Are School Counselors a Cost-Effective Education Input?*

Scott E. Carrell*
UC Davis and NBER

Mark Hoekstra*
University of Pittsburgh

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Abstract

While much is known about the effects of class size and teacher quality on achievement, there is little evidence on whether non-instructional resources improve academic achievement. We exploit plausibly exogenous within-school variation in counselors and find that one additional counselor reduces student misbehavior and increases reading and math achievement by 1.1 percentile points. Estimates imply the marginal counselor has the same impact on achievement as increasing the quality of *every* teacher in the school by 0.4 standard deviations, and is 3 times more effective than reducing class size by hiring an additional teacher. Results also indicate the academic benefits are largest for children from higher-income families attending school with economically disadvantaged peers, suggesting that additional support staff may help prevent flight from urban schools.

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*Scott E. Carrell: UC Davis, Department of Economics, One Shields Ave., Davis, CA 95616 (email: secarrell@ucdavis.edu). Mark Hoekstra: University of Pittsburgh, Department of Economics, 4714 WW Posvar Hall, 230 S. Bouquet Street, Pittsburgh, PA 15260 (email: markhoek@pitt.edu). We would like to thank Susan Carrell, Kasey Buckles, Christopher Knittel, Doug Miller, and seminar participants at the University of California-Santa Barbara and University of Kentucky for their helpful comments and suggestions.

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1. Introduction

One of the central questions in education is how schools can allocate resources most efficiently to produce education. Recent work has focused on factors of production such as teacher quality (Buddin and Zamarro, 2009; Jepsen, 2005; Kane, Rockoff, and Staiger 2008; Kane and Staiger, 2009; Koedel, 2008; Rivkin, Hanushek, and Kain, 2005; Stoddard, 2003) and smaller class size (Angrist and Lavy, 1999; Babcock and Betts, 2009; Boozer and Rouse, 2001; Hoxby, 2000; Krueger, 1999; Urquiola, 2006). However, in addition to hiring more or better teachers, schools can also increase the number of school support personnel to deal with student problems that may impact both their learning and the learning of their peers. Indeed, recent evidence indicates that even one "bad apple" in the classroom can have serious negative consequences for others (e.g., Aizer, 2008; Carrell and Hoekstra, 2009; Lavy, Paserman, and Schlosser, 2007), which means that by helping even a few children in the classroom, school counselors could potentially induce widespread academic gains. In addition, to the extent that counselors are effective in helping teachers manage problems in the classroom, schools may be more able to retain quality teachers. Teachers in the 1999-2000 Schools and Staffing Survey who reported disruption as a problem in their school are more than three times as likely to also say they "definitely plan to leave teaching as soon as I can." Thus, allocating more resources toward school counselors could be particularly attractive for high-poverty urban schools found to have greater difficulty in attracting and retaining quality teachers (Hanushek, Kain, and Rivkin, 2004; Lankford, Loeb, and Wyckoff, 2002). In addition, to the extent that counselors have a disproportionate impact on disadvantaged populations, policymakers may wish to shift resources toward more counselors for equity reasons.

To date, however, there is limited evidence on the effectiveness of counselors. Reback (2010) examines the impact of student-to-staff ratios by cleverly exploiting discontinuities in Alabama's financing system and finds that while counselors reduce disciplinary incidents, there is no effect on test scores. And in a study that is most similar to this one, Carrell and Carrell (2006) find that counselors reduce disciplinary problems. However, the primary interest of policymakers is in improving achievement rather than behavior, in part because the potential subjectivity of the reporting of student behavior. While the subjectivity of disciplinary infractions likely less of a concern for Reback (2010), who examines severe disciplinary problems such as suspensions, expulsions, drug-related incidents and weapon-related incidents in elementary schools, these low-frequency outcomes affect relatively few children directly. Perhaps more importantly, the test score estimates of Reback (2010) are relatively imprecise, making it difficult to rule out meaningful gains.[1] This imprecision reflects a common drawback to using regression discontinuity designs in general as well as using test score data aggregated at the school level. Thus, it is difficult to conclude from the existing empirical evidence whether counselors have a significant impact on student achievement.

In this study, we address the question of whether school counselors impact student misbehavior and academic achievement by exploiting a unique data set in which administrative school records for elementary schools were linked to placement records of graduate counselor interns from the nearby university. To overcome potential confounding factors correlated with counselor presence, we exploit the within-school variation in the number of counselors caused by

[1] For example, while the regression discontinuity estimate of the effect of 1 more full-time-equivalent counselor on 3rd grade math scores is 0.0006 of a standard deviation (calculated as twice the effect of a 0.5 increase in FTE counselors), the corresponding standard error is 0.176 of a standard deviation.

the placement of the graduate counselor interns. Importantly, tests support this identification strategy: we find no evidence that the year-to-year variation in counselors is correlated with student achievement, disciplinary infractions, or demographics from the current or previous year. This is also consistent with our discussions with the placement director and a former intern, who indicated that proximity to the intern's residence was the primary factor in determining the location of the placement.

Results indicate that school counselors have a direct positive impact on student achievement; adding one full time equivalent counselor to a school increases student reading and math achievement by 1.1 percentile points, or by approximately as much as raising the quality of *every* teacher in the school by 0.4 standard deviations. In addition, calculations based on our estimates and the class size estimates from Project STAR suggest that hiring a school counselor is approximately three times as cost-effective as hiring an additional teacher. Results also indicate that both the academic and behavioral benefits are largest for boys. Finally, the academic benefits are particularly large for students from higher-income families who attend school with predominantly lower-income children.

Collectively, these results provide evidence that it may be optimal for schools to shift resources away from educational inputs such as smaller class sizes, and toward relatively more cost-effective inputs such as school counselors. Furthermore, our results indicate that such a shift may be particularly beneficial for schools serving disadvantaged populations who wish to prevent middle-class flight.

2. Identification Strategy and Methodology

To identify the effect of school counselors, we utilize a school fixed effects framework that exploits the within-school variation in counselors from the placement of graduate counselor interns from the University of Florida. Intuitively, we ask whether achievement rises within a school and year when an additional counselor is present in the school relative to other years within the same school. Formally, we estimate the following equation using ordinary least squares:

$$y_{isgt} = \phi_0 + \phi_1 \, Counselors_{st} + \beta_1 X_{isgt} + \lambda_{sg} + \sigma_{gt} + \varphi_{sg} t + \varepsilon_{isgt}$$

where y_{isgt} is the outcome variable for individual *i* in school *s* grade *g*, and in year *t,* $Counselors_{st}$ is the number of counselors in school *s* in year *t, and* X_{isgt} is a vector of individual characteristics including own family violence (reported and unreported), race, gender, subsidized lunch, and median zip code income and $\overline{X}$ measure average cohort-level race, gender, subsidized lunch and size. λ_{sg} is a set of school-by-grade fixed effects, σ_{gt} is a set of grade-year fixed effects, and $\varphi_{sg} t$ is a set of school-by-grade specific linear time trends included to account for any changes in the neighborhood or school over time. Given the potential for error correlation across individuals who attended the same school in the same year and within individuals over time, we cluster at both the school by year level and the individual level using multi-way clustering (Cameron, Gelbach, and Miller, 2006). In additional specifications we also make both within-family and within-individual comparisons (i.e., including sibling and individual fixed effects) and control for school-by-year specific fixed effects.

The primary coefficient of interest is ϕ_1, which captures the marginal effect of adding one full-time equivalent counselor to the school. In additional specifications we also estimate the effects separately by gender, family income, and school socioeconomic status in order to examine whether the effects of counselors are stronger for some students than for others.

3. Data

3.1 School Counselors in Alachua County, Florida

Before assessing the consequences of counselors, it is instructive to understand their role in elementary schools. The primary responsibility is to provide classroom guidance by giving classroom lessons on social and emotional development, peer relations, drug use, and academic skills. In addition, counselors consult with teachers and provide individual and small group counseling. This counseling focuses on improving the social skills and emotional health of the students rather than their math and reading skills.

Thus, counselors may affect student achievement in one of two ways. First, counselors may help students directly by enabling them to better deal with the personal pressures and issues in their lives. This may happen through either individual or small group counseling or through the classroom level lessons.

In addition, counselors may facilitate learning by reducing negative peer effects in the classroom. For example, counselors often work directly with the classrooms that are having the most difficulty with disruptive students. Beyond offering classroom lessons aimed at the children, the counselor often shares techniques with the teacher on how to handle particularly disruptive students. Finally, to the extent that counselors help troubled or disruptive children

cope with their social or emotional problems, they may also decrease the disruptions caused by such children in the classroom, as individual counseling is typically a part of the school's response to particularly disruptive students. When a student is reprimanded for disrupting a classroom or having conflicts with peers, the school counselor typically meets with the student (and often the parent) to assess and help remedy the situation. It is important to point out, however, that counselors often work with disruptive children during lunch, recess, or during class time otherwise devoted to physical education or social studies. This means that to the extent counselors impact math or reading achievement, it is likely not because the disruptive children were removed from class during the relevant class time.

While the primary advantage of studying the effectiveness of counselors in Alachua County is that it allows for within-school estimates of our treatment effect, we remain agnostic about whether the impact of graduate counselors here under- or overstates the causal effect of school counselors in other contexts. For instance, the marginal counselor in our data is relatively inexperienced, which implies our estimates may understate the effect. Alternatively, graduate counselors in our data may be more energetic or have more up-to-date training than typical counselors, which may overstate the effects.

3.2 School Records

We use a confidential student-level dataset containing a panel of annual test scores provided by the School Board of Alachua County (SBAC) in Florida. The data cover every 3rd through 5th grader in the twenty-two elementary schools in the county from the 1995-1996 academic year through 2002-2003. Alachua County is a large school district containing nearly 30,000 students, making it the 192nd largest school district in the county in 1999-2000 among the

nearly 15,000 districts nationwide. As shown in the descriptive statistics in Table 1, the school system is also demographically diverse: 55 percent of students are white, 38 percent are black, 4 percent are Hispanic, and 3 percent are Asian. Fifty-three percent of students are eligible for free or reduced lunches.

The test scores reflect percentile rankings on the math and reading sections of the Iowa Test of Basic Skills and Stanford 9 exams.[2] Over ninety percent of students took the test in a given year. The other outcome of interest is the number of disciplinary infractions committed by each student in each academic year, which are "incidents that are very serious or require intervention from the principal or other designated administrator" (SBAC, 1997). Additional variables include student race, gender, subsidized lunch status, neighborhood family income (from the Census using zip codes), and school attended.

3.3 Counselor Data

Data on counselor intern placements come from the Department of Counselor Education at the University of Florida, which is located in Alachua County. The department places each graduate student counselor into an Alachua County school to work alongside the full-time counselor for a semester-long practicum or internship. We convert these placements to full-time equivalent (FTE) positions to measure the marginal effect of adding a full-time graduate counselor to the school. The placement of these counselors provides us with the within-school variation that enables us to identify their effectiveness.

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[2] In the 1999-2000 school year, the district changed from the Iowa Test of Basic Skills to the Stanford 9 exam. Both exams test reading and math skills and both report how the student ranks relative to students taking the same exam nationwide.

Each elementary school in our data had one permanent school counselor on staff during each academic year. Thus, the only source of variation in the number of counselors during this time period was the placement of graduate student counselor interns from the University of Florida's Department of Counselor Education. Prior to serving an internship, each graduate student submitted to the school district the names of the schools in which they would most like to intern. The school district coordinator would then match interns to schools using these preferences. As shown in Table 1, the average school in the sample has 1.29 counselors per year, with each school having one full-time counselor and 0.29 graduate student counselors.

4. Results

4.1 Exogeneity of Counselor Placement

To identify the effect of counselors on academic achievement, we exploit the within-school variation in counselor placement over time. The identifying assumption is that even though some schools may receive more counselor interns than others (perhaps due to proximity to the university), the timing of the placements is uncorrelated with other time-varying determinants of achievement in the school.

To formally test the exogeneity of the within-school variation in total school counselors, we regress the number of counselor interns on individual student characteristics while including school fixed effects. The results of this analysis are shown in Table 2. Specification 1 tests whether school demographics such race, gender, family income and domestic violence predict the number of counselor interns in the current year while Specification 2 tests whether these characteristics as well as prior year school test scores and disciplinary problems predict the number of counselors in the following year. Across both specifications no individual coefficient

is statistically significant at the 5 percent level. Moreover, we cannot reject the null hypothesis in either specification that the coefficients on all of the explanatory variables are jointly equal to zero. Collectively, this suggests that counselor intern assignments appear to be as-good-as-random within schools.

4.2 Do Counselors Increase Academic Achievement?

Estimates of the effect of counselors on math and reading scores are shown the first row of Table 3. Estimates in column 1 control only for school and year fixed effects, while columns 2 through 8 additionally control for school-by-grade fixed effects, school by grade specific linear time trends, grade by year fixed effects, peer demographics, and individual controls. Estimates indicate that counselors increase student math and reading performance by about 1 percentile point. Results from our preferred specification in column 6 indicates that one additional counselor increases achievement by 1.13 percentile points, or approximately four percent of a standard deviation. This effect is roughly equivalent to increasing teacher quality by 0.4 standard deviations in *every* classroom within the school.[3]

In column 7 of Table 3, we additionally control for family fixed effects. Thus, estimates are identified by comparing the performance of one child with access to a graduate counselor intern to the performance of his sibling who did not such access. The estimate remains

[3] Recent studies on teacher quality generally find that a one-standard deviation change in teacher quality results in approximately a 0.10 standard deviation change in student test scores. See: Buddin and Zamarro, 2009; Kane, Rockoff, and Staiger 2008; Kane and Staiger, 2009; Rivken, Hanushek, and Kain, 2005

unchanged at 1.04 percentile points. Thus, our results do not appear to be driven by families selecting into school-years in which an additional counselor is on staff.[4]

Finally, in column 8 we control for individual fixed effects, which reduces the counselor estimate to 0.52 percentile points. This suggests the counselor effect on achievement likely persists at a diminished rate across years.

To put the magnitude of our effects in perspective, we compare the estimates presented in our preferred Specification 1 of Table 5 to the impact of hiring an additional teacher to reduce class size. Assuming that 1st- and 2nd-graders are affected in the same way as 3rd- through 5th-graders, our estimates imply that hiring one counselor increases achievement of all 500 students in our average school by 1.13 percentile points. By comparison, Krueger (1999) finds that reducing class size by 7 students increased annual test scores in the first year by 4 percentile points. Given those estimates, back-of-the-envelope calculations[5] suggest that on the margin, hiring one additional counselor is three times more effective in raising achievement than reducing class size by hiring an additional teacher.

4.3 The Effect of Counselors on Disciplinary Infractions

We also examine whether counselors affect the number of disciplinary infractions committed by students. While the *reporting* of such incidents could potentially be endogenous

[4] Such selection seems highly implausible because counselor intern placements are typically made within a few weeks of the start of the semester.

[5] To reduce the class size from 22.7 to 15.7 as did Project STAR, the average school of 500 students would need to hire 10 more teachers. According to estimates by Krueger (1999), this would increase student achievement by four percentile points in the first year. Consequently, hiring one additional teacher would increase achievement by 0.4 percentile points, or approximately one-third as much as hiring one additional counselor. Accounting for infrastructure and maintenance costs would make hiring additional counselors even more desirable relative to reducing class size.

to the number of counselors in the school, examining the effects may still provide insight into how counselors affect achievement.[6]

Estimates are shown in the second row of Table 3. Results indicate that counselors reduce misbehavior by students in a statistically significant way. Estimates are also robust across all specifications; the estimate from our preferred specification in column 6 suggests that one additional counselor reduces student infractions by 0.09 infractions, or approximately sixteen percent. Importantly, controlling for family fixed effects (column 7) or individual fixed effects (column 8) does not diminish the significance or magnitude of this estimate.

4.4 Counselor Effects by Race, Gender, and Family Income

We also investigate whether counselors impact some children more than others. This is a particularly critical question for determining whether schools can hire additional counselors to address achievement gaps or other policy goals.

Results are shown in Table 4, where column 1 shows results for the full sample, while columns 2 through 5 show results for boys, girls, children from schools in lower-income neighborhoods, and children from schools in higher-income neighborhoods.[7] Results indicate that the positive effects on boys' achievement are approximately twice as large as those on girls' achievement (1.51 vs 0.78 percentile points). Effects are nearly four times as large for children

[6] For instance, teachers may be more or less likely to report disciplinary incidents depending on the number of counselors in the school.

[7] Lower income schools are defined as those the bottom half of schools in Alachua County as measured by the school mean of neighborhood median family income. Sixty-eight percent of students in these thirteen schools are recorded as being eligible for the subsidized school lunch program.

in lower-income schools as they are for children in higher-income schools (1.51 vs 0.38 percentile points).

In columns 6 though 9, we stratify the sample along both the income of the socioeconomic status of the entire student body as well as that of the individual student.[8] Results indicate that counselors have the largest impact on higher-income students attending schools in lower-income neighborhoods. This suggests that counselors may be most effective at delivering benefits to those families most likely to leave urban schools serving lower-income populations.

Results for disciplinary infractions are in the 2nd row of Table 4. We find that counselors cause the largest reductions in misbehavior by boys and students from low-income families.

In summary, our study yields several notable findings. First, we find that counselors significantly reduce student misbehavior and increase academic achievement. Estimates suggest that hiring an additional school counselor raises achievement approximately three times as much as hiring an additional teacher to reduce class size. Likewise an additional full-time counselor is equivalent to raising the quality of *every* teacher in the school by approximately 0.4 standard deviations. In addition, the effect of counselors on math and reading scores is largest for children from higher-income families who attend schools in lower-income neighborhoods.

5. Conclusions

This paper examines the effectiveness of school counselors on academic achievement. Our findings indicate that school counselors cause an economically and statistically significant increase in achievement. Point estimates indicate that one additional school counselor reduces

[8] Lower income students are defined as those eligible for the subsidized school lunch program.

student misbehavior by 16 percent and increases student achievement by 1.1 percentile points, or approximately four percent of a standard deviation. Moreover, our estimates indicate that relative to other education inputs such as additional teachers to reduce class size, counselors appear to be a cost-effective way of improving academic achievement. Estimates indicate that hiring an additional counselor is equivalent to raising the quality of *every* teacher in the school by 0.4 standard deviations. Similarly, our calculations imply that the marginal counselor is three times as effective in raising achievement as the marginal teacher hired as part of Project STAR to reduce class size. Finally, effects are driven largely by academic gains for students from higher-income families who attend schools in lower income neighborhoods. Thus, it appears that by hiring additional school counselors, schools serving lower-income populations may be able to better attract and retain the middle-class families most likely to move away to attend schools serving more advantaged populations.

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Table 1: Summary Statistics

Variable	Mean
Number of School Counselor Interns	0.29
	(0.38)
Reading and Mathematics Score	52.91
	(29.02)
Number of Disciplinary Incidents	0.56
	(1.92)
Male	0.49
	(0.50)
Black	0.38
	(0.48)
Free/Reduced Lunch	0.53
	(0.50)
Median Neighborhood Family Income	$44,241
	(13,504)
School Size	289.05
	(104.83)

Notes: Figures come from 44,482 observations, of which 42,278 were observed with test scores.

Table 2: Tests of the Exogeneity of Counselor Placement

	1	2
Outcome Variable	Current Number of Counselors	Next Year's Number of Counselors
Proportion of Peers with Unreported Family Violence	-0.0119	-0.0001
	(0.0154)	(0.0164)
Proportion of Peers with Reported Family Violence	0.0191	-0.0101
	(0.0131)	(0.0098)
Black	-0.0027	0.006
	(0.0067)	(0.0134)
Male	-0.0047	-0.0049
	(0.0041)	(0.0043)
Gifted	0.0265	-0.0162
	(0.0222)	(0.0260)
Disability	-0.0044	0.0264
	(0.0118)	(0.0165)
Subsidized Lunch	0.0091	0.0067
	(0.0060)	(0.0062)
Log Median Zip Code Income	-0.0151	-0.0203*
	(0.0093)	(0.0116)
Reading and Mathematics Score		0.0003
		(0.0003)
Number of Disciplinary Infractions		-0.0004
		(0.0027)
Observations	44,454	37,036
F-Statistic: All Variables	1.25	1.17
P-Value	[-0.2739]	[-0.3181]

Notes: Each column reports results from a separate regression. Robust standard errors clustered at the school by year level are in parentheses. All specifications include school fixed effects.

* Significant at the 0.10 level

** Significant at the 0.05 level

*** Significant at the 0.01 level

Table 3: The Effect of Counselors on Academic Achievement and Misbehavior

Independent Variable: Number of Counselors	1	2	3	4	5	6	7	8
Reading and Mathematics Score	0.92	0.85	1.30**	1.28**	1.21***	1.13***	1.04*	0.52
	(0.59)	(0.59)	(0.53)	(0.53)	(0.44)	(0.41)	(0.53)	(0.35)
Observations	42,478	42,478	42,478	42,478	42,478	42,478	26,922	42,478
Disciplinary Infractions	-0.13**	-0.13**	-0.11**	-0.11**	-0.09	-0.09*	-0.14***	-0.13**
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)
Observations	44,882	44,882	44,882	44,882	44,882	44,882	28,597	44,882
Year Fixed Effects	Yes	Yes	Yes	-	-	-	-	-
School Fixed Effects	Yes	-	-	-	-		-	-
School by Grade Fixed Effects	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School by Grade Specific Linear Time Trends	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Grade by Year Fixed Effects	No	No	No	Yes	Yes	Yes	Yes	Yes
Peer Controls	No	No	No	No	Yes	Yes	Yes	Yes
Individual Controls	No	No	No	No	No	Yes	Yes	Yes
Sibling Fixed Effects	No	No	No	No	No	No	Yes	No
Individual Fixed Effects	No	No	No	No	No	No	No	Yes

Notes: Each cell reports results from a separate regression. Standard errors in parentheses are two-way clustered at the school-by-year and individual level. Individual controls include gender, race, median family income, and subsidized lunch status.

* Significant at the 0.10 level

** Significant at the 0.05 level

*** Significant at the 0.01 level

Table 4: The Effect of Counselors on Academic Achievement and Misbehavior by Gender, Family Income, and School Type

	Full Sample	Boys	Girls	Low-Income Schools	High-Income Schools	Low-Income Sudents in Low-Income Schools	High-Income Sudents in Low-Income Schools	Low-Income Sudents in High-Income Schools	High-Income Sudents in High-Income Schools
Independent Variable: Number of Counselors	1	2	3	4	5	6	7	8	9
Reading and Mathematics Score	1.13**	1.51**	0.78**	1.51*	0.38**	1.02	3.02***	0.09	0.53*
	(0.44)	(0.48)	(0.46)	(0.78)	(0.19)	(0.85)	(0.84)	(0.38)	(0.31)
Observations	42,478	20,859	21,619	21,770	20,708	14,751	7,019	7,923	12,785
Disciplinary Infractions	-0.09*	-0.14*	-0.06	-0.06	-0.14**	-0.09	-0.04	-0.27**	-0.03
	(0.06)	(0.08)	(0.04)	(0.08)	(0.06)	(0.11)	(0.04)	(0.12)	(0.02)
Observations	44,882	22,120	22,762	22,486	22,396	15,339	7,147	8,531	13,865
Year Fixed Effects	-	-	-	-	-	-	-	-	-
School Fixed Effects	-	-	-	-	-	-	-	-	-
School by Grade Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School by Grade Specific Linear Time Trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade by Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Peer Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sibling Fixed Effects	No	No	No	No	No	No	No	No	No
Individual Fixed Effects	No	No	No	No	No	No	No	No	No

Notes: Each cell reports results from a separate regression. Standard errors in parentheses are two-way clustered at the school-by-year and individual level. Individual controls include gender, race, median family income, and subsidized lunch status.

* Significant at the 0.10 level

** Significant at the 0.05 level

*** Significant at the 0.01 level