

Dressed for Success: Do School Uniforms Improve Student Behavior, Attendance, and Achievement?

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Abstract: Concerns about safety in urban schools has led many school districts to require uniforms for their students. However, we know very little about what impact school uniforms have had on the educational environment. In this paper we use a unique dataset to assess how uniform adoption affects student achievement and behavior in a large urban school district in the southwest. Since each school in the district could decide independently about whether or not to adopt uniforms, we are able to use variation across schools and over time to identify the effects of uniforms. Using student and school fixed-effects along with school-specific linear time trends to address selection of students and schools into uniform adoption, we find that uniforms had little impact on student outcomes in elementary grades but provided modest improvements in language scores and attendance rates in middle and high school grades. These effects appear to be concentrated in female students.

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1 Introduction

As urban schools have become more difficult to manage, administrators have increasingly turned to uniforms as part of a strategy to maintain student safety and control over schools. In 1996, the US Department of Education found that only three percent of schools required uniforms. However, in 2000, a survey of 775 principals by the National Association of Elementary School Principals found that 21% of schools had uniform policies, though it did not specify whether they were required. Today, many large school districts have some schools that require students to wear uniforms. Most notably Philadelphia public schools require all students to wear uniforms while Long Beach, California and Dallas requires uniforms in pre-secondary grades. In addition, the nation's largest school district, New York City, requires uniforms in elementary grades. Other large school districts, including Miami-Dade, Houston, Chicago, and Boston, allow schools to require uniforms.

However, the effects of these uniforms on students is unclear. Proponents of uniforms have argued that they reduce victimization of students, allow administrators and faculty to differentiate students from trespassers, encourage positive attitudes in students, reduce bad behavior, and improve attendance. On the other hand, opponents argue that uniforms restrict students' rights and impose financial hardships on low-income families (Brunsma and Rockquemore, 1998).

Despite the large growth in the use of uniforms in public schools, there is very little empirical research that has been done to assess their effectiveness. Only a handful of papers have tried to assess the effects of uniforms on student outcomes. this is despite the evidence that there is a substantial correlation between discipline, which uniforms would most likely affect, and achievement².

Brunsma and Rockquemore (1998) look at the differences between students who attend schools with uniforms and those who attend those without uniforms in a nationally repre-

²See Fergusson and Horwood (1995) Finn, Pannozzo and Voelkl (1995), Gottfredson (1981), Hawkins (1997), Hawkins and Lishner (1987), Jensen (1976), Lynam, Moffitt and Stouthamer-Loeber (1993), Maquin and Loeber (1996), Rhodes and Reiss (1969), and Sliberberg and Sliberberg (1971). .

sentative sample of high-school students and find little difference in absenteeism, behavior problems, and substance abuse while uniforms correlate negatively with test scores. However, this analysis suffers from some fundamental flaws. First of all, as pointed out by Bodine (2003), much of the Brunnsma and Rockquemore results are based on Catholic schools and thus may not be reflective of uniforms in public schools. Second, even if they had a large number of public school students in their sample, Brunnsma and Rockquemore's results would still be biased due to selection of students into schools with uniforms and schools deciding to require uniforms based on previous discipline problems. For example, parents may send their children to schools with uniforms in response to improved discipline. If these parents respond this way because they have misbehaving children, this would bias the uniform impact downwards. At the school level, the potential for selection may be even larger since schools and districts do not choose whether to require uniforms randomly. In fact, it is likely that schools and districts that choose to require uniforms already have a substantial problem with student behavior. Thus, on average, schools with uniforms will have more behavioral problems and lower test scores than schools without, before we account for the impact of uniforms themselves on these outcomes. In this case, the results in Brunnsma and Rockquafort will again be biased downwards, and they will underestimate the impacts of uniforms. Yeung (Forthcoming) looks at the effect of uniforms on student achievement in two national panels of students. He finds little impact of uniforms on math and reading scores. Nonetheless, while he improves upon Brunnsma and Rockquafort's strategy through value-added modeling there still remains substantial potential for bias if schools choose whether or not to require uniforms based on student characteristics or trends in student outcomes.

Stanley (1996) uses a change in uniform policy in the Long Beach United School District (LBUSD) to identify the uniform impacts. In 1994 LBUSD required all schools covering grades PreK through eight to adopt student uniforms. Thus, Stanley compares student outcomes before and after the change in policy. However, her analysis is limited to a comparison of means and she does not provide measures of precision for her results.

Rather than look directly at outcomes of students who wear uniforms, Wade and Stafford (2003) study how uniforms affect students' perceptions of themselves and of their peers. They find that students' score lower on assessments of their self-worth in uniform schools. This leaves open the possibility that uniforms can actually be detrimental to students by reducing their self-esteem although, since they look at a cross-section, the concerns about bias raised above remain. They also found that teachers believed that uniforms reduced the presence of gangs.

Another unique paper is Evans, Kremer, and Ngatia (2008) who evaluate a random lottery that gave uniforms to students in Kenya. They find improvements in attendance and, preliminarily, test scores for students who receive uniforms. While this suggests that uniforms can be effective tools at improving student outcomes, the context is very different from the United States. In this case the authors do not evaluate a policy change of imposing uniforms, rather they measure the impact of providing uniforms for free to students in schools where they are already required. This reduces the cost of education for those students, who would have had to purchase the uniforms otherwise. Thus, they are not able to evaluate the effect of a change in uniform policy.

The sparseness and the identification problems of the prior literature thus leave us with a very unclear picture of how uniforms affect student outcomes. We seek to address this gap in the literature in this paper by studying uniform adoption in a large urban school district in the southwest (LUSD-SW). In the early 1990's schools in LUSD-SW began to require uniforms. Each school was permitted to decide on its own whether or not and when to adopt uniforms. Since our data covers time periods before and after uniform adoption for many schools we are able to utilize a combination of student fixed-effects, school fixed-effects, and school-specific time trends to identify the effect of uniforms on student outcomes. We find that uniforms appear to have little effect on test scores, attendance, or disciplinary infractions for elementary (grades 1 - 5) students. For middle and high school (grades 6 - 12) students, we find improvement in language scores but not math or reading. We

also find improvements in attendance rates. These effects both primarily occur in female students. Disciplinary infractions increase, but it is unclear whether this is due to the uniforms themselves, uniform violations, or increased enforcement. Thus, overall it appears that uniforms have a small but positive impact on student outcomes in higher grades.

2 Uniforms in LUSD-SW

LUSD has permitted its schools to require students to wear uniforms since at least 1992³. Initially, only a handful of schools required uniforms. However, as shown in Figure 1, uniform adoption grew substantially over the following 13 years. Of schools that responded to our survey of uniform policies, which we describe in more detail below, only 10% required uniforms in 1993. By 2006, 82% of these schools and 80% of students in these schools had required uniforms.

Schools vary considerably in how they define their uniforms. Schools can require specific shirt colors and styles and pant styles. In 2008 almost all schools that required uniforms specified between 1 and 3 colors for shirts, and casual or denim pants in khaki or navy colors. Some schools also required polo style shirts. Only a handful of school require students to purchase specific shirts with a school logos. Some middle and high schools also required different grades to wear specific colors.

Disobeying a mandatory uniform policy is considered a “level II” disciplinary infraction, which requires intervention by a school administrator. Such a violation can result in a variety of punishments depending on the severity of the infraction and the student’s prior behavior. These can range from a call to the student’s parent to in-school suspension, although the administrator is given discretion to increase or reduce the punishment beyond this range if necessary.

³We cannot determine when uniforms were first allowed. The earliest any school had required uniforms was in 1968, but this was a school operating under contract with LUSD and not one of LUSD’s schools. Of LUSD’s own schools, the earliest date provided in our survey of uniform policies was 1992.

3 Methods

The main concern with an analysis of the effects of school uniforms on student outcomes is that schools and districts choose whether or not to adopt uniforms. This decision is likely based, at least in part, on the school's/district's existing levels of student behavior and achievement. We can model this framework as

$$Y_{ijt} = \alpha + \beta Uniform_{ijt} + \mathbf{X}_{ijt}\boldsymbol{\Omega} + \gamma_i + \delta_j + \epsilon_{ijt}. \quad (1)$$

where Y_{ijt} is an outcome for student i in school j and academic year t , $Uniform$ is an indicator for whether or not the student has to wear a uniform, \mathbf{X} is a set of student and school characteristics. γ , δ and ϵ are error terms where γ varies over students but not schools or time, δ varies over schools but not students or time, and ϵ varies over schools, students and time. Ideally we would want $Uniform$ to be uncorrelated with γ , δ , or ϵ , but since uniform adoption is a choice of the school, and whether to send a child to a uniform school is the choice of the parents this is unlikely.

Thus, a simple regression that compares schools with uniforms to those without uniforms will be biased. The availability of panel data where schools adopt uniforms at different times and students move between schools with and without uniforms provides allows us to use student and school fixed effects to address this concern. This procedure accounts for any unobserved characteristics of students and schools that may affect the school's decision to adopt uniforms, the parents' decision to move their child to a school with uniforms and student outcomes, as long as these characteristics do not vary over time. Thus, the procedure accounts for omitted variables such as parents' preferences for discipline, students' innate tendencies to misbehave, student ability, and schools' long-term problems with discipline and test scores. Thus, we can modify equation 1 by demeaning within students and adding school indicators as such:

$$Y_{ijt} - \bar{Y}_{ijt} = \beta(\text{Uniform}_{ijt} - \overline{\text{Uniform}_{ijt}}) + (\mathbf{X}_{ijt} - \bar{\mathbf{X}}_{ijt})\boldsymbol{\Omega} + (\mathbf{S}_{ijt}^j - \bar{\mathbf{S}}_{ijt}^j)\boldsymbol{\Lambda} - \epsilon_{ijt} - \bar{\epsilon}_{ijt}. \quad (2)$$

where \mathbf{S}^j is a set of school “dummy” variables and a bar over a variable indicates that it is a mean over all the observations for student i .

Even with this strategy there may still be residual bias if schools choose to require uniforms in response to trends in discipline or other outcomes. To address this concern, we also include school specific linear time trends in our regressions:

$$Y_{ijt} - \bar{Y}_{ijt} = \beta(\text{Uniform}_{ijt} - \overline{\text{Uniform}_{ijt}}) + (\mathbf{X}_{ijt} - \bar{\mathbf{X}}_{ijt})\boldsymbol{\Omega} + (S_{ijt}^j - \bar{S}_{ijt}^j)\boldsymbol{\Lambda} + (S_{ijt}^j * \text{Year} - \bar{S}_{ijt}^j * \text{Year})\boldsymbol{\Gamma} - \epsilon_{ijt} - \bar{\epsilon}_{ijt}. \quad (3)$$

A potential problem with this specification is that, ideally we would like to include prior test scores as a covariate to account for student growth. Unfortunately, lagged test scores are potentially endogenous due to omitted variables that could affect both lagged and current test scores. Thus, a model which includes lagged-dependent variables as covariates is undesirable. Imberman(Forthcoming) shows that the “levels” specification shown above and a “gains” specification where test score changes are included on the left-hand side of the equation rather than levels bound a lagged-dependent variable model in expectation. We therefore follow this framework and provide both levels and gains estimates to bound the true impact of uniforms on student outcomes. We also provide variations on these specifications to look at different effects by grade level, gender, race, and years of uniform exposure.

4 Data

In this paper we utilize two sources of data from a large urban school district in the southwest. The first dataset includes administrative records for students in LUSD from 1993 through 2006. This data includes student demographics, test scores, disciplinary records and attendance records for every student in LUSD. Testing data include students's scaled scores on the Stanford Achievement Test which we standardized within grade and year and is available starting in 1998⁴. Discipline data includes any infraction that results in an in-school suspension or more severe punishment. Attendance records include the attendance rate for each student.

Unfortunately, LUSD does not keep centralized records of when schools adopted uniforms. Thus, we emailed and mailed a survey to each school in LUSD with the following questions in the fall of 2007:

- *Does your school currently require students to wear uniforms? Note that I define a uniform as any outfit where a particular style of shirt (i.e. polo) and bottom (i.e. khaki, skirt, etc.) and a specified color are required.*
- *If your school currently requires uniforms, what school year did you first require them? Were there any years since then when the requirement was suspended?*
- *If your school currently does not require uniforms, did you ever require them in the past, and if so, could you please provide the years during which students were required to wear uniforms?*

Schools were also given the option to not provide any information. We then followed up via telephone with any school that did not respond to the initial survey and to ask for clarification for schools that did not give specific years of uniform adoption. If the principal did not know the date then we requested that they ask their staff members. Data collection

⁴In 2005 LUSD received some evacuees from Hurricanes Katrina and Rita. While we keep these students in the data, they do not contribute to the standardization.

was completed in October, 2008. For the 292 schools that were in operation in the 2007-08 school year 79% were able to provide dates of uniform adoption while the date could not be determined for 14% and 7% of the schools refused to participate in the survey⁵. Table 1 shows the percent of schools in LUSD which had uniforms, no uniforms, or for which we do not have information over the time-frame of this study. Since our survey was based on schools existing in 2007-08 earlier years have higher rates of unknown uniform status than later years. Nonetheless, it is clear that uniforms gained substantially in popularity over the course of the sample.

Since we rely on school fixed effects to help identify the uniform impact it is also important to know how many schools switch to requiring uniforms over the course of the sample. From 1994-05, the second year for which we have discipline and attendance data, to 2006-07 168 schools adopt uniforms. From 1999-00 through 2006-07, the period after the first year of testing data, 96 schools adopt uniforms. Thus there is substantial variation in policies during the period for which we have data.

Table 2 provides summary statistics for students who attended schools with required uniforms, those without, and those where the uniform requirements are unknown. In general, uniform and non-uniform schools have similar demographics. The most notable differences is that uniformed schools have ten percentage points more Hispanics and are only 28% black compared to 34% for non-uniform schools. Uniform schools also have more students who qualify for free or reduced-price lunch. Schools for which we do not know the uniform status also have demographics that are generally similar to the schools where uniform status is known. The notable exception is that these schools appear to have higher rates of free-lunch eligibility. In terms of outcomes, test scores are higher than in non-uniform schools than in uniform schools. On the other hand, attendance rates are lower. Schools with unknown

⁵Some schools responded that the uniform policy was adopted before a certain date. In these cases, unless that date was prior to the start of the data sample in 1993, I considered the uniform adoption date for those schools to be unknown. This occurs for 13 schools. In addition three schools stated that they recommended but did not require uniforms. These schools are considered to not have a uniform for the purposes of this study.

status have lower test scores than both uniform and non-uniform schools, however this, and the higher rates of free lunch eligibility, are likely due to changing demographics of the district over time.

5 Results

Before moving to the main results, we can get a sense of the potential uniform impact in Figure 2. This figure shows test scores for math, reading, and language along with attendance rates and disciplinary infractions both before and after uniform adoption. The graphs show that uniforms may generate substantial improvements in all measures. Prior to uniform adoption both test scores and discipline are relatively flat at approximately -0.15 standard deviations and 0.45 infractions, respectively. After uniform adoption (year 0) test scores start trending upwards, reaching 0.07 standard deviations in six years. Disciplinary infractions also trend downwards, albeit after a delay of two years to 0.34 infractions per student, per year. The only measure showing a clear trend prior to adoption is attendance rates, which increase in the two years before adoption and then continue thereafter. Five years prior to adoption attendance rates average 93.8% and rise to 95.6% five years after adoption. The steep trend in attendance rates highlight the need to include school-specific time trends in our analysis so that we may account for any pre-existing trends that lead to uniform adoption.

Table 3 provides some pooled estimates of the effect of uniform adoption on student outcomes. In keeping with Imberman(Forthcoming) we present both levels and gains models and use them to place bounds on our preferred specification of a lagged dependent variable model. The results present a mixed picture. In no case are both gains and levels specifications statistically significant so we cannot say that uniforms have an impact. Nonetheless each measure is statistically significant in one of the models with math and reading showing negative impacts, while language is positive. Attendance improves in levels models, but discipline worsens.

Since the pooled model provides unclear results, in table 4 we consider a model split by students in elementary grades (grades 1 - 5) and middle/high school grades (grades 6 - 12). It is reasonable to believe that younger students may react differently to uniforms than older students, and thus compositional differences could be driving the mixed results in table 3. Indeed, when we split the estimates by grade level, a much clearer picture emerges. Thus, given these results we will provide regressions split by grade level for the rest of this paper. Panel A provides the results for elementary students. No estimate is statistically significant for elementary grades. However, for middle and high school grades we find statistically significant impacts, at least at the 10% level, in both levels and gains models for language scores and attendance rates. In both cases the estimates are positive, albeit modest. Language scores increase by between 0.02 and 0.04 standard deviations while attendance rates increase by 0.2 to 0.4 percentage points. Reading shows a statistically significant drop of 0.02 standard deviations in levels models but the gains model is not statistically significant. Similarly, disciplinary infractions show a small increase of 0.10 per student. It is possible, however, that the increase in infractions are specific to uniform violations. Another possibility is that uniform adoption is often commensurate with increased enforcement and harsher punishments. Unfortunately we are not able to observe whether either or both of these are true.

Even though we include school fixed-effects and school specific linear time trends in the regressions, we may still be concerned that schools choice of uniform adoption may be based on prior student outcomes in a way that is not captured by the time trends and fixed effects. To test this, in table 5 we provide estimates of the effect of being in a school two, three, or four or more years prior to uniform adoption on outcomes relative to being in the school in the year immediately prior to adoption. If schools select off of trends then we would expect the estimates on the years prior to adoption to be significantly different from the year immediately before adoption. Panel A once again shows the results for elementary schools. There is little evidence of trending as only language three years prior to adoption

in the gains model is statistically significant at the 5% level. For middle and high school students in panel B there also appears to be little evidence of trends for all but one of the outcomes. The exception is reading which shows some decrease in scores over time prior to uniform adoption. However, of these estimates only scores four or more years prior to adoption in the gains model is statistically significant at the 5% level. Thus, overall, the results seem to suggest that there is little further selection into uniform adoption of trends after controlling for school-specific linear trends and school fixed effects.

In table 6 we consider whether responses to uniforms vary by gender. Once again, we cannot definitively say that there are impacts of uniforms on elementary students of either gender as there is no case where both levels and value-added models are statistically significant. Similarly, for male students in middle and high school, we see no cases where both levels and value-added models are statistically significant. However, we do find some impacts of uniforms on high school females. These students show increases in language scores of between 0.02 and 0.05 standard deviations and attendance rate improvements of between 0.4 and 0.5 percentage points. Thus it seems that almost all of the improvements in these outcomes are coming from female students rather than males. In addition, to the extent that we see disciplinary infractions increase in levels models, most of that increase appears to be focused in male students. This does provide some suggestive, albeit admittedly weak, evidence that the possible increase in infractions is not due to more enforcement as we would expect such policy changes to affect female students as well.

Table 7 shows the main regression results split by whether the student is black, Hispanic, or white. In no case do we find statistically significant results at the 5% level in both gains and levels models. With that in mind, the results are suggestive that the increase in language scores and attendance rates for middle and high schools are concentrated in black students. Gains models show an increase in language scores of 0.07 standard deviations and levels models show an increase in attendance rates of 0.5 percentage points for blacks. It also seems that increases in disciplinary infractions may be concentrated in middle and high

school white students as they show a significant increase of 0.11 infractions in levels models.

6 Conclusion

In this paper we assess whether requiring uniforms in schools affects student outcomes using administrative data from a large urban school district in the southwest. Since schools in this district individually decided whether or not to adopt uniforms over the time period for which we have data, we are able to incorporate school fixed-effects, student fixed-effects, and school specific linear time trends into our regressions. This allows us to account for schools endogenously deciding to adopt uniforms off of their fixed characteristics and permanent trends and also to account students' selection into uniform schools provided that selection is based on students' fixed characteristics. Overall, we find that uniforms appear to have a moderately positive impact on students in middle and high school and little impact on elementary students. Students in middle and high school grades who are required to wear uniforms show improvements in scores on language exams of between 0.02 and 0.04 standard deviations and improvements in attendance rates of between 0.2 and 0.4 percentage points. These improvements appear to be strong for female students. For all other outcomes we cannot definitively bound the estimates away from zero using both gains and levels models. Nonetheless, we do see increases in disciplinary infractions in levels models that are concentrated in boys and some small drops in Hispanic reading scores. It is possible that the increase in disciplinary infractions are due to uniform violations or increased enforcement, although the lack of a similar increase for girls suggest that the latter is unlikely.

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Figure 1: Uniform Adoption in Schools that Responded to Survey

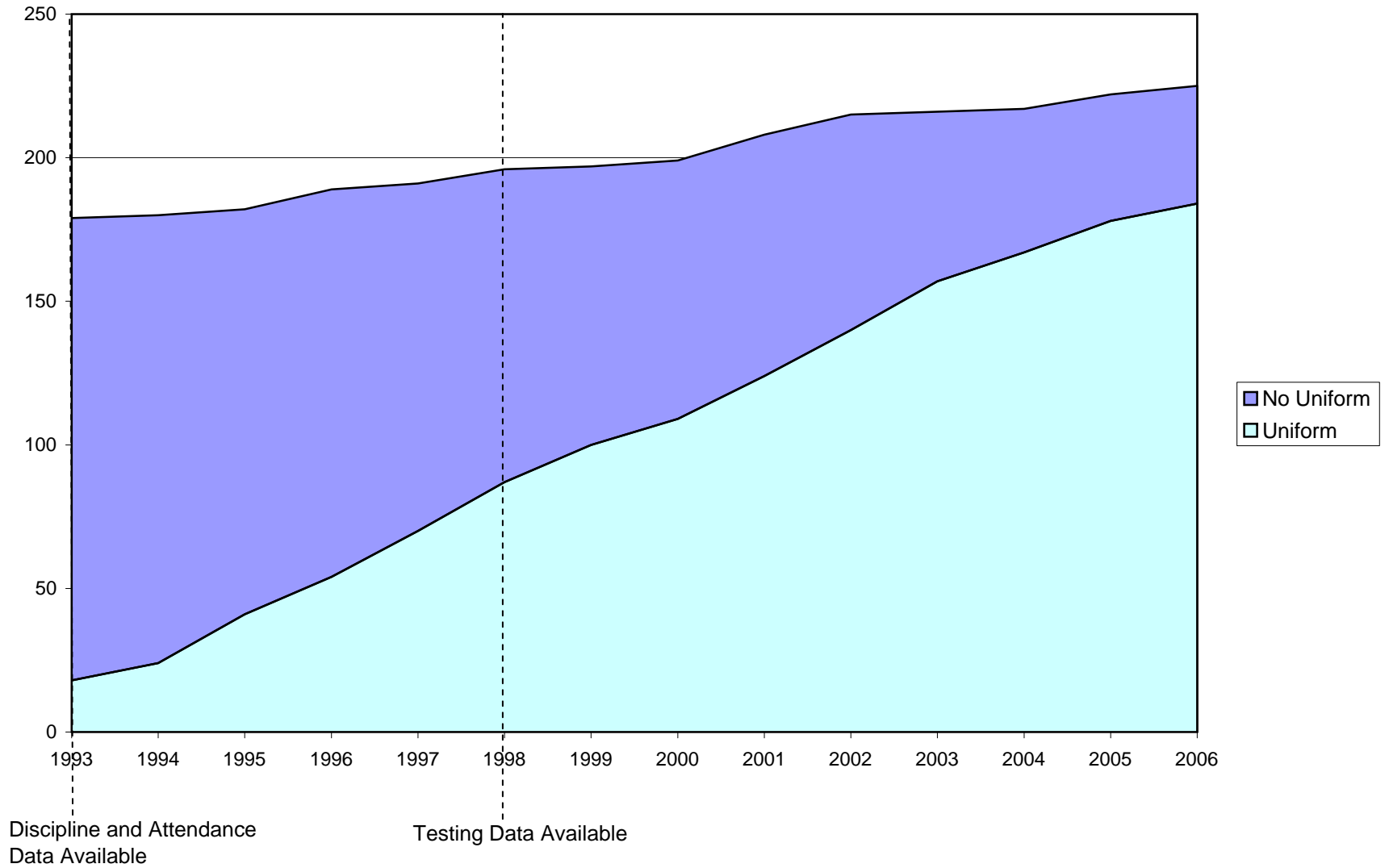


Figure 2: Student Outcomes Before and After Uniform Adoption

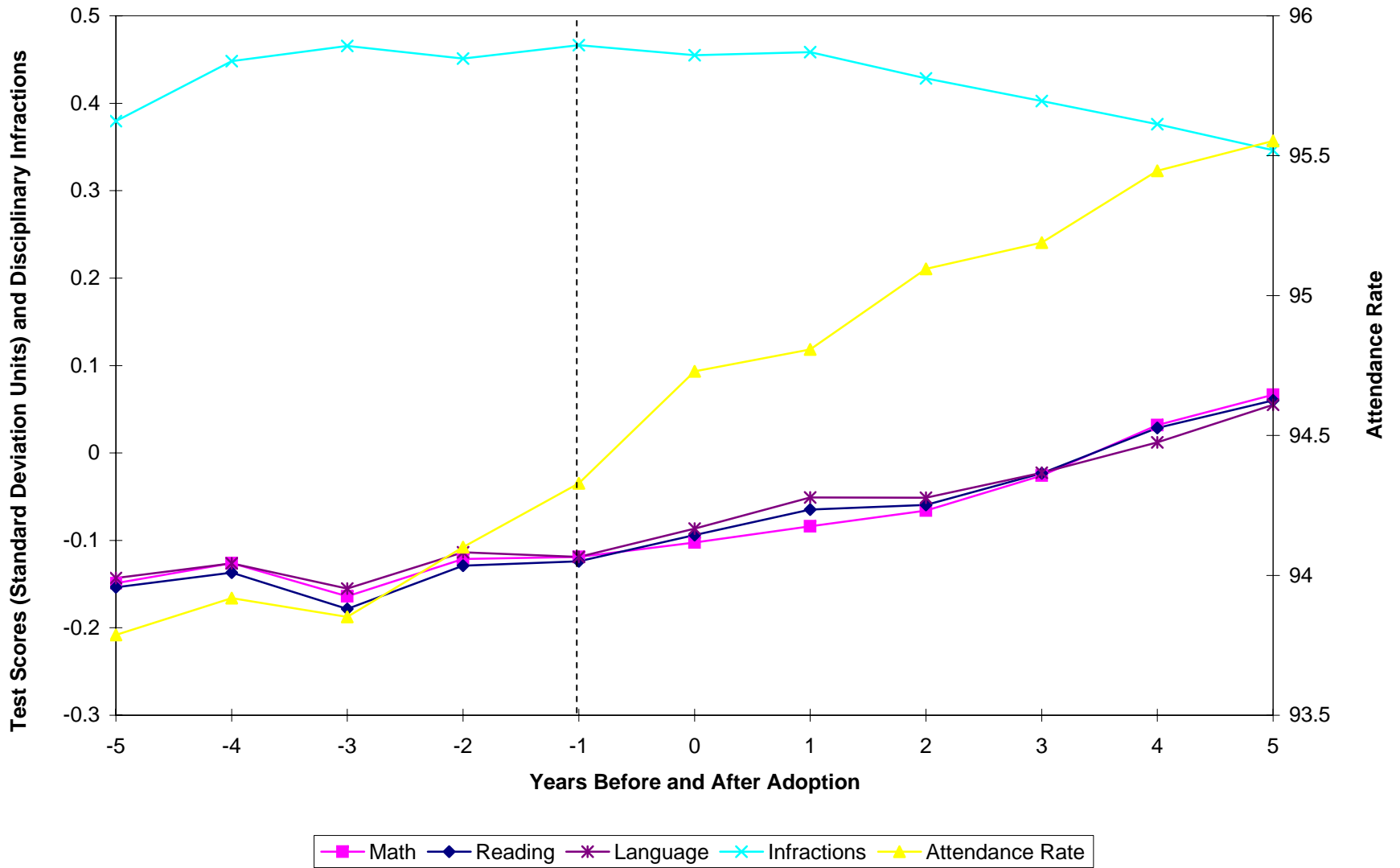


Table 1: Percent of Schools in LUSD Requiring Uniforms By Year

Year	Uniform	No Uniform	Unknown/Refused	Total Number of Schools
1993	7%	63%	30%	257
1994	9%	59%	32%	263
1995	15%	52%	33%	273
1996	19%	47%	34%	287
1997	23%	40%	37%	301
1998	29%	36%	34%	299
1999	34%	33%	33%	295
2000	38%	31%	31%	290
2001	41%	28%	31%	300
2002	46%	25%	30%	305
2003	51%	19%	30%	309
2004	55%	16%	29%	305
2005	59%	15%	27%	303
2006	62%	14%	24%	296

Table 2: Descriptive Statistics

	A. Demographics				B. Outcomes		
	Uniform Not Required	Uniform Required	Unknown		Uniform Not Required	Uniform Required	Unknown
Female	0.49 (0.50)	0.50 (0.50)	0.48 (0.50)	Stanford Math (std deviations)	0.06 (1.05)	0.01 (0.98)	-0.10 (0.96)
				Observations	376,590	569,251	246,755
Native American	0.00 (0.02)	0.00 (0.02)	0.00 (0.02)	Stanford Reading	0.06 (1.05)	0.01 (0.99)	-0.11 (0.94)
				Observations	376,033	569,203	247,008
Asian	0.04 (0.18)	0.03 (0.16)	0.02 (0.15)	Stanford Language	0.06 (1.05)	0.01 (0.98)	-0.11 (0.95)
				Observations	375,681	569,009	246,671
Black	0.34 (0.47)	0.28 (0.45)	0.38 (0.48)	Disciplinary Infractions	0.43 (1.33)	0.45 (1.42)	0.38 (1.28)
				Observations	1,107,333	859,730	528,054
Hispanic	0.49 (0.50)	0.59 (0.49)	0.53 (0.50)	Substance Abuse Infractions	0.00 (0.09)	0.01 (0.12)	0.01 (0.13)
				Observations	1,107,333	859,730	528,054
White	0.13 (0.34)	0.10 (0.29)	0.07 (0.25)	Violent Crime Infractions	0.01 (0.09)	0.01 (0.11)	0.01 (0.12)
				Observations	1,107,333	859,730	528,054
Grade Level	6.91 (3.45)	5.16 (3.04)	4.78 (2.83)	Attendance Rate	93.62 (9.87)	95.42 (7.10)	94.55 (8.64)
				Observations	1,077,790	856,069	518,304
Free Lunch	0.51 (0.50)	0.63 (0.68)	0.68 (0.47)				
Reduced Price Lunch	0.05 (0.22)	0.09 (0.29)	0.07 (0.25)				
Other Economic Disadvantage	0.05 (0.22)	0.07 (0.25)	0.05 (0.22)				
Limited English Proficiency	0.22 (0.41)	0.27 (0.44)	0.28 (0.45)				
At Risk Status	0.56 (0.50)	0.59 (0.49)	0.58 (0.49)				
Special Education	0.11 (0.32)	0.11 (0.31)	0.11 (0.31)				
Gifted and Talented	0.12 (0.33)	0.11 (0.32)	0.07 (0.26)				
Immigrant	0.13 (0.34)	0.13 (0.33)	0.12 (0.32)				
Student Observations	1,107,333	859,730	528,054				
School-Years	1345	1446	1211				

Standard deviations in parentheses.

Table 3: Pooled Estimates of the Effect of Uniforms on Student Outcomes

	(1)	(2)	(3)	(4)	(5)
	Math	Reading	Language	Attendance	Discipline
I. Levels					
Uniform Required	-0.0235**	-0.0221***	0.0114	0.153**	0.076**
	(0.0107)	(0.0073)	(0.0087)	(0.071)	(0.030)
	945,841	945,236	944,690	1,933,859	1,967,063
II. Gains					
Uniform Required	0.0086	-0.0009	0.0356**	0.088	0.043
	(0.0198)	(0.0127)	(0.0148)	(0.070)	(0.034)
	659,437	658,817	658,577	1,458,434	1,479,898

Standard errors clustered by school in parentheses. Each regression is demeaned within individuals to remove student fixed-effects and also includes school dummies to remove school fixed effects, school dummies interacted with a linear time trend, grade indicators, year indicators, interactions of grade and year indicators, and the student's free-lunch, reduced-price lunch, or other economic disadvantage status. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 4: Estimates of the Effect of Uniforms on Student Outcomes by Grade Level

A. Elementary					
	(1)	(2)	(3)	(4)	(5)
	Math	Reading	Language	Attendance	Discipline
I. Levels					
Uniform Required	-0.0303 (0.0201)	-0.0199 (0.0147)	0.0127 (0.0164)	-0.0256 (0.0377)	0.0082 (0.0125)
Observations	406,282	405,865	406,322	878,131	893,530
II. Gains					
Uniform Required	-0.0041 (0.0264)	0.0057 (0.0288)	0.0376 (0.0300)	-0.0301 (0.0513)	0.0005 (0.0141)
Observations	239,271	238,758	239,347	584,699	594,017
B. Middle/High					
I. Levels					
Uniform Required	-0.0070 (0.0113)	-0.0188** (0.0093)	0.0202* (0.0106)	0.3785*** (0.1312)	0.0987** (0.0498)
Observations	539,559	539,371	538,368	1,055,728	1,073,533
II. Gains					
Uniform Required	0.0224 (0.0329)	-0.0162 (0.0164)	0.0444** (0.0198)	0.2321* (0.1352)	0.0821 (0.0656)
Observations	351,627	351,394	350,648	749,979	760,728

Standard errors clustered by school in parentheses. Each regression is demeaned within individuals to remove student fixed-effects and also includes school dummies to remove school fixed effects, school dummies interacted with a linear time trend, grade indicators, year indicators, interactions of grade and year indicators, and the student's free-lunch, reduced-price lunch, or other economic disadvantage status. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 5: Estimates of Years Until Uniform Adoption on Outcomes
A. Elementary

	(1)	(2)	(3)	(4)	(5)
	Math	Reading	Language	Attendance	Discipline
I. Levels					
>= 4 Years Prior to Adoption	0.0702 (0.0641)	0.0781 (0.0590)	0.0877* (0.0501)	0.1082 (0.0879)	-0.0021 (0.0171)
3 Years Prior to Adoption	0.0128 (0.0346)	0.0154 (0.0305)	0.0282 (0.0283)	0.0129 (0.0563)	-0.0071 (0.0132)
2 Years Prior to Adoption	0.0090 (0.0254)	0.0196 (0.0194)	0.0195 (0.0186)	0.0284 (0.0424)	0.0038 (0.0082)
Uniform Required	-0.0397** (0.0182)	-0.0276* (0.0152)	0.0038 (0.0154)	-0.0293 (0.0375)	0.0089 (0.0128)
Observations	406,282	405,865	406,322	878,131	893,530
II. Gains					
>= 4 Years Prior to Adoption	0.0738 (0.0897)	0.0450 (0.1076)	-0.0110 (0.0773)	0.0127 (0.1033)	0.0256 (0.0207)
3 Years Prior to Adoption	-0.0571 (0.0720)	-0.0616 (0.0431)	-0.1186** (0.0466)	-0.0282 (0.0875)	-0.0059 (0.0176)
2 Years Prior to Adoption	-0.0003 (0.0440)	0.0298 (0.0431)	-0.0046 (0.0372)	0.0220 (0.0817)	0.0224 (0.0146)
Uniform Required	-0.0161 (0.0279)	0.0066 (0.0305)	0.0396 (0.0335)	-0.0277 (0.0593)	0.0031 (0.0144)
Observations	239,271	238,758	239,347	584,699	594,017

B. Middle/High

I. Levels					
>= 4 Years Prior to Adoption	-0.0109 (0.0404)	0.0442* (0.0260)	-0.0342* (0.0188)	-0.3290 (0.3177)	-0.1363* (0.0704)
3 Years Prior to Adoption	-0.0205 (0.0276)	0.0309* (0.0162)	-0.0117 (0.0157)	-0.2978 (0.2017)	-0.0560 (0.0653)
2 Years Prior to Adoption	-0.0078 (0.0190)	0.0165 (0.0128)	0.0051 (0.0123)	-0.0275 (0.1416)	-0.0521 (0.0568)
Uniform Required	-0.0080 (0.0103)	-0.0218** (0.0105)	0.0281** (0.0108)	0.3558*** (0.1282)	0.0870* (0.0479)
Observations	539,559	539,371	538,368	1,055,728	1,073,533
II. Gains					
>= 4 Years Prior to Adoption	0.0127 (0.0556)	0.0939** (0.0430)	-0.0165 (0.0287)	0.0765 (0.3317)	-0.0760 (0.1187)
3 Years Prior to Adoption	-0.0098 (0.0288)	0.0530* (0.0299)	0.0219 (0.0264)	-0.0475 (0.2402)	-0.0221 (0.0910)
2 Years Prior to Adoption	0.0057 (0.0190)	0.0355* (0.0180)	0.0102 (0.0135)	0.0737 (0.1877)	-0.0239 (0.0870)
Uniform Required	0.0214 (0.0343)	-0.0255 (0.0181)	0.0504** (0.0204)	0.2349 (0.1436)	0.0822 (0.0767)
Observations	351,627	351,394	350,648	749,979	760,728

Standard errors clustered by school in parentheses. Each regression is demeaned within individuals to remove student fixed-effects and also includes school dummies to remove school fixed effects, school dummies interacted with a linear time trend, grade indicators, year indicators, interactions of grade and year indicators, and the student's free-lunch, reduced-price lunch, or other economic disadvantage status. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 6: Estimates of the Effect of Uniforms on Student Outcomes by Gender and Grade Level

	Males					Females				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Math	Reading	Language	Attendance	Discipline	Math	Reading	Language	Attendance	Discipline
A. Elementary										
I. Levels										
Uniform Required	-0.0169 (0.0230)	-0.0139 (0.0171)	0.0170 (0.0204)	-0.0878** (0.0429)	0.0146 (0.0197)	-0.0466** (0.0198)	-0.0263* (0.0148)	0.0090 (0.0159)	0.0393 (0.0395)	0.0013 (0.0054)
Observations	206,713	206,483	206,721	448,505	456,590	199,569	199,382	199,601	429,626	436,940
II. Gains										
Uniform Required	0.0223 (0.0301)	0.0301 (0.0323)	0.0236 (0.0330)	-0.0662 (0.0581)	-0.0010 (0.0220)	-0.0373 (0.0326)	-0.0169 (0.0300)	0.0531* (0.0312)	0.0183 (0.0661)	0.0010 (0.0069)
Observations	121,720	121,420	121,728	298,697	303,538	117,551	117,338	117,619	286,002	290,479
B. Middle/High										
I. Levels										
Uniform Required	-0.0149 (0.0127)	-0.0179* (0.0100)	0.0218* (0.0127)	0.2711* (0.1388)	0.1298** (0.0640)	0.0008 (0.0122)	-0.0196* (0.0101)	0.0176* (0.0103)	0.4797*** (0.1363)	0.0615 (0.0396)
Observations	268,158	267,942	267,359	530,281	539,398	271,401	271,429	271,009	525,447	534,135
II. Gains										
Uniform Required	0.0118 (0.0310)	-0.0259 (0.0208)	0.0376 (0.0244)	0.0962 (0.1311)	0.0923 (0.0843)	0.0336 (0.0360)	-0.0054 (0.0183)	0.0519*** (0.0186)	0.3622** (0.1596)	0.0690 (0.0519)
Observations	174,043	173,782	173,430	374,642	380,137	177,584	177,612	177,218	375,337	380,591

Standard errors clustered by school in parentheses. Each regression is demeaned within individuals to remove student fixed-effects and also includes school dummies to remove school fixed effects, school dummies interacted with a linear time trend, grade indicators, year indicators, interactions of grade and year indicators, and the student's free-lunch, reduced-price lunch, or other economic disadvantage status. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 7: Estimates of the Effect of Uniforms on Student Outcomes by Race and Grade Level

	Blacks					Hispanics					Whites				
	Math	Reading	Language	Attendance	Discipline	Math	Reading	Language	Attendance	Discipline	Math	Reading	Language	Attendance	Discipline
A. Elementary															
I. Levels															
Uniform Required	-0.0180 (0.0266)	-0.0185 (0.0252)	0.0015 (0.0257)	-0.0658 (0.0501)	0.0304 (0.0304)	-0.0154 (0.0246)	-0.0055 (0.0183)	0.0240 (0.0187)	-0.0088 (0.0464)	-0.0018 (0.0115)	-0.0333 (0.0416)	-0.0161 (0.0239)	0.0404 (0.0280)	0.0662 (0.0844)	0.0136 (0.0113)
Observations	146,553	146,301	146,616	249,633	254,564	182,610	182,471	182,644	497,110	503,792	60,201	60,182	60,157	105,559	108,655
II. Gains															
Uniform Required	-0.0467 (0.0379)	-0.0078 (0.0329)	0.0170 (0.0384)	-0.0783 (0.0888)	0.0171 (0.0321)	0.0435 (0.0389)	0.0335 (0.0417)	0.0541 (0.0386)	0.0150 (0.0604)	-0.0071 (0.0132)	0.0543* (0.0310)	0.0535 (0.0369)	0.1050 (0.0741)	-0.2255* (0.1306)	0.0194 (0.0123)
Observations	90,020	89,712	90,095	162,663	165,690	101,365	101,188	101,398	337,805	341,956	37,670	37,647	37,644	68,138	69,857
B. Middle/High															
I. Levels															
Uniform Required	-0.0042 (0.0271)	0.0058 (0.0163)	0.0186 (0.0157)	0.5255** (0.2110)	0.0587 (0.0633)	-0.0059 (0.0124)	-0.0232* (0.0133)	0.0181 (0.0126)	0.2005 (0.1544)	0.1232* (0.0663)	-0.0396 (0.0240)	-0.0165 (0.0119)	0.0370* (0.0204)	0.2673* (0.1380)	0.1080*** (0.0351)
Observations	173,104	173,085	172,858	360,275	366,410	289,585	289,464	288,773	542,044	550,106	57,679	57,643	57,564	117,419	120,293
II. Gains															
Uniform Required	0.0702 (0.0560)	0.0303 (0.0302)	0.0741** (0.0336)	0.2592 (0.2556)	0.1224 (0.0974)	0.0088 (0.0400)	-0.0335* (0.0197)	0.0450* (0.0243)	0.1420 (0.1800)	0.0485 (0.0674)	0.0880** (0.0386)	0.0110 (0.0266)	-0.0319 (0.0510)	0.1188 (0.1646)	0.1072 (0.0735)
Observations	110,430	110,416	110,274	252,876	256,473	190,832	190,685	190,124	389,630	394,603	37,659	37,594	37,555	81,741	83,391

Standard errors clustered by school in parentheses. Each regression is demeaned within individuals to remove student fixed-effects and also includes school dummies to remove school fixed effects, school dummies interacted with a linear time trend, grade indicators, year indicators, interactions of grade and year indicators, and the student's free-lunch, reduced-price lunch, or other economic disadvantage status. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.