

No potential conflict of interest was reported by the authors.

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