

# Are School Counselors a Cost-Effective Education Input?\*

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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 policymakers can improve education by utilizing non-instructional resources. We exploit plausibly exogenous within-school variation in counselors and find that one additional counselor increases boys' reading and math achievement by over one percentile point, and reduces misbehavior of both boys and girls. Estimates imply the marginal counselor has the same impact on overall achievement as increasing the quality of *every* teacher in the school by nearly one-third of a standard deviation, and is twice as effective as reducing class size by hiring an additional teacher.

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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, such as school counselors, 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).

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 statistically significant 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 is 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.<sup>1</sup> 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 the placement of the graduate counselor interns. Importantly, tests support this identification strategy: we find no evidence that the year-to-year variation in the number of counselors is

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<sup>1</sup> For example, while the regression discontinuity estimate of the effect of 1 more full-time-equivalent counselor on 3<sup>rd</sup> 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.

correlated with the previous year's student achievement, disciplinary infractions, or demographics, or with the demographics or likelihood of taking the test in the current year. This is also consistent with our discussions with the placement director and a former intern, who reported that proximity to the intern's residence was the primary factor in determining the location of the placement, as opposed to time-varying school characteristics.

Results indicate that school counselors have a direct positive impact on student achievement; adding one full time equivalent counselor to a school increases boys' reading and math achievement by over one percentile point, and reduces disciplinary infractions by boys and girls by approximately 20 percent. The overall effect of one additional counselor on boys' and girls' achievement is approximately equivalent to raising the quality of *every* teacher in the school by 0.3 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 twice as effective as hiring an additional teacher.

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.

## **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:

$$y_{isgt} = \varphi_0 + \varphi_1 \text{Counselors}_{st} + \beta_1 X_{isgt} + \lambda_s + \sigma_{gt} + \phi_{sg} t + \varepsilon_{isgt}$$

where  $y_{isgt}$  is the outcome variable for individual  $i$  in school  $s$  grade  $g$ , and in year  $t$ ,  $\text{Counselors}_{st}$  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  $\bar{X}$  measure average cohort-level race, gender, subsidized lunch and size.  $\lambda_s$  is a set of school fixed effects,  $\sigma_{gt}$  is a set of grade-year fixed effects, and  $\phi_{sg} t$  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, 2010). In additional specifications we also make both within-family and within-individual comparisons (i.e., including sibling and individual fixed effects).

The primary coefficient of interest is  $\phi_1$ , which captures the marginal effect of adding one full-time equivalent counselor to the school. Intuitively, this estimate is identified by comparing student performance in years where the school has additional graduate student counselor(s) to years when the (same) school does not have any graduate student counselors.

While counselors may well have a direct impact on some students, we also expect counselors may affect all students by diminishing negative peer effects. Prior research has shown that boys are more likely to cause negative peer effects (e.g., Carrell and Hoekstra, 2009;

Lavy and Schlosser, 2007), and to be affected by their disruptive peers (Carrell and Hoekstra, 2009). For that reason, we estimate the impact of counselors separately for boys and for girls.

### **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 several 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. Second, counselors may facilitate learning by reducing negative peer effects in the classroom. For example, counselors will often work directly with classrooms that are having difficulty with disruptive students. In addition to offering classroom lessons aimed at resolving classroom conflict, the counselor will also share techniques with the teacher on how to handle particularly disruptive students.

Finally, counselors may also decrease the disruptions caused by troubled students through individual counseling, which is frequently 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 population 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 3<sup>rd</sup> through 5<sup>th</sup> 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 192<sup>nd</sup> largest school district in the country 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.<sup>2</sup> 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 (measured by matching student home zip codes to Census data), 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.<sup>3</sup> The placement of these counselors provides us with the within-school variation in the number of counselors that enables us to identify their effectiveness.

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

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<sup>2</sup> 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.

<sup>3</sup> Thus, if a school received one graduate intern counselor in the fall semester and one in the spring semester, we record that school as having a total of two FTE counselors—one permanent counselor (as for all schools in our sample), and one graduate intern counselor.

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 placements 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.

This assumption would be violated if, for example, students or families were to select into or out of schools that receive an additional counselor for that particular year. This seems unlikely for several reasons. First, counselor intern placements are typically made within a few weeks of the start of the semester, which gives families little time to choose schools on the basis of such a factor. In addition, the lack of school choice in Alachua County means families need to move to a different school catchment area in order to switch schools. Finally, it seems rather unlikely that families would move residences on the basis of temporary graduate student interns.

Nevertheless, 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 not taking the standardized test or 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 The Effect of Counselors on Boys' Achievement and Misbehavior**

Estimates of the effect of counselors on boys' 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 5 additionally control for grade by year fixed effects, peer demographics, individual controls, and school-specific linear time trends. Estimates indicate that counselors increase math and reading performance for boys by about 1 percentile point. Results from our preferred specification in column 4 indicate that one additional counselor increases achievement by 1.2 percentile points, or approximately four percent of a standard deviation.

In column 6 of Table 3, we control for family fixed effects, along with grade-by-year fixed effects and individual and peer controls. Intuitively, 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 have such access. The estimate remains unchanged at 1.2 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. Finally, in column 8 we control for individual fixed effects,

which yields an estimate of 0.972 percentile points and is still statistically significant at the 5 percent level.

Estimates for disciplinary infractions are shown in the second row of Table 3. Estimates range from an imprecisely estimated reduction of 0.13 infractions to a statistically significant 0.22 infractions. These estimates represent relative declines of 15 and 26 percent, respectively.

#### **4.3 The Effect of Counselors on Girls' Achievement and Misbehavior**

Results for girls are shown in Table 4. While the results generally suggest that school counselors reduce misbehavior by girls, estimates of the effect on achievement are much more modest than for boys and are generally indistinguishable from zero. Thus, it appears that counselors primarily benefit boys' academic achievement. Our view is that this is generally consistent with counselors having a direct impact on troublesome students (boys in our sample commit nearly three times as many disciplinary infractions as girls) and/or reducing the negative peer effects that are largest for boys (Carrell and Hoekstra, 2009) and are most often caused by boys (Carrell and Hoekstra, 2009; Lavy and Schlosser, 2007).

### **5. Discussion**

A critical question for policymakers is whether the goal of increasing achievement can be better achieved by hiring more teachers to reduce class size, hiring better teachers, or employing additional non-instructional resources such as school counselors. Results here indicate that hiring an additional school counselor increases boys' achievement by 1.21 percentile points and girls' achievement by 0.46 percentile points, though the latter is imprecisely estimated. This implies that the aggregate effect of an additional counselor is to increase boys' and girls'

achievement by 0.84 percentile points, or 3 percent of a standard deviation.<sup>4</sup> This is approximately equivalent to increasing the quality of *every teacher in the school* by 0.3 standard deviations.<sup>5</sup>

To further put the magnitude of our effects in perspective, we compare the estimates presented in our preferred Specification 4 of Tables 3 and 4 to the impact of hiring an additional teacher to reduce class size. Assuming that 1<sup>st</sup>- and 2<sup>nd</sup>-graders are affected in the same way as 3<sup>rd</sup>- through 5<sup>th</sup>-graders, our estimates imply that hiring one additional counselor increases achievement of all 500 students in our average school by 0.84 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<sup>6</sup> suggest that on the margin, hiring one additional counselor is twice as effective in raising achievement as reducing class size by hiring an additional teacher.

## 6. Conclusions

This paper examines the effect of school counselors on the academic achievement and misbehavior of elementary school students. Our findings indicate that school counselors cause an economically and statistically significant increase in achievement, though the gains are

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<sup>4</sup> The estimate for boys and girls together that corresponds to preferred specification 4 in Tables 3 and 4 is 0.81 percentile points, which is statistically significant at the 10 percent level.

<sup>5</sup> 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; Rivkin, Hanushek, and Kain, 2005

<sup>6</sup> 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 half 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.

concentrated amongst boys. We also find evidence that counselors reduce the misbehavior of both boys and girls by roughly 20 and 29 percent, respectively.

Moreover, our results 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 nearly one-third of a standard deviation. Similarly, our calculations imply that the marginal counselor is twice as effective in raising achievement as the marginal teacher hired as part of Project STAR to reduce class size. This suggests that hiring counselors may be an effective alternative to other education policies aimed at increasing academic achievement.

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Table 1: Summary Statistics

Variable	Boys	Girls
Number of School Counselor Interns	0.28 (0.38)	0.29 (0.38)
Reading and Mathematics Score	50.95 (29.40)	54.80 (28.51)
Number of Disciplinary Incidents	0.84 (2.39)	0.29 (1.26)
Black	0.37 (0.48)	0.39 (0.49)
Free/Reduced Lunch	0.52 (0.50)	0.54 (0.50)
Median Neighborhood Family Income	44,394 (13,537)	44,091 (13,470)
School Size	289.25 (104.83)	288.84 (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

Outcome Variable	1 Current Number of Counselors	2 Next Year's Number of Counselors
Proportion of Peers with Unreported Family Violence	-0.0104 (0.0152)	-0.0001 (0.0164)
Proportion of Peers with Reported Family Violence	0.0195 (0.0131)	-0.0101 (0.0098)
Black	-0.0029 (0.0067)	0.006 (0.0134)
Male	-0.0048 (0.0041)	-0.0049 (0.0043)
Gifted	0.0247 (0.0209)	-0.0162 (0.0260)
Disability	0.0000 (0.0105)	0.0264 (0.0165)
Subsidized Lunch	0.0093 (0.0061)	0.0067 (0.0062)
Log Median Zip Code Income	-0.015 (0.0092)	-0.0203* (0.0116)
Missing Test Score	(0.0525) (0.0601)	-
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	1.20	1.17
P-Value	[-0.2956]	[-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 Boys' Academic Achievement and Misbehavior

Independent Variable: Number of Counselors	1	2	3	4	5	6	7
Reading and Mathematics Score	1.404*	1.370*	1.339**	1.214**	1.429***	1.244**	0.972**
	(0.79)	(0.79)	(0.64)	(0.58)	(0.49)	(0.60)	(0.42)
Observations	20,859	20,859	20,859	20,859	20,859	13,136	20,859
Disciplinary Infractions	-0.159*	-0.157*	-0.154*	-0.164*	-0.128	-0.217**	-0.223**
	(0.09)	(0.10)	(0.09)	(0.09)	(0.08)	(0.09)	(0.09)
Observations	22,120	22,120	22,120	22,120	22,120	13,990	22,120
Year Fixed Effects	Yes	-	-	-	-	-	-
School Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade by Year Fixed Effects	No	Yes	Yes	Yes	Yes	Yes	Yes
Peer Controls	No	No	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	No	No	Yes	Yes	Yes	Yes
School Specific Linear Time Trends	No	No	No	No	Yes	No	No
Sibling Fixed Effects	No	No	No	No	No	Yes	No
Individual Fixed Effects	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 Girls' Academic Achievement and Misbehavior

Independent Variable: Number of Counselors	1	2	3	4	5	6	7
Reading and Mathematics Score	0.312 (0.66)	0.287 (0.65)	0.405 (0.62)	0.456 (0.53)	0.916* (0.47)	0.623 (0.59)	0.188 (0.43)
Observations	21,619	21,619	21,619	21,619	21,619	13,786	21,619
Disciplinary Infractions	-0.089** (0.04)	-0.090** (0.04)	-0.083** (0.04)	-0.085** (0.04)	-0.051 (0.04)	-0.075* (0.04)	-0.059 (0.04)
Observations	22,762	22,762	22,762	22,762	22,762	14,067	22,762
Year Fixed Effects	Yes	-	-	-	-	-	-
School Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade by Year Fixed Effects	No	Yes	Yes	Yes	Yes	Yes	Yes
Peer Controls	No	No	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	No	No	Yes	Yes	Yes	Yes
School Specific Linear Time Trends	No	No	No	No	Yes	No	No
Sibling Fixed Effects	No	No	No	No	No	Yes	No
Individual Fixed Effects	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

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\*\*\* Significant at the 0.01 level