THE LINKAGES BETWEEN TEACHER UNIONS AND STUDENT ACHIEVEMENT

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ABSTRACT

Over the past decade, researchers have uncovered a positive teacher union productivity effect in the public schools and have further demonstrated that the benefits of unionized schooling accrue primarily to the average student, possibly at the expense of other students. At present, however, the moderators of the union-achievement relationship have not been definitively identified. After surveying literature from the fields of education, industrial relations, and organizational theory, a model of how teacher unions influence student achievement was constructed and tested. The teacher union productivity effect was found to be primarily generated by organizational changes in response to unionization rather than by specific union bargaining gains.

What variables affect the achievement of elementary and secondary school students? The most intuitive responses would probably include factors such as the student's innate ability, student effort, the support and economic status of the family, the quality of teaching, and the school's resources. Typically, a teacher union is not a variable that immediately surfaces in such a discussion. However, a consensus appears to be emerging in the industrial relations literature that teacher unions indeed have a positive effect on achievement. What is not understood are its causal connections. This article attempts to uncover some of these connections in an effort to inform the debate over educational reform.

LITERATURE REVIEW

To date, a few researchers [1-6] have quantitatively linked unions to student achievement. Eberts and Stone broke new ground by comparing the mathematics achievement of public school students in union versus nonunion schools [1].

Fourth graders at both types of schools took a math examination at the beginning (pretest) and the end (posttest) of the school year. The individual's score improvement served as the authors' measure of student achievement. Constructing an "educational production function" for each type of school, the authors attempted to estimate the productivity differential between union and nonunion schools [7]. Their study revealed a positive and significant effect of teacher unions on the order of 7 to 8 percent; that is, students in union schools demonstrated greater score improvement relative to those in nonunion schools, other things being equal. Eberts and Stone published a similar study in 1987 that reported a positive productivity effect of 3 percent [2].

Looking across student ability groups also yielded an interesting and informative result: Average-ability students improved more in unionized schools, while above- and below-average students improved more in nonunion schools. Eberts and Stone speculated that this phenomenon is produced by a "standardization" of educational procedures and practices that accompanies unionism, but they did not provide any general theory supporting this contention [2].

Milkman replicated the Eberts and Stone methodology to analyze secondary school student achievement [3]. Using an individual's improvement in score from sophomore to senior year on a standardized math test as his measure of achievement gain, Milkman estimated the union productivity differential at a positive and significant 2 percent of the average achievement test score [3].

Analyzing the differential across ability groups again proved illuminating. Otherwise identical students of average ability indeed appeared to benefit more from the unionized school environment than did their peers in nonunion schools. Gains of above- and below-average students in different school types, however, were not significantly different [3].

Three other studies have also attempted to link teacher unions with student achievement. All used SAT scores as their outcome measure. Kurth analyzed the decline in SAT scores from 1972 to 1983 with respect to the rapid growth of teacher unionism during this time [4]. Specifying SAT scores as a function of changing social conditions (divorce rate, labor force participation rate of women, and increasing prevalence of drugs, crime, and promiscuity), financial resources devoted to education (per pupil spending, teacher pay, percentage of school resources from local sources, and school district consolidation), and bargaining variables (percentage of teachers bargaining and percentage of teachers permitted to meet and confer), Kurth estimated the bargaining variables explained more of the decline in both verbal and math scores than any other variables. This, he concluded, was evidence of a negative union productivity effect [4].

Nelson and Gould reanalyzed Kurth's data using a more conventional educational production function [5]. They found the increasing incidence of collective bargaining had a *positive* rather than negative effect on SAT scores and reasoned the disparity in results stemmed from Kurth's misspecified model and poorly constructed variables [5]. In reply, Kurth retorted that Nelson and Gould,

employees of the American Federation of Teachers, themselves defined variables and specified the model inappropriately so as to achieve a predetermined conclusion [8]. Nothing in this seemingly inconclusive exchange, however, addressed achievement gains across student ability.

Lastly, Register and Grimes, using a National Assessment of Economic Education database of 2,360 seniors in sixty-one school districts, also specified an educational production function with SAT scores as the dependent variable [6]. With traditional controls and the inclusion of a selection bias variable (to control for self-selection of students who chose to take the SAT), the study concluded that teacher unions had a positive and significant effect on SAT scores. To the extent that SAT scores are a reflection of student achievement, the Register and Grimes study provides supplemental evidence of a positive productivity effect of teacher unions [6].

The totality of the empirical literature, then, suggests unions have at least two impacts on achievement that currently remain unexplained. At the school level, the presence of a teacher union appears to have a positive productivity effect. However, at the individual level, the benefit of an education in a unionized school depends on one's ability. Teacher union productivity effects may accrue disproportionately to the average student, perhaps at the expense of other students.

THEORY

This study constructs and tests a model of how unions affect student achievement by drawing on the substantial research that links unions to various educational inputs [9].

Traditionally, scholars have hypothesized two paths from teacher unions to student outcomes. The first of these involves unions' political activities. For several decades, the National Education Association (NEA) and the American Federation of Teachers (AFT) have lobbied Congress and the states for additional education funding in an effort to increase salaries and school resources [14-16]. The goals of this activity have been the improvement of teacher quality, professionalism, and working conditions, and the expansion of financial resources available for books, supplies, and equipment. Arguably, these political victories may subsequently enhance student achievement [17]. However, at present no work has specifically linked union political activities to educational outcomes.

The second and more developed path postulates a nexus between bargaining gains and achievement. In particular, it has been hypothesized that bargaining affects important educational inputs of class size (negative), time spent in class (negative), teacher quality (positive: through higher salaries and increased teacher education and training), and possibly teacher morale (positive: through greater participation, respect, and due process) [19]. Reviews of this literature have concluded that, although unions indeed positively influence salary and teacher education, negatively influence class hours, and have an indeterminate influence

on class size and morale [12, 13], there may be few, if any, linkages between these educational inputs and student achievement [11]. In fact, Hanushek's analysis of 147 educational production function studies reported:

> The results are startlingly consistent in finding no strong evidence that teacher-student ratios, teacher education, or teacher experience have an expected positive effect on student achievement. . . . [Also], there appears to be no strong or systemic relationship between school expenditures (including salaries) and student performance [11, p. 1162].

Moreover, even when controlling for these bargaining gains, Eberts and Stone still observed a positive and highly significant union effect, which suggests collective bargaining outcomes are not the only moderators of the teacher union productivity effect [1, 2]. In fact, given the findings of Hanushek, it is not even clear that they are moderators at all [11]. Perhaps a third, previously neglected path exists that helps to explain how unionization generates educational outcomes: management's organizational response to unionization.

When a teacher union wins the right to bargain for teachers, school management reacts in several ways: by supplementing administrative staffs and centralizing management to handle contract administration, by enforcing previously unenforced work rules [22], and by formalizing teacher duties in a labor contract [23]. This management response, in tandem with union desires to specify the boundaries of teacher work, fosters a more bureaucratized, more tightly controlled school organization [24]. Such observations about unions and bureaucracy comport with those of classical industrial relations research in the private sector (e.g., [25]).

To better understand organizational differences in union and nonunion schools, it is useful to juxtapose these conclusions about unionized schools with educational work from the field of organizational theory (OT). Examining the predominantly nonunion schools of the 1960s and early 1970s, OT researchers advanced the notion that the typical school is not at all tightly, but rather loosely, coupled [26-27].

> By loose coupling, the author intends to convey the image that coupled events are responsive, *but* that each event also preserves its own identity and some evidence of its physical and logical separateness. Thus, in the case of an educational organization, it may be the case that the counselor's office is loosely coupled to the principal's office. The image is that the principal and the counselor are somehow attached, but each retains some identity and separateness and that their attachment may be circumscribed, infrequent, weak in its mutual effects, unimportant, and/or slow to respond. Each of those connotations would be conveyed if the qualifier loosely were attached to the word coupled. Loose coupling also carries connotations of impermanence, dissolvability, and tacitness—all of which are potentially crucial properties of the "glue" that holds organizations together (emphasis in original) [28, p. 3].

Thus, Weick's imagery depicted educational organizations as having several autonomous building blocks (teacher, counselor, administrator, etc.) all loosely connected to create a "school."

Meyer and Rowan were more specific about the nature of a loosely coupled school [29]. They distinguished between loosely controlled instruction and tightly controlled "rituals" of credentialing, student assignment, and curriculum topics. Instruction, they claimed, is not closely supervised because such scrutiny can uncover inconsistencies and inefficiencies for which administrators would prefer not to take responsibility. Therefore, teaching is not subject to serious organizational inspection; curriculum usually exists as general guidelines to be adapted by teachers; and little direct authority is exercised over instruction and teaching methods [29].

By contrast, they said, the *structure* of the school is strictly regulated. For example, credentialing is rigid insofar as it imposes definite specifications for elementary and secondary school teachers; students are distinguished by grade; curriculum topics are formalized, even though the manner in which these topics will be taught is not; teacher absenteeism is monitored; and funds, space, and materials allocation is regulated by a set of rules. In short, there is little control over what goes on in the classroom but significant control over who the classroom actors are and how they get there [29].

Beginning with the seminal work in this area, coupling theory has evolved with little recognition for the observed bureaucratizing effects of unionization. Plausibly, the default condition may be a nonunion, loosely coupled environment. Unionization may then transform this organization into one that is more tightly coupled.

More specifically, management fear of forfeiting its control over the education process to teachers and their union may prompt greater administrative intervention into the classroom. Often this occurs through the enforcement of dormant educational policies on classroom practice [22]. To further ensure productivity and to counterbalance union monopoly gains, management may hold unionized teachers more accountable for student performance. Overall, then, unionized educational organizations should demonstrate a higher degree of interconnectedness between management desires and classroom practice.

Bureaucracy theory would predict that this is a more productive form of organization than the conventional nonunion school [30]. Thus, it is hypothesized here that the unionization of a school, via management's response, generates a more tightly coupled, more efficient school bureaucracy that in turn generates the observed productivity effects. It is further believed (but not tested) that the additional scrutiny of teachers by management gives teachers an incentive to target the average student in an effort to maximize overall class achievement. Appendix A elaborates on this hypothesis. The consequent change in instructional strategy may produce the pattern of achievement gains first observed by Eberts and Stone [1].

DATA AND METHODOLOGY

The data for this study came from High School and Beyond (HSB) and the Administrator and Teacher Survey (ATS), both collected by the Department of Education (DOE). HSB surveyed and tracked approximately 30,000 sophomores in 1,015 public and private high schools nationwide over the years 1980 to 1986. It solicited information on individual student demographics and attitudes, in addition to school, parent, and local labor market characteristics. As part of HSB, the DOE also administered student achievement tests in 1980 in reading comprehension, writing, vocabulary, math, science, and civics. The students retook similar exams in 1982 as seniors. This 1982 post-test score is the dependent variable in the educational production functions (EPF) specified [33].

Using a representative subset (532) of the HSB schools, the ATS surveyed principals, teachers, and guidance counselors in 1984 on school culture, control, and working conditions [34]. Combining the data from both surveys permits the construction of an EPF that is consistent with past research. The methodology used here to identify important moderators of the union-achievement relation entails first specifying an EPF with a union dummy variable. The hypothesized moderators of union bargaining gains, union political success, and school coupling are, however, omitted from this first equation and then added to observe their effects on the union parameter and on achievement. In particular, the first equation regresses achievement gain on family socioeconomic status, peer socio-economic status, teacher characteristics (union status, average experience, and tutoring time), school characteristics (region of country, urban, suburban, or rural location), and individual student characteristics (race, gender, disciplinary problems, pretest score, and pretest score squared). The next equations include measures of bargaining gains (average teacher salary and education level [35], time spent in class each day), political success (district expenditures per pupil [36]), and organizational coupling variables (defined in Appendix B) to ascertain the paths by which unions affect achievement. When all of the relevant paths are included, the union parameter should reduce to insignificance [37]. Table 1 presents definitions and summary statistics for EPF variables.

Based on previous work, unionization should have a positive effect on school productivity, and political successes should be more important moderators than bargaining gains. Further theorized is that tighter organizational coupling stemming from unionization is also an important moderator of the union-achievement relation.

RESULTS AND DISCUSSION

Tables 2 through 5 present student-level regressions. Equation 1 in Table 2 specifies achievement as a function of teacher union status and of the customary EPF variables. All of these variables are included as controls in all regressions, but

Table 1. Variable Definitions and Summary Statistics

posttest	This dependent variable is the student's total number of correct answers as a senior on a standardized vocabulary, reading, writing, math1, math2, and science test administered by the DOE.
indivses	Socioeconomic status of the student. This variable was created by the DOE using measures of parent education and income.
peer_ses	Average socioeconomic status of the school's students who participated in the HSB survey.
female	Student dummy variable = 1 if male, 2 if female.
wellbehv	"Well-behaved student" dummy variable = 1 if student had disciplinary problems during junior year, 2 otherwise.
pretest	Student's score on sophomore battery of exams.
pretest2	Pretest squared; this variable was included to ascertain whether the pattern of achievement was curvilinear, as found in the Eberts and Stone (1984) study.
urban, suburban	School location dummy variables coded 1, 0; reference group is "rural."
experavg	Average teaching experience in years of the school's teachers who responded to the HSB survey.
tutoravg	Average weekly tutoring in hours as reported by school's teachers who responded to the HSB survey.
union	School level dummy variable = 1 if the teachers in the school are unionized, 0 otherwise.
testvar	School variance for sophomore battery of exams; this variable was included to control for school standardization around the average student once the teachers unionize.
black - oth_race	Student race dummy variables coded 1, 0; "white" is the reference group.
new_eng - mountain	Regional dummy variables coded 1, 0; "pacific" is the reference group.

Bargaining Gain Variables:

educavg	Average education level of the school's teachers who responded to the HSB survey (1 = high school diploma, 9 = Ph.D.).
salavg	Average salary of the school's teachers who responded to the HSB survey. The survey furnished respondents with 5000 dollar ranges. Midpoints of these ranges were used for this study.
clastime	Amount of time in minutes the student spends in class each school day.

Political Success Variable:

distexp	The amount of money spent per pupil in the school's district each year.

Table 1. (Cont'd.)

Simple Statistics

Variable	N	Mean	Std. Dev.
POSTTEST	8409	66.452	21.901
INDIVSES	7963	0.096	0.739
PEER_SES	8353	−0.108	0.400
FEMALE	8395	1.525	0.485
WELLBEHV	8402	1.861	0.310
PRETEST	8409	59.561	20.246
PRETEST2	8409	3957.44	2517.110
URBAN	8409	0.269	0.443
SUBURBAN	8409	0.440	0.496
RURAL	8409	0.289	0.453
EXPERAVG	8409	9.888	1.099
TUTORAVG	8409	2.056	0.462
UNION	8409	0.863	0.343
TESTVAR	8409	182.795	138.597
WHITE	8409	0.692	0.461
BLACK	8409	0.168	0.374
AMER_IND	8409	0.029	0.169
ASIAN	8409	0.029	0.169
OTH_RACE	8409	0.062	0.241
NEW_ENG	8409	0.066	0.248
MID_ATL	8409	0.199	0.399
SOUTHHATL	8409	0.038	0.192
ESOCENTR	8409	0.009	0.094
WSOCENTR	8409	0.104	0.305
ENOCENTR	8409	0.039	0.194
WNOCENTR	8409	0.034	0.181
MONTAIN	8409	0.031	0.175
PACIFIC	8409	0.210	0.408
EDUCAVG	8409	5.537	0.375
SALAVG	8409	23228.450	4453.260
CLASTIME	8253	289.304	44.609
DISTEXP	6771	1605.750	663.622
ADMNCLAS	8195	−25.204	3.696
SCHLCSTR	6533	−13.270	3.237
ADMNGUID	7494	−0.571	0.494
OTHRCOUP	6785	2.347	2.072

Table 2. General Specification
Dependent Variable: Score on Senior
Achievement Test Battery
(Standard Errors in Parentheses)

	Equation 1
Intercept	6.498***
	(1.808)
Student SES	2.022***
	(0.186)
Peer SES	0.108
	(0.366)
Female	−1.184***
	(0.224)
Well Behaved	3.022***
	(0.364)
Pretest	1.043***
	(0.033)
Pretest Squared	−0.0011***
	(0.0003)
Urban	1.836***
	(0.338)
Suburban	−0.299
	(0.287)
Avg. Teacher Experience	−0.169
	(0.116)
Avg. Teacher Tutoring	−0.609**
	(0.260)
Pretest Variance	0.002**
	(0.0008)
Union	2.356***
	(0.334)

(Student race and nine census region dummy
variables also included)

R-Square	0.8042
Adjusted R-Square	0.8036
Observations	7901

***, ** Significant at the 0.001, 0.01 level.

their coefficients are not presented. As expected, the union parameter is positive
and highly significant, suggesting a positive union productivity effect [38].

To investigate the connections between teacher unions and this productivity
effect, equations 2, 3, and 4 in Table 3 include variables hypothesized to moderate
the union-achievement relation—bargaining gains, political success, and organi-
zational coupling variables, respectively. If the union parameter in equation 1

Table 3. Inserting Moderating Variables
Dependent Variable: Score on Senior Achievement Test Battery
(Standard Errors in Parentheses)

	Equation 2	Equation 3	Equation 4
Union	2.698***	1.593***	1.872***
	(0.347)	(0.357)	(0.395)
Collective Bargaining Moderators			
Average Teacher Education	0.631		
	(0.389)		
Average Teacher Salary	-0.00011**		
	(0.00004)		
Average Student Time in Class	-0.0031		
	(0.0025)		
Political Success Moderator			
District Expenditure per Pupil		0.00016	
		(0.00019)	
Coupling Moderators			
Administration and Classroom			0.067*
			(0.035)
Administration and Guidance Dept.			0.087
			(0.268)
School Constrained by Central Office			0.212***
			(0.040)
Other Coupling			0.051
			(0.075)
R-Square	0.8095	0.8212	0.8229
Adjusted R-Square	0.8088	0.8205	0.8219
Observations	7771	6438	5081

***,**,* Significant at the 0.001, 0.01, 0.05 level.

Table 4. Inserting Combinations of Moderating Variables
Dependent Variable: Score on Senior Achievement Test Battery
(Standard Errors in Parentheses)

	Equation 5	Equation 6	Equation 7
Union	2.041*** (0.364)	2.233*** (0.411)	0.499 (0.415)
Collective Bargaining Moderators			
Average Teacher Education	0.168 (0.419)	−0.747 (0.481)	
Average Teacher Salary	−0.00015** (0.00005)	−0.0001* (0.00005)	
Average Student Time in Class	−0.0030 (0.0026)	−0.0094** (0.0035)	
Political Success Moderator			
District Expenditure per Pupil	0.00008 (0.00020)		0.00007 (0.00021)
Coupling Moderators			
Administration and Classroom		0.062 (0.035)	0.064 (0.038)
Administration and Guidance Dept.		−0.211 (0.265)	0.553* (0.288)
School Constrained by Central Office		0.180*** (0.041)	0.134** (0.042)
Other Coupling		0.190** (0.076)	−0.013 (0.082)
R-Square	0.8292	0.8266	0.8344
Adjusted R-Square	0.8284	0.8255	0.8333
Observations	6361	5025	4226

***,**,* Significant at the 0.001, 0.01, 0.05 level.

Table 5. Restricted Sample for Equations 5 and 6
Dependent Variable: Score on Senior Achievement Test Battery
(Standard Errors in Parentheses)

	Equation 8	Equation 9
Union	1.044**	0.959*
	(0.427)	(0.430)
Collective Bargaining Moderators		
Average Teacher Education	0.104	0.064
	(0.507)	(0.517)
Average Teacher Salary	−0.00019***	−0.00015**
	(0.00006)	(0.00005)
Average Student Time in Class	−0.0074*	−0.0079*
	(0.0037)	(0.0037)
Political Success Moderator		
District Expenditure per Pupil	0.00025	
	(0.00023)	
Coupling Moderators		
Administration and Classroom		0.052
		(0.038)
Administration and Guidance Dept.		0.257
		(0.289)
School Constrained by Central Office		0.083*
		(0.043)
Other Coupling		0.166*
		(0.086)
R-Square	0.8375	0.8379
Adjusted R-Square	0.8364	0.8368
Observations	4176	4176

***,**,* Significant at the 0.001, 0.01, 0.05 level.

were simply picking up the effect of any set of moderators, the coefficient would go to zero when those moderating variables are included in the EPF. However, UNION remains positive in all equations in Table 3, implying that no individual set of moderators fully explains the effect.

It is logical, then, to explore whether combinations of these moderators explain away the union effect. Table 4 reports estimates specified accordingly.

Equation 7 is most noteworthy because the union parameter is indistinguishable from zero. The inclusion of both union political success and coupling measures in the model is responsible for this result. Bargaining gains, by contrast, do not appear to be a critical linkage between unions and student achievement, as their insertion (equations 5 and 6) fails to make the UNION variable insignificant.

It is possible the decline in sample size from equations 5 to 7 (due to missing data as more variables are included) has created a spurious result that coupling and political successes indeed moderate the union-achievement relation. If adding variables produced a nonrandom exclusion of observations, the union variable might lose its significance for reasons unrelated to the moderators. To investigate this possibility, equations 5 and 6 were reestimated using only the sample from equation 7. Equations 8 and 9 in Table 5 illustrate that the coefficient on UNION remains significant when these models use only the restricted sample. It would appear, then, that equation 7 indeed offers evidence about the important moderators of the union-achievement relation.

These findings have implications for bargaining, for educational funding, and for the effective organization of schools. Measured outcomes of bargaining, either individually or collectively, do not positively affect achievement. Arguments that higher salaries and more teacher schooling have an impact on teacher quality and, thereby student performance, are not supported by this research. One cannot infer from this, however, that the growth in school funding should necessarily be curtailed. Juxtaposing equations 4 and 7 strongly suggests that greater expenditures on non salary budgetary items may be an important path by which unions ' influence achievement. A possible conclusion then, but one that requires more research, is that educational funding should be weighted more heavily in favor of nonsalary expenditures [39].

The result that tighter coupling significantly moderates the union-achievement relation suggests unionization somehow facilitates a more efficient organization. This may in part by a shock effect [40, 41], insofar as school management becomes more efficient. However, because the coupling variables in this study primarily measure connections between management and classroom rather than within management itself, it seems more likely that the school *as an organization* is shocked into greater efficiency by the introduction of a union. In essence, it becomes a better bureaucracy.

How does this point inform the educational reform debate? This "better" bureaucracy entails tighter linkages between management's goals and classroom practices, ultimately generating desired classroom outcomes. Thus, school

administrations need to pay attention to both setting educational policy and to its implementation. Typically, the latter is neglected in the name of teacher autonomy or professionalism. With respect to teacher unions, although they champion both autonomy and professionalism, the existence of a teacher union in a school appears, paradoxically, to induce the heightened scrutiny of classroom practice that in turn facilitates positive achievement effects.

CONCLUSION

I have attempted to identify the linkages between teacher unions and student achievement and have found that the historically observed positive relationship is a function of 1) management intervention into classroom practice in response to unionization and 2) union political successes in securing more educational funding. Future research should address whether union-induced tighter coupling of the school is also responsible for the disparate achievement effects across students.

APPENDIX A

Perrow [31], in summarizing the work of Simon [42] and March and Simon [43], discussed the effect of the more rigid bureaucratic form on the member of the organization. Organizations, in an effort to ensure that members make decisions in a rational manner, seek to control their discretion through hierarchy, rules, and standards of output. In this way, the organization encourages decisions that are consistent with organizational rather than with member goals. Individual members in this type of environment meet organizational expectations of output by engaging in "satisficing" behavior: they maximize the utility of their decisions given the cost of searching for another solution. Decision making, in essence, becomes a constrained optimization problem for the individual: one wants to gain as much utility from one's job as possible but must simultaneously meet organizational requirements (which are often greater than they would be under a traditional bureaucracy).

When a school is unionized, the power of school management and its ability to unilaterally carry out its central educational mandate is threatened. Management not only tightens its own ship, but also seeks to safeguard its control over the educational process. This may manifest itself as the codification of standards of "output," the enforcement of previously unenforced rules and regulations, or heightened regulation of instructional practices, teaching techniques, homework load, student discipline, and other classroom activity.

Teachers who work in rational-legal environments can be expected to engage in more satisficing behavior than their counterparts in traditional environments. Given their more regulated work life and the formal enforcement of production standards, they begin to focus on the objectives rather than the process of education. Because these objectives often entail improving the achievement of as many

students as possible in essentially the same amount of time with essentially the same resources, teachers will satisfice by refocusing their instruction on the median student. A by-product of this transformation may be a less creative, less innovative, less community-oriented teacher. Perrow suggested that professionals in such environments will become more robotic [31, p. 29] and will be "only mildly innovative" [31, p. 124].

By refocusing in this way, unionized teachers maximize overall student achievement given their constraints. It is expected that a consequence of this satisficing behavior will be achievement gains for above- and below-average students that are lower than they would be in a traditional bureaucratic setting. Thus, it may be that satisficing behavior among unionized teachers leads to the pattern of achievement uncovered by Eberts and Stone [1, 2].

Educational researchers, although they have not stated the effect quite this way, have discussed this same phenomenon, generally attributing it to dysfunctional consequences of bureaucratic rule-making and unionism. Some have theorized that the unionization of a school has a rationalizing effect on teacher work. When professional duties and boundaries are specifically enumerated in a contract, teaching tends to become more preplanned and structured [23, 24]. Teacher behavior is more regulated, more scrutinized, more controlled. The binding of the school environment through rules and regulations stimulates a process by which teachers, perhaps unconsciously, begin to envision their work as being divided into mandatory and optional duties. According to Johnson, union teachers regularly sought "to control . . . their non-instructional time and to limit their obligations to classroom instruction" [22, p. 95]. Such behavior is more reflective of a "trade union mind set" [44] than of professionalism. Indeed, Wise contended that teachers have a bureaucratic conception of their role once unionization has taken root, ultimately leading to the exercise of more standardized classroom practice [20]. The very process of contract administration and adjudication, then, "sets the stage . . . for the standardization of instruction" [24, p. 324].

Because "teaching work is more rationalized and rule-directed than it would have been without unions" [24, p. 340], dysfunctional consequences of those rules (for instance, goal displacement, performance to minimum standards, and treatment of individual student needs in a predetermined manner [see generally 45] become more prevalent. Although it is not the union's intent, its specification of the parameters of teacher work may have the residual effect of transforming the teacher's view of his or her function in the school. Collective bargaining could have the effect of encouraging teachers to think of themselves as laborers, leading to a diminished sense of responsibility for the quality of education [21]. A more rule-directed teacher, or perhaps any professional in this circumstance, may feel constraints on his or her ability to contribute (or on the value of that contribution), resulting in lower morale, less initiative or effort, and/or an increasing perception that teaching is "just a job." A supplement to the satisficing explanation, then, is that union rationalization of teaching work alters teacher job

perception, leading to a consequent change in instructional strategy that targets the median student.

The explanations of the education literature (changing mind-set) and of organizational theory (satisficing behavior), predict the same result: unionized and nonunion teachers will work in different types of environments, will have different priorities, and will pursue different instructional strategies. The fundamental distinction between the two appears to be that educational researchers indict unions for "dysfunctional" teacher behavior while organizational theorists attribute changing behavior to structural transformation in a value-neutral manner. Regardless of one's perspective, though, it may be the case that union influences enter the classroom through a transformation in the teacher's approach to teaching, generating the observed patterns of achievement across student ability levels.

APPENDIX B

There is, at present, no consensus on what constitutes a legitimate measure of organizational coupling. Weick stated:

> there appear to be some fairly rich probes that might be used to uncover the nature of coupling within educational organizations. Conceivably, crucial couplings within schools involve the handling of disciplinary issues and social control, the question of how a teacher gets a book for the classroom, and the question of what kinds of innovations need to get cleared by whom. These relatively innocuous questions may be powerful means to learn which portions of a system are tightly and loosely coupled [28, p. 11].

Other researchers have attempted to isolate the construct as follows:

Bridges and Hamilton [46] Work system interdependence measure

Deal and Celotti [47] Extent to which participants share a common perception of organizational rules and work practices

Covariance between administrator decisions and teaching activity

Miskel et al. [48] Percentage of time working in isolation from other teachers/administrators

Wilson and Corbett [49] Percentage of teachers who thought rules on lesson plans and curriculum guides were enforced

Percentage of teachers who indicated they had discretion on decisions regarding classroom and instruction

Firestone [50] Vertical communications, centralization on instructional matters, centralization on resource matters, support by the principal, and goal consensus

In light of this literature, the HSB data set appears to provide some defensible indicators of the nature of coupling in a school. They are:

- Principal's perception of the extent to which school is constrained by the 1) school board, 2) superintendent, and 3) central office
- Principal's perception that central office has too much control over hiring
- Principal's perception of who sets policy on homework: individual teacher or school head
- Teacher perception of their his/her on 1) textbooks/instructional matter, 2) selecting content of subjects to be taught, 3) teaching techniques, 4) student discipline, and 5) amount of homework assigned
- Guidance director's perception of who makes the most important guidance department decisions: guidance head or administration

A factor analysis of these variables identified the following latent constructs to be included in the EPF, each of which has been structured so that a higher number indicates tighter coupling on that dimension.

ADMNCLAS: ADMINISTRATION CONTROL OVER CLASSROOM = (teacher influence over textbooks/instructional matter + selecting content of subjects to be taught + teaching techniques + student discipline + amount of homework assigned)

SCHLCSTR: CONSTRAINTS ON SCHOOL FROM HIGHER MANAGE-MENT = Extent to which school is constrained by the school board + the superintendent + the central office

ADMNGUID: ADMINISTRATIVE CONTROL OF GUIDANCE DEPART-MENT DECISIONS = (guidance head rather than administration makes most important guidance department decisions)

OTHRCOUP: OTHER COUPLING = principal's perception that central office has too much control over hiring + principal's perception of who sets policy on homework

Testing for significant coupling differences in union and nonunion schools yielded results consistent with the theory that unionized schools are more tightly coupled (note: higher values on these indices correspond to tighter coupling):

Variable	Union Mean (N)	Nonunion Mean (N)	T-value
ADMNCLAS	-25.197 (7079)	-25.252 (1116)	-0.4684
ADMNGUID	-0.553 (6505)	-0.693 (988)	-8.784
SCHLCSTR	-13.201 (5555)	-13.665 (978)	-4.384
OTHRCOUP	2.416 (5831)	1.925 (954)	-8.439

*   *   *

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34. Because these data are necessary to properly specific an EPF, HSB schools that are not ATS schools were omitted from the analysis in this paper.

35. Salary and education level are included because evidence of their effect on achievement is currently inconclusive. Education level is specified as a union bargaining gain because labor contracts often contain tuition remission benefits. Along with pay scales tying pay to teacher education levels, unionized teachers have both an incentive and the means to obtain more education. Class size was not included anywhere in this analysis, given the clear evidence that it is not an important educational input [10, 11].

36. It is not known to what extent union lobbying is responsible for expenditures per pupil in any particular district. This measure therefore serves as an imperfect proxy for the union political successes that should affect achievement. However, no better measure exists in the data set.

37. There should be no direct effect of a union on student achievement, as is implied by a significant UNION parameter. Rather, the positive estimates of the union dummy variable in past work indicate it is picking up the effects of omitted variables. If the hypothesized moderators are indeed these omitted variables, the union correlation with the error term should go to zero when the appropriate moderators are inserted. Expected, then, is that a fully specified EPF will report that UNION is not significant.

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