

Instructional Conditions in Charter Schools and Students' Mathematics Achievement Gains

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Abstract

Because charter school research on student achievement is mixed, many researchers and policymakers advocate looking inside the black box of schools to better understand the conditions under which schools of choice may be effective. We begin to address this issue with data from charter and a comparison group of traditional public schools; we also conduct propensity score matching at the student level to further understand achievement gains. In our analyses of these data, we find no charter school effects on students' achievement gains. Instructional conditions, such as teachers' focus on academic achievement, are related to mathematics gains. However, we find that our innovation measure is negatively associated with gains (controlling for other conditions) suggesting that innovation for innovation's sake should not be the sole focus of schools, whether charter or not.

Biographies

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When examining school choice, one is struck by the variety of options available in the United States, such as magnet schools, charter schools, school vouchers, tuition tax credits, open enrollment, private schools, homeschooling, and school transfer options under No Child Left Behind (NCLB). One is also struck by bitter controversies surrounding these choices.

Despite the controversies, the school choice movement is gathering steam. So too, research on choice is expanding to assess whether or not the movement is doing what it aims to do: advance educational opportunities for America's students by expanding school choice options to families (Berends et al. 2009). Most of that research effort to date, however, has limited its focus to student outcomes, neglecting school structure and processes as they relate not only to student outcomes but the three key aspects of schools that the choice movement intends to improve—autonomy, innovation, and accountability (Berends et al. 2008a; Gill et al. 2007; Lubienski 2003).

Central to advocates' argument for choice is that these three aspects of reform will produce changes in organizational conditions that promote learning, curriculum, and instruction, which in turn will lead to better student outcomes. Moreover, the argument goes, practices and conditions related to autonomy, innovation, and accountability will differ across schools and school types, thus responding to parental and community preferences, and further promoting student achievement. Notwithstanding this foundational claim of school choice advocates, research supporting or refuting it is either nonexistent or mixed (Berends et al. 2009; Betts et al. 2006; Betts and Loveless 2005; Gill et al. 2007).

Charter school-effects research proves the point: many studies lack information about the schools themselves, whether charter or traditional public. Although they shed some light on the main effects of charter schools in different locales, they provide limited information about the

schools as organizations and the conditions within them that may promote student achievement. The organizational practices remain a black box, particularly the curriculum and instruction that is most likely to affect student learning.

In this paper, we focus on the area of school choice as it relates to charter schools. In particular, we explore the achievement gains in charter and traditional public schools and how these gains are mediated by organizational and instructional conditions. Thus, we extend the research of Goldring and Cravens (2008) by linking the organizational enabling conditions and teachers' academic press for learning to the mathematics achievement gains of elementary school students in charter and traditional public schools.

In what follows, we briefly review the current state of research on charter schools, emphasizing the need to look "inside the black box" in terms of organizational and instructional conditions that promote achievement. We go on to briefly describe the research questions, conceptual framework, hypotheses, and constructs we will examine to understand differences among students in charter and traditional public schools. In addition, we outline the data collection procedures and analytic approach before presenting the results, discussing their implications, and describing the next steps in our research.

The Need to Open the Black Box of Charter Schools

Many researchers and policymakers advocate looking inside schools to better understand the conditions under which schools of choice have or do not have positive effects on achievement (Betts and Loveless 2005; Gill et al. 2007; Hess and Loveless 2005; Zimmer and Buddin 2007; Zimmer et al. 2003). A consensus panel of prominent researchers on choice concluded that researchers should seek to distinguish among schools of choice in terms of effectiveness, and to distinguish the reasons for those differences (Betts et al. 2006). They go on

to say that such research requires detailed information about curriculum, instruction, organizational conditions that promote achievement, and teacher characteristics and qualifications.

Thus, as these researchers suggest, we attempt here to open up the black box of charter schools and link this information to student achievement gains within a quasi-experimental design. Specifically, we use propensity score matching at the student level to explore differences in student mathematic gains and their relationship to organizational and instructional conditions.

In our analyses, we address the following research questions: How do students in charter public schools compare with matched students in traditional public schools in terms of student achievement gains? What are the mediating effects of organizational and instructional conditions on these elementary students' achievement gains?

These research questions are embedded in a conceptual framework that aims to further our understanding of what goes on inside charter schools. This framework is grounded in the sociological literature on the social organization of schools and classrooms (Bidwell 1965; Hallinan et al. 2003). It also addresses how market theory and institutional theories differ in their predictions about whether charter schools' organizational conditions and teachers' academic press promote greater learning than their traditional counterparts. In this paper, we provide a test of whether charter school students outperform matched students in traditional public schools and whether student achievement gains are related to instructional conditions.

Market and Institutional Theories

There are two competing theories about the possible impact of charter schools on teaching and learning and in-school organizational conditions—market theory and institutional theory. Many reformers maintain that market-style mechanisms of consumer choice and

competition between autonomous schools will encourage diverse and innovative approaches (e.g., Chubb and Moe 1990; Walberg and Bast 2003). The assumption is that as school choice undercuts bureaucratic political control of public education, it provides educators in schools of choice the opportunity and motivation to experiment with new organizational and instructional strategies for improving student achievement.

Proponents of choice argue that providing this freedom not only diversifies educational opportunities, but also creates incentives for the improvement of traditional public schooling through increased market competition for services. For example, Chubb and Moe (1990) and others (e.g., Friedman 1962; Lieberman 1989, 1993) argue that as choice allows market-like competition to increase and bureaucratic structures to decline, it provides parents with greater opportunities to interact with schools and schools with greater openness to parents' demands. Supporters of de-bureaucratization contend that parents, especially low-income and minority parents, will be less intimidated by the schools and more willing to make their needs known to school personnel, resulting in school processes that will lead to higher achievement (Cookson 2002; Rinehart and Lee 1991). Based on the supply-and-demand supposition of market theory, we can imagine a situation in which school administrators have almost complete control over the mix of services that they provide and the approaches they use, and a situation in which parents have many choices of schools available for their children (Betts 2005). Summarizing this perspective, Chubb and Moe (1990, 67) argue that choice schools

operate in a very different institutional setting distinguished by the basic features of markets—decentralization, competition, and choice—and their organizations should be expected to bear a very different stamp as a result. They should tend to possess the autonomy, clarity of mission, strong leadership, teacher professionalism, and team cooperation that public schools want but except under very fortunate circumstances are unlikely to have.

Some hold that privatization and school choice can bring about “creative destruction,” borrowing from Joseph Schumpeter, who in the 1940s argued that entrepreneurs relied on radically new technologies—whether more effective, more efficient, or both—to promote economic progress and replace older technologies (Walberg forthcoming; Schumpeter 1942). As the theory goes, such privatization and increased choice will lead to better outcomes, lower costs, and greater satisfaction of employees, parents, and students. According to Walberg (forthcoming, 73), “market-based consumer-driven school choice seems the best hope for creative destruction of new technologies, the expansion of choice, competition, and diversity for substantial, sustained achievement improvement.” Chubb and Moe (1990, 217) hold a similar position, calling choice a “revolutionary reform that introduces a new system of public education.”

Critics of the market model, however, raise questions about the empirical validity of its key assumptions about parent-consumers (demand-side), schools (supply-side), and the products that a market in education would generate (Finnegan 2007; Henig 1999). From such criticism comes an alternative theory about the consequences of school choice: institutional theory. Stemming from broader organizational analysis, this *new institutionalism*, developed by John Meyer and colleagues over several decades (Meyer 1977; Meyer and Rowan 1977, 1978; Powell and DiMaggio 1991; Scott and Meyer 1994; Scott and Davis 2007), characterizes schools as institutions with persistent patterns of social action that individuals take for granted.

Agreeing with market theorists that the bureaucratic form of schooling dominates the public school sector in the United States (and some other countries), institutional theorists take a different tack in their analysis of the education environment. For instance, the increase in bureaucratization of schools has led to an increase in rational coordination among the nested layers of the school—from the federal government to the state, districts, schools, and classrooms.

According to institutional theorists such as Meyer and Rowan (1977, 1978), this bureaucratic, rational network has resulted in a system of categories or rules, called *ritual classifications*, that define the actions of schools, teachers, and students. Over time these ritual classifications become institutionalized and accepted as the norm for what constitutes a legitimate school and schooling activities (Bidwell and Kasarda 1980).

Examples of taken-for-granted classifications include certified teachers, instructional time, standardized curriculum subjects, age-based classes of reasonable size, and use of curricular materials. In large part, these rules have shaped schools, whatever the type in whatever sector, that look much more alike than different. Institutional theorists refer to this as *isomorphism* and have documented its diffusion both in the United States and throughout the world (Meyer and Ramirez 2000). Summarizing the research and theory regarding the taken-for-granted school rules in the institutional perspective, Bidwell and Dreeben (2006, 23) write:

For all schools, public and private, the academic curriculum has become standardized around state mandates, following worldwide patterns of convergence for teaching basic elementary school skills and a core of high school subjects, including: English (or a mother tongue), science, mathematics, social studies, and foreign language.... To the same end, the constraints of college entrance requirements are felt equally keenly by both public and private high schools that offer college preparation.

To legitimize themselves within the broader community, school compliance to ritual classifications is important—more important, according to institutional theorists, than maximizing efficiency and innovations of school operations (Meyer and Rowan 1977; Scott and Meyer 1994). In other words, schools adapt to their environments by adopting accepted rules and structures, leaving actual classroom instruction and learning relatively unexamined and unmonitored. Such loose coupling helps schools maintain their validity (Weick 1976) and is further promoted by schools' logic of confidence that delegates instruction to teacher professionals who ultimately control what goes on inside their classrooms.

DiMaggio and Powell (1983) argue that there are different types of environmental pressures on organizations to make them more similar than different. These pressures include *coercive isomorphism*, which stems from formal and informal pressures by organizations and groups on which the school depends (e.g., federal and state mandates under NCLB); *mimetic isomorphism*, which stems from the adoption of similar structures and practices when facing uncertain tasks; and *normative isomorphism*, which stems primarily from professionalization of educators and professional networks.

When applied to school choice—including public charter schools—institutional theory emphasizes that *all* schools operate within highly institutionalized environments, which define what counts as legitimate schooling. All types of schools, no matter the sector or organizational form, adopt rituals, norms, and myths to support their validity (Meyer and Rowan 1977, 1978; Scott and Davis 2007). Thus, even schools of choice pay attention to institutional rules such as teacher certification, curricular subject matter, instructional time, reasonable class size, and mostly age-based grade organization.

In short, institutional theorists argue that the institutional environment of American schooling is so strong that significant changes in instruction are likely to be rare or short lived (Elmore 2007), and market theorists claim that increased choice will result in widespread autonomy promoting innovation, competition, and increased satisfaction and outcomes.

So who is right? Unfortunately, despite a couple of decades of charter school reform, the question has not been definitively answered. The limited empirical research is mixed on improved and differentiated instruction and in-school organizational conditions, curriculum content, and pedagogy in charter schools, supporting neither market theories nor institutional theories (e.g., Hoxby 2002; Lubienski 2003; Finn et al. 2000). Our research aims to inform these

theories by examining not only achievement effects, but organizational and instructional conditions of schools in charter and traditional public schools.

In-School Organizational Conditions, Teachers' Academic Press, and School Context

Many have argued that school improvement processes may work better in schools of choice than in traditional public schools (Betts and Loveless 2005; Bryk et al. 1993; Chubb and Moe 1990; Gamoran 1996; Walberg forthcoming). Specifically, proponents of choice have argued that characteristics long touted in the effective schools movement—leadership, teacher professional communities, teacher efficacy, instructional innovation and coherence—are all characteristics that school choice will promote (Goldring and Berends 2009). Thus, schools of choice will have higher levels of these conditions than traditional public schools (Chubb and Moe 1990; Walberg forthcoming). In other words, advocates of school choice point to these school organization and instructional conditions, because they argue that schools of choice should be more effective than traditional public schools. We view this as an open question in need of research.

School effectiveness research indicates that the aspects of schooling closest to students—teaching, instruction, and curriculum—have the greatest impact on student learning (Gamoran et al. 1995; Newmann and Associates 1996; Newmann et al. 2000; Newmann and Wehlage 1995). Therefore, as portrayed in Figure 1, we are interested primarily in what aspects of the outer circles are related to the central focus on student learning, as proxied by gains on student achievement tests. Drawing on previous school effectiveness studies, the theoretical framework depicted in Figure 1 motivated our data collection efforts to operationalize key theoretical constructs with teacher and principal surveys. Although other factors may be important (“omitted variables”), these constructs and their operationalization are supported by previous research in

terms of measurement properties and predictive validity, i.e., related to student outcomes like achievement scores (Goldring and Berends 2009).

Teachers' Academic Press for Learning

The circle for teachers' academic press for student learning incorporates teachers' activities with students' learning in classrooms. For instance, whether teachers use instructional innovations may be directly related to what students learn. So, too, might the amount of time that teachers and students spend on academic work. This framework also hypothesizes that student learning will increase when there is instructional program coherence—that is, when a common instructional framework guiding teaching and learning is implemented in the classrooms, and is well supported by school resources dedicated to its use (Newmann et al. 2001).

Within this circle of Figure 1, therefore, we include four constructs. The first is *academic instructional innovation*, which addresses schools' and teachers' incorporation of *instructional innovations* focused on student learning and with high expectations for academic success. Second, we consider *time on task* as it focuses on how engaged teachers are on the core activities of teaching and learning, including instructional focus, high expectations, school climate, monitoring of student progress, and school-community relations (Garrison and Holifield 2005). Third, following Newmann and Wehlage (1995), we include teachers' *focus on student achievement*; this comprises teachers striving for high levels of learning; dedicating themselves to the quality of curriculum content, accuracy, and precision in teaching practices and student performance; and emphasizing an in-depth understanding of instructional practice and student achievement (see also Newmann 1996). Although effective schools have a shared mission and goals focusing on student learning, the focus is not on any type of student learning. Rather,

effective schools concentrate on achievement goals that are aimed at a shared understanding of and continuous commitment to challenging academic standards for what students should know.

There is evidence that the coherence of the set of interventions schools adopt may matter at least as much as the nature of each intervention alone. Thus, the fourth construct we consider is *instructional program coherence*. This can be analyzed along several dimensions, including the degree to which the interventions a school has adopted fit together in terms of their demands on teacher attention and other resources, the alignment of classroom content with external standards and assessments, the consistency of the content taught among teachers of particular grades or courses, and the appropriate sequencing of content across grades.

Newmann et al. (2001, 297) define *instructional program coherence* “as a set of interrelated programs for students and staff that are guided by a common framework for curriculum, instruction, assessment, and learning climate that are pursued over a sustained period.” They point out the common finding that high-poverty, low-performing schools often adopt and drop programs according to the short-lived whims of district superintendents and school principals. Such adoption processes seldom build coherence among the various programs (see also Berends et al. 2002). Examining whether schools of choice are able to foster greater program coherence may be critical for understanding achievement differences that occur among school types.

In-School Organizational Enabling Conditions

This circle in our framework examines the organizational conditions that provide school capacity for improving instruction and student learning (Newmann et al. 2000). The four constructs we include here are *principal leadership*, *teacher decision-making authority*, *professional learning community*, and *teacher efficacy*.

The importance of *principal leadership* for school reform and improvement has been well recognized in educational research (Fullan 2007). Several studies have shown the value of leadership in establishing effective school improvement efforts, both in terms of setting a school's vision and mission as well as providing instructional direction (Berends et al. 2002; Edmonds 1979; Louis et al. 1996; Purkey and Smith 1983; Spillane 1996).

Teachers' decision-making authority, or the influence teachers have over school decisions, is an important hallmark of charter schooling and other reform efforts. The rationale for this is twofold. First, it is argued that moving decisions closer to those with technical expertise will result in more informed decisions than those made by administrators who are further removed from students. Second, reformers claim that teachers who have a voice in decisions will take greater ownership in those decisions and therefore invest more in their implementation. Although research has challenged this notion in charter schools (Finnigan 2007), further multivariate analyses are necessary to assess these claims.

The logic for greater teacher autonomy is grounded in the conception of the teacher as expert. If teachers were only freed from bureaucratic schools, critics suggest, they would be autonomous to innovate, diversify the curriculum, offer varied instructional strategies, and meet the needs of their students (Chubb and Moe 1990). In a survey of charter school teachers across ten states, the large majority indicated that having more teaching authority and less bureaucracy were factors in their decision to teach in a charter school (Vanourek et al. 1998). Similar findings are reported from research comparing private and public school teachers. In their study of San Antonio's private and public schools with students from a privately funded voucher program, Goodwin et al. (1998, 289) report that private school teachers "have greater autonomy and influence in their schools."

Professional learning communities—or the extent to which teachers cooperate, coordinate, and learn from each other to improve instruction and develop the curriculum—is an important feature of any school embarking on the path of improvement (Louis et al. 1996; Marks and Louis 1997). Judith Warren Little (2002, 46) provides a helpful description of this construct:

Genuine teacher learning communities—those with a demonstrable effect on teaching and learning—have a distinctive character. They question—and challenge—teaching practices when they prove ineffective with students and routinely investigate new conceptions of teaching and learning. They respect the creative contributions and passions of individuals, but are able to ask one another tough questions. Such groups maintain an open curiosity about their own practices and tolerate informed dissent...As McLaughlin and Talbert (1993, 15) observe, “Teacher learning community is not simply the collection of good and committed teachers.” Rather it is a group that embraces certain collective obligations for student success and well-being and that develops a certain collective expertise by employing problem solving, critique, reflection, and debate. The importance of respectful, professional debate within professional learning

communities is critical for continuous self-assessment—of one’s own teaching practice, of one’s own management of the school and classroom, of the schoolwide commitment to and engagement in furthering professional development and alignment to challenging instruction, and of coherence of schooling activities with the school’s mission and goals (Newmann 2002).

Teacher efficacy is the final construct we examined within the circle of in-school organizational enabling conditions. This we defined as teachers’ perceptions that their teaching is worth the effort and can lead to success for students (Newmann et al. 1989). In his seminal study, Lortie (1975) concluded that those teachers who perceive that they are achieving success with students report higher levels of commitment. “Conversely, teachers derive few rewards from teaching apathetic students” (Bryk et al. 1990, 183). We suspect that teachers with a high sense of efficacy are more likely to feel committed to their schools because they are more likely to invest in their profession and their students. Research has found that high school teachers who have greater control of classroom practices are more efficacious (Lee et al. 1991). Other studies

report a positive relationship between teacher efficacy and student achievement (Ashton and Webb 1986).

School Context

The outer circle of school context is also likely to shape the school organization and processes. School characteristics such as minority and socioeconomic composition as well as school size are likely to shape the types of activities that occur within schools (Berends et al. 2008).

School Type

The central argument about school choice, particularly charter schools, is that choice will influence not only the context (i.e., types of students who attend), but also the in-school organizational conditions, teachers' academic press for student learning, and, most importantly, student learning. It is the autonomy and flexibility, free from the typical requirements faced by traditional public schools, that allow charter public schools to directly shape the organization, instruction, and student learning in innovative ways (Bulkley and Fisler 2003; Gill et al. 2007; Lubienski 2003; U.S. Department of Education 2004). Thus, in Figure 1, we portray *school type* as cutting across not only school context, but also through the core of school organizations into classrooms in ways that directly and indirectly affect student achievement.

Do charter schools promote more effective in-school organizational conditions and improved teachers' press for student learning? In other analyses of the data examined here, Goldring and Cravens (2008) found that when compared with traditional public schools, charter public schools had significantly higher levels for measures of teachers' academic press, i.e., instructional innovation, instructional program coherence, time on task, and focus on academic achievement. In addition, when examining in-school organizational conditions, charter schools

had higher levels on measures of professional learning community and teacher efficacy when compared with traditional public schools. When examining the multivariate relationships among teacher academic press measures and school type, school demographic characteristics, and in-school enabling conditions, Goldring and Cravens found a positive association between charter schools and teachers' academic press variables, particularly when examining instructional innovation and instructional program coherence. Compared with traditional public schools, charter school type was negatively associated with time on task and a focus on academic achievement. In addition, they found that measures for in-school organizational enabling conditions were positively related to academic press measures, net of other school measures.

Despite these informative findings, a pressing question remains: Does the promotion in charter schools of effective in-school organizational conditions and improved teachers' press for student learning relate to greater student achievement? Before we turn to an empirical analysis to address this, we describe further the key constructs in our theoretical framework, focusing first on in-school organizational enabling conditions, and then teachers' academic press for learning.

Data and Methods

One of the partners with the National Center on School Choice (NCSC) is Northwest Evaluation Association (NWEA). NWEA contracts with states, districts, and schools to provide student assessments in mathematics, reading, and Language Arts. Currently, NWEA tests students in over 2,000 districts in 40 states across the nation. As a testing and research organization, NWEA has loaded in its Growth Research Database (GRD) over 4 million students, 36 million test records, from about 8,200 schools in over 2,000 districts. NWEA administers computerized adaptive assessments in the fall and spring of each academic year in core subjects such as reading, Language Arts, and mathematics.

As a part of the NCSC's quasi-experimental program of research, we entered into a partnership with NWEA for use of this database to identify sample schools, and we had files cleaned and analyzed for the 2002-2003 through the 2005-2006 school years. In addition, data from the National Center for Education Statistics (NCES) Common Core of Data (CCD) had been merged with the NWEA data files to compile further information about schools.

In the spring of 2006, we administered teacher and principal surveys in a matched-paired sample of charter and traditional public schools in different states within the NWEA data from the 2004-05 school year (Goldring and Cravens 2008). The states with the largest clusters of charter schools in the NWEA data include Idaho (16), Indiana (18), and Minnesota (28). So these 62 charter schools composed our initial sample of charter schools for matching with a sample of NWEA-tested public schools.ⁱ

Overall, when compared with national estimates for charter schools from the CCD, the charter schools in our sample reflected what others have found across the United States in the charter school sector compared with traditional public schools—charter schools tend to enroll students who are historically disadvantaged by racial-ethnic or socioeconomic characteristics (Center for Education Reform 2008; Gill et al. 2007). For instance, in our sample, charter schools tended to have greater proportions of students on free/reduced price lunches (45% in sample vs. 38% in CCD) and of African American students (25% in sample vs. 10% in CCD), as well as slightly smaller enrollments (398 in sample vs. 447 in CCD). Since the composition of the schools in our sample consisted of more disadvantaged charter schools (i.e., greater proportions of historically disadvantaged minorities and students with lower socioeconomic status), the estimates provided in the analyses are likely to be informative; that is, if we find differential effects on achievement gains for a statistically matched student sample of charter and

traditional public students, then we can further our understanding about school and schooling effects on historically disadvantaged student populations. Although we placed further restrictions on this sample for the analyses that follow (e.g., elementary schools), these restrictions did not substantively change the above comparative results with the CCD.

As we have noted above, when making comparisons between traditional public schools and charter schools, it is important to account for possible differences in the types of students that they serve. Since the charter and public schools varied in their participation rates, the resulting match at the school level did not meet our expectations. Thus, in the current study, although we rely on data from the surveyed schools, we conduct propensity score analyses at the student level to examine the gains of students in charter schools compared with matched students in traditional public schools; we then examine how organizational conditions and teachers' academic press are associated with these gains. To create this matched set of traditional public school students and charter school students, we used a procedure of propensity score matching (Dehejia and Wahba 2002; Luellen et al. 2005; Rosenbaum and Rubin 1983). This procedure generates a propensity score for each student, which gives the probability that that student is a charter school student. Charter school students are then matched with a traditional public school student who has a similar propensity score (Zimmer and Buddin 2005). Below we discuss the propensity score matching procedures in more detail, and then we describe the variables in our subsequent analyses.

Propensity Score Matching

To prepare the data for analysis, we constrained our student dataset to include only those students who had valid NWEA mathematics scores in the fall 2004, spring 2005, and spring 2006 test administrations. Next, we applied a further constraint such that we retained only those

students who remained in the same school across the entire time period from the fall of 2004 to the spring of 2006. This step limited the possible confounding effect on math achievement gains of students who switch schools, both within and across sectors (Hanushek et al. 2005). Finally we examined only elementary grade levels (2nd-6th).

We stratified our sample of students by the state in which they resided in the spring of 2005 (Idaho, Indiana, Minnesota) and by students' grade classifications as of the spring of 2005. This ensured that each student was matched to another student who resided in the same state as well as being in the same grade; this process created 15 'bins' (five grade levels by three states) to which each student was assigned.

In the next step of the process we generated a propensity score for all students within each state by estimating a probit regression model conditional on student observed characteristics. For example for each bin the following model was fit:

$$\Pr(S_i) = \beta_0 + X_i\beta_k + \varepsilon_i$$

where X is a vector of k observable characteristics of student i predicting a probability of student i being a charter school student S_i (1=charter school student, 0= traditional public student (TPS)).

The student observable characteristics that were included in this equation were: the prior math achievement of the student (fall 2004 math score), dummy variables indicating the student's race/ethnicity (Black, Hispanic, or other with White excluded), a dummy variable indicating the student's gender (1=female, 0=male), the student's age as of the administration of the fall 2004 math test, and dummy variables indicating the student's classification as a special education student or as an English language learner (1=yes, 0=no). The predicted probability obtained from this estimation is then the propensity score p for each student in the data reflecting the conditional probability that the student is a charter school student.

A distance score ($d_{ij} = |p_i - p_j|$) was then computed for each charter student (i) with every TPS student (j). Each charter student was matched to the TPS student who minimized d_{ij} . TPS students were allowed to match to multiple charter students. This was done to ensure that we retained as many charter school students as possible in our matched sample. This form of propensity score matching is known as nearest-neighbor matching with replacement. In some instances the nearest neighbor match to a charter school student may not be sufficiently close such that one may question the validity of the match. To address this issue we applied a caliper to the distance scores so that only those matches whose distance score was less than .01 were retained in the matched sample.

Table 1 provides the results of t-tests of the difference in group means between traditional public and charter schools for each student characteristic used in the matching equation for our total matched sample (all state*grade bins combined). There were statistically significant differences between the group means of traditional public and charter school students with respect to percentage of White and Black students. Further investigation indicated that these differences were being driven by the available sample of students in Indiana, with traditional public schools having higher percentages of White students and charter schools serving higher percentages of Black students. Within the estimation of the propensity score equation, these two race variables were nearly perfect predictors of charter school student status, resulting in the statistically significant difference in group means in the total matched sample. To address this, student race will be included in our subsequent analyses.

Dependent Variable

Year Gain in Mathematics Score. This is the gain in math achievement scores computed from tests administered in spring 2005 and spring 2006. Students were included in the sample if

they had test scores for both semesters. All the NWEA subject scores in mathematics, reading, and Language Arts reference a single, cross-grade, and equal-interval scale developed using Item Response Theory methodology (Hambleton 1989; Ingebo 1997; Lord 1980). The NWEA mathematics scale is based on strong measurement theory, and it is designed to measure student growth in achievement over time. NWEA research provides evidence that the scales have demonstrated to be extremely stable over twenty years (Kingsbury 2003; Northwest Evaluation Association 2002, 2003).

For our purposes, in addition to having good psychometric measurement properties (e.g., vertically equated computer adaptive tests administered in fall and spring), the NWEA mathematics tests is useful for our study because it is used by districts and schools to monitor schools' progress over the course of the year to prepare for the state accountability tests under NCLB. It is important to understand that our sample may be biased in certain ways because it only involves districts and schools that contract to test most of their students. Although measures that are aligned to specific curriculum and instruction interventions would be another approach, all schools face accountability requirements under NCLB. Other standardized measures administered in the fall and spring to a sample such as this either do not exist or are cost-prohibitive to administer to a large sample. Thus, the NWEA tests provides a helpful (although not only) indicator of achievement gains in charter and traditional public schools and how these gains are associated with in-school organizational conditions and teachers' academic press measures.

Student Level Variables

We included several measures at the student level within our models (see Table 2 for descriptives of variables in the analysis). First, a continuous variable measured the time elapsed

(in weeks) between test administrations in spring 2005 and spring 2006. Schools administer the computerized math assessments at different times: fall tests are generally given at the beginning of the semester, and spring tests are generally given at the end of the semester. Second, race/ethnicity dummy variables (Black, Hispanic, Other with White as the reference group), were included for the reasons addressed above. Finally, dummy variables indicated the student's grade level to account for the use of grade level as a stratification variable.

School Level Variables

To control for school level demographic characteristics, we included two variables obtained from the CCD for 2004-2005 for each school in our data: total percentage of each race/ethnicity category (Black, Hispanic, and Other with White as the excluded category) and the school's total enrollment.

We also analyzed the scales for organizational conditions and teachers' academic press by aggregating the teacher responses to the school level. Motivated by our conceptual framework, the survey scales and items of the constructs measured in this study were created from several well-established surveys with well-known psychometric properties, and have been linked with student achievement in previous research. Four core constructs, as discussed earlier, were selected to gauge teachers' academic focus on learning based on previous research and theory about school improvement processes.

Academic Instructional Innovation was based on nine items ($\alpha = 0.92$) developed by the NCSC, measuring teachers' perception on the school's improvement efforts on a Likert scale from one to six. For example, teachers were asked if the school used innovative strategies to improve student learning; if the instructional program was considered unique; and if the instructional approaches used were based on research evidence. Our measure expanded the

concept to focus on innovations that are related to learning and fit the programs and practices already in place in the school.

Instructional Program Coherence was measured by eight survey items developed by Newmann et al. (2001) ($\alpha=0.81$) on a scale from one to six. This scale measures the degree to which the interventions a school has adopted fit together in terms of their demands on teacher attention and other resources; the alignment of classroom content with external standards and assessments; the consistency of the content taught among teachers of particular grades or courses; and the appropriate sequencing of content across grades.

Time on Task was a six item scale ($\alpha= 0.73$) with responses on a six-point Likert scale that measured how engaged students and teachers were on the core activities of teaching and learning. The particular concept was used by Garrison and Holifield (2005) and addresses instructional focus, high expectations, school climate, monitoring of student progress, and school-community relations. Questionnaire items asked if the school used a multifaceted approach to maintain a high level of student attendance; if teachers and administrators practiced management and supervisory techniques that kept students on task and minimized disruptions; and if students were engaged during the vast majority of class time.

Focus on Achievement was based on surveys used by the National Institute of School Leadership study (NISL 2004) with four items ($\alpha= 0.86$) on a scale from one to six. Teachers were asked if they expect students to complete every assignment; if they encourage students to keep trying even when the work is challenging; and if they set high expectations for academic work.

School Characteristics were obtained from the 2004-2005 CCD for demographic information for the charter and traditional public schools. Included in the analyses were total

number of students enrolled, percent of students in free and reduced lunch programs, percent of Black students, and percent of Hispanic students. Charter schools were coded as one; traditional public schools were coded as zero.

For *In-School Organizational Enabling Conditions*, four constructs were used. *Principal Leadership-Vision and Mission* were based on 5 items ($\alpha= 0.93$) on a scale from one to six. Some of these items were adapted from the Consortium on Chicago School Research (CCSR).

Teachers were asked to think about the leadership the principal has provided at the school in terms of vision for academic success and communication of standards and goals to instructional staff. For example, the teachers were asked whether the principal clearly communicated expected standards for mathematics instruction, encouraged teachers to raise test scores, and conveyed a clear vision for the school.

Teacher Decision Making Authority was based on the Schools and Staffing Survey (SASS) and the CCSR with seven items ($\alpha= 0.86$) on a scale of one to six, measuring the influence that the teachers had over school policy in areas such as hiring professional staff, planning how discretionary school funds should be used, establishing the curriculum and instruction program, and determining the content of in-service programs.

Professional Learning Community was based on 10 items ($\alpha= 0.87$) on a scale of one to six. This scale was adapted from the CCSR and the Study of Instructional Improvement (SII). Teachers were asked to what extent they agreed that in their schools teachers respect other teachers who take the lead in school improvement efforts, may openly express their professional views at faculty meetings, are expected to continually learn and seek out new ideas in this school, and typically go beyond their classroom teaching to address the needs of students.

Teacher Efficacy was also based on seven items ($\alpha = 0.74$) on a scale of one to six and adapted from the SII. Teachers were asked to what extent they agreed on statements such as “I am capable of making the kinds of changes expected in this school,” “If I try really hard, I can get through to even the most difficult and unmotivated students,” and “Most of a student’s academic performance depends on the home environment, so I have limited influence on my students’ achievement.”

Analytic Models

Noting the hierarchically nested structure of our data, with students nested within schools (or in terms of a growth model student achievement nested within students nested within schools), we initially intended to use a hierarchical linear modeling strategy to account for this structure. Due to data limitations, we were unable to retain enough higher level units to adequately carry out these analyses with any statistical power. In future administrations of our surveys in a larger set of charter schools and other schools of choice (Berends et al. 2008b), we will have a fuller and more robust dataset to which these methods can be applied.

Given our data constraints, we applied an ordinary least squares (OLS) modeling strategy that accounted for the nesting of students within schools by adjusting estimated standard errors for clustering. For each of our models, we included both state- and grade-level fixed effects in the form of dummy variables. This accounted for the stratification strategy we used in generating our matched sample of traditional public and charter school students.

In our first model, we looked at the effect of charter schools on student yearly math gains conditional on school-level demographic characteristics and the time between test administrations, yet unadjusted for school organizational conditions that enabled student achievement. Consider the following:

$$(1) \Delta Y_i = \beta_0 + \beta_1 Charter_i + \beta_2 Time_i + S_j \beta_3 + \Theta_i \beta_4 + \varepsilon_i$$

where:

ΔY_i is student i 's math achievement score gain from spring 2005 to spring of 2006, $Charter$ is a dummy variable representing the type of school in which the student is enrolled, $Time$ represents the time between testing points in weeks, S is a vector of school level demographic characteristics including percentage Black, percentage Hispanic, percentage Other (percentage White excluded) and total enrollment for school j . Finally the vector Θ represents the set of state and grade level dummies used as stratification variables for student i .

Our second model added to the base model found in equation (1) a block of variables that represented school *In-school Organizational Enabling Conditions*. These variables included our measures of *Principal Leadership in Vision and Mission*, *Teacher Decision Making*, *Professional Learning Community*, and *Teacher Efficacy*. Our third model returned to the base model of equation (1) and added a block of variables that represented school *Academic Press for Learning*. These variables included our measures of *Focus on Student Achievement*, *Instructional Innovation*, *Instructional Program Coherence*, and *Time on Task*. Finally, our full model combined models two and three and allowed us to investigate the effect of the *In-school Organizational Enabling Conditions* and the *Academic Press for Learning* on student math achievement yearly gains conditional on school-level demographic characteristics as well as controlling for state and grade level.

Results

Gaining a better understanding of the types of instructional practices that positively impact student achievement is an ongoing objective of educational research. As part of a larger research study investigating the relationship between instructional conditions and academic

achievement in schools of choice and traditional public schools, this paper described findings from teacher surveys and student achievement in a pilot sample of charter and traditional public schools. Table 3 presents results from our OLS estimations of instructional conditions and achievement gains. Overall, our analyses did not reveal a statistically significant difference in the gain in academic achievement between students who attend charter schools and students who attend traditional public schools in our sample. The amount of time between tests was controlled for and also statistically insignificant. Moreover, the charter school effect was statistically insignificant regardless of whether or not differences in the in-school organizational processes or academic press components were controlled for in the models. Once students in charter and traditional public schools were stratified by state and grade level and then matched on prior achievement, race/ethnicity, English language learner status, special education status, and gender, they did not experience a difference in their gain in math achievement from the spring of 2005 to the spring of 2006 in these data. In effect, students who did not differ with respect to their observable characteristics made the same achievement gains in math whether they attended a charter school or a traditional public school during the study period in these NWEA data.

Although our analyses did not find a charter school effect in terms of academic achievement, we did find a statistically significant relationship between several components of the instructional conditions and achievement gains. Controlling for state, student's grade level, and school-level characteristics such as school size, race/ethnicity, and school type, Model 2 in Table 3 shows that teacher decision-making was negatively associated with achievement gains in math. The mean year gain in math was 9.09 with a standard deviation of 7.98. A one unit increase in teacher decision-making was associated with a 2.51 decrease in the mathematics gain, or 0.31 of a standard deviation in average annual gains. The measures for principal leadership

and teacher learning community were not related to achievement gains in a statistically meaningful manner. The final component, teacher efficacy, was not statistically significant.

Model 3 examined the relationship between measures of teacher academic press and achievement gains. Controlling for state, student, and school characteristics, the academic press measure for focus on achievement showed a strong and positive association with higher math gains. A one-unit increase in the measure of focus on achievement was associated with a 4.84 increase in the gain in achievement, or 0.61 of a standard deviation in average annual gains. In contrast, increases in academic instructional innovation were strongly and negatively associated with math gains. The coefficient for the measure of instructional innovation is -4.62, or 0.58 of a standard deviation. The teacher academic press measures of instructional program coherence and time on task were positive but statistically insignificant.

Model 4 presents the full model with controls for state, school, and student characteristics, and the two sets of instructional conditions. In the full model, the measure of teacher decision-making was no longer statistically significant, suggesting that teacher academic press variables mediated this relationship. None of the in-school organizational enabling conditions were statistically significant in the full model. The teacher academic press variables for focus on achievement and instructional innovation remained statistically significant. The measure for focus on achievement was even larger in magnitude in the full model, where a one-unit increase in focus on achievement was associated with a 6.11 increase in achievement gains, or 0.77 of a standard deviation in average annual gains. The negative impact of instructional innovation on achievement gains was smaller in magnitude in the full model (-3.17 points, 0.40 of a standard deviation), but still statistically significant. The measures of instructional program coherence and time on task remained statistically insignificant in the full model.

One of the issues in these analyses was the potential multicollinearity of our independent measures for in-school organizational enabling conditions and teachers' academic press for learning. As shown in Table 4, the correlations among these measures ranged from 0.041 to 0.778. Since 8 of the 28 correlations in Table 4 are greater than 0.700, we wanted to check the robustness of the models above given some of these high correlations. Thus, we estimated models by entering each of the measures for the in-school organizational conditions and teachers academic press one at a time, controlling for the school composition, demographic, and grade level, and state measures. When estimating the models in this way, the substantive results did not change. As shown in Table 5, the teacher decision-making measure was negatively associated with students' mathematics gains, similar to model 2 in Table 3. None of the other in-school organizational measures for principal leadership, professional learning community, and teacher efficacy were statistically significant in Table 5.

For the teacher academic press measures in Table 5, the measure for focus on student achievement was positive and significant, as it was in the full model of Table 4. Instructional innovation was negative and significant when entered by itself in Table 5, consistent with the full model of Table 4. Also consistent with the previous results, the other measures in Table 5 for teacher academic press (instructional program coherence and time on task) were not related to student mathematics gains in a statistically meaningful manner.

Discussion

This paper addressed questions about how charter and matched traditional public school elementary students compare in terms of their mathematics achievement gains, and whether organizational and teacher academic press measures are related to these gains. When students were matched on observable characteristics in this sample, charter and traditional public school

students did not exhibit differences in their mathematics achievement gains between spring 2005 and spring 2006.

As mentioned, Goldring and Cravens (2008) found a positive association between charter schools and teachers' academic press variables, but the significant association was not there when controlling for school characteristics and organizational enabling conditions. In addition, they found that organizational enabling conditions were positively associated with academic press measures, net of other school conditions.

Although we did not find statistically significant relationships of the organizational enabling conditions and student achievement gains in our final model, we did find relationships between teacher academic press measures and gains in mathematics. Measures of focus on achievement and instructional innovation revealed statistically significant associations with student achievement gains, although those effects were pointed in the opposite direction. That is, in schools where teachers reported that they had high expectations for achievement, believed it is important for all students to do well, and emphasized challenging work and completing assignments, students experienced higher gains than those in schools where the focus on academic achievement was less.

However, the measure for instructional innovation revealed a negative association with mathematics gains in the models we estimated, which controlled for other school and student characteristics, including school type. That is, in schools where teachers reported that there was greater instructional innovation (e.g., teachers experimented with new ideas for teaching and learning, relied on unique instructional programs, used innovative strategies to improve achievement, worked with staff to implement innovative approaches), students had lower achievement gains than those in schools where teachers reported less innovation. This finding

suggests that net of an academic focus on student achievement (and other school factors), innovation for its own sake may not be the best strategy for improving student achievement.

Although such a finding needs further examination, both of the individual survey items and of a larger sample of students nested in classrooms and schools, it is consistent with that of other researchers. For instance, Fullan (2001, 127) made the point that innovation, while potentially helpful for creating effective schools, should not be the sole focus of school reform efforts:

The goal is not to innovate the most. The organization or leader who takes on the sheer most number of innovations is not the winner. In education, we call these organizations the ‘Christmas Tree Schools.’ These schools glitter from a distance—so many innovations, so little time—but they end up superficially adorned with many decorations, lacking depth and coherence.

Together, the results for the sample analyzed here did not suggest a definitive perspective about the theoretical debate between market and institutional theories. The empirical data are much messier than a simple acceptance or rejection of one of the theories vis-à-vis the other. On the one hand, the research of Goldring and Cravens (2008) of the data analyzed here revealed consistent findings with some of the market theorists’ claims that some of the in-school organizational and teacher academic press conditions are higher in charter schools compared with traditional public schools. Yet, generally, these levels do not explain the most important claim of the market theorists that choice reform will result in robust positive effects on student achievement. To date, and supported by the present analysis, the achievement effects are mixed (Loveless 2009; Teasley 2009). Furthermore, implementing high levels of effective school characteristics is difficult to do, especially at scale (Elmore 2007), and particularly when different states and schools implement so many different types of charter school reforms.

On the other hand, there is also support for the institutional theorists who claim that the regulations, i.e., NCLB accountability, and rituals of classification are so strong in education that it is very difficult for truly innovative reforms to take hold in individual schools and certainly in a large number of schools. As Goldring and Cravens (2008, 56) pointed out in their analyses, it may be that “prevailing accountability mechanisms under NCLB and the normative views of what is involved with helping schools meet adequate yearly progress are creating an institutional environment where choice cannot lead to types of innovation hoped for by their founders.” Although there may be some individual schools or pockets or schools where innovation and success are occurring, the scale-up of such schools continues to be challenging because of the larger institutional environments and its constraints.

Still, further research needs to explore how school organization and instructional processes differ between schools of choice and traditional public schools. Such research informs not only the choice debate, but the school effectiveness tradition that has examined more outlier schools with levels of achievement rather than examining how school effectiveness measures are related to student achievement gains and growth.

In the next couple of years, we hope to expand the research here to a larger sample of charter and other choice schools within a quasi-experimental design. In this larger sample, we will collect similar measures across a wide array of organizational, curricular, and instructional conditions.

By gathering measures of school effectiveness—with a particular focus on organizational enabling conditions, teacher academic press, and more specific measures of classroom instruction—we will be able to understand the conditions under which different school types are related to academic achievement gains and growth. Only then will we be able to determine if

there is a main effect for choice versus non-choice schools, or if there are only interaction effects regarding effective school components. And only then will we—researchers, policymakers and educators alike—better understand the context of choice schools, their effects on student achievement growth, and the conditions under which these effects occur.

REFERENCES

- Ashton, Patricia, and Rodman Webb. 1986. *Making a Difference: Teachers' Sense of Efficacy and Student Achievement*. White Plains, NY: Longman.
- Berends, Mark, Matthew G. Springer, and Herbert J. Walberg (Eds.) 2008a. *Charter School Outcomes*. Mahweh, NJ: Lawrence Erlbaum Associates/Taylor and Francis Group.
- Berends, Mark, Matthew G. Springer, Dale Ballou, and Herbert J. Walberg (Eds.) 2009. *Handbook of Research on School Choice*. New York: Routledge.
- Berends, Mark, Caroline Watral, Bettie Teasley, and Anna Nicotera. 2008b. "Charter School Effects on Achievement: Where We Are and Where We're Going." In *Charter School Outcomes*. M. Berends, M. G. Springer, and H. J. Walberg (pp. 243-266). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Berends, Mark, Susan Bodilly, and Sheila Kirby. 2002. *Facing the Challenges of Whole-School Reform: New American Schools After a Decade*. Santa Monica, CA: RAND.
- Betts, Julian. 2005. "The Economic Theory of School Choice." In *Getting Choice Right*. J. R. Betts and T. Loveless (pp. 14-39). Washington, DC: Brookings Institution Press
- Betts, Julian, Paul Hill, Dominic Brewer, Anthony S. Bryk, Dan Goldhaber, Laura Hamilton, Jeffrey Henig, Susanna Loeb, and Patrick McEwan. 2006. "Charter School Achievement Consensus Panel." In *Key Issues in Studying Charter Schools and Achievement: A Review and Suggestions for National Guidelines*. Seattle, WA: National Charter School Research Project, Center on Reinventing Public Education.
- Bidwell, Charles. (1965). "The School as a Formal Organization. In *Handbook of Organizations*, J. G. March (pp. 972-1022). Chicago: Rand McNally.
- Bidwell, Charles E., and Robert Dreeben. 2006. "Public and Private Education: Conceptualizing the Distinction." In *School sector and student outcomes*, M. T. Hallinan (pp. 9-37). Notre Dame, IN: University of Notre Dame Press.
- Bidwell, Charles E., and John D. Kasarda. 1980. Conceptualizing and Measuring the Effects of School and Schooling. *American Journal of Education*, 88: 401-430.
- Bryk, Anthony, Valerie Lee, and Peter Holland. 1993. *Catholic Schools and the Common Good*. Cambridge, Mass.: Harvard University Press.
- Bryk, Anthony, Valerie Lee, and Julia Smith. 1990. "High School Organization and Its Effects on Teachers and Students." In *Choice and control in American education*, Vol. 1: *The*

- Theory of Choice and Control in American Education*. W. Clune and J. Witte. Bristol, PA: Falmer Press.
- Center for Education Reform. 2008. *America's Attitudes Toward Charter Schools*. Washington, DC: Author.
- Chubb, John, and Terry Moe. 1990. *Politics, Markets and American Schools*. Washington, DC: Brookings Institution.
- Cookson, Peter W. 2002. Privatization and Educational Equity: Can Markets Create a Just School System? *Current Issues in Comparative Education*, 1(2), 57-64.
- Dehejia, Rajeev, and Sadek Wahba. 2002. "Propensity Score-Matching Methods for Nonexperimental Causal Studies." *Review of Economics and Statistics* 84(1): 151-161.
- Edmonds, Ronald. 1979. Effective Schools for the Urban Poor." *Educational Leadership*, 37: 15-27.
- Elmore, Richard. 2007. *School Reform from the Inside Out: Policy, Practice, and Performance*. Boston, MA: Harvard Education Press.
- Finn, Chester E., Brunno Manno, and Greg Vanourek. 2000. *Charter Schools in Action: Renewing Public Education*. Princeton, NJ: Princeton University Press.
- Finnegan, Kara S. 2007. "Charter School Autonomy: The Mismatch between Theory and Practice." *Educational Policy* 21(3): 503-526.
- Friedman, Milton. 1962. *Capitalism and Freedom*. Chicago: Chicago University Press.
- Fullan, Michael. 2001. *Leading in a Culture of Change*. San Francisco, CA: Jossey-Bass.
- Fullan, Michael. 2007. *The New Meaning of Educational Change, Fourth Edition*. New York: Teachers College Press.
- Gamoran, Adam. 1996. "Student Achievement in Public Magnet, Public Comprehensive, and Private City High Schools." *Educational Evaluation and Policy Analysis* 18 1: 1-18.
- Gamoran, Adam, M. Nystrand, Mark Berends, and Paul LePore. 1995. "An Organizational Analysis of the Effects of Ability Grouping." *American Educational Research Journal* 24: 687-715.
- Garrison, Lawrence, and Mitchell Holifield. 2005. "Are Charter Schools Effective?" *Planning and Changing* 36(1), 2: 90-103.

- Gill, Brian, P. Michael Timpane, Karen Ross, Dominic Brewer, and Kevin Booker. 2007. *Rhetoric Versus Reality: What We Know and What We Need to Know about Vouchers and Charter Schools, 2nd Edition*. Santa Monica, CA: RAND.
- Goldring, Ellen, and Mark Berends. 2009. *Leading with Data: Pathways to Improve Your School*. Thousand Oaks, CA: Corwin Press.
- Goldring, Ellen, and Xiu Cravens. 2008. "Teachers' Academic Focus on Learning in Charter and Traditional Public Schools." In *Charter School Outcomes*, M. Berends, M. G. Springer, and H. J. Walberg, New York: Taylor and Francis (pp. 39-60).
- Goodwin, R. Kenneth, Frank Kremerer, and Valerie Martinez. 1998. "Comparing Public School and Private Voucher Programs in San Antonio." In *Learning from School Choice*, P. Peterson and B. Hassel. Washington, DC: Brookings Institute.
- Hallinan, Maureen, Adam Gamoran, Warren Kubitschek, and Tom Loveless. 2003. *Stability and Change in American Education: Structure, Process, and Outcomes*. New York: Eliot Werner Publications, Inc.
- Hambleton, Ronald. 1989. "Principles and Selected Applications of Item Response Theory." In *Educational Measurement, 3rd Edition*, R. L. Linn. New York: American Council on Education, Macmillan Publishing Company.
- Hanushek, Eric A., John Kain, Steven Rivkin, and Gregory Branch. 2005. "Charter School Quality and Parental Decision-Making with School Choice." Cambridge, MA: NBER Working Paper 11252.
- Henig, Jeffrey. 1999. "School Choice Outcomes." In *School Choice and Social Controversy*, S. Sugarman and F. Kemerer. Washington, DC: Brookings Institute Press
- Hess, Frederick, and Tom Loveless. 2005. "How School Choice Affects Student Achievement." In *Getting Choice Right: Ensuring Equity, and Efficiency in Education Policy*. J. Betts and T. Loveless. Washington, DC: Brookings Institution Press.
- Hoxby, Caroline. 2002. "Would School Choice Change the Teaching Profession?" *The Journal of Human Resources*, 374: 846-891.
- Ingebo, George. 1997. *Probability in the Measure of Achievement*. Chicago, IL: MESA Press.
- Kingsbury, G. Gage. 2003. "A Long-Term Study of the Stability of Item Parameter Estimates." Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.
- Lee, Valerie, Robert Dedrick, and Julia Smith. 1991. "The Effect of the Social Organization of Schools on Teachers' Efficacy and Satisfaction." *Sociology of Education* 643: 190-208.

- Lieberman, Myron. 1989. *Privatization and Educational Choice*. New York: John Wiley.
- Lieberman, Myron. 1993. *Public Education: An Autopsy*. Cambridge: Harvard University Press.
- Lord, Frederic. 1980. *Applications of Item Response Theory to Practical Testing Problems*. Hillsdale, N.J.: Erlbaum.
- Louis, Karen, Helen Marks, and Sharon Kruse. 1996. "Teachers' Professional Community in Restructuring Schools." *American Educational Research Journal*, 334: 757-798.
- Loveless, Tom. 2009. "Perspectives on Charter Schools" In *Handbook of Research on School Choice*, M. Berends, M. G. Springer, D., Ballou, H. J. Walberg. Mahwah, NJ: Lawrence Erlbaum Associates/Taylor and Francis Group.
- Lubienski, Christopher. 2003. "Innovation in Education Markets: Theory and Evidence on the Impact of Competition and Choice in Charter Schools." *American Educational Research Journal*, 402: 395-443.
- Luellen, Jason, William Shadish, and M. H. Clark. 2005. "Propensity Scores: An Introduction and Experimental Test." *Evaluation Review*. 296: 530-558.
- Marks, Helen, and Karen Louis. 1997. "Does Teacher Empowerment Affect the Classroom? The Implications of Teacher Empowerment for Teachers' Instructional Practice and Student Academic Performance." *Educational Evaluation and Policy Analysis*, 193.
- McLaughlin, Milbrey, and Joan Talbert. 1993. *Contexts that Matter for Teaching and Learning*. Palo Alto, CA: Stanford University, Center for Research on the Context of Secondary School Teaching.
- Meyer, John W. 1977. "The Effects of Education as an Institution." *American Journal of Sociology*, 83(1): 55-77.
- Meyer, John. W., and Francisco Ramirez. 2000. "The World Institutionalization of Education. In *Discourse Formation in Comparative Education*, J. Schriewer (pp. 111-132). Frankfurt: Peter Lang.
- Meyer, John. W., and Brian Rowan. 1977. "Institutionalized Organizations: Formal Structure as Myth and Ceremony." *American Journal of Sociology* 83: 340-363.
- Meyer, John. W., and Brian Rowan. 1978. "The Structure of Educational Organizations." In *Environments and organizations*, M. W. Meyer and Associates (pp. 78-109). San Francisco: Jossey-Bass.

- National Institute for School Leadership (NISL). 2004. *Assessing the Impact of Principals' Professional Development: An evaluation of the National Institute for School Leadership*. Chicago, IL: Northwestern University, Consortium for Policy Research in Education.
- Newmann, Fred M. 2002. Achieving High-Level Outcomes for All Students: The Meaning of Staff Shared Understanding and Commitment. In *The Keys to Effective Schools: Educational Reform as Continuous Improvement* W. D. Hawley. Thousand Oaks, CA: Corwin Press.
- Newmann, Fred M, and Associates. 1996. *Authentic Achievement: Restructuring Schools for Intellectual Quality*. San Francisco, CA: Jossey-Bass.
- Newmann, Fred M., and Gary Wehlage. 1995. *Successful School Restructuring: A Report to the Public and Educators by the Center on Organization and Restructuring of Schools*. Alexandria, VA: Association for Supervision and Curriculum Development; Reston, VA: National Association for Secondary School Principals.
- Newmann, Fred M., M. Bruce King, and Peter Youngs. 2000. "Professional Development that Addresses School Capacity: Lessons from Urban Elementary Schools." *American Journal of Education*, 108(4), 259-299.
- Newmann, Fred M., BetsAnn Smith, Elaine Allensworth, and Anthony Bryk. 2001. "Instructional Program Coherence: What It is and Why It Should Guide School Improvement Policy." *Educational Evaluation and Policy Analysis*, 234, 297-321.
- Newmann, Fred M., Robert Rutter, and Marshall Smith. 1989. "Organizational Factors that Affect School Sense of Efficacy, Community and Expectations." *Sociology of Education*, 624: 221-238.
- Northwest Evaluation Association 2002. *RIT Scale Norm*. Portland, OR.
- Northwest Evaluation Association 2003. *Technical Manual*. Portland, OR.
- Powell, Walter W., and Paul J. DiMaggio. 1991. *The New Institutionalism in Organizational Analysis*. Chicago, IL: The University of Chicago Press.
- Purkey, Stewart, and Marshall Smith. 1983. "Effective Schools: A Review." *The Elementary School Journal*, 834: 427-452.
- Rinehart, James, and Jackson Lee. 1991. *American Education and the Dynamics of Choice*. New York: Praeger.
- Rosenbaum, Paul, and Donald Rubin. 1983. "The Central Role of the Propensity Score in Observational Studies for Causal Effects." *Biometrika*, 701, 41-55.

- Schumpeter, Joseph A. 1942. *Capitalism, Socialism, and Democracy*. New York: Harper.
- Scott, W. Richard., and Gerald F. Davis. 2007. *Organizations and Organizing: Rational, Natural and Open System Perspectives*. Englewood Cliffs: Prentice Hall.
- Scott, W. Richard, and John W. Meyer. 1994. *Institutional Environments and Organizations: Structural Complexity and Individualism*. Thousand Oaks, CA: Sage.
- Spillane, James.1996. "School Districts Matter: Local Educational Authorities and State Instructional Policy." *Educational Policy*, 101, 63-87.
- U.S. Department of Education. 2004. *Successful Charter Schools*. Washington, DC: U.S. Department of Education, Office of Innovation and Improvement.
- Vanourek, Greg, Bruno Manno, Chester Finn, and Louann Bierlein. 1998. "Charter Schools as Seen by Students, Teachers, and Parents." In *Learning from School Choice*, P. Peterson, and B. Hassel. Washington DC: Brookings Institute.
- Walberg, Herbert J. Forthcoming. *How Students Learn and What to Do About It*. Stanford, CA: Hoover Institution Press.
- Walberg, Herbert J., and Joseph L. Bast. 2003. *Education and Capitalism: How Overcoming Our Fear of Markets and Economics Can Improve America's Schools*. Stanford, CA: Hoover Institution Press.
- Weick, Karl E. 1976. "Educational Organizations as Loosely Coupled Systems. *Administrative Science Quarterly*, 21(1): 1-19.
- Zimmer, Ron, and Richard Buddin. 2005. "Charter School Performance in Urban Districts." *Journal of Urban Economics*, 60, 307-326.
- Zimmer, Ron, and Richard Buddin. 2007. "Getting Inside the Black Box: Examining How the Operation of Charter Schools Affect Performance." *Peabody Journal of Education*, 82(2-3), 231-273.
- Zimmer, R., Richard Buddin, Derrick Chau, Brian Gill, Cassandra Guarino, Laura Hamilton, Cathy [Krop](#), Dan [McCaffrey](#), Melinda [Sandler](#), and Dominic [Brewer](#). 2003. *Charter School Operations and Performance: Evidence from California*. Santa Monica, CA: RAND.

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Figure 1: Relationships between In-School Organizational Enabling Conditions and Teachers' Academic Press for Learning

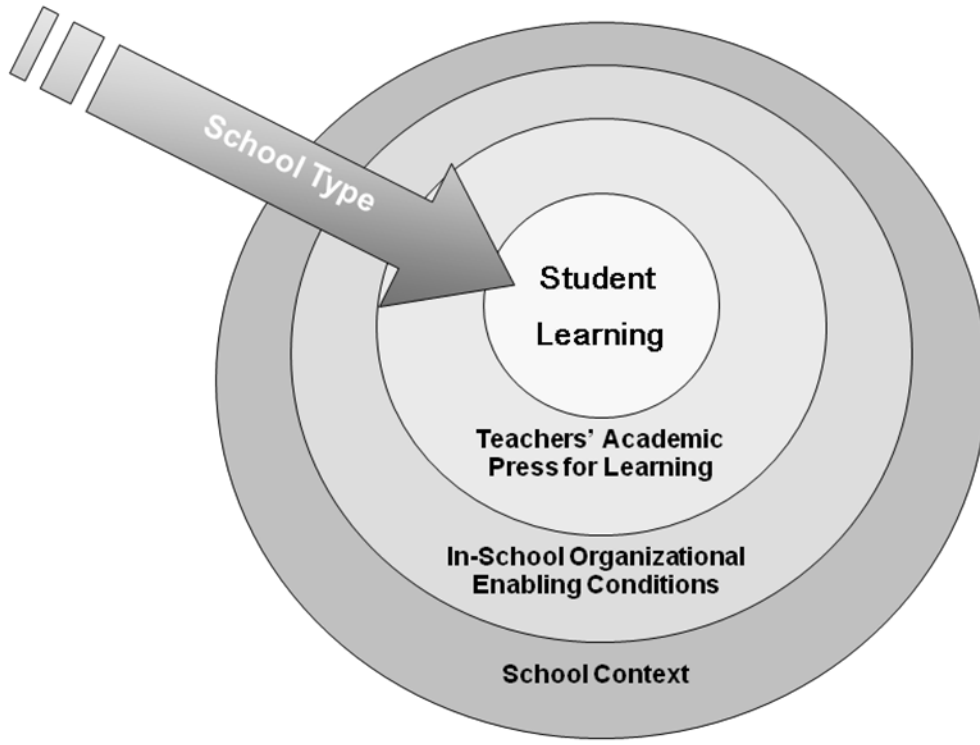


TABLE 1

Results for Differences in Group Means Between Traditional Public Schools and Charter Public Schools for Matching Students After Propensity Score Matching

Variable	Traditional Public School	Charter Public School	Difference
Prior Achievement	199.594 (0.69)	198.310 (0.56)	1.285 (0.89)
Gender	0.525 (0.02)	0.504 (0.02)	0.021 (0.02)
Age	9.688 (0.06)	9.576 (0.05)	0.112 (0.07)
English Language Learner	0.010 (0.00)	0.007 (0.00)	0.003 (0.00)
Special Education	0.065 (0.01)	0.057 (0.01)	0.008 (0.01)
White	0.678 (0.02)	0.594 (0.02)	0.084*** (0.02)
Black	0.227 (0.02)	0.320 (0.01)	-0.093*** (0.02)
Hispanic	0.049 (0.01)	0.048 (0.01)	0.001 (0.01)
Other	0.045 (0.01)	0.037 (0.01)	0.008 (0.01)
N	709	1018	

* $p < 0.10$

** $p < 0.05$

*** $p < 0.01$

TABLE 2
Descriptive Statistics for Measures in Analysis

Variable	Obs.	Mean	SD	Min	Max
Math Gain	1727	9.090	7.980	-29.205	40.414
Time between Tests	1727	52.248	2.186	45.714	60.286
White	1727	0.629	0.483	0	1
Black	1727	0.282	0.450	0	1
Hispanic	1727	0.049	0.215	0	1
Other	1727	0.041	0.197	0	1
Principal Leadership	44	4.961	0.616	2.743	5.836
Teacher Decision Making	44	4.537	0.463	3.611	5.708
Professional Learning Community	44	4.734	0.465	3.533	5.578
Teacher Efficacy	44	3.527	0.565	2.201	4.694
Focus on Student Achievement	44	4.536	0.501	3.315	5.457
Instructional Innovation	44	4.475	0.346	3.776	5.202
Instructional Program Coherence	44	2.964	0.266	2.320	3.550
Time on Task	44	4.502	0.657	2.940	5.500
Percentage Black	44	0.256	0.350	0.000	0.994
Percentage Hispanic	44	0.047	0.046	0.000	0.203
Percentage Other	44	0.039	0.057	0.000	0.287
Total Enrollment	44	391.296	300.993	39.000	1403.000

TABLE 3

OLS Estimates of Relationships of Student Achievement Gains in Mathematics and School Characteristics, In-School Organizational Conditions, and Teachers' Academic Press

Variable	Model 1	Model 2	Model 3	Model 4
Intercept	8.97 (11.87)	8.88 (10.16)	-2.56 (9.63)	-5.86 (8.24)
Charter	0.08 (1.20)	1.44 (1.14)	-0.65 (0.94)	-1.07 (0.77)
Principal Leadership		1.51 (0.88)		-1.36 (1.03)
Teacher Decision Making		-2.51 (1.20)		-1.16 (0.98)
Professional Learning Community		-2.49 (1.43)		0.18 (1.65)
Teacher Efficacy		0.15 (1.28)		-1.65 (1.49)
Focus on Student Achievement			4.84*** (1.10)	6.11*** (1.18)
Instructional Innovation			-4.62*** (1.24)	-3.17*** (1.19)
Instructional Program Coherence			2.10 (1.36)	2.56 (1.43)
Time on Task			1.17 (1.41)	2.26 (1.49)
Percentage Black	-0.05 (1.48)	-4.77* (1.92)	-0.79 (1.42)	-0.95 (1.69)
Percentage Hispanic	-6.35 (10.13)	-5.77 (7.93)	-14.02 (7.24)	-14.13* (6.99)
Percentage Other	-11.15 (10.15)	-16.95 (8.73)	-2.08 (7.52)	-1.86 (7.59)
Total Enrollment	-0.004 (0.002)	-0.001 (0.002)	-0.003 (0.002)	-0.003 (0.002)
Time between Tests	0.09 (0.23)	0.34 (0.22)	0.18 (0.16)	0.25 (0.16)

Black	-0.72 (0.92)	-0.73 (0.72)	-0.19 (0.61)	-0.43 (0.63)
Hispanic	-0.29 (0.84)	-0.30 (0.86)	-0.04 (0.78)	-0.13 (0.80)
Other	-0.66 (0.80)	-0.77 (0.85)	-0.15 (0.86)	-0.32 (0.87)

Grade Level Fixed Effects	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes
R-squared	0.128	0.146	0.167	0.171
N	1727	1727	1727	1727

* p < 0.10 **p < 0.05 ***p < 0.01

TABLE 4

Correlations among Measures for In-School Organizational Conditions and Teachers' Academic Press

	Principal Leadership	Teacher Decision Making	Professional Learning Community	Teacher Efficacy	Focus on Student Achievement	Instructional Innovation	Instructional Program Coherence	Time on Task
Principal Leadership	1.000							
Teacher Decision Making	0.365	1.000						
Professional Learning Community	0.743	0.287	1.000					
Teacher Efficacy	0.494	0.232	0.559	1.000				
Focus on Student Achievement	0.420	0.041	0.274	0.416	1.000			
Instructional Innovation	0.633	0.513	0.710	0.661	0.379	1.000		
Instructional Program Coherence	0.703	0.483	0.711	0.536	0.264	0.657	1.000	
Time on Task	0.712	0.405	0.705	0.679	0.289	0.725	0.778	1.000

Instructional Conditions in Charter Schools

TABLE 5

OLS Estimates of Relationships of Student Achievement Gains in Mathematics and School Characteristics, In-School Organizational Conditions, and Teachers' Academic Press.

	1	2	3	4	5	6	7	8	9
Intercept	6.251 (11.257)	12.541 (11.653)	6.539 (9.904)	13.453 (11.114)	9.542 (11.726)	-10.383 (14.064)	18.688 (11.021)	7.178 (10.915)	5.477 (11.405)
Charter	1.035 (1.213)	1.334 (1.353)	1.517 (1.173)	1.405 (1.198)	1.091 (1.249)	0.85 (1.039)	1.283 (1.018)	1.13 (1.378)	0.935 (1.381)
Principal Leadership		-0.772 (0.835)							
Teacher Decision Making			-2.174** (1.002)						
Prof. Learning Comm.				-1.666 (1.175)					
Teacher Efficacy					-0.657 (1.416)				
Focus on Student Achievement						3.212** (1.268)			
Instructional Innovation							-2.105* (1.113)		
Instructional Program Coherence								-0.260 (1.160)	
Time on Task									0.195 (0.885)
Percentage Black	-0.974 (1.407)	-1.240 (1.380)	-3.645* (1.505)	-1.724 (1.378)	-1.165 (1.473)	-0.812 (1.355)	-1.925 (1.379)	-1.071 (1.393)	-0.809 (1.519)
Percentage Hispanic	-1.926 (6.775)	-0.918 (6.736)	-2.409 (5.519)	-2.117 (6.449)	-2.473 (6.840)	-5.293 (6.833)	-3.095 (6.201)	-1.954 (6.773)	-1.765 (6.763)
Percentage Hispanic	-3.793 (10.119)	-2.539 (10.845)	-9.805 (9.188)	-4.618 (9.859)	-3.979 (10.132)	-0.146 (8.577)	-7.838 (9.000)	-4.368 (10.238)	-3.855 (10.073)
Total Enrollment	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.001 (0.002)	0.002 (0.002)	0.002 (0.002)	0.001 (0.001)	0.002 (0.002)	0.002 (0.002)
Time between Tests	0.110 (0.209)	0.060 (0.206)	0.265 (0.210)	0.133 (0.208)	0.108 (0.212)	0.246 (0.220)	0.079 (0.199)	0.115 (0.217)	0.107 (0.208)
Black	-0.87	-1.276*	-1.342*	-0.889	-0.903	-0.628	-1.164	-0.936	-0.837

	(0.780)	(0.684)	(0.671)	(0.755)	(0.754)	(0.775)	(0.693)	(0.681)	(0.770)
Hispanic	-0.693 (0.871)	-0.848 (0.896)	-0.946 (0.888)	-0.673 (0.880)	-0.680 (0.870)	-0.640 (0.860)	-0.758 (0.874)	-0.721 (0.852)	-0.677 (0.865)
Other	-0.858 (0.812)	-1.129 (0.911)	-1.000 (0.838)	-1.093 (0.863)	-0.921 (0.809)	-0.76 (0.797)	-0.967 (0.825)	-0.927 (0.876)	-0.821 (0.842)
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Grade Level Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.121	0.123	0.132	0.125	0.121	0.129	0.131	0.121	0.114
N	1727	1727	1727	1727	1727	1727	1727	1727	1727

** $p < 0.05$; * $p < 0.1$

ⁱ During the time of data collection, the U.S. Charter Schools website (<http://www.uscharterschools.org/>) revealed that the total number of charter schools in the four states consisted of the following: Idaho: NWEA tests 16 of 24; Indiana: NWEA tests 18 of 21; Minnesota: NWEA tests 28 of 149.