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## Do Lower Student to Counselor Ratios Reduce School Disciplinary Problems?

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## Abstract

The American School Counselor Association (ASCA) recommends that there be no more than 250 students to each school counselor. Although numerous studies in the education literature show that school counselors play a positive role in educating children, to our knowledge, this is the first study answering the question of whether lower student to counselor ratios, all else equal, improve student outcomes. Using data provided to us by Florida's Alachua County School District and the University of Florida Counselor Education Department, we show that lower student to counselor ratios decrease both the recurrence of student disciplinary problems and the share of students involved in a disciplinary incident. These effects are greater for minority and low-income students. The fixed-effect models used, control for all unobserved heterogeneity across schools, isolating the effects on discipline from the within-school changes in the student-to-counselor ratio. The empirical methodologies employed produce unbiased estimates as long as the variation in the student to counselor ratio is not driven by unobserved factors that affect disciplinary outcomes.

**KEYWORDS:** education, discipline, counselor

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## I. Introduction

Public school systems are host to numerous academic challenges that face our children today. Among these challenges are students with learning disabilities and mental illness as well as classrooms plagued with disruptive students, bullies and underachieving students. According to the National Institute of Mental Health (NIMH), “one in 10 children and adolescents suffer from mental illness severe enough to result in significant functional impairment”(NIMH, 2001). However, experts estimate that only 5 to 7 percent of these children are identified and receive treatment for their disabilities and these children “are at much greater risk for dropping out of school and suffering long-term impairments”(NIMH, 2001). Additionally, 2.9 million or 5% of the school-aged population suffer from specific learning disabilities, which put them at risk academically (NCLD, 2006). The negative costs associated with troubled youth in our nations school system likely extend beyond the individuals directly affected. As evidence, disruptive students have been shown to have a direct negative influence on academic outcomes for their classroom peers (Figlio, 2005).

Although there is no simple solution to eradicating the problems faced by our school systems today, numerous case studies indicate that school counselors can play an instrumental role in reducing educational impediments such as those previously discussed. Examples of counselor effectiveness can be found in Boutwell & Myrick (1992), Brigman & Campbell (2003), and Webb, Brigman & Campbell (2005) when implementing student skills programs, which targeted academic performance. Additionally, Dolan et al., (1993) and Kellam et al., (1994) found positive effects on student behavior from the counselor implementation of the “Good Behaviors Game”.

There have also been several counselor effectiveness studies analyzing a cross-section of schools. Sink and Stroh (2003) found a linkage between comprehensive school counseling programs and academic performance. Lapan, Gysbers, & Sun (1997) found that schools with more fully implemented guidance programs had positive effects on high school student’s self reporting of 1) grades, 2) preparation for future, 3) career and college resources, and 4) perceptions of school climate. Lapan, Gysbers, & Petroski (2001) found that students reported feeling safer in school and had better relationships with their teachers in schools with more fully implemented school counseling programs.

In recognition of the counselor effectiveness studies, the American School Counselor Association (ASCA) recommends that there be no more than 250 students to each school counselor (ASCA, 2005). However, a majority of schools do not adhere to this recommendation. In 2003, the national average was nearly 478 students per counselor, with California having the highest ratio of 951 followed by Minnesota at 797. Furthermore, there are only 11 states that average

350 students or less per counselor and a vast majority of states average over 400 students per counselor (ASCA, 2005).

Although ASCA recommends a ratio of 250 students per counselor, to our knowledge, there is no direct empirical evidence in support of lower student to counselor ratios. The paucity of research addressing this question is likely due to a deficiency of within-school variation in the student to counselor ratio over time, and; hence, any cross-sectional effects can be explained by the unobserved heterogeneity across schools. Using student-level elementary school discipline records provided by the School Board of Alachua County Florida from 1995 through 1999, our study seeks to answer the question of whether decreases in the student to counselor ratio, all else equal, improve student outcomes. To accomplish this, we exploit the with-in school variation in the student-to-counselor ratio, allowing us to control for all unobserved differences across schools.

Our results provide evidence that lower student to counselor ratios decrease both the recurrence of student disciplinary problems and the share of students involved in a disciplinary incident. These effects are greater for minority and low-income students. The empirical methodologies employed produce unbiased estimates as long as the variation in the student to counselor ratio is not driven by unobserved factors that affect disciplinary outcomes.

## II. School Counselor Legislation

Following the rash of school violence incidents in the late 1990's, a number of policymakers at the Federal and state level have lobbied for additional funding and/or have taken steps to explore the role of the school counselor. For example, the Elementary and Secondary School Counseling Program (ESSCP), which was initiated as part of the No Child Left Behind Act of 2001, helps school districts hire school counselors, social workers and psychologists, with expenditures of approximately \$35 million in 2005. This funding level was adequate to fund approximately 529<sup>1</sup> school counselors, which is currently stretched across 32 states and 98 school districts. "Funds are awarded through a competitive grant process to school districts that demonstrate the greatest need for new or additional counseling services, the potential for replication or dissemination, or propose the most innovative programs" (ACA, 2004).

Many states have also added legislation in response to school violence. In May, 2001, the Texas legislature passed a bill requiring the "State Comptroller to:

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<sup>1</sup> Figure calculated using the 2005 Bureau of Labor Statistics, Occupation and Employment Statistics national mean wage for a school counselor of \$47,590 with a 38.9% benefits mark-up (Salary.com). A total of 529 counselors, nationwide, would reduce the national ratio by approximately 2.5 students per counselor (477.7 to 475.2).

1) determine student-to-counselor ratios on Texas elementary, middle and high school campuses; 2) conduct a statewide survey of how school counselors spend their time; and 3) develop recommendations for future improvements” (Strayhorn, 2002). Results from the study found a statewide student to counselor ratio of 423, with elementary schools having the highest ratio of 555 to one. The survey also found that counselors spend a large amount of time doing administrative duties and spend, on average, only 60% of their time counseling. The report made several recommendations regarding use of counselor’s time and policy, but fell short of mandating a maximum number of students per counselor (Strayhorn, 2000).

Other states such as Louisiana, New York, North Carolina, South Carolina and California have made recommendations or have taken steps to increase the role school counselors’ play in deterring school violence. For example, the South Carolina Safe Schools Task Force “called for a reduction in the student to counselor ratio at all grade levels and a redefining of role and job responsibilities so the school counselors are able to counsel and work directly with students” (Riley, 2000). Additionally, in 2000, the state of California passed legislation to increase the number of school counselors (Riley, 2000).

### **III. Role of the School Counselor**

The role of the school counselor has greatly evolved since their inception at the turn of the century. In the early years, school counselors were typically teachers providing vocational guidance to students preparing for the world of work. By the 1980’s, school counselors were being trained to provide a more comprehensive and developmental model of counseling. Today, school counseling programs are typically an integral component of a school-wide curriculum providing comprehensive and developmental programs to the school population. School counseling programs strive to be preventative in nature rather than reactive. Thus, school counselors, particularly in the elementary years, focus a great deal of their efforts on teaching classroom guidance lessons. The curriculum for classroom lessons generally consists of social/emotional development, peer relations, drug education and academic skills. In addition to classroom guidance, school counselors provide individual and small group counseling to students struggling with friendships, academics or other situations affecting their ability to be effective and efficient learners. School counselors also consult with teachers, administrators, parents and other members of the community in an effort to assist students. Another essential role of the school counselor is to help identify<sup>2</sup> students who may suffer from learning disabilities or

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<sup>2</sup> School counselors do not “classify” students as gifted or learning disabled. A certified school psychologist accomplishes the actual testing and diagnosis of students.

other mental health disabilities and connect them with the appropriate community or school resources.

In Alachua County, Florida (the source of data for our study) the role of the elementary school counselor is consistent with role of the school counselor as defined by the American School Counselor Association. School counselors provide classroom guidance, individual and group counseling, consultation, and make referrals to community resources as needed. As in most schools, school counselors in Alachua County play a significant role in student disciplinary problems. For example, when a student is reprimanded for disrupting the classroom, has conflicts with peers, or exhibits any other behavior affecting the student's ability to learn, the school counselor is typically asked to meet with the student(s) to assess and help remedy the situation. Examples of typical strategies used to assist students include problem solving, behavior charting or contracting, and small group counseling. All of these efforts are then facilitated and monitored by the school counselor.

#### **IV. Data and Methods**

To directly assess the marginal benefit of additional school counselor resources on student outcomes, we exploit the placement of practicum and internship graduate counseling students into elementary schools in Alachua County, Florida. We analyze student-level elementary school discipline records provided by the School Board of Alachua County from 1995 through 1999 to determine the effect of lower student to counselor ratios on student discipline outcomes. Alachua County is a large public school district, relative to the nation, with nearly 30,000 students across all grades during the 1998-99 school year. The school system is racially diverse with approximately 56 percent of students' white, 38 percent black, 3 percent Hispanic, and 2 percent Asian. Forty-six percent of the students are eligible for free or reduced lunches.

Our data come from the 23 public elementary schools<sup>3</sup> where disciplinary records for students are recorded by incident type and date in the Student Discipline System. For elementary school students, "incidents that are very serious or require intervention from the principal or other designated administrator" are reported in the system (SBAC, 1997). The primary explanatory variable of interest in the study is the student to counselor ratio. Increased availability and access to a school counselor, as measured by the student to counselor ratio, should lead to a decrease in disciplinary problems. This variable is computed by dividing the yearly school enrollment<sup>4</sup> by the number of full time equivalent (FTE) school counselors for each school by

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<sup>3</sup> The sample of schools excludes "special" schools such as those for troubled children.

<sup>4</sup> Yearly school enrollments obtained from the National Center for Education Statistics.

semester. Each elementary school in Alachua County is allotted one paid full-time school counselor.<sup>5</sup>

Additionally, the University of Florida, Department of Counselor Education, places graduate student counselors in Alachua County schools to work alongside the full-time counselor for semester-long practicum and internships.<sup>6</sup> The placement of these practicum and intern counselors provides the primary source of with-in school variation across time in the student to counselor ratio. Over the eight-semester period of our study, 16 of the 23 schools had at least one student counselor during a semester. The median number of semesters for a school to have a student counselor was 3 and the maximum was 5 semesters. Overall, the student to counselor ratio ranged from 249 at Charles W. Duval Elementary during the spring semester of 1997 to 965 at Kimball Wiles Elementary during the spring semester of 1999.

To control for the various characteristics of students in our models, individual information on student race (black or Hispanic), gender, gifted program, learning disabled, and eligibility for free or reduced lunch were collected. Additionally, to control for within-school differences across time in classroom size, the student to teacher ratio was added as an explanatory variable. This variable was computed by dividing the yearly school enrollment by the FTE number of teachers in the school. Appendix A provides summary statistics for the variables used in our study.

For the first portion of the analysis, we estimate a series of fixed effects models in which the probability of a disciplinary recurrence for a given student is our dependent variable and the key independent variable of interest is the student to counselor ratio. Specifically, we estimate the following linear probability model:<sup>7</sup>

$$\Pr(Recurr)_{istm} = \beta_1(Ratio_{stm}) + \beta_2X_{ist} + \delta_s + \alpha_t + \phi_m + \varepsilon_{istm},$$

where  $\Pr(Recurr)_{istm}$  is the probability of a discipline recurrence for student  $i$ , at school  $s$ , in academic year  $t$ , in semester  $m$ .  $Ratio_{stm}$  is the student to counselor

<sup>5</sup> Quarterly personnel records for the full-time paid counselors were obtained from the Alachua County School District. The records available only indicate whether there was turnover within a position during any point within the quarter. A dummy variable was included in the model if turnover occurred during the semester.

<sup>6</sup> Graduates of the University of Florida's Counselor Education program in school counseling are required to work two practicum and one internship in an elementary, middle or high school. The practicum are 150 hours and the internship is 600 hours working in the school during a semester. Based on a combination of experience and *student* contact time, a practicum I, practicum II, and an internship student were considered, 0.40, 0.50, and 0.75 FTE counselors. Results are not highly sensitive to variations in these FTE assumptions. Appendix B provides results when assuming student counselors are equivalent to a full-time counselor.

<sup>7</sup> Results were consistent when using a conditional logit model.

ratio.  $X_{ist}$  is a vector of individual and school specific explanatory variables. Individual controls include race, sex, eligibility for free/reduced lunch, gifted, learning disabled and whether the student enrolled late or departed early in the academic term.<sup>8</sup> School-level variables include the student to teacher ratio as well as the percent of the school population who is black, Hispanic, and eligible for free/reduced lunch.  $\delta_s$ ,  $\alpha_t$ , and  $\phi_m$  are school, year, and semester fixed effects. The school fixed effect,  $\delta_s$ , is used to control for all unobserved differences across schools and; therefore, isolates the semester-to-semester effects on student discipline from changes in the within-school student to counselor ratio. The error term is represented by  $\varepsilon_{istm}$ . Given the potential for error correlation across individuals and across time within a given school and semester, we correct all standard errors to reflect clustering at the school by year by semester level.

The recurrence of a serious disciplinary incident was chosen as an explanatory variable due to a high likelihood of referral to the school counselor once a disciplinary incident has occurred. Although we believe a substantial proportion of a counselor's influence on discipline will take place after such infractions have occurred, counselors do play an active role in providing services to all students during classroom guidance lessons on various topics such as bullying, social skills, and careers. Counselors may also intervene with students who are having trouble, but have not yet been recorded as having a disciplinary occurrence through small group and individual guidance. Therefore, we also employ the following model:

$$Share_{stm} = \gamma_1(Ratio_{stm}) + \gamma_2 X_{st} + \delta_s + \alpha_t + \phi_m + \varepsilon_{stm}$$

Where *Share* represents the fraction of students in the school who had at least one disciplinary incident in school *s* in year *t* in semester *m*. *Ratio*<sub>stm</sub> represents the student to counselor ratio and  $X_{st}$  represents the set of school-level characteristics, including the student to teacher ratio and the percent of the student population who are black, Hispanic, and eligible for free/reduced lunch.

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<sup>8</sup> Enrollment data were only available for 35% of our observations. Therefore, a dummy variable is included in the regression for those observations where attendance information is missing.

## V. Results

Tables 1 and 2 show results for our first model analyzing the student to counselor ratio effect on student disciplinary recurrences.<sup>9</sup> Table 1 shows results for disciplinary recurrences by semester and Table 2 shows results by year. For Table 1, Specification 1, we begin by analyzing the student to counselor ratio while excluding the school fixed-effect, which is at the heart of our analysis. Results show a positive and significant coefficient for the student to counselor ratio (0.014). This result indicates that schools with more students per counselor have an increased probability of student disciplinary recurrences within a given semester. Additionally, the positive and significant results for the black student, free/reduced lunch student, and male student dummy variables indicate that these respective demographic groups have a higher probability of a disciplinary recurrence. Likewise, the negative and significant results for the Hispanic and gifted student dummy variables indicate that these respective groups have a lower probability of a disciplinary recurrence. Finally, the positive and significant result for the student to teacher ratio indicates that schools with larger than *average* classroom sizes have a higher recurrence of disciplinary incidents. This result provides evidence supporting the theory that students' in smaller-sized classrooms have fewer disciplinary outbursts. However, one must take caution in interpreting this result as the variable only provides the average student to teacher ratio for the entire school in the given year. Hence, there is no information in the data regarding the actual classroom size for the students studied in the analysis.<sup>10</sup>

Results from this first specification may merely reflect the unobserved differences across schools in disciplinary outcomes (i.e., administration, socioeconomic factors, etc.). Therefore, Specification 2 adds a school fixed effect to isolate the effects on discipline from within-school changes in the student to counselor ratio. Results show that the student to counselor ratio variable remains positive and significant (0.012) with a slight decrease in the magnitude compared to Specification 1. The reported coefficient indicates that the probability of a disciplinary recurrence increases 1.2 percentage points with a 100 student increase in the number of students per counselor. The model estimates that a drop from the mean of 544 students per counselor to the ASCA recommended ratio of 250 students per counselor would result in a 3.5-percentage point or a 7.4 percent

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<sup>9</sup> Table 1a and 2a of Appendix B report results for the model when computing the student to counselor ratio with all student counselors considered a full time equivalent (FTE) counselor. We believe these estimates to be the lower bound of the counselor effect.

<sup>10</sup> For brevity, results for the school level demographic characteristics (percent black, Hispanic, and free/reduced lunch) are not shown, but are all positive and statistically insignificant in all specifications. Results for the attendance information (enrolled late, departed early, or missing attendance) are also not shown, but are statistically insignificant in all specifications.

decrease in the probability of a disciplinary recurrence.<sup>11</sup> All coefficients for the other variables in the model remain consistent with Specification 1.

Might the positive and significant results for the student to counselor ratio be simply reflecting semester or time differences in disciplinary recurrences? To test this hypothesis, Specification 3 adds semester by year fixed effects to the model. Results are similar to those in Specification 2, with no appreciable changes in the magnitude or significance of any covariates.<sup>12</sup> Specification 4 adds an individual-student fixed effect to control for all unobserved student characteristics, thereby, isolating the counselor ratio effect using only the within student variation in disciplinary recurrences across time. In this highly specified model, the counselor ratio variable remains positive (0.006), but is no longer statistically significant. The student to teacher ratio variable remains positive (0.040) and highly significant. As a final test, Specification 5 adds a school-specific linear time trend to the model. Again, the counselor ratio variable remains positive (0.003), but is not statistically significant.

Specifications 6-8 add interaction terms between the student to counselor ratio and the student demographic dummy variables to test for nonlinearities in the counselor effect across student type. For brevity, only those specifications with statistically significant interaction effects are shown. Specification 6 shows a positive and significant coefficient (0.016) for the two-way interaction between the student to counselor ratio and the black student dummy variable. The positive and significant coefficient on this interaction implies that indeed, while lower student to counselor ratios apparently play a positive role in deterring disciplinary recurrences for all students, they play an even greater role for black students. The model estimates that a drop from the mean student to counselor ratio to the ASCA recommended ratio of 250 would result in a 4.9-percentage point or a 9.4 percent decrease in the probability of a disciplinary recurrence for black students.<sup>13</sup>

Next, Specification 7 adds a three-way interaction term between the student to counselor ratio, the black student, and the male student variables, as well as all relevant two-way interactions. The positive and significant (0.033) coefficient for the three-way interaction variable shows that lower student to counselor ratios have a positive differential effect for black male students. That is, not only do lower counselor ratios decrease discipline problems greater for

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<sup>11</sup> It should be noted that the reported marginal effects from decreasing the student to counselor ratio to the ASCA recommendation of 250 are outside the range of our data sample. Hence, our use of linear model does not account for any potential decreasing returns to lower student to counselor ratios.

<sup>12</sup> We also tested our model when assuming all students (with enrollment data available) who enrolled late or departed early had a disciplinary recurrence. Using all other controls as in Specification 3, the counselor ratio variable remains positive and significant (0.013) at the 0.1-level.

<sup>13</sup> The sample average recurrence rate for black students is 52.8%.

black students than all other students, they also decrease recurrences even greater for black male students. The model estimates that a drop from the mean student to counselor ratio to the ASCA recommended ratio would result in a 6.1-percentage point or a 10.8 percent decrease in the probability of a disciplinary recurrence for black male students.

Finally, Specification 8 interacts the student to counselor ratio with the free/reduced lunch student variable. The positive and significant (0.026) result for this interaction term indicates that lower student to counselor ratios have a greater effect in deterring disciplinary recurrences for economically disadvantaged students. The model estimates that a drop from the mean student to counselor ratio to the ASCA recommended ratio would result in a 4.9-percentage point or a 9.6 percent decrease in the probability of a disciplinary recurrence for students eligible for free or reduced lunch.

Results in Table 2 repeat the analysis when estimating the effects on disciplinary recurrences within each *school year*. For these estimates, the student to counselor ratio was computed by dividing the annual school enrollment by the total number of full time equivalent counselors.<sup>14</sup> The reported results provide further evidence of a positive effect of lower student to counselor ratios on disciplinary recurrences. Specifications 9-11 sequentially add school and year effects to the model, with the counselor ratio positive and highly significant in all specifications. Compared to the results reported in Table 1, the magnitude of the coefficient on the student to counselor ratio variable is considerably larger. For Specification 11, which includes a school and year fixed effect, the estimated coefficient of 0.048 indicates that a drop from the mean of 544 students per counselor to the ASCA recommended ratio of 250 students per counselor would result in a 14.1-percentage point or a 25.5 percent decrease in the probability of a disciplinary recurrence. For Specification 12, which includes the individual student fixed effect, the coefficient on the counselor variable remains positive (0.052) and statistically significant with a slight increase in the magnitude. Specification 13 adds a school-specific linear time trend and although the counselor ratio variable is positive (0.022), it is no longer statistically significant at conventional levels ( $p=0.125$ ).<sup>15</sup>

Specifications 14 - 16 add the interaction terms between the student to counselor ratio and the student demographic dummy variables to test for nonlinearities in the counselor effect across student type. As with the semester-by-semester results, the positive and significant results for the interaction terms provide further evidence that counselor ratios play an even greater role in

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<sup>14</sup> As with the previous analysis practicum I, practicum II, and an internship student were considered, 0.40, 0.50, and 0.75 FTE counselors for the semester they were in the school.

<sup>15</sup> Results (not shown) for the counselor ratio variable are positive and significant (0.019) when including *both* a student fixed effect and the school specific linear time trends ( $p=0.001$ ).

detering disciplinary problems for black students, black male students, and economically disadvantaged students. The model estimates that a drop from the mean student to counselor ratio to the ASCA recommended ratio would result in a 16.5-percentage point or a 25.6 percent decrease in the probability of a disciplinary recurrence for black male students.

The large increase in the magnitude of the counselor ratio effect, compared to the semester-by-semester results, indicates that counselors may play a more important role with the marginally misbehaved students who are only involved in a disciplinary occurrence during one of the two semesters. That is, those students who have perpetual disciplinary problems (each semester) receive less weight in the yearly model versus the semester-to-semester specifications.<sup>16</sup>

The reported results in Tables 1 and 2 provide evidence of a positive effect from lower student to counselor ratios on student disciplinary recurrences. However, one potential concern is the use of recurrences as the dependent variable. Although our models control, partially, for students who enrolled late or departed early in the academic term, this non-random group may introduce selection bias into the estimates when using recurrences as the dependent variable. Additionally, school counselors also spend time performing classroom guidance activities with all students and conduct small group and individual guidance with students who may be having trouble, but do not yet have a recorded disciplinary infraction.

Therefore, to alleviate potential problems with selection bias and to broaden our outcome set, we employ our second model, which estimates the effects of lower student to counselor ratios on the share of the student population with at least one disciplinary incident.<sup>17</sup> Results for this analysis are shown in Table 3.<sup>18</sup> Specifications 17 and 18 show results using the semester-to-semester variation in the share of students with a disciplinary occurrence and Specifications 19 and 20 show results by academic year. All regressions include analytic weights by school enrollment as well as school and time fixed effects.<sup>19</sup> For

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<sup>16</sup> The ideal test of this hypothesis would involve a model predicting the student to counselor ratio effect on the probability of a disciplinary occurrence. Unfortunately, student-level data on students who don't have a reported violation are unavailable to us.

<sup>17</sup> We also examined the counselor ratio effects on the average number of incidents per student (incidents divided by school enrollment). Results were positive and significant for the counselor ratio variable except in those specifications including the school-specific linear time trend.

<sup>18</sup> Table 3a of Appendix B shows results for the model when computing the student to counselor ratio when student counselors are considered a full time equivalent (FTE) counselor.

<sup>19</sup> We tested our school-level data for serial correlation in the schools that did not have changes in the number of counselors over time. We found mild evidence of serial correlation using the Wooldridge test for autocorrelation in panel data ( $p=0.0445$ ). Therefore, we computed our models in Table 3 using feasible generalized least squares to correct for the AR(1) autocorrelation within panels. Results did not vary significantly when using OLS.

Specification 17, the positive and significant (0.0034) result for the student to counselor ratio variable indicates that a 100 person increase in the number of students per counselor would result in a 0.34-percentage point increase in the fraction of students involved in a disciplinary incident. The model predicts that a drop from the mean student to counselor ratio to the ASCA recommended ratio would result in a 0.99-percentage point or an 11.8 percent decrease from the mean in the share of students with a disciplinary occurrence. For the mean-sized school, this decrease equates to approximately 6 fewer students per semester (50.7 to 44.7). Specification 18 adds a school-specific linear time trend to the model. Although the counselor ratio variable remains positive (0.0022), the coefficient is no longer statistically significant at conventional levels ( $p=0.15$ ).

Next, Specifications 19 and 20 estimate the model using the share of students within the academic year who have a disciplinary occurrence. For Specification 19, the positive and significant (0.025) coefficient on the counselor ratio variable indicates that a 100 person increase in the number of students per counselor would result in a 2.5-percentage point increase in the share of students involved in a disciplinary incident. The model predicts that a drop from the mean student to counselor ratio to the ASCA recommended ratio would result in a 7.4-percentage point or a 59.1 percent decrease from the mean in the share of students with an occurrence. For the typical school, this decrease equates to approximately 45 fewer students per year (75.8 to 31.0). Specification 20 adds the school-specific linear time trends to the model and the counselor ratio variable remains positive and statistically significant (0.019).

Again, the large increase in the magnitude of the counselor effect in the yearly regressions indicates that counselors may play a more important role with the marginally misbehaved students. This suggestive evidence is driven by the fact that those students who have perpetual disciplinary problems receive less weight in the yearly model versus the semester-to-semester specifications.

The preceding results provide evidence that lower student to counselor ratios, all else equal, decrease both the probability of a disciplinary recurrence and the share of the student population involved in a disciplinary incident. However, the unbiasedness of these results relies on the random placement of the University of Florida student counselors into elementary schools. Therefore, the placement of the student counselors warrants further investigation.

## **VI. Possible Counselor Selection Bias**

The potential non-random placement of student counselor presents two conflicting hypothesis, which could result in a bias on the student to counselor

ratio. First, with final placement authority, the school district may have an incentive to allocate more resources (i.e., student counselors) to schools having a high number of previous semester disciplinary problems. If so, then the positive counselor effect could simply be a mean reversion in the number of discipline recurrences in the schools where student counselors were placed.<sup>20</sup> Hence, there would be an upward bias on the student to counselor ratio variable. As an alternative hypothesis, it is possible that student counselors self select into schools with a low number of previous semester disciplinary problems. If this were the case, the bias on the student to counselor ratio variable would be toward zero with stationary data.

To test these alternative hypotheses, we estimated a series of models to examine whether prior semester disciplinary problems had an effect on the placement of UF student counselors. Specifically, we estimate the model:

$$\Pr(UF\ Student)_{stm} = \gamma(Prior\ Discipline_{stm}) + \beta X_{st} + \delta_s + \alpha_{tm} + \varepsilon_{stm},$$

where  $\Pr(UF\ Student)_{stm}$  is the probability of the placement of a UF student counselor at school  $s$ , in academic year  $t$ , in semester  $m$ . *Prior Discipline*<sub>stm</sub> is the prior semester level of disciplinary problems in the school.  $X_{st}$  is a vector of school specific explanatory variables including the percent black, percent Hispanic, percent free/reduced lunch and the student to teacher ratio.  $\delta_s$  and  $\alpha_{tm}$  are school and year by semester fixed effects.

Results for this analysis are shown in Table 4. Two alternative measures of discipline are tested as an explanatory variable. Specifications 21 and 22 use the prior semester share of the student population with a discipline occurrence and Specifications 23 and 24 use the prior semester average incidents per student. Results for the discipline variable are negative and insignificant in all specification except for Specification 22. The negative and significant result (-2.354) in Specification 22 indicates that the probability of a placement of a student counselor decreases as the share of students involved in a previous semester discipline occurrence rises. The magnitude of the effect is relatively large, with a 1-standard deviation increase from the mean in the share of students involved in an occurrence decreasing the probability of a counselor placement by 13.9-percentage points. This result provides some evidence of non-random placements of student counselors into schools with fewer previous semester disciplinary problems. Hence there could be a bias toward zero if prior semester disciplinary incidents exhibit a mean reverting process.

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<sup>20</sup> We tested the stationarity of our data in schools without student counselors using Levin-Lin-Chu panel unit root test. We rejected null hypothesis of nonstationarity ( $p=0.0039$ ). This pooled Dickey-Fuller-type test also indicates the data are (negative) trend stationary. Therefore, we believe our data to be exhibiting a mean reverting process.

The results in Table 4 indicate a potential bias in our estimates due to student counselors selecting into schools with a lower number of previous semester disciplinary problems. Because our data appear to be stationary, this selection effect is likely to cause a bias towards zero on the previously reported coefficients for the student to counselor ratio variable. Thus, our results may underestimate the positive effects school counselors have on student disciplinary outcomes.

## VII. Cost/Benefit Analysis

Although our study provides evidence that lower student to counselor ratios decrease disciplinary outcomes, further policy analysis is required to determine if reducing the student to counselor ratio to the ASCA recommended ratio of 250 to one is warranted. That is, would the benefits of lowering the student to counselor ratio exceed the costs of doing so?

At a national level, the cost of reducing the average student to counselor ratio to the recommended level would require a near doubling of the current number of school counselors and would likely cost in excess of \$6 billion annually.<sup>21</sup> Additionally, many of the benefits of a lower student to counselor ratio are currently unknown; we do not know if lower counselor ratios increase non-disciplinary outcomes such as academic performance, graduation rates, and college attendance. Further analyses on these outcomes are necessary.

However, to provide a compulsory analysis of lowering the student to counselor ratio, we use our results in Table 3 to estimate the costs and potential benefits on discipline from adding one additional full-time counselor to each of the 23 elementary schools in Alachua County. Each elementary school currently has one full-time counselor; therefore, one additional counselor per school would reduce the student to counselor ratio from the sample mean of 544 to 272. Our models estimate that doing so would result in a total of 257 to 984 fewer students, per year, involved in at least one disciplinary incident.<sup>22</sup> The approximate annual cost of these reductions would be \$1.52 million or \$113 per student enrolled.<sup>23</sup> In terms of student disciplinary reductions, the cost would range between \$1,500 and \$3,000 per reduction.

Although measuring the total benefits from reducing the number of students involved in a disciplinary incident is difficult, Figlio's (2005) study

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<sup>21</sup> According to ASCA 2003 figures, there are 100,901 school counselors. A nationwide increase of nearly 92,000 public school counselors would be required to decrease the average student to counselor ratio to 250.

<sup>22</sup> Figures calculated using Specifications 17 and 20 of Table 3.

<sup>23</sup> Figure based on the 2004 national average wage plus benefits of \$66.1 thousand per counselor and student enrollment of 13,516 during the 1998-99 academic school year as reported by the National Center on Education Statistics.

offers some insight. His results suggest that, “adding one additional disruptive child to the classroom results in reduced peer mathematics test scores of 2.2 national percentiles.” Thus, his study suggests, through peer effects, lower counselor ratios may increase academic outcomes by reducing the number of disruptive children in the classroom.

## **VII. Conclusions**

This study investigates whether lower student to counselor ratios, all else equal, improve student disciplinary outcomes using student-level data from Alachua County Florida from 1995 through 1999. Our results provide evidence that lowering the number of students per counselor decreases both the probability of a disciplinary recurrence and the share of students involved in a disciplinary incident. We find the effects on discipline are greater for minority and low-income students. The fixed-effect models used control for all unobserved heterogeneity across schools, isolating the effects on discipline from the within-school variation in the student-to-counselor ratio. The empirical methodologies employed produce unbiased estimates as long as the variation in the student to counselor ratio is not driven by unobserved factors that affect disciplinary outcomes.

Additional studies are warranted to further assess the total costs and benefits of reducing the student to counselor ratio. Evidence on outcomes such as student academic performance, attendance, and school climate would provide a more in-depth assessment of school counselor effectiveness on student outcomes.

Table 1: Student to counselor ratio effects on the recurrence of disciplinary problems (by semester)

Variable	1	2	3	4	5	6	7	8
Student to counselor ratio <sup>1</sup> (hundreds)	0.014** (0.006)	0.012* (0.007)	0.012* (0.007)	0.006 (0.007)	0.003 (0.006)	0.001 (0.009)	0.019 (0.012)	-0.010 (0.010)
Black student	0.107*** (0.016)	0.099*** (0.016)	0.100*** (0.016)	NA	0.098*** (0.016)	0.010 (0.050)	0.169** (0.071)	0.097*** (0.016)
Hispanic student	-0.070* (0.039)	-0.066* (0.037)	-0.065* (0.037)	NA	-0.071* (0.037)	-0.061 (0.038)	-0.060 (0.036)	-0.066* (0.037)
Gifted student	-0.095*** (0.024)	-0.096*** (0.024)	-0.096*** (0.024)	NA	-0.093*** (0.024)	-0.095*** (0.024)	-0.095*** (0.024)	-0.093*** (0.024)
Learning disabled student	0.025* (0.015)	0.025* (0.015)	0.025* (0.015)	NA	0.026* (0.015)	0.026* (0.015)	0.026* (0.015)	0.025* (0.015)
Free/reduced lunch student	0.106*** (0.016)	0.106*** (0.016)	0.106*** (0.016)	NA	0.106*** (0.016)	0.103*** (0.016)	0.103*** (0.016)	-0.045 (0.056)
Male student	0.113*** (0.013)	0.118*** (0.013)	0.119*** (0.013)	NA	0.119*** (0.012)	0.119*** (0.013)	0.263*** (0.066)	0.118*** (0.013)
Student to teacher ratio	0.018** (0.008)	0.025** (0.010)	0.026*** (0.010)	0.040*** (0.012)	0.040*** (0.013)	0.025*** (0.010)	0.024** (0.010)	0.026*** (0.095)
Interaction between counselor ratio and Black student						0.016* (0.009)	-0.009 (0.012)	
Interaction between <i>counselor ratio</i> and <i>male student</i>							-0.023* (0.012)	
Interaction between Black student and Male student							-0.207** (0.083)	
Three-way interaction between counselor ratio, Black student and Male student							0.033*** (0.038)	
Interaction between <i>counselor ratio</i> and <i>Free/reduced lunch student</i>								0.026*** (0.009)
Observations	8,799	8,799	8,799	8,799	8,799	8,799	8,799	8,799
R-Square	0.041	0.062	0.063	0.548	0.068	0.063	0.064	0.064
Fixed effects		School	School, Year by Semester	School, Year by Semester, Student	School, Year by Semester, and School Specific Time Trend	School, Year by Semester	School, Year by Semester	School, Year by Semester

Notes: Dependent variable is a major discipline recurrence (yes/no). Standard errors in parentheses are clustered by school by year by semester. All specification also include: a dummy variable if turnover occurred in the full-time counselor position, school-level controls for the percent black, percent Hispanic, and percent free lunch, and dummy variables for whether the student enrolled later than two weeks after the start of the semester or departed at least two weeks prior to the end of the semester. \* Significant at the 0.10 level, \*\* Significant at the 0.05 level, \*\*\* Significant at the 0.01 level

<sup>1</sup> Student counselors from the University of Florida are counted as part-time counselors

Table 2: Student to counselor ratio effects on the recurrence of disciplinary problems (by year)

Variable	9	10	11	12	13	14	15	16
Student to counselor ratio <sup>1</sup> (hundreds)	0.022** (0.008)	0.043*** (0.014)	0.048*** (0.014)	0.052*** (0.015)	0.022 (0.014)	0.034** (0.013)	0.067*** (0.015)	0.017 (0.016)
Black student	0.119*** (0.016)	0.112*** (0.017)	0.113*** (0.017)	NA	0.113*** (0.017)	-0.011 (0.064)	0.201* (0.103)	0.110*** (0.017)
Hispanic student	-0.035 (0.043)	-0.029 (0.042)	-0.028 (0.042)	NA	-0.031 (0.042)	-0.023 (0.042)	-0.024 (0.043)	-0.030 (0.042)
Gifted student	-0.060** (0.024)	-0.069*** (0.023)	-0.069*** (0.023)	NA	-0.063*** (0.023)	-0.066*** (0.024)	-0.066*** (0.024)	-0.063*** (0.023)
Learning disabled student	0.046*** (0.016)	0.045*** (0.016)	0.044*** (0.016)	NA	0.046*** (0.016)	0.044*** (0.016)	0.044*** (0.016)	0.045*** (0.016)
Free/reduced lunch student	0.108*** (0.019)	0.112*** (0.018)	0.111*** (0.018)	NA	0.112*** (0.018)	0.107*** (0.019)	0.107*** (0.019)	-0.113 (0.074)
Male student	0.114*** (0.015)	0.119*** (0.014)	0.120*** (0.014)	NA	0.120*** (0.014)	0.120*** (0.015)	0.383*** (0.083)	0.119*** (0.014)
Student to teacher ratio	0.012 (0.011)	0.018 (0.012)	0.020 (0.013)	0.024 (0.016)	0.014 (0.016)	0.019 (0.013)	0.019 (0.013)	0.020 (0.013)
Interaction between counselor ratio and Black student						0.022* (0.011)	-0.009 (0.018)	
Interaction between <i>counselor ratio</i> and <i>male student</i>							-0.041*** (0.015)	
Interaction between Black student and Male student							-0.268** (0.107)	
Three-way interaction between counselor ratio, Black student and Male student							0.040** (0.019)	
Interaction between <i>counselor ratio</i> and <i>Free/reduced lunch student</i>								0.039*** (0.012)
Observations	6,621	6,621	6,621	6,621	6,621	6,621	6,621	6,621
R-square	0.046	0.071	0.071	0.669	0.074	0.072	0.073	0.073
Fixed effects		School	School, Year	School, Year, Student	School, Year, and School Specific Time Trend	School, Year	School, Year	School, Year

Notes: Dependent variable is a major discipline recurrence (yes/no). Standard errors in parentheses are clustered by school by year. All specification also include: a dummy variable if turnover occurred in the full-time counselor position, school-level controls for the percent black, percent Hispanic, and percent free lunch, and dummy variables for whether the student enrolled later than two weeks after the start of the year or departed at least two weeks prior to the end of the year. \*

Significant at the 0.10 level, \*\* Significant at the 0.05 level, \*\*\* Significant at the 0.01 level

<sup>1</sup> Student counselors from the University of Florida are counted as part-time counselors

Table 3: Student to counselor ratio effects on the share of students with a disciplinary incident

Variable	17	18	19	20
	<u>By Semester</u>		<u>By Year</u>	
Student to counselor ratio <sup>1</sup> (hundreds)	0.0034*** (0.0011)	0.0022 (0.0015)	0.025*** (0.005)	0.019*** (0.006)
Percent Black	0.103 (0.101)	0.074 (0.124)	0.288* (0.159)	0.325 (0.231)
Percent Hispanic	0.497** (0.238)	0.289 (0.293)	0.675* (0.394)	0.035 (0.552)
Percent Free/reduced lunch student	0.007 (0.127)	-0.176 (0.138)	-0.105 (0.211)	-0.400 (0.281)
Student to teacher ratio	0.007** (0.003)	0.005* (0.003)	0.006 (0.005)	0.001 (0.005)
Observations	182	182	92	92
Wald Chi-sq	952.15	2,051.67	937.86	2,707.61
Fixed effects	School, Year by Semester	School, Year by Semester, School Specific Time Trend	School, Year	School, Year, School Specific Time Trend

Notes: Dependent variable is the share of students with a disciplinary incident

Models estimated using feasible generalized least squared to correct for panel-specific AR(1)

\* Significant at the 0.10 level, \*\* Significant at the 0.05 level, \*\*\* Significant at the 0.01 level

<sup>1</sup> Student counselors from the University of Florida are counted as part-time counselors

Table 4: Prior semester disciplinary effects on the probability of a placement of a UF student counselor

Variable	21	22	23	24
Share of student population with a discipline incident (prior semester)	-1.705 (1.037)	-2.354* (1.275)		
Total number of incidents per student population (prior semester)			-0.462 (0.371)	-0.571 (0.417)
Percent Black	-0.868 (2.115)	-0.271 (2.299)	-0.740 (2.103)	-0.334 (2.289)
Percent Hispanic	4.841 (4.557)	4.361 (4.549)	4.866 (4.632)	4.231 (4.672)
Percent Free/reduced lunch student	2.427 (2.084)	1.365 (2.159)	2.224 (2.097)	1.278 (2.186)
Student to teacher ratio	-0.003 (0.042)	-0.010 (0.041)	-0.008 (0.042)	-0.014 (0.042)
Observations	159	159	159	159
R-Square	0.279	0.323	0.276	0.317
Fixed effects	School	School, Year by Semester	School	School, Year by Semester

Notes: Dependent variable is the placement of a UF student counselor

\* Significant at the 0.10 level, \*\* Significant at the 0.05 level, \*\*\* Significant at the 0.01 level

## Appendix A: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Student to counselor ratio <sup>1</sup> (hundreds)	182	5.44	1.59	2.49	9.65
Student to counselor ratio <sup>2</sup> (hundreds)	182	5.16	1.82	1.97	9.65
Disciplinary recurrences by semester (dummy variable)	8799	0.48	0.50	0	1
Disciplinary recurrences by semester (dummy variable)	6621	0.55	0.50	0	1
Share of student involved in a disciplinary incident (by school by semester)	182	0.08	0.06	0	0.26
Total yearly student enrollment (by school)	92	605.40	153.90	253	965
Black student (dummy variable)	8799	0.65	0.48	0	1
Hispanic student (dummy variable)	8799	0.02	0.15	0	1
Gifted student (dummy variable)	8799	0.05	0.22	0	1
Learning disabled student (dummy variable)	8799	0.18	0.38	0	1
Free/reduced lunch student (dummy variable)	8799	0.82	0.39	0	1
Male student (dummy variable)	8799	0.70	0.46	0	1
Student to teacher ratio (by school)	8799	17.19	1.50	13.50	20.40
Enrolled late (dummy variable)	3069	0.04	0.20	0	1
Departed early (dummy variable)	3069	0.04	0.19	0	1
Missing enrollment information (dummy variable)	8799	0.65	0.48	0	1
Percent of school black	8799	0.44	0.19	0.15	0.91
Percent of school free lunch	8799	0.55	0.19	0.14	0.87
Percent of school Hispanic	8799	0.03	0.02	0	0.08

<sup>1</sup> Student counselors from the University of Florida are counted as part-time counselors<sup>2</sup> Student counselors from the University of Florida are counted as full-time counselors

## Appendix B: Supplemental Regressions

Table 1a: Student to counselor ratio effects on the recurrence of disciplinary problems (by semester)

Variable	1a	2a	3a	4a	5a
Student to counselor ratio <sup>1</sup> (hundreds)	0.011** (0.005)	0.009** (0.004)	0.009** (0.005)	0.006 (0.005)	0.002 (0.004)
Black student	0.107*** (0.016)	0.098*** (0.016)	0.099*** (0.016)	NA	0.098*** (0.016)
Hispanic student	-0.070* (0.039)	0.066* (0.037)	-0.065* (0.037)	NA	-0.071* (0.037)
Gifted student	-0.095*** (0.024)	-0.096*** (0.024)	-0.097*** (0.024)	NA	-0.092*** (0.024)
Learning disabled student	0.024 (0.015)	0.025* (0.015)	0.025* (0.015)	NA	0.026* (.015)
Free/reduced lunch student	0.107*** (0.016)	0.106*** (0.016)	0.106*** (0.016)	NA	0.106*** (0.016)
Male student	0.113*** (0.013)	0.118*** (0.013)	0.119*** (0.013)	NA	0.119*** (0.013)
Student to teacher ratio	0.018** (0.008)	0.025*** (0.010)	0.026*** (0.009)	0.041*** (0.012)	0.041*** (0.013)
Observations	8,799	8,799	8,799	8,799	8,799
R-Square	0.041	0.062	0.063	0.548	0.068
Fixed effects		School	School, Year by Semester	School, Year by Semester, Student	School, Year by Semester, and School Specific Time Trend

Notes: Dependent variable is a major discipline recurrence (yes/no). Standard errors in parentheses are clustered by school by year by semester. All specification also include: a dummy variable if turnover occurred in the full-time counselor position, school-level controls for the percent black, percent Hispanic, and percent free lunch, and dummy variables for whether the student enrolled later than two weeks after the start of the semester or departed at least two weeks prior to the end of the semester. \* Significant at the 0.10 level, \*\* Significant at the 0.05 level, \*\*\* Significant at the 0.01 level

<sup>1</sup> Student counselors from the University of Florida are counted as full-time counselors

Table 2a: Student to counselor ratio effects on the recurrence of disciplinary problems (by year)

Variable	9a	10a	11a	12a	13a
Student to counselor ratio <sup>2</sup> (hundreds)	0.020*** (0.007)	0.037*** (0.010)	0.039*** (0.010)	0.045*** (0.010)	0.019* (0.010)
Black student	0.120*** (0.017)	0.113*** (0.017)	0.113*** (0.017)	NA	0.113*** (0.017)
Hispanic student	-0.035 (0.043)	-0.029 (0.042)	-0.029 (0.042)	NA	-0.031 (0.042)
Gifted student	-0.060** (0.024)	-0.069*** (0.023)	-0.069*** (0.023)	NA	-0.064*** (0.023)
Learning disabled student	0.046*** (0.016)	0.045*** (0.016)	0.045*** (0.016)	NA	0.045*** (0.016)
Free/reduced lunch student	0.108*** (0.019)	0.112*** (0.018)	0.111*** (0.018)	NA	0.112*** (0.018)
Male student	0.114*** (0.015)	0.119*** (0.014)	0.119*** (0.014)	NA	0.120*** (0.014)
Student to teacher ratio	0.011 (0.011)	0.019 (0.012)	0.022* (0.012)	0.026* (0.015)	0.015 (0.015)
Observations	6,621	6,621	6,621	6,621	6,621
R-square	0.046	0.072	0.072	0.670	0.075
Fixed effects		School	School, Year	School, Year, Student	School, Year, and School Specific Time Trend

Notes: Dependent variable is a major discipline recurrence (yes/no). Standard errors in parentheses are clustered by school by year. All specification also include: a dummy variable if turnover occurred in the full-time counselor position, school-level controls for the percent black, percent Hispanic, and percent free lunch, and dummy variables for whether the student enrolled later than two weeks after the start of the year or departed at least two weeks prior to the end of the year. \* Significant at the 0.10 level, \*\* Significant at the 0.05 level, \*\*\* Significant at the 0.01 level

<sup>2</sup>Student counselors from the University of Florida are counted as full-time counselors

Table 3a Student to counselor ratio effects on the share of students with a disciplinary problem

Variable	17a	18a	19a	20a
	By Semester		By Year	
Student to counselor ratio <sup>2</sup> (hundreds)	0.0023** (0.0010)	0.0015 (0.0011)	0.017*** (0.004)	0.013*** (0.004)
Percent Black	0.099 (0.101)	0.076 (0.124)	0.261 (0.160)	0.360 (0.232)
Percent Hispanic	0.499 (0.238)	0.299 (0.294)	0.733* (0.400)	0.208 (0.560)
Percent Free/reduced lunch student	0.011 (0.127)	-0.178 (0.139)	-0.013 (0.216)	-0.405 (0.283)
Student to teacher ratio	0.007*** (0.003)	0.006* (0.003)	0.008* (0.005)	0.003 (0.005)
Observations	182	182	92	92
Wald Chi-sq	942.63	2,041.56	917.30	2,769.64
Fixed effects	School, Year by Semester	School, Year by Semester, School Specific Time Trend	School, Year	School, Year, School Specific Time Trend

Notes: Dependent variable is the share of students with a disciplinary incident

Models estimated using feasible generalized least squared to correct for panel-specific AR(1

\* Significant at the 0.10 level, \*\* Significant at the 0.05 level, \*\*\* Significant at the 0.01 level

<sup>2</sup> Student counselors from the University of Florida are counted as full-time counselors

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