Do Teacher Unions Hinder Educational Performance? Lessons Learned from State SAT and ACT Scores*

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Abstract

Teacher unions have been demonized by their critics and canonized by their advocates...
for years, but the actual relationship between teacher unions and educational performance has received very little empirical scrutiny. In this article, Lala Carr Steelman, Brian Powell, and Robert Carini examine the question, "Do teacher unions hinder educational performance?" Focusing on two of the best-known standardized tests, the Scholastic Assessment Test (SAT) and the American College Test (ACT), the authors examine whether interstate variation in standardized test performance is negatively linked to interstate variation in teacher unions. They find a significant and positive relationship: that is, the presence of teacher unions appears to be linked to stronger state performance on these exams. These findings challenge the position that teacher unions depress student academic performance, and in so doing invite further empirical scholarship on this topic from a range of academic disciplines. (pp.437-466)

Do Teacher Unions Hinder Educational Performance?

Although teacher unions have been demonized by their critics and canonized by their advocates, little empirical research has been conducted to investigate the question: Do teacher unions hinder educational performance? In this article, we attempt to answer this question by using an analytical strategy that we introduced in two previous articles in this journal (Powell & Steelman, 1984, 1996). Focusing on two well-known standardized tests, the Scholastic Assessment Test (SAT) and the American College Test (ACT), and highlighting state differences, we examine whether interstate variation in standardized test performance is negatively linked to interstate variation in the presence of teacher unions, as asserted by some critics of teacher unions. Our goals are to address the question at hand and to seek more empirical scholarship on this topic from a range of academic disciplines.

Background

The first collective teacher organization, which eventually became known as the National Educational Association (NEA), was founded in Chicago in 1857. Today there are two major unions, the NEA and the American Federation of Teachers (AFT), which was established in 1916. The use of collective bargaining, however, is a fairly recent development for teacher organizations. Since the 1960s, an increasing number of states have passed legislation permitting collective bargaining by teacher unions. Concurrently, the transformation of teacher unions from relatively passive organizations to organizations willing to assert the rights of their constituency has been spectacularly swift and represents one area in which unions, against a backdrop of anti-union sentiment, have thrived (Murphy, 1990; Streshly & DeMitchell, 1994; Urban, 1982). In the midst of labor union retrenchment in the private sector, teacher unions have continued to grow and to gain political strength (Eberts & Stone, 1984; Murphy, 1990;
In contemporary public discourse, unions elicit visceral reactions, and perhaps none more so than teacher unions. The frequency and rancor of debates regarding teacher unions fluctuate and often increase during election years. In 1996, for instance, when Robert Dole accepted the presidential nomination at the Republican national convention, he declared that teacher unions were largely responsible for the plight of U.S. education and pledged, "To the teachers unions I say, when I am president, I will disregard your political power, for the sake of our children, the schools, and the nation" ("Unions," 1996). Although the American electorate prevented him from keeping this pledge, the sentiment behind it, that teacher unions are at odds with educational reform, appears to have intensified and gained more legitimacy, or at least more visibility, since then. While Democratic candidates attempted to shore up support among teacher unions in their bid for the presidency in 2000, some Republican candidates were lambasted by others in their party for not being sufficiently tough on teacher unions. For example, although George W. Bush confirmed his belief that teacher unions are a key obstacle to educational reforms (Balz, 1999), former U.S. Supreme Court nominee Robert H. Bork (1999) admonished Bush, "Education at all levels is disgraceful. Mr. Bush offers some mild remedies for education but has yet to take on . . . the real problem: the teachers' unions" (p. A03).

Rhetoric regarding unions appears no less heated at the state and local level. Governor Frank Keating of Oklahoma not surprisingly elicited a negative reaction from teachers and others when he used the word "homicide" to discuss how he would prefer to handle teacher unions (Jenkins, 2000). In his State of the City speech in 2000, New York City mayor Rudolph Giuliani also singled out teacher unions: "We should be ashamed of ourselves that we don't have the political courage to take on the unions, the special interests, and everything else . . . holding our children back" (Bumiller, 2000, pp. A1, B6). These views are echoed in newspaper and magazine articles and books with such incendiary titles as Power Grab: How the National Education Association Is Betraying Our Children (Moo, 1999) and The Teacher Unions: How the NEA and AFT Sabotage Reform and Hold Students, Parents, Teachers, and Taxpayers Hostage to Bureaucracy (Lieberman, 1997). Quite often these critiques use a litany of educational problems, especially low standardized test scores, as ostensible proof of the detrimental effects of teacher unions. Efforts to malign teacher unions appear to have succeeded: a report by the Kamber Group (1997), commissioned by the NEA, warns that teacher unions have become "an institution at risk" and that public perception is that teacher unions are largely responsible for the failures of the educational system.

Teacher union advocates have countered these polemics with sometimes equally aggressive and emotionally charged attacks on critics of unions, further fueling existing acrimony between anti- and pro-union groups. As a result, the conflict's tone has
escalated to an almost feverish pitch at which the National Educational Association is christened the "National Extortion Association," leaders of teacher unions are commonly referred to as "the mafia" and "bosses" (Brimelow & Spencer, 1993), and both critics and advocates of teacher unions are labeled as "enemies" and "foes" of education (Feldman, 1998; Lieberman, 1997). In this battle for public opinion, curiously missing is adequate empirical analysis of whether teacher unions really are negatively related to educational quality. That is, explicit comparisons between unionized and non-unionized states rarely figure into the debate. Rather, the link between teacher unions and educational performance has been inferred by anti-union groups that rely on state-by-state report cards (i.e., comparisons of states on indicators of educational policy and practice) to assert a negative relationship between teacher union strength and educational reform, as well as educational progress (Finn & Petrilli, 2000). Pro-union groups all too readily assume a positive effect or at least no disadvantage from the presence of unions (Feldman, 2000). Regrettably, both positions have been proffered with little empirical foundation. Instead, what appears to be wrong, or right, with America's educational system is often attributed to unions without the requisite evidence to draw such a conclusion. Needed are analyses of educational performance by unionized and non-unionized states to see if any of the politically charged rhetoric has merit.

**Academic Input on the Effects of Unions**

For the most part, academic voices have been relatively silent on this topic. The primary contributions to this discourse have been restricted to those of economists, even though scholars from other disciplines have long-standing interest in union activities. For example, in the field of sociology, effort has been directed at understanding the conditions under which workers organize into collective bargaining units, resort to strikes to resolve labor disputes, and struggle with management (Cornfield, 1991; Perron, 1984; Rubin, 1986; Wallace, Griffin, & Rubin, 1989), as well as disparities in unionization rates across states and nations (Western, 1995). Sociologists also have explored how unions affect workers in terms of such outcomes as job solidarity, dignity, autonomy, and job satisfaction (Blauner, 1964; Edwards, 1979; Hodson, 1991; Hodson, Welsh, Ribble, Jamison, & Creighton, 1993; Kalleberg & Berg, 1987), but generally have made few attempts to draw connections between unions and worker productivity. Instead, with few exceptions, sociologists and other academicians outside of economics seemingly entrust this piece of the puzzle to economists and take for granted the assumption that productivity and unionization are incompatible. This concession is unfortunate because scholars outside of economics also may offer valuable insight into the relationship between unions and productivity and, combined with the contributions of economists, may help create a more developed interdisciplinary picture of unions.
Perhaps the reluctance to study the link between unions and productivity comes from the economic nature of the concept "productivity." That is, we typically think of productivity in terms of explicit economic outputs. A noteworthy exception is in the educational sphere, where the product is the education of children. In this regard, educational productivity is envisioned by educational researchers and social scientists as success in teaching students, and is assessed by such indicators as high school graduation rates, college attendance rates, and, as studied in this article, standardized test scores (Eberts & Stone, 1987). Surely, educational productivity differs from productivity in the private sector. The former focuses on a public good rather than on an explicitly commercial commodity, and it is difficult to reach a consensus over how much investment is required to yield acceptable returns. In turn, educational productivity may not fit conveniently in econometric models. Although not examining the consequences of teacher unions, a wide range of scholars has amassed an extensive body of literature linking educational productivity to other organizational features of local and state school systems, such as school and classroom size, per capita expenditures on education, instructional grouping arrangements, and the extent to which schools are structured to facilitate teacher control over working conditions (Powell & Steelman, 1984, 1996; Rowan, Chiang, & Miller, 1997; Shavit & Featherman, 1988). Given this interest in organizational features and correlated educational outcomes, it is perplexing that non-economists cede the empirical research regarding the link between teacher unions and educational productivity to economists.

**Alternative Views on Unions**

Compelling but rival arguments can be made about the implications of unions (in general) with respect to productivity. Some scholars posit that unions create an adversarial atmosphere between workers and management, protect ineffective workers, advocate restrictive rules limiting managerial flexibility in work settings, pressure management to hire more workers than necessary, and unnecessarily drive up costs and thereby decrease profit margins (Machin, 1991; Metcalf, 1989). The upshot, according to these scholars, is that unions weaken the economic competitiveness of businesses (Machin, 1991; Metcalf, 1989; Warren, 1985).

In stark contrast, others claim that unions offer workers stability in the workplace, wages and benefits commensurate with contributions, security, dignity, and job satisfaction (Cornfield, 1991; Freeman & Medoff, 1984). Further, observers contend that unions may boost worker stability, reduce the turnover rate, and offer a collective voice for employees to air their concerns (Pfeffer & Davis-Blake, 1990). Unions also may encourage more proficient management and "shock" the system into needed restructuring. Even featherbedding, or requiring more slots than is necessary to run an organization, may inadvertently raise production. Under this reasoning, the goals of management and workers need not be mutually exclusive. Rather than weakening the
bottom line, labor unions can result in secure and productive workers (Brown & Medoff, 1978; Freeman & Medoff, 1984; Hirschman, 1970).

**Teacher Unions and Educational Outcomes**

Extending the positive or negative claims about unions in general to teacher unions specifically, however, requires acknowledgment of the distinct features of teacher unions. First, in contrast to the overall declining percentage of unionized workers (especially in the private sector) during the past few decades (Cornfield, 1989; Griffin, McCammon, & Bostko, 1990; Hirsch & Macpherson, 1997), the percentage of teachers in unions, as well as the percentage of teachers covered by collective bargaining agreements, has increased during the same period (Hirsch & Macpherson, 1997; U.S. Bureau of the Census, 1980, 1989, 1997). With a combined membership of more than three million in the National Education Association and the American Federation of Teachers, more teachers belong to unions than does any other group of workers (U.S. Bureau of the Census, 1989, 1997).

Teacher unions also may differ from other unions because, as mentioned above, the organizational aim of schools is to promote human capital, in essence, to educate students (Becker, 1993). Since the product is not an explicitly commercial commodity but rather an investment in human potential, it is unclear whether the relationship between unionization and productivity in the private sector (or other parts of the public sector) can generalize to teacher unions.

Still, claims about teacher unions parallel those made about unions overall. A commonly held position is that teacher unions are negatively related to educational outcomes. Proponents of this stance often hold a "rent-seeking" view of unions that puts teachers' interests at loggerheads with those of parents and the community (Hoxby, 1996). Under this view, teacher unions are problematic because they are singularly interested in maximizing working conditions and compensation rather than, and at the possible expense of, student gains. Those espousing this position contend that teacher unions inflate expenses in a frivolous and harmful way that defeats the purpose of education by lowering student performance (Kurth, 1987). Moreover, strikes or threats of teacher strikes, although rare, are seen as highly disruptive for workers and their families and children, and as undermining community respect for teachers. Others cite overregulation of the curriculum as a counterproductive by-product of unions (Eberts & Stone, 1984). Teacher unions also are characterized, because of their collective influence on legislators, as impediments to educational reforms (Eberts & Stone, 1984). In addition, teacher unions may shield teachers from dismissal through a seniority system that is impervious to merit. Under this scenario, the educational caliber of schools may diminish insofar as unions lobby against merit pay raises.
Others, however, question the fundamental assumption of the rent-seeking model that goals of unions and of the community are necessarily incompatible. Although acknowledging that unions press for higher wages, benefits, and expenditures on education, they maintain that the educational system requires such investments to meet the objective of bolstering human capital. Better pay and more secure working conditions may attract higher quality teachers and foster a standard of professionalism that is conducive to effective teaching (Eberts & Stone, 1984, 1987). Unions also may negotiate classroom changes by pressing for smaller classes, time set aside during the school day for lesson preparations, and lighter teaching loads - factors that some social scientists have suggested are positively associated with educational output (Hall & Carroll, 1975; Powell & Steelman, 1996; Rowan, Chiang, & Miller, 1997). Additionally, unions may strengthen teacher standards through licensure procedures that eventually boost educational productivity (Kleiner & Petree, 1988) and may lead to changes in administrative practices and styles that prove beneficial (Zigarelli, 1994). Taken together, these possible benefits of unions may enhance not only the status of teachers but also the educational climate to which students are exposed.

Despite their disagreement about the role of teacher unions, scholars from both sides of this debate lament the dearth of empirical work on the association between teacher unions and educational outcomes and call for more scrutiny of this relationship (Eberts & Stone, 1984; Hoxby, 1996; Kurth, 1987; Nelson & Gould, 1988). Existing studies are not conclusive about the benefit or detriment of teacher unions to education. Eberts and Stone (1987) and Argys and Reese (1995) find that, in general, students in unionized districts score higher on standardized tests than students in non-unionized districts, but suggest that the benefit accrues mainly to middle-range (i.e., average) students, a pattern they attribute to union policies that siphon resources away from exceptional students. McGiverin, Gilman, and Tillitski (1989) challenge this assertion by showing that smaller classes, a goal of many union negotiations, benefit exceptional students. In a similar vein, Kleiner and Petree (1988) find that interstate variation in teacher unionization correlates positively with state high school graduation rates and SAT scores, whereas Hoxby (1996) finds that financial demands of unions parlay into lower high school graduation rates. Correspondingly, Kurth (1987) argues that SAT scores are negatively linked to teacher unionization. This decidedly mixed set of findings is due at least in part to differences in union measures employed, choices of dependent variables studied, units of analysis used, and other methodological decisions (see, for example, the exchanges between Nelson and Gould [1988] and Kurth [1988], and between Kleiner and Petree [1988] and Eberts and Stone [1988]). Given the inconclusive and limited nature of these studies, we concur with most scholars in this area that more research is warranted.

**Data and Measures**
We analyze here the relationship between interstate variation in teacher unionization and educational productivity. For most of our analysis, teacher unionization is measured by the percentage of teachers covered by collective bargaining or by meet-and-confer agreements in a state, and educational productivity is gauged by state SAT and ACT scores. Both the SAT and ACT are standardized tests taken by high school students who aspire to attend college. As described by the College Entrance Examination Board, "The SAT is designed to measure verbal and quantitative reasoning skills, developed over many years of education, that are related to academic performance" (1993, p. iii). According to the American College Testing Program, the ACT measures "individual high school students' educational development as related to their readiness to pursue further study at the college level" (1994, p. 2). Although their goals are quite similar, the SAT and ACT include different subtests (verbal and math in the SAT; English, math, reading, and science reasoning in the ACT) and use different metrics (total scores on the SAT range from 400 to 1600, while scores for the ACT range from 1 to 36). These exams also differ in their status. Not only do more students take the SAT than the ACT, but public and academic dialogue on educational policy focuses more heavily on the SAT than the ACT.4,5

In a period when "accountability" is the buzzword in educational circles and is often equated with standardized test outcomes, the SAT and, to a lesser degree, the ACT have become the "gold standard" of educational performance, since completion of the SAT or ACT is required for admission to nearly all colleges and universities in the United States. Published annually, state rankings on the SAT and the ACT are monitored closely by educators, politicians, and the public at large and are seen as a direct measure of the quality of state educational systems. Although some critics question the fairness and utility of standardized exams (Crouse & Trusheim, 1989; Rooney & Schaeffer, 1998; Slack & Porter, 1980) and others promote reliance on other standardized exams such as the National Assessment of Educational Progress (NAEP), the SAT and ACT jointly may attract more public attention than does any other indicator of student educational performance.6 Since the 1980s, we have witnessed an upswing in the emphasis on standardized testing and especially the SAT. For example, in the 2000 electoral campaign, SAT scores of presidential candidates were widely published, presidential candidates promised to provide bonuses to states that improve test scores, and governors' records on education often were reduced to state rankings on SAT scores (Associated Press, 2000; Maraniss & Nakashima, 2000; Seelye, 2000). Scholars in turn have attempted to examine the relationship between educational inputs such as per capita expenditures on education, student-teacher ratios, and, most relevant here, teacher unionization and SAT scores (Grimes & Register, 1991; Kleiner & Petree, 1988; Kurth, 1987; Nelson & Gould, 1988; Powell & Steelman, 1996).

In our analysis, the outcome variables, student SAT and ACT scores, and the predictor
variables are aggregated at the state level. Social scientists have documented the utility of state-level analyses on a variety of topics (Lee & Guest, 1983; Linksy & Straus, 1986; Straus, 1985). Educational outcomes are particularly well suited to state-level analyses, as articulated elsewhere (Fitzpatrick & Yoels, 1992; Kleiner & Petree, 1988; Kurth, 1988; Page & Feifs, 1985). Several factors dictate our decision to analyze the link between educational productivity and teacher unions at the state level.

First, public school systems are increasingly governed at the state level. States have shouldered an increasing proportion of school finance over the past few decades and have expanded their influence in educational policy and reform accordingly (Fitzpatrick & Yoels, 1992; Gray & Jacob, 1996). Further, since public school teachers are licensed by individual states, states constitute a "natural unit" for studying teacher unions (Kleiner & Petree, 1988). Second, the parameters regarding teacher unionization are set at the state level: states enact laws that determine the extent to which teachers are allowed to organize and bargain collectively (Valletta & Freeman, 1988). Consequently, there may be more interstate than intrastate variation in unionization rates and presence. Third, interstate variation in educational productivity also is quite high and is prominently featured in public and academic discussions of educational policy (Feldman, 2000; Finn & Petrilli, 2000; Fitzpatrick & Yoels, 1992; Will, 1993). This is particularly true of state SAT scores and, to a lesser degree, ACT scores. Indeed, interest in state comparisons of educational productivity and, collaterally, state policies or programs that are linked to high state rankings has intensified in the past few decades (National Education Goals Panel, 1997). Fourth, the most complete data on SATs and ACTs, and on the measure of unionization used here, are available at the state level, as we describe below.

**Unionization**

To measure the degree to which teachers in each state are represented by unions, we use data from the *Schools and Staffing Survey, 1993-1994* (SASS), conducted by the U.S. Bureau of the Census for the National Center for Education Statistics. SASS was designed to provide national and state representative estimates for schools. School district administrators were asked if teachers in their district were represented by either collective bargaining or meet-and-confer agreements. These data were then aggregated into the percentage of teachers in each state who were represented by either collective bargaining or meet-and-confer agreements. Supplementary analyses discussed later will compare the use of this operationalization of teacher unionization with that of others. Descriptions, means, and standard deviations of this measure and of other key variables in our models estimating state average SAT and ACT scores are shown in Table 1.

**Measures for SAT Models**
For information regarding state SAT scores, we use data from the state-by-state *College Bound Seniors, 1993* reports, published by the Admissions Testing Program of the College Board. These reports provide data on average state SAT scores, statistical profiles of students who took the test in each state, and summaries of student self-reports of academic history and family background.

After examining the bivariate relationship between interstate variation in teacher unionization and state SAT scores, we test whether this relationship shifts with the addition of controls for the selectivity of the test-taking population, as well as other sociodemographic factors. Our earlier work and that of others have cautioned against the practice of using unadjusted state SAT scores - for example, scores that do not take into account the selectivity of the test-taking population - to derive conclusions about statewide academic performance (Nelson & Gould, 1988; Page & Feifs, 1985; Powell & Steelman, 1984, 1996). Unfortunately, public and academic accounts of the relationship between state educational inputs and SAT scores typically have not followed this recommendation (Kleiner & Petree, 1988; Kurth, 1987; Will, 1993).

The importance of adjusting for selectivity becomes apparent if we consider the wide range in the percentage of students taking the SAT exam in 1993, from a low of four percent (in Utah and Mississippi) to a high of 88 percent (in Connecticut). Much of this variation occurs because states vary in the standardized exam used for admission into their public universities. In addition, Ivy League schools and other prestigious colleges and universities more commonly expect SAT scores in students' applications. As a result, students in ACT states who take the SAT are more likely to be among the most academically successful students and, in turn, states with a low percentage of students taking the SAT may have artificially high average scores. Because past work has shown that the lion's share of state differences is attributable to this factor alone (Page & Feifs, 1985; Powell & Steelman, 1984, 1996), studies of state SAT scores need to control for the participation rate (i.e., percentage of students taking the exam) or another proxy for student selectivity.

Previous work also documents the advisability of incorporating compositional factors in examinations of state SAT scores (Page & Feifs, 1985; Powell & Steelman, 1984, 1996). In our models, we include each state's test-taking population's average parental education (i.e., the percentage whose parents have attended college), racial composition (i.e., the percentage who are Black, Latino, and Asian American), sex composition (i.e., the percentage who are female), and median familial income (adjusted for interstate variation in cost of living).

Because unionization rates tend to be lower in southern states (Aronowitz, 1983; Carver, 1993; Roscigno & Kimble, 1995) and because southern states fare comparatively poorly on standardized exam performance (Parcel & Geschwender, 1995;
Powell & Steelman, 1984; U.S. Department of Defense, 1982), we also include region in our models. Our definition of South (coded as 1) includes all states that are identified concurrently by the U.S. Bureau of the Census (1997), Reed (1982), and Zelinsky (1973) as southern and excludes states that are not mentioned by each. Using alternative definitions of southern states does not change the central findings of this article.

Measures for ACT Models

We rely on unpublished reports provided to us by the American College Testing Program for ACT data. The ACT program offered state-by-state breakdowns on average ACT scores and information on the selectivity of each state's test-taking population (the percentage of test-takers who reported being in the top 25 percent of their graduating class, as well as the percentage of eligible seniors who took the exam). Sociodemographic information provided by the ACT program includes the test-taking population's racial composition (the percentage of the test-taking population who are African American, Latino, White, and "other"), sex composition (the percentage of test-takers who are female), and familial income (median family income, adjusted for cost-of-living differences between states). As in the SAT models, we also test for the influence of region.

Results

Base Models of Unionization and SAT Scores

Table 2 presents regression models in which state SAT scores are estimated as a function of teacher unionization rates, participation rates, and sociodemographic variables. From Model 1, in which state SAT scores are regressed on teacher unionization rates, we see that the bivariate relationship between these two variables is positive, but not statistically significant. In other words, at first glance it appears that states with high rates of teacher unionization rates are neither advantaged nor disadvantaged in terms of SAT performance.

Yet this picture is not only incomplete, but also misleading. When considering state SAT scores, one must, as indicated earlier, take into account the extensive interstate variation in the percentage of students taking the exam. An inspection of the bivariate relationship between state SAT scores and participation rate reveals a nonlinear relationship: the negative slope between these two variables is greatest when comparing the lowest participation rates (for example, 5 versus 10 percent) and continues to decrease until there is almost no difference (for example, between a 70 percent and a 75 percent participation rate). Various transformations of participation rate were explored, and we chose percent and square root of percent participation as the best representation.
Model 2 of Table 2 presents the regression model for this relationship, in which state SAT scores are regressed on percentage and the square root of the percentage. In this model, approximately 85 percent of the interstate variation in SAT scores is explained by state differences in participation rate.

This finding, though, is not new and has been reported before in this journal (Powell & Steelman, 1996). What is new, however, is the effect of teacher unionization rates once participation is taken into account, as displayed in Model 3. The effect is quite strong: the coefficient of .516 (p < .01) indicates that, on average, a state in which all its teachers are covered by collective bargaining or meet-and-confer agreements has an average SAT score that is 51.6 points higher than its counterpart in which none of its teachers are covered.

Our earlier work has demonstrated that compositional and selectivity factors other than participation rate also may be related to state SAT scores (Powell & Steelman, 1984, 1996); these factors may minimize or magnify the relationship between unionization and state SAT scores. Model 4 adds parental education, the percentage of test-takers in each state whose parents attended college. Model 5 adds the percentage of African Americans among the test-takers in each state. Model 6 adds the percentage of Latinos and of Asian Americans among the test-takers, sex composition (the percentage of test-takers who are female), and median familial income of the test-takers.

The most salient finding in these models is the consistency of the effect of teacher unionization. The positive coefficient of unionization rates is reduced in these models, especially with the inclusion of parental education (from .516 to .401) and percentage African American (from .401 to .269); however, regardless of the model used, the coefficient remains positive and significant.

Although these control variables are not the focus of this article and have been analyzed elsewhere (Powell & Steelman, 1996), it should be noted that parental education and the percentage of African Americans in each state's test-taking population are significantly related to state SAT scores, but the percentage of Latinos, of Asian Americans, and of females, and the median family income of each state's test-taking population, are not. Additional analyses further show that the effects of unionization rates, although significant for both sections of the SAT, are stronger for math scores than for verbal scores in contrast to the effects of racial composition and parental education, which are more profound for verbal scores.

Alternative Measures of Selectivity of the Test-Taking Population

To check if these findings are robust regardless of the measure of selectivity, we explore
a variety of additional specifications of selectivity, including, as recommended by others, the use of class ranking or grade point average instead of participation rate (Wainer, 1986). Participation rate is so highly correlated with state SAT scores because the former, presumably, is a proxy for the average academic potential and accomplishments of the test-taking population: the lower the participation rate, the more academically talented the cohort taking the SAT. The College Board data include information on self-reported class ranking (operationalized as the percentage of students in each state's test-taking population who report being in the top 10 percent of their class) and self-reported grades (measured on self-reports of grades converted to a 4-point scale), two indicators of academic performance. We therefore are able to test whether the effect of teacher unionization remains significantly positive when using these other measures in lieu of participation rate.

Table 3 compares partial correlations between teacher unionization and state SAT scores when controlling for participation rate, class ranking, or grades. The first coefficient from the first column is derived from Model 3 of Table 2. It indicates that the correlation between unionization and state SAT scores, once one partials out participation rate, is .673. Using the alternative measures of selectivity also yields significant positive partial correlations between unionization and state SAT scores: .623 when class ranking is used as the selection measure and .571 when grade point average is used as the measure of selectivity. The remaining correlations in Table 3 are analogous to those in Model 4 through Model 6 of Table 2 in that they adjust for the effects of parental education, racial composition, sex composition, and familial income. In all cases, the partial correlation between unionization and state SAT scores is significantly positive (p < .01), ranging from .411 to .697. In other words, the presence of a strong and positive relationship between unionization and state SAT scores does not appear to be a function of the selectivity measure chosen.18

South/Non-South Differences

As noted earlier, teacher unionization rates vary by region, with southern states having a much lower teacher union presence than their nonsouthern counterparts. Consequently, we next test whether the observed effect of unionization is illusory - that is, whether it disappears once region (South = 1; non-South = 0) is introduced into the regression models. Model 1 of Table 4 suggests, perhaps counterintuitively, that southern states do not fare significantly worse on SAT scores. However, the absence of a significant effect is simply a function of not controlling for participation rate (or, as indicated in auxiliary analyses, for class ranking or average grades). Once this factor is incorporated in the regression analysis (Model 2, Table 4), the South/non-South difference increases to nearly 32 points (p < .01). Although controls for parental education, race composition, sex composition, and median income markedly reduce the regional difference (Model 3 through Model 5, Table 4), it is only upon entering unionization that the
South/non-South gap no longer remains statistically significant (Model 6, Table 4). Equally telling, even when sociodemographic variables are not included in the model, the regional effect virtually disappears as a function of unionization (Model 7, Table 4). In other words, the effect of unionization is not merely the result of a South/non-South difference, but the South/non-South gap can be attributed in large measure to the different rates of unionization in the South and non-South.

Alternative Measures of Unionization

Our analyses consistently find that state teacher unionization rates are positively related to state SAT scores. Some scholars, however, have suggested that the disagreement over the influence of unions stems in part from the measures of unionization employed (Hoxby, 1996; Nelson & Gould, 1988). In our examination of the extant literature on teacher unionization, we have found several operationalizations of unionization or union strength. Are our results and, in turn, the consistency of our patterns idiosyncratic - for example, the result of the measure of unionization we use?

To test this possibility, we replicate our analyses using other measures of unionization or union strength. The first alternative measure of unionization is the percentage of teachers in a state who are covered by collective bargaining agreements only (National Center for Educational Statistics, 1994). We then use the percentage of school district employees in a state who are represented by bargaining units (1987 Census of Governments) as a measure of unionization. The third measure of unionization is the percentage of full-time instructional staff in a state who are organized (1987 Census of Governments). Our fourth measure of unionization is a dichotomous variable indicating if, by 1990, state law required school administrations to meet with teachers' organizations (Hoxby, 1996; Valletta & Freeman, 1988). Last, we operationalize unionization using a scale based on state laws that shape the extent of union rights (Hoxby, 1996; Valletta & Freeman, 1988).

Table 5 summarizes the key results, presenting the partial correlations between these different measures and state average SAT scores, cumulatively controlling for percentage of students taking the SAT, parental education, racial composition, sex composition, and income. To facilitate a comparison to our earlier models, the first row of coefficients uses the measure of unionization from our earlier tables: the percentage of teachers who are covered by collective bargaining or by meet-and-confer arrangements, as reported in SASS. Regardless of the measure of unionization used and the control variables included, the correlation between unionization and state SAT scores is significantly positive.

Unionization and ACT Scores
Finally, we test to see whether the relationship between unionization and educational productivity holds if state ACT scores are used as the measure of productivity. The regression models in Table 6 are comparable to the SAT models we presented earlier. A few exceptions should be noted. First, our models use the average class ranking (as reported by students), rather than the percentage of students taking the exam, as a measure of test-taker selectivity. While participation rate and class ranking are interchangeable for models predicting SAT scores, class ranking is qualitatively different from participation rate for ACT scores. Indeed, the correlation between state ACT scores and participation rate is markedly weaker (-.24) than the correlation between state ACT scores and class ranking (.62). Second, we were unable to obtain measures on parental education for the ACT models; however, as we noted earlier (see footnote 16), the relationship between parental education and income typically is quite high and, as a result, income may serve as an approximate proxy in this case.

The bivariate relationship between unionization and state ACT scores is presented in Model 1 of Table 6. In contrast to the state SAT models, the bivariate relationship is significantly positive at the .01 level of significance. That is, even without an adjustment for selectivity, states with higher rates of unionization appear to have higher ACT scores. The inclusion of class ranking (Model 3, Table 6), percentage of African Americans in the test-taking population (Model 4, Table 6), percentage of Latinos and other racial/ethnic groups, sex composition, and median income (Model 5, Table 6) reduces the size of the union effect, but it remains significantly positive at .01 level of significance. The South/non-South gap is strong (Model 6, Table 6) and, as in the SAT models, a large portion of the regional gap is attributable to unionization (Model 7 and Model 8, Table 6).

**Conclusion**

In this article, we examined whether economists, other social scientists, politicians, and members of the public at large who claim that teacher unions impede the educational progress of students are correct. As evidence of teacher unions' allegedly negative influence on "educational productivity," advocates of this stance often marshal aggregated comparisons, such as interstate comparisons of SAT performance. We do not find support for this position. On the contrary, we find a statistically significant and positive relationship between state teacher unionization rates and state standardized test scores, after controlling for potential confounding factors. In other words, our study reveals that if we take into account compositional factors (e.g., the percentage of students taking the exam), then states with greater percentages of teachers in unions tend to report higher test performance of their students. This pattern is surprisingly robust; it holds for both state SAT and ACT scores and persists across different model
specifications. Although social scientists have disagreed over which measure of teacher unionization is preferable, this pattern remains, regardless of the measure chosen. In no model is the effect of teacher unions significantly negative. In fact, the relationship between state test scores and unionization is significantly positive in all models, except one in which SAT scores are estimated without any adjustment for selectivity of the test-takers. This exception is noteworthy. Had we not controlled for the selectivity or quality of the test-takers (i.e., the percentage of students taking the exam, the average grades of the test-taking population, or the average class rank of the test-taking population), the positive relationship between unions and state SAT scores would have been undetected or underestimated. Certainly, caution should be exercised in concluding that unionization rates are responsible for higher state SAT and ACT scores. However, at the very minimum, these findings are inconsistent with the contention that greater teacher unionization depresses standardized test scores.

These findings also have implications for scholars interested in the South as a distinctive region. We noted earlier that the inclusion of region in our models does not substantially reduce the benefit to standardized test scores associated with greater unionization, but the negative impact of southern states is reduced dramatically once unionization rates are considered. These results suggest an important and underexplored mechanism, low rates of teacher unionization, by which the southern disadvantage in education is manifested. This does not deny the role that other factors (e.g., political economy or culture) may play. We cannot discount the possibility of the indirect influence of these factors via unionization (e.g., political economy and/or culture) that may hamper the formation and proliferation of teacher unions and, in turn, depress educational productivity in southern states.

Despite the consistency of the patterns, there are limitations to the current research that suggest future avenues of research. First, our dependent variables, SAT and ACT scores, are just one type of academic outcome, and these tests typically are taken by students intending to attend college. Some might, therefore, conclude that our focus overestimates the positive effect of teacher unions, which in part may explain the discrepancy between these patterns and those found by Hoxby (1996) using high school graduation rates. However, if Eberts and Stone (1987) and Argys and Reese (1995) are correct that above-average students benefit less from teacher unions than do average students, then our results may underestimate the influence of teacher unions. Moreover, in supplementary analyses (not shown here), we find that teacher unions' positive relationship with state SAT and ACT scores can be extended to high school graduation rates and NAEP scores (Steelman, Powell, & Carini, 1997). Further explorations of the effects of teacher unions on a wider range of academic outcomes would help clarify the role that teacher unions have on academic productivity.
Second, although the use of alternate measures of unionism bolsters our confidence in the findings, it is possible that what we are capturing in our findings is not teacher unionization per se, but rather teacher unionization as a proxy for some unspecified factor, such as greater commitment to education. Of course, this criticism can be directed at virtually all studies, although it has not been explicitly aimed at those studies that report a negative effect of teacher unions.

Third, the use of cross-sectional, state-level data is, in some ways, less than ideal. Earlier we justified our use of state data on the grounds that other studies in this area (and public accounts of educational productivity) highlight state comparisons, and that laws regarding collective bargaining and much governance of education occur at the state level (Hoxby, 1996; Kleiner & Petree, 1988; Page & Feifs, 1985). However, the risk of ecological fallacy arises here, as it does in most analyses of educational phenomena using aggregated (by district, state, or country) independent or dependent variables (Fitzpatrick & Yoels, 1992; Weglinsky, 1997). In our examination of these data, however, we have taken several precautions to reduce the likelihood of this problem (see, e.g., note 15). Nevertheless, other levels of analysis (e.g., at the district or school level) can also prove fruitful, should appropriate data be available. Although we welcome longitudinal hypotheses to test, (e.g., the possibility of a lagged effect of teacher unions), the extant data on labor unions preclude a comprehensive analysis of this type. Let us reiterate, however, that although causality cannot be established, our results challenge the position that teacher unions are negatively related to state test scores.

Our finding that teacher unions are positively linked to state average SAT and ACT scores prompts the question of why. Clearly, our study challenges the "rent-seeking" view outlined earlier, which envisions teacher unions at odds with what parents desire from schooling, namely, the educational advancement of their children. The zero-sum orientation that permeates much research on unions and assumes that worker gains inevitably result in production losses appears misguided, at least with respect to teacher unions. Still, our data cannot distinguish among the previously outlined explanations for the positive relationship between unions and state-level SAT and ACT scores. However, in supplementary analyses (available from the authors), we were able to test one possibility: that teacher unions are positively related to lower average class size (i.e., student-teacher ratios), higher per capita expenditures on education (adjusting for interstate variation in the cost of living), and higher salary (also adjusting for cost of living). Although these variables are linked to state SAT and ACT scores, their inclusion in our models did not significantly reduce the effect of teacher unionization. Other mechanism(s) (i.e., better working conditions; greater worker autonomy, security, and dignity; improved administration; better training of teachers; greater levels of faculty professionalism) must be at work here. Future scholarship should be directed at unraveling why teacher unions appear to favorably influence academic outcomes.
Finally, this study cannot tell us if there is an overall net benefit of teacher unions, at least with respect to cost effectiveness. Because we examined the link between teacher unions and productivity but not costs, we cannot gauge whether the higher test scores are enough to offset the purportedly higher costs of unionization. Whether there is a net benefit of teacher unions hinges not only on the impact of teacher unions on economic (and non-economic) costs, but also on the specific costs deemed acceptable (by the public, policymakers, or academe) for a unit increase in educational productivity - an assessment for which consensus may be difficult to reach. Moreover, even if, through some mechanism, unionization raises test scores, teacher unions may be a relatively inefficient vehicle of educational reform: for example, states might raise scores more with an identical investment in school infrastructure, additional teacher training, or special programs.

In closing, we must admit that when we began this inquiry, we did not anticipate a positive or a negative link between teacher unions and these measures of educational productivity. Rather, we expected no relationship. That we found such a strongly consistent positive relationship across so many permutations of analysis should give pause to those who characterize teacher unions as adversaries to educational success and accountability. Our intent here certainly is not to serve as the final word on the issue. Rather, our goal is to encourage educational scholars and social scientists to engage more fully in the analysis of teacher unions and to try to uncover whatever advantages or disadvantages may accrue to teacher unionism.

Notes

1. Scholars have disagreed over the meaning of the terms unionized states and non-unionized states. For most of the analysis presented here, we focus on the percentage of teachers in a state who are covered by collective bargaining and/or meet-and-confer agreements. Others differentiate between states by the percentage of teachers who belong to an organization whose function is to deal with administration on work-related issues (U.S. Department of Commerce, 1991), while others compare states that do or do not require schools to meet and/or negotiate with teachers' organizations (Hoxby, 1996; Valletta & Freeman, 1988).

2. See Cornfield (1991) for a comprehensive review of this literature.

3. Rent-seeking refers to efforts to bypass typical pressures that organizations face in a market economy. These often take the form of lobbying government officials to promote laws or regulations that insulate the organization from competitive forces. Taken to its extreme, these competitive advantages could lead to a monopoly position for the organization (Krueger, 1974).
4. Although more students take the SAT than the ACT nationwide, it should be noted that there are more "ACT states" (i.e., states in which universities and colleges prefer the ACT) than "SAT states" (i.e., states in which the SAT is preferred instead). However, ACT states typically have smaller student populations than SAT states.

5. In our examination of the Nexis databank, we find that the ratio of articles in newspapers since 1990 that referred to the SAT versus the ACT exceeds 4:1.

6. Our assessment here is based on a comparison, using the Nexis databank, of the number of references to the SAT or the ACT versus other indicators of educational performance (e.g., dropout rates) in major and regional newspapers.

7. Commentaries about state educational productivity have been far-reaching. For example, senatorial candidates in North Carolina attributed its comparatively low ranking on the SAT (typically among the five lowest scoring states) to educational policies (including the presence or absence of collective bargaining for teachers) at the state level, although ironically both were running for a federal position (Kern & Just, 1997). And more recently, the comparatively poor showing of Texas students on the SAT (Texas regularly ranks among the bottom ten states) provided irresistible fodder to those opposing George W. Bush's bid for the presidency (Seelye, 2000).

8. The state percentages were weighted to account for the number of teachers in each district. We thank F. Howard Nelson of the American Federation of Teachers for providing these aggregated state data.

9. As early as the 1920s, unions have struggled to follow the migration of capital from the North to the South. Explanations for the South's resistance to unionization typically hinge on economic and cultural factors. For example, some scholars have contended that the labor supply, political structure, attitudes of employers, and the generally strong anti-union sentiments in the South have made the terrain difficult for all types of unions, including teacher unions, to gain a foothold (Aronowitz, 1983; Carver, 1993; Roscigno & Kimble, 1995).

10. The states categorized as southern (South = 1; non-South = 0) include Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia.

11. Other nonlinear transformations include logarithmic, reciprocal, and parabolic transformations, in addition to the nonlinear correction proposed by Edwards and Cummings (1989) and the self-selection techniques recommended by Gohmann (1988). Of note, the key finding of Table 2, that unionization rates are significantly and positively related to state SAT scores, is reproduced regardless of the nonlinear transformation or selection technique used. In fact, in some cases, these other
transformations yield even more pronounced patterns in support of this finding than does the measure used in Table 2.

12. Competing predictions about the effects of unions on educational performance dictate the use of two-tailed tests of significance. In contrast, the remaining variables in the models are based on previous predictions and, therefore, justify the use of one-tailed tests. However, even if we were to rely on the two-tailed test for all items, the control/background variables that are significant in our models would remain so (at the .05 level), with one exception (the effect of region in Model 4 of Table 4).

13. We also consider a measure that takes into account the percent of students who dropped out of high school. In these supplementary analyses, we examine the percentage of those who should be high school seniors (i.e., eligible high school seniors and dropouts) who took the SAT. Our supplementary analyses examine linear and nonlinear variants of this measure and find patterns remarkably similar to those presented in Table 2, especially with regard to the effects of teacher unionization.

14. We also test the possibility that unions influence participation rates as well. The correlation (.167) is not high.

15. In additional analyses, we restrict our analysis to only those states that were virtually completely unionized (i.e., over 90%) or non-unionized (i.e., less than 10%). As in our other models, these analyses corroborate a very strong relationship between teacher unionization and state test performance. These analyses discount the possibility that the performance in the non-unionized schools in highly unionized states is responsible for these states' higher scores. Supplementary analyses also confirm that the strong effect of unions is not the result of a few influential cases or outliers and that the inclusion of Washington, DC, to our data set would not substantively alter these patterns.

16. We also consider alternative modifications of income, such as logarithmic transformations. These alternatives do not notably change the magnitude of the effects of income, nor do they appreciably alter the significant effects of unionization rates on state SAT scores. Because the correlation between median family income and parental education is high (.755), we also estimate models in which parental education is excluded. In these supplementary models, the coefficients for median income more than triple in magnitude (b_income = 2.702; p < .01). More important, however, the effect of unionization remains quite strong (b_union = .341; p < .01).

17. Supplementary multivariate analysis, however, shows that the percentage of Latinos, as well as of Asian Americans, is significantly and negatively related to verbal SAT scores, but not to math SAT scores.
18. In considering self-reported class rank and self-reported grades, one needs to take into account the possibility of an upward bias in student reports - for example, that students may inflate their class standing or grades. However, there is no reason to believe that the extent of bias in self-reporting varies by state or, more relevant to our concerns, by teacher unionization.

19. This measure differs from the one we use in our primary analysis by excluding the percentage of teachers in a state with meet-and-confer procedures. Collective bargaining is indicative of greater union strength than is meeting and conferring; therefore, use of collective bargaining alone offers a more conservative estimate of union strength than the measure we use in models presented in Tables 1-4 and 6. Because we expect that the effect of collective bargaining on state SAT scores should be stronger than the effect of meeting and conferring, we also run regression analyses in which meeting and conferring and collective bargaining are added as separate variables. The analyses support our expectations: the standardized effect of collective bargaining is at least twice as large and, in some models, three times as large as the effect of meeting and conferring.

20. As defined in the 1987 Census of Governments (U.S. Department of Commerce, 1991), a bargaining unit consists of a group of employees who exist to bargain collectively or meet and confer with an administration. Since Alaska, Hawaii, Maryland, North Carolina, and Virginia do not have school districts in the same way that the other states do (i.e., school districts in these five states are fiscally dependent districts), we substitute the percentage of local government employees in a state who were represented by bargaining units. Alternative substitution approaches do not yield different patterns from those presented in Table 5.

21. Comparable data from the U.S. Census Bureau after 1987 are not available. Consequently, the percentage with bargaining units and percentage organized are from 1987, while the state SAT and ACT scores are from 1993 and 1994, respectively. This temporal inconsistency should not be unduly problematic, however, since it is not likely that these two measures of unionization changed substantially in the interim. Interestingly, some have argued that the impact(s) of unionization on test scores may operate with a time lag - for example, the effects of unions may accumulate over the years as student cohorts pass through the elementary and secondary grades (Nelson & Gould, 1988). If so, then measures of unionization should predate these outcomes by even a decade if the more complete effect of unions is to be detected. In auxiliary analyses, we examined comparable measures of unionization from 1982 (from the 1982 Census of Governments), more than ten years before the SAT and ACT scores. The partial correlations for unionization measures from 1982 are not substantively different than those from 1987, however.
22. As operationalized in the 1987 Census of Governments (U.S. Department of Commerce, 1991), organized employees belong to an organization that exists, at least in part, to deal with administrations on work-related issues. Thus, some organized employees are not specifically unionized; for example, they may belong to associations, federations, or councils. As explained earlier, school districts in Alaska, Hawaii, Maryland, North Carolina, and Virginia are dissimilar from those in other states and, as a result, for these states we substitute the percentage of full-time, instructional staff from all other local governments who were organized. Nevertheless, the use of other substitution techniques do not change the key patterns.

23. The variable was coded as "1" if a law requiring meetings was passed in a state by 1990 and "0" if no such law was passed. Hoxby (1996) uses this measure to differentiate between states in which any form of collective bargaining is and is not possible.

24. The variable was coded as "3" if the state expressly permitted union shops by 1990, school districts could employ only teachers who joined the union; "2" if the state permitted agency shops, that is, teachers had to pay union dues even if they did not join the union; "1" if the state passed a law by 1990 requiring school administrators to meet with teacher unions; and "0" if no such laws passed by 1990. Therefore, the higher the score, the more powerful the union is in the state.

25. This anomaly can be attributed to the different motivations to take the ACT and SAT. Students taking the SAT typically intend to apply to schools in states in which the SAT is the predominant exam, most often in the East and West. Moreover, Ivy League schools and many other prestigious colleges and universities are in SAT states and generally expect applicants to submit their SAT scores. As a result, one should expect a strong negative relationship between SAT scores and the percentage of students taking the SAT because the relatively few students who take the SAT in ACT states presumably are likely to be highly motivated and high achieving, and more likely to apply to prestigious schools. In contrast, the rationale for those taking the ACT in non-ACT states does not appear to be as based on academic concerns. That is, those taking the ACT in non-ACT states are not necessarily among the academically strongest students. As a result, the relationship between the percentage of students taking the ACT and class ranking is not strong.

26. In supplementary regression analyses, we include the percentage of seniors in each state who took the ACT. The use of this item instead of class ranking necessarily and markedly reduces the explained variance of the full model; however, it does not noticeably change the effect of the union variable, which remains significantly and positively linked to state ACT scores.

27. The effect of familial income on state ACT scores is quite strong, which we attribute
to the absence of parental education in the regression model.

28. The metrics for the ACT and SAT differ, but psychometricians have proposed formulae to equate scores from these exams (Houston & Sawyer, 1991; Wainer, 1986). In additional analyses, we use these formulae to convert state ACT scores to an SAT metric. For example, when an ACT-to-SAT conversion is used, the .015 coefficient for unionization in Model 3 of Table 6 (in which class rank also is included) translates into a .604 coefficient - which is similar in magnitude to coefficients in comparable SAT models.

29. Others have proposed that the effect of teacher unionization on student performance or educational attainment may vary by students' race (Grimes & Register, 1991; Milkman, 1997) or gender (Zwerling & Thomason, 1994).

30. The correlations between our measure of teacher unionization and recent state NAEP math scores (for eighth graders) and high school dropout rates are .638 and -.463, respectively. The relationship between unionization and these two indicators of educational productivity remains significant at the .01 level, even upon controlling for other factors such as average income and racial composition. As in the case of state SAT and ACT scores, one should be cautious in interpreting unadjusted NAEP scores, because states reportedly vary in student participation rates (Associated Press, 1999).

31. The impact of using different levels of analysis (state, local, individual) is unclear. Hanushek, Rivkin, and Taylor (1996) contend that greater levels of aggregation can exacerbate any omitted variable bias in model estimates. However, our models are more completely specified than those employed in earlier studies and, regardless of the model specification (save the bivariate model of SAT scores and unionization), the relationship between unionization and standardized test scores remains strong.

References


Do Teacher Unions Hinder Educational Performance? Lesson...


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