

# Are School Counselors an 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 the impact of 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 (e.g., Buddin and Zamarro, 2009; Chetty, Friedman, and Rockoff, 2014; Kane, Rockoff, and Staiger 2008; Kane and Staiger, 2009; Rivkin, Hanushek, and Kain, 2005) and smaller class size (e.g., Angrist and Lavy, 1999; 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 counselors, to deal with student problems that may impact academic achievement either directly or through peer interactions. 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; Carrell and Hoekstra, 2012; Lavy, Paserman, and Schlosser, 2012). This means that by helping even a few children in the classroom, school counselors could potentially induce widespread academic gains.

To date, however, there is limited evidence on the effectiveness of school counselors. Reback (2010a) examines the impact of student-to-staff ratios by cleverly exploiting discontinuities in Alabama’s financing system and finds that counselors reduce disciplinary incidents. Reback (2010b) shows descriptive evidence that states with more aggressive elementary counseling policies make greater test score gains and have fewer student behavioral problems than otherwise-comparable states. Finally, in a study perhaps most similar to this one, Carrell and Carrell (2006) use within-school variation in counselors and find that lower student-to-counselor ratios reduce disciplinary recidivism.

This paper complements this existing research by examining the impact of school counselors on academic achievement. The key contribution of our paper is that we are able to combine individual-level administrative data with a compelling research design that uses plausibly exogenous within-school variation.

## 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 (UF). 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  $\varphi_{sg} t$  is a set of school-by-grade specific linear time trends. Standard errors are clustered at both the school-by-year level and the individual level using multi-way clustering (Cameron, Gelbach, and Miller, 2011).

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 within the school. This

assumption would be violated if, for example, students or families were to select into or out of schools in years that receive an additional counselor. This seems unlikely since counselor placements are made only weeks before the start of the semester and because families would have to move to a new catchment area to switch schools.

Nevertheless, in results shown and discussed in the Appendix A, we show that the within-school counselor variation is uncorrelated with lagged student outcomes and demographics, as well as with current student demographics and test taking. Along similar lines, we also show that current year test scores and disciplinary outcomes are uncorrelated with follow-on year counselors.

### **3. Background and Data**

#### **3.1 The Role of Elementary School Counselors**

The primary role of counselors is to provide classroom guidance by giving 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. Thus, counselors may affect student achievement in several ways. First, counselors may help students directly by enabling them to better deal with the personal pressures and issues in their lives. Second, counselors may reduce negative peer effects by either working directly in classrooms with disruptive students or by sharing techniques with teachers. Finally, counselors may also reduce the disruptions caused by troubled students through individual counseling.

### **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 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.

The test scores reflect percentile rankings on the math and reading sections of the Iowa Test of Basic Skills and Stanford 9 exams, which are given in the spring. 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.”

### **3.3 Counselor Data**

Data on counselor intern placements come from the Department of Counselor Education at UF, 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 counselor to the school.

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 was the placement of graduate student counselor interns. 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 then matched interns to schools using these preferences.

The average school has 1.29 counselors per year, with each school having exactly one full-time counselor and an average of 0.29 graduate student counselors.

#### **4. Results and Discussion**

Results are shown in Table 1. 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. Columns 6 and 7 control for family and individual fixed effects, respectively.

Results for boys' test scores are shown in row 1 of Panel A and range from 0.83 to 1.43. All 8 estimates are statistically significant at the 10 percent level, while 4 are significant at the 5 percent level. Importantly, estimates from specifications including family or individual fixed effects remain essentially unchanged, indicating that our results are not driven by families selecting into school-years with additional counselors. Overall, these results suggest that counselors significantly improve boys' academic achievement.

Estimates for disciplinary infractions for boys are shown in the second row of Panel A. Estimates range from -0.13 to -0.20 infractions, which represent relative declines of 15 and 29 percent, respectively. Seven of eight estimates are statistically significant at the 10 percent level.

Results for girls are shown in Panel B of Table 1. While the results generally suggest that school counselors reduce misbehavior by girls, estimates on academic achievement are more modest than for boys and are generally indistinguishable from zero. We view this as consistent with counselors having a direct impact on boys, who are most likely to cause negative peer effects and are most likely to be affected by disruptive peers (Carrell and Hoekstra, 2009; Lavy and Schlosser, 2011).

Table 1: The Effect of Counselors on Academic Achievement and Misbehavior

Indep. Variable: Number of Counselors	1	2	3	4	5	6	7
<u>Panel A: Boys</u>							
Reading and Mathematics Score	1.404* (0.79)	1.370* (0.79)	1.339** (0.64)	1.214** (0.58)	1.429*** (0.49)	1.123* (0.59)	0.834** (0.42)
Observations	20,859	20,859	20,859	20,859	20,859	13,136	20,859
Disciplinary Infractions	-0.159* (0.09)	-0.157* (0.10)	-0.154* (0.09)	-0.164* (0.09)	-0.128 (0.08)	-0.186** (0.08)	-0.204** (0.09)
Observations	22,120	22,120	22,120	22,120	22,120	13,990	22,120
<u>Panel B: Girls</u>							
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	-
School Specific Linear Time Trends	No	No	No	No	Yes	Yes	Yes
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

\* Significant at the 0.10 level

\*\* Significant at the 0.05 level

\*\*\* Significant at the 0.01 level

One important question is how the effectiveness of counselors compares with that of other educational inputs. Results here indicate the aggregate effect of an additional counselor is to increase boys' and girls' achievement by 0.85 percentile points, or 3 percent of a standard deviation.<sup>1</sup> Back-of-the-envelope calculations shown in Appendix B indicate this is

<sup>1</sup> The estimate for boys and girls together that corresponds to Column 4 in Tables 3 and 4 is 0.81 percentile points, which is statistically significant at the 10 percent level.

approximately equivalent to increasing the quality of every teacher in the school by 0.3 standard deviations.

The estimated impact of counselors is also large compared to the impact of hiring an additional teacher to reduce class size. Given the result by Krueger (1999) that reducing class size by 7 increased test scores in the 1<sup>st</sup> year by 4 percentile points, a back-of-the-envelope calculation shown in Appendix B suggests that hiring a counselor is approximately twice as effective as hiring an additional teacher.

## **5. Conclusions**

This paper uses within-school variation in elementary school to show that counselors cause an economically and statistically significant increase in achievement, particularly for boys. We also find evidence that counselors reduce the misbehavior of both boys and girls by roughly 20 and 29 percent, respectively. Moreover, results indicate that relative to other education inputs such as additional teachers to reduce class size, counselors appear to be an effective way of improving academic achievement. This suggests that hiring counselors may be an effective alternative to other education policies aimed at increasing academic achievement.

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## Web Appendix A

Table A1: 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 A2: Tests of the Exogeneity of Counselor Placements

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 A3: Falsification Test: The Impact of Next Year's Counselors on Academic Achievement and Misbehavior

Independent Variable: Number of Counselors in the Following Year	1	2	3	4	5	6	7
<b>Panel A: Boys</b>							
Reading and Mathematics Score	-0.491 (0.72)	-0.437 (0.72)	0.063 (0.59)	0.135 (0.54)	-0.108 (0.31)	0.612 (0.54)	-0.089 (0.41)
Observations	18,313	18,313	18,313	18,313	18,313	11,761	18,313
Disciplinary Infractions	0.06 (0.10)	0.06 (0.10)	0.047 (0.10)	0.035 (0.09)	0.142* (0.08)	0.079 (0.07)	0.08 (0.09)
Observations	19,574	19,574	19,574	19,574	19,574	12,615	19,574
<b>Panel B: Girls</b>							
Reading and Mathematics Score	-0.281 (0.67)	-0.239 (0.65)	0.368 (0.58)	0.294 (0.51)	0.556 (0.42)	0.464 (0.59)	0.206 (0.45)
Observations	19,097	19,097	19,097	19,097	19,097	12,440	19,097
Disciplinary Infractions	-0.016 (0.04)	-0.015 (0.04)	-0.018 (0.04)	-0.016 (0.04)	0.028 (0.03)	0.013 (0.04)	-0.005 (0.04)
Observations	20,240	20,240	20,240	20,240	20,240	13,261	20,240
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	-
School Specific Linear Time Trends	No	No	No	No	Yes	Yes	Yes
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

\* Significant at the 0.10 level

\*\* Significant at the 0.05 level

\*\*\* Significant at the 0.01 level

## Web Appendix B

Recent findings suggest that a one-standard deviation increase in teacher quality results in a test score increase of one-tenth of a standard deviation (Buddin and Zamarro, 2009; Kane, Rockoff, and Staiger 2008; Kane and Staiger, 2009; Rivkin, Hanushek, and Kain, 2005). Thus, the increase of 0.3 standard deviations shown in this paper is roughly equivalent to the impact of increasing the quality of every teacher by one-third of a standard deviation.

To further put the magnitude of our effects in perspective, we compare our estimates 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 0.85 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. To reduce the class size from the observed 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.

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