Grade Configuration Research
9-29-16
Grades 6-8

Do Top Dogs Rule in Middle School? Evidence on Bullying, Safety, and Belonging
http://aer.sagepub.com/content/early/2016/07/07/0002831216657177.full.pdf+html?ijkey=5rYuHMOFCG3nc&keytype=ref&siteid=spaer

The Impact of Alternative Grade Configurations on Student Outcomes through Middle and High School
http://www.edweek.org/media/gradeconfiguration-13structure.pdf

Grade Configuration Among Middle School Students Isn't the Problem (cites research)
http://www.nytimes.com/roomfordebate/2012/06/18/the-middle-school-conundrum/grade-configuration-among-middle-school-students-isnt-the-problem

What Does the Research Say About Middle School Grade Configuration (Grade 6-8)
https://www.relcentral.org/what-does-the-research-say-about-middle-school-grade-configuration-grade-6-8-2/

How Can Middle Schools Best Organize to Help Young Adolescents Thrive?
https://ww2.kqed.org/mindshift/2016/10/10/how-can-middle-schools-best-organize-to-help-young-adolescents-thrive/

Grades PreK-K

Facilitating the Transition to Kindergarten: What ECLS-K Data Tell Us about School Practices Then and Now
http://ero.sagepub.com/content/2/3/2332858416655766.full.pdf+html

The Primary Years Agenda: Strategies to Guide District Action
http://pdk.sagepub.com/content/96/3/63.full

Ready or Not, Here Come the Preschoolers!
http://pdk.sagepub.com/content/92/3/32.full

Grades K-12

Grade Configuration: Who Goes Where?
http://www.nmusd.us/district/cm_zone/grade_configuration.pdf

Other District Reports

Wayland Public Schools (highlights below) **Link may not work – please copy and paste the url below.**
http://www.wayland.k12.ma.us/UserFiles/Servers/Server_1036352/File/Superintendent/Building%20Use%20Task%20Force/Elementary%20Grade%20Configuration%20Final%20Report.pdf

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- *The research indicated that decisions to change grade configurations at any level is typically driven by enrollment, building options, and budget, rather than as a means to improve student achievement.*
- *The factors that a school district should consider during grade configuration changes include the demographics/population of community, preferred school size, site availability, impact on transportation costs, length of bus ride, desired number of transitions, and parent involvement.*
- *There's relatively limited research on elementary school grade configurations in peer-reviewed journals.*

Weston Public Schools (highlight below)

- *We have reviewed educational literature and learned that grade configuration options are wide ranging, that their implementation is influenced by community values, available facilities and budget constraints, and that there is no universal, optimal solution.*

Summary from Visioning Sessions

Participants were asked to place dots between grade levels where they believed the natural developmental breaks occur in students
Pk-K= 11
K-1= 31
1-2= 3
2-3= 12
3-4= 2
4-5= 6
5-6= 38
6-7= 26
7-8= 1
8-9= 55
9-10= 6
This data suggests that the ideal grade configuration in AB would be PK-K; 1-5; 6-8; 9-12

We also surveyed visioning participants about their preferred grade configuration. 40 attendees participated in the survey.

PreK-K	49%
K-6 Elementary	23%
K-5 Elem & 6-8 Middle	6%
PreK-K and 6-8 Middle	23%

Some benefits of grade configurations include:

PK-K

- An early childhood center would allow for early intervention and collaboration around practices for PK, K, and possibly a transition class.
- Teachers and the school district would get to know students and their needs before they are placed in a specific elementary school program
- Parents would get to know the district before they select an elementary school

Grade Configuration Research
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- Would allow more developmentally appropriate educational practices, classroom design and playgrounds for early childhood.
- We could schedule as many All Day Kindergarten and Half Day Kindergarten classes as requested
- We could have more intense support for English Language Learners, Speech and Language, OT/PT for younger children
- Preschool and Kindergarten teachers from across the district could collaborate
- Remove stigma of retention in Kindergarten
- Students from across both towns could get to know each other before they go to the individual elementary schools and then they come back together at the Jr. High
- Would allow continued school choice for grades 1-6

6-8

- A 6-8 middle school would allow teachers and administrators to get to know students better, provide longer adjustment times for students, and increase and change expectations based on 6-8 MA standards.
- 6th graders' needs feel different than elementary needs
- K-6 is a large developmental span – 1-6 is a more manageable developmental span
- Keeping grade 6 at the elementary schools keeps the 6th grade students younger and allows for closer care
- K-6 or 1-6 is better because it allows AB to keep the community of grade level students smaller, provide for differentiation, and meet the needs of individual students in a better way.
- There are benefits to grade 6 in elementary schools but standards shift and make delivering curriculum harder on the elementary schedule.
- 6th graders are mostly ready for more autonomy and responsibility
- Minimize the number of transitions
- Teacher licensing affects what grades you can teach
- Keep kids at the younger groupings longer
- Jr. High is meant to adjust kids and be prepared for HS. 2 years is the right amount of time; 3 years is excessive.
- Starting JH at 6th grade increases stress and starts the process of grades and levels even sooner making it worse for high school students
- Need 2 years of HS before 11th grade because there is so much pressure during junior year that starting students in 10th grade would leave students unprepared
- 6th graders seem to fit in elementary schools at the start of the year but shift to a jr. high mentality half way through the year.

11-17-16
SC Packet

Grade Configuration Research
9-29-16
Grades 6-8

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Do Top Dogs Rule in Middle School? Evidence on Bullying, Safety, and Belonging

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Recent research finds that grade span affects academic achievement but only speculates about the mechanisms. In this study, we examine one commonly cited mechanism, the top dog/bottom dog phenomenon, which states that students at the top of a grade span ("top dogs") have better experiences than those at the bottom ("bottom dogs"). Using an instrumental variables strategy introduced in Rockoff and Lockwood (2010) and a longitudinal data set containing student survey data for New York City public middle school students, we estimate the impact of top dog and bottom dog status on bullying, safety, belonging, and academic achievement. This article provides the first credibly causal evidence that top dog status improves the

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learning environment and academic achievement. We further find that the top dog effect is strongest in sixth grade and in schools with longer grade spans and that the top dog effect is not explained by new students to a school or student height.

KEYWORDS: academic achievement, bullying, grade span, learning environment

Introduction

> Well my story about being bullied all started in 6th grade, I was getting picked on because I was to [*sic*] tiny for my age. Then I started getting picked on for the guys I would date, they would call me harsh names n [*sic*] some very bad words, I think everyone knows what im [*sic*] talking about . . . then 7th grade year came around and the bullying got worse I had people wanting to fight me and jump me for even trying to talk to kids, I told adults like school officials sadly they did not take action. I even told my parents but they didnt [*sic*] believe me. In 8th grade everything was ok.
>
> —Angel, NOPLACE4HATE,
> http://www.noplace4hate.org/real-bullying-stories/

The middle school grades (sixth, seventh, and eighth) are widely regarded as a difficult period for students due to hormonal changes, amplified social pressures, and increased bullying (Poiner, 2015). Nationally, a majority of students in sixth, seventh, and eighth grades are separated from students in elementary grades (K–5) and high schools (9–12), perhaps to provide targeted support to students during these difficult years. Recent research, however, finds that transitioning to middle school has a negative effect on student academic achievement (Rockoff & Lockwood, 2010; Schwartz, Stiefel, Rubenstein, & Zabel, 2011; Schwerdt & West, 2013).

One commonly cited potential mechanism for the middle school achievement dip is the top dog/bottom dog (TDBD) phenomenon (Blyth, Simmons, & Bush, 1978; Cook, MacCoun, Muschkin, & Vigdor, 2008; Weiss & Kipnes, 2006), which occurs when students at the top of a grade span distribution have better experiences than those at the bottom. That is, the oldest students in a school ("top dogs") experience a more favorable school environment (including increased participation in leadership roles and decreased incidence of bullying and fights) than the youngest students in a school ("bottom dogs"), who face increased victimization, exposure to delinquent peer influences, and feelings of anonymity. The TDBD hypothesis suggests that when students graduate from an elementary school—where they are top dogs—to a middle school—where they become bottom dogs—they see a dip in quality of school experiences. This TDBD effect may drive

the dip in performance observed at the start of middle school. Despite the intuitive appeal, there is little evidence to support the TDBD hypothesis, much less its effect on academic performance. In this article, we begin to close this gap, providing causal evidence on the effects of top or bottom dog status on student learning environments and opening the black box of grade span effects. Specifically, we explore effects on bullying, safety, belonging, and academic achievement in the middle school grades, contributing to the evolving literature on mechanisms through which grade span may affect academic performance.

The TDBD hypothesis was first introduced by Blyth et al. (1978) in a study of 622 students attending 14 schools (6 K–8 and 8 K–6) in a large Midwestern city. The authors found that seventh-grade students who were nearly top dogs in a K–8 were more confident, participated in more activities, and felt less anonymous than seventh-grade students who were bottom dogs in junior high schools after transitioning from a K–6. This provided suggestive evidence that students in the middle grades could benefit from attending elementary schools with longer grade spans rather than middle schools or junior high schools. Since then, it has been repeatedly observed that students at the top of a grade span distribution are less bullied, safer, and feel more comfortable in school than those at the bottom (Byrnes & Ruby, 2007; Cook et al., 2008; Simmons & Blyth, 1987; Weiss & Kipnes, 2006). While the TDBD hypothesis is widely cited, existing research is best viewed as descriptive and correlational, making little or no effort to disentangle the causal effects from sorting, differences across grades, or other potential confounders. For example, the extent to which the TDBD effect is driven by new students (bottom dogs are almost always new) or student height (bottom dogs are most often shorter than top dogs) is unaddressed in previous literature.

Isolating the effects of top dog and bottom dog status on bullying, safety, and belonging is difficult for two key reasons. First, it is challenging to identify random variation in TDBD status. On the one hand, some school districts offer only one grade span option to students in each grade, providing no variation to study the TDBD effect and confounding grade effects with the TDBD mechanism. On the other hand, in school districts with a variety of grade spans, grade span might be endogenous to TDBD status. For example, a bullied rising sixth grader in a K–8 school may use sixth grade as an opportunity to transfer to a 6–8 school, making the student a bottom dog. Perhaps this sixth grader is simply more prone to bullying than the average student, which precipitates the transfer and the student's bottom dog status in sixth grade. In this particular example, an ordinary least squares (OLS) estimate of the effect of bottom dog status on bullying would be biased upward. The second key challenge in testing the TDBD hypothesis is the scarcity of student-level data with good measures of bullying, safety, and belonging.

This article explores the TDBD hypothesis using relatively new longitudinal data on students and schools in the nation's largest school district, New York City (NYC), including student-level responses to questions on the NYC School Survey regarding student experiences and the school environment. We estimate the effects of TDBD status on bullying, safety, and belonging using two cohorts of NYC public middle school students, including roughly 90,000 sixth- through eighth-grade students in over 500 schools. These rich data allow us to use both student fixed effects and a variety of student characteristics to control for potential differences between students. Further, we aim to address potential endogeneity of TDBD status using an instrumental variables strategy previously employed to study grade span and student mobility (Rockoff & Lockwood, 2010; Schwartz, Stiefel, & Cordes, 2016). The intuition is as follows. The problem with the causal interpretation of correlations between outcomes and TDBD status is that students effectively choose top dog/bottom dog status by enrolling in a school with a particular grade span in a given grade. Thus, TDBD status reflects the combined effect of a student's grade and school grade span. But, as discussed in Rockoff and Lockwood (2010), grade span in third grade is plausibly exogenous to TDBD status in sixth, seventh, and eighth grades because grade span choice for third grade occurs long before middle school and is not likely to reflect anticipation of the middle school learning environment three to five years later. Grade span in third grade is, however, highly predictive of TDBD status in middle school grades. Thus, grade spans of students' third-grade schools can be used as a set of instruments for top dog/bottom dog status in sixth, seventh, and eighth grades.

In this article, then, we estimate the effects of TDBD status by examining student reports of the learning environment as students are promoted through and transfer between schools. We estimate how students' experiences and academic achievement change as they move from bottom to top dog or from top to bottom dog. In brief, we find that top dog status improves a student's learning environment. Top dogs are *less likely* to report bullying, fights, and gang activity and *more likely* to report feeling safe and welcome in school than bottom dogs due to their top dog status. In contrast, bottom dogs report *higher* rates of bullying, fighting, and gang activity and *lower* rates of safety and belonging than top and middle dogs, although the bottom dog results are sensitive to the inclusion of student fixed effects and addressing selection into TDBD status. We note that there is greater variation in TDBD status among sixth graders than among seventh and eighth graders. Thus, we explore possible heterogeneity by grade of the top dog effect, finding a larger top dog effect in sixth grade than eighth grade. We test whether the top dog effect is bigger in schools with longer grade spans and find the top dog effect is increasing in "heap size." We also dig deeper into the causes of the TDBD effect, showing results are not driven by new students or student height. While new students and shorter students have more negative

perceptions of the school learning environment, there is an independent top dog effect even once conditioning on these plausible moderators. We further note that other plausible explanations of the TDBD effect in sixth, seventh, and eighth grades, such as differences in financial resources, class sizes, or use of subject-specific teachers, are unlikely because these do not vary greatly for students in the middle school grades no matter what NYC school students attend (Rockoff & Lockwood, 2010). Moreover, we show that top dog status leads to improved academic achievement and provide correlational evidence that this could operate through improved student experiences for top dogs. These findings suggest that longer grade spans (e.g., K–8 schools) may better serve students in the middle grades compared to other popular grade spans (e.g., 6–8) due to the benefits of top dog status in longer grade spans.

The article is organized as follows. In the following, we review the literature on the TDBD phenomenon as it relates to grade span. Then, we discuss our methods, including our data and measures, descriptive statistics, and analytic approach. Finally, we summarize our results and discuss our conclusions.

Literature Review: TDBD and Grade Span

Recent evidence suggests that student academic performance in middle school grades is shaped by school grade span (Rockoff & Lockwood, 2010; Schwartz et al., 2011; Schwerdt & West, 2013). There are at least three plausible explanations for the why grade span matters. Grade span could affect a student's (a) top dog/bottom dog status; (b) mobility, due to school transitions; and (c) school and student characteristics, including school/cohort size, class size, subject-specific teachers, funding per pupil, and student motivation and self-concept. We address a gap in the literature, providing insight into how student experiences are shaped by grade span and complementing existing research exploring other potential mechanisms, for example, mobility, school characteristics such as cohort or school size and classroom environments, and student motivation and self-concept (Alspaugh, 1998; Bloom & Unterman, 2012; Carolan, Weiss, & Matthews, 2015; Cordes, Schwartz, & Stiefel, 2014; Eccles, Lord, & Midgley, 1991; Eccles & Midgley, 1989; Eccles, Wigfield, Midgley, Reuman, Iver, & Feldlaufer, 1993; Howley, 2002; Lee & Smith, 1997; Napier, 2008; Offenberg, 2001; Powell, Farrar, & Cohen, 1985; Rubenstein, Schwartz, Stiefel, & Zabel, 2009).

Schwartz et al. (2011) suggest that grade span may affect student achievement because grade span changes the social environment and particularly TDBD status. Longer grade spans, for example, extend students' opportunity to be among the oldest in a school, while students entering middle schools transition from being the oldest in elementary school to the youngest in middle school. In addition, Cook et al. (2008) suggest that

middle school entry exposes sixth or seventh graders to older peers who can serve as negative influences and hinder academic performance. Moreover, Blyth et al. (1978) hypothesize top dogs in schools with longer grade spans benefit from delaying school transitions, experiencing more welcoming school environments, and having greater opportunity to be nearly top dogs in their school. Conversely, new students may be particularly vulnerable to bullying and poorer perceptions of the learning environment, and bottom dogs are almost always new (Pellegrini et al., 2010).

The TDBD effect may also depend on student grade due to developmental differences across middle school grades, such as differences in prefrontal cortex development, pubescent physical maturation, and development of greater ability to think abstractly (Eccles, 1999; Fuster, 2002; Keating, 1990; Yurgelun-Todd, 2007). For example, eighth graders may have matured to be better equipped to serve as school leaders than sixth graders, resulting in larger top dog effects among eighth graders than sixth graders. Alternatively, one might believe that sixth-grade top dog effects are greater than in eighth grade because eighth graders have greater ability to situate themselves in social contexts and may maintain better perceptions of the learning environment even without top dog status. Most middle school configurations give eighth graders top dog status, which may indicate policymakers' implicit preferences to give eighth graders a boost to their learning environment (rather than, e.g., including ninth graders in middle school or beginning high school in eighth grade).

Others have found that short students are more susceptible to bullying (Borg, 1999; Voss & Mulligan, 2000). Students sixth through eighth grades grow at a rapid rate, and differences in timing of growth spirts during early adolescents might matter (Eccles, 1999). Thus, the TDBD effect may depend on student height.

Despite being widely cited in the grade span literature, there is little empirical evidence on the TDBD phenomenon per se. Blyth et al. (1978) and Simmons and Blyth (1987) are notable exceptions, providing evidence from a longitudinal study in 14 Milwaukee public schools in the 1970s. They compare student responses to surveys in sixth and seventh grades in an effort to disentangle the confounding effects of timing of middle school entrance and TDBD status. They find negative effects of bottom dog status on female students. These effects, however, may reflect differences across students rather than the position of students in a school. For example, parents of unhappy students attending K–8 schools may use the summer before seventh grade as an opportunity to change school districts while allowing their children to begin a junior high school on time. This is explained in Cook et al. (2008):

> It is possible that any correlation between school grade span and the measured infraction rate reflects nonrandom sorting of students.

> Parents may choose where to live or whether to keep their children in the public schools based, in part, on the configuration of grades. That sort of selection process may influence the characteristics of the student body in ways not necessarily reflected in observed indicators. (p. 108)

School choice could bias an estimate of the effect of TDBD status on student experiences, overestimating the TDBD effect in the previous example because only the relatively happy seventh-grade students stay enrolled long enough to become top dogs in eighth grade. As a result, previous research on the TDBD phenomenon falls short of establishing a causal relationship because it does not convincingly address the plausible endogeneity of enrollment decisions over time.

Methods

Data

We use richly detailed, longitudinal, student-level data from the NYC Department of Education (NYCDOE). These data include indicators for eligibility for free or reduced price lunch, ethnicity/race, gender, English language learner status, English is primary home language, special education status, borough of residence, birth date, height, weight, and New York State standardized examination test scores. Student height and weight are collected annually as a part of NYC's Fitnessgram (over 85% of middle school students are assessed). We link these data to student responses on the NYC School Survey. We match students to school attended and use school-level longitudinal data on enrollment by grade and grades served (grade span) from the New York State School Report Cards (SRC).

NYC School Survey data include student responses to more than 60 questions regarding student experiences, school environment, and nonacademic outcomes. Starting in the 2006–2007 (2007) school year, the NYCDOE distributed the NYC School Survey to all students in Grades 6 through 12. From 2008 to 2011 (our sample period), about 90% of general education and part-time special education middle school students respond to the survey each year, with response rates varying marginally by question.

Our sample includes two cohorts of NYC public school general education and part-time special education students who entered sixth grade for the first time in 2008 or 2009, attended NYC public schools in third grade, made standard academic progress from Grades 6 to 8, and responded to the NYC School Survey in at least one year.[1] The sample spans a four-year period from 2008 through 2011, and each student is observed for three years. All together, our sample includes more than 500 unique schools and 90,000 unique students.

Table 1
Measures of Bullying, Safety, and Belonging

Category	New York City School Survey Question	Variable Name	= 1 If Respond
Bullying	"Students threaten or bully other students at school"	Bullying	Most or all of the time
Safety	"Students get into physical fights at my school"	Fights	
	"There is gang activity in my school"	Gangs	
	"I stay home because I don't feel safe at school"	Stay home	
	"I am safe in the hallways, bathrooms, and locker rooms at my school"	Safe school	Agree or strongly agree
Belonging	"Most of the teachers, counselors, school leaders, and other adults I see at school every day know my name or who I am"	Known	
	"I feel welcome in my school"	Welcome	

Measures

The main outcome variables are student reports of experiences in school. While there are many measures of school learning environment in the NYC School Survey, we rely on components that most closely match the outcomes studied in the TDBD literature—bullying, safety, and belonging. Following previous research, we use student-level survey data to construct measures of student experiences. As shown in Table 1, the measures include student reports of the frequency of school bullying, fights, and gang activity; how frequently a student stays home due to feeling unsafe; whether a student feels safe in school hallways, bathrooms, and locker rooms; and the extent to which a student feels he or she is known by school adults and welcome in school. Survey respondents provide answers on a scale of 1 to 4 for each question. We use indicator variables for each measure of bullying, safety, and belonging, which take a value of 1 if the student reports the activity happens more frequently (all of the time or most of the time) or the student reports agreement (agree or strongly agree) and a value of 0 if the activity happens less frequently (some of the time or never) or the student reports disagreement (disagree or strongly disagree).[2]

We construct seven binary outcome variables in all, which we term *bullying, fights, gangs, stay home, safe school, known*, and *welcome* (see Table 1). Previous researchers have used the same measures of bullying, safety, and belonging and have found that they provide apt measures of the school learning environment (Lacoe, 2013; Schwartz, Stiefel, & Wiswall, 2016). For

example, in order to assess the construct validity of bullying measures, Lacoe (2013) compares student survey responses to school-level administrative measures of school violence. She finds that student responses to these questions are highly correlated in the expected direction with violence reported annually through the New York State Violent and Disruptive Incident Reporting (VADIR) system (Lacoe, 2013, Figure 3).

Still, to address potential weaknesses in individual measures of the learning environment, we use multiple survey questions, exploring whether the TDBD effect is consistently observed across multiple measures of bullying, safety, and belonging.[3] While answers to individual survey questions are likely imperfect, collectively, they provide a clear picture of student perceptions of the school environment. For example, our bullying measure asks whether "students threaten or bully other students at school" and therefore does not directly identify whether students are actually bullied themselves (student self-reports, e.g., "I have been bullied at school this year" or "I have bullied others at school this year," are the most commonly used measure in the bullying literature, and peer nominations are a distant second; see Kim & Leventhal, 2008; Nakamoto & Schwartz, 2010). Some NYC School Survey questions on student safety, however, ask about individual experiences (e.g., "I stay home because I don't feel safe at school" and "I am safe in the hallways, bathrooms, and locker rooms at my school"). Previous research suggests these measures collectively offer a strong indication of student perceptions of bullying and safety in school (see Kim & Leventhal, 2008).

Our main independent variable is student TDBD status, defining top dogs as students at the top of a grade span and bottom dogs as those at the bottom of a grade span. "Middle dogs" are enrolled in any grade between the top and bottom (e.g., seventh-grade students are middle dogs in a 6–8 school).

There are a wide variety of school grade spans available to middle school students in NYC during this period. Of these, five major school types (6–8, 6–12, 5–8, K–6, K–8) each enroll more than 2% of the sixth-grade population, and more than a dozen others enroll small shares of students. Importantly, these grade spans provide within-grade variation in TDBD status. For example, sixth-grade students would be top dogs in a K–6 but bottom dogs in a 6–8. Of equal importance, these different grade spans are unlikely to exhibit significant resource and staffing differences. NYC funding for educating sixth-, seventh-, and eighth-grade students is the same regardless of grade span and NYC students in these grades generally have subject-specific teachers in both environments rather than a single teacher for all subjects. Moreover, class sizes are similar when comparing students in the same grades (Rockoff & Lockwood, 2010). Taken in sum, NYC provides a unique context for which within-grade variation in TDBD status can be observed but for which it is unlikely that staffing and resource differences

between elementary and middle schools would explain differences in performance (Rockoff & Lockwood, 2010).

Heap size captures grade span length, measured as the number of grades underneath top dogs in the same school. For example, the heap size of a 6–8 school is two. We use the natural logarithm of heap size because additional grades in schools with long grade spans affect the relative position of students less than those with short grade spans.[4]

We also distinguish "new dogs," who have just enrolled in a new school (most but not all of whom are also bottom dogs), and "big dogs," who are tall compared to other students in their school. Students are new dogs if they attended a different school—in NYC or elsewhere—in the preceding school year and are "returning" otherwise. New bottom dogs begin a new school at a standard time, but new middle dogs enter a new school midway through the normal grade progression.

Student height is measured once a year as a part of NYC's Fitnessgram program and is available for over 85% of the sample. We measure students' relative height in a school as zHeight, which is the z-score of height calculated using the mean and standard deviation of height in the student's school in that year. Thus, a student with a zHeight of 1, for example, is one standard deviation taller than the mean student in his or her school; the school mean of zHeight is zero, and the standard deviation is one. We also measure students' academic achievement on statewide English Language Arts (ELA) and math exams, standardizing scores to mean zero and standard deviation of one (z-scores) based on NYC test takers in a given grade and year.

Descriptive Statistics

Table 2 shows descriptive statistics for the most common grade spans for sixth-grade students in 2008 (Table S1 in the online version of this journal shows descriptive statistics for uncommon grade spans). A majority of sixth-grade students attend 6–8 schools (and are bottom dogs), and there are significant differences in student characteristics across grade spans. For example, sixth graders in 6–8 schools (bottom dogs) are less likely to be free lunch eligible or part-time special education and more likely to be White or Asian than sixth graders in K–6 (top dogs) and K–8 schools (middle dogs). Students in 6–8 schools are relatively advantaged on observed characteristics compared to students in other grade spans.

Figure 1 shows sixth-grade student responses (2008 sixth graders) to survey questions regarding bullying, safety, and belonging for the most common middle school grade spans—those comprising at least 2% of each grade's population citywide (Figure 1 offers binary indicators that are consistent with our empirical strategy; details on all four responses to each question are in Table S2 in the online journal, with seventh and eighth grader responses available upon request of the authors). Among sixth graders,

Table 2
Descriptive Statistics, Sixth-Grade Students, by School Grade Span, 2008

	Bottom Dogs		Middle Dogs		Top Dogs
	6–8	6–12	5–8	K–8	K–6
Percentage in grade span	64.8	3.0	4.2	8.7	6.9
Age	11.2	11.3	11.2	11.3	11.3
Percentage:					
Female	50.9	53.7	52.3	51.4	51.5
Ethnicity					
Black	24.5	36.5	28.2	39.0	30.3
Hispanic	38.0	45.4	54.4	36.8	39.4
Asian	20.1	6.7	10.1	10.8	20.4
White	17.5	11.3	7.3	13.4	9.9
English as a home language	52.4	67.2	46.2	63.4	52.8
Limited English proficiency (LEP)	9.5	6.1	13.0	7.6	8.6
Part-time special education	11.1	13.8	6.5	12.2	11.6
Free lunch eligible	70.0	78.4	74.8	75.0	75.8
Reduced price lunch eligible	10.1	7.7	10.6	8.1	8.8
Residential borough					
Manhattan	10.6	20.0	10.2	16.1	17.1
Bronx	17.2	34.8	33.4	26.7	14.0
Brooklyn	34.4	39.4	26.0	33.4	4.3
Queens	28.1	5.6	30.2	23.4	64.3
Staten Island	9.7	0.2	0.0	0.0	0.0
N	33,624	1,545	2,154	13,086	3,588

Note. Sample includes 2008 sixth graders who answer all seven survey questions included in this article and who attend schools with grade spans enrolling at least 2% of the sixth-grade student population. For other grade spans, see Table S1 in the online journal.

top dogs report feeling safer, less bullying, and greater belonging than bottom and middle dogs. For example, among sixth graders, the top dogs (in K–6 schools) are less likely to report students threaten or bully other students at school most or all of the time (25.8%) than the bottom dogs (in 6–8 or 6–12 schools, reporting 31.0% and 33.0%, respectively). Similarly, on average, middle dogs report better experiences than bottom dogs. Among sixth graders, middle dogs (in 5–8 or K–8 schools) are less likely to report there is gang activity always or most of the time (17.3% and 15.9%, respectively) than the bottom dogs (18.2% and 19.4% for 6–8 and 6–12, respectively).

Comparing students in different grades within the same grade span, top dogs again report better experiences than bottom dogs. Among students attending 6–8 schools, a greater share of top dogs (80.2% of eighth graders)

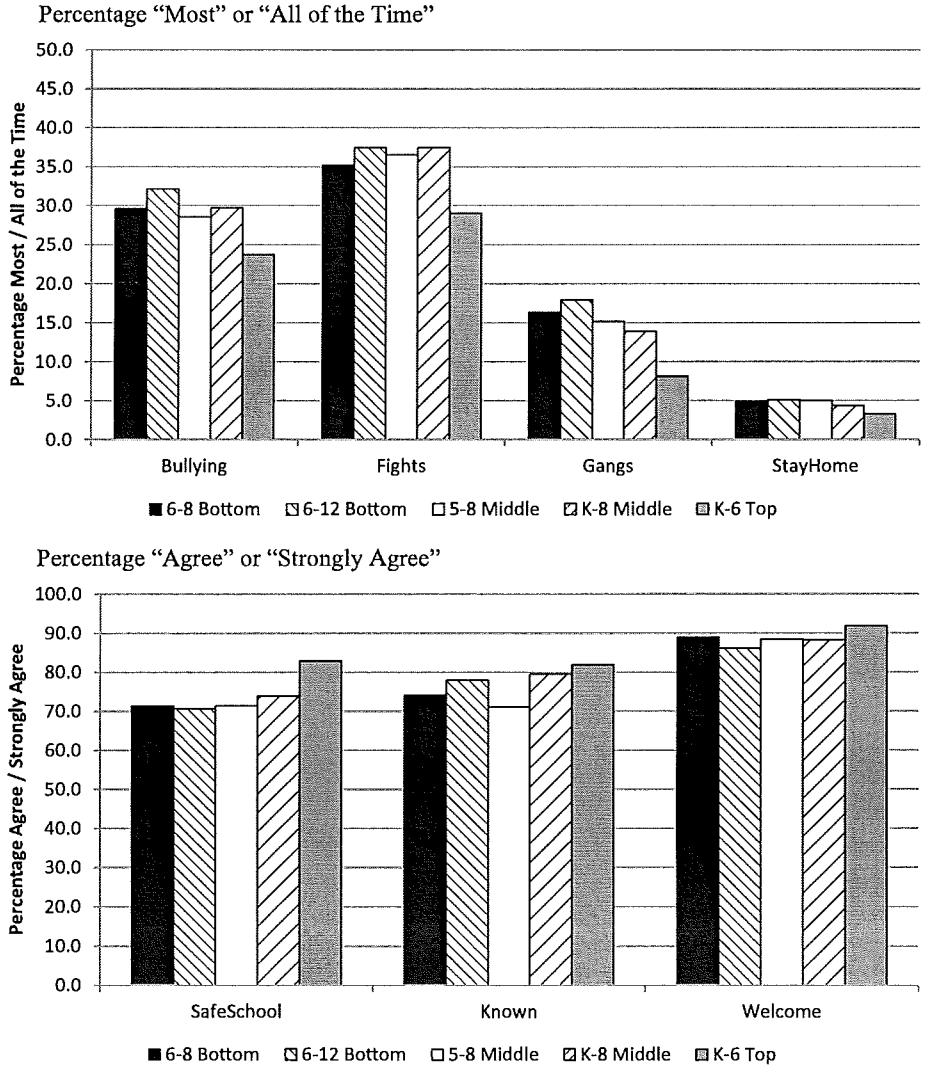

Figure 1. **Bullying, safety, and belonging by relative position and grade span, sixth-grade students, 2008.**

Note. Sample includes 2008 sixth graders who answer all seven survey questions included in this article and who attend schools with grade spans enrolling at least 2% of the sixth-grade student population. There are 65,852 students in 6–8 schools, 3,453 students in 6–12 schools, 4,301 students in 5–8 schools, 13,086 students in K–8 schools, and 7,079 students in K–6 schools.

report they agree (or strongly agree) that most of the teachers, counselors, school leaders, and other adults in school know who they are compared to bottom dogs (73.1% of sixth graders, see Table S2 in the online journal). As another example, top dogs in K–8 schools (eighth grade) are less likely to report they (strongly) agree that students get into physical fights at their

school (24.8%) than K–8 middle dogs (37.8% and 32.4% of sixth and seventh graders report fights, respectively). Taken together, the descriptive statistics are consistent with the TDBD hypothesis. We turn next to impact estimates using regression analysis.

Analytic Strategy

Baseline Model

Our baseline model links bullying, safety, belonging, and academic performance to TDBD status as well as a set of student characteristics, and grade, year, and student fixed effects, as follows:

$$BSB_{ist}=\beta_0+\beta_1 TD_{ist}+\beta_2 BD_{ist}+\beta_3 G_{ist}+\beta_4 X_{it}+\alpha_i+\mu_{ist}, \quad (1)$$

where BSB_{ist} is a bullying, safety, or belonging outcome for student i in school s in year t; TD_{ist} is a variable indicating top dog status; BD_{ist} is variable indicating bottom dog status; G_{ist} is a series of binary variables indicating if student i is in Grade 6, 7, or 8; X_{it} is a vector of time-varying student characteristics (English language proficiency, free or reduced price lunch, special education participation, and borough of residence), and in models excluding student fixed effects, X also includes time-invariant student characteristics (gender, ethnicity, if English is spoken at home); α_i is a student fixed effect; and μ_{ist} is an error term. Standard errors are clustered at the school year level in order to correct for correlations among students who are sharing a school and have the same TDBD status.

Even conditional on observed student characteristics and student fixed effects, students may still sort into TDBD status. That is, students may choose their school environment by enrolling in a grade span in a given grade and effectively selecting to be top or bottom dog in a particular grade (as described previously, this may bias estimates of the TDBD effect).[5] As outlined earlier, to address possible endogeneity of TDBD status, we use grade spans of students' third-grade schools as instruments for TD and BD status, following Rockoff and Lockwood (2010) and Schwerdt and West (2013). TDBD status and grade span are closely related in any year, but it is unlikely that grade span three to five years before an observation reflects current middle school learning environment, except through its effect on TDBD status. To be specific, we instrument for TD_{ist} and BD_{ist} (using two-stage least squares) in Model 1 using a vector of binary variables indicating if student i (who attends school s) is exposed to a particular grade span in third grade.[6]

Our key coefficients are β_1 and β_2, which capture the effect of top dog and bottom dog status on student perceptions of the learning environment, respectively. For some of these outcomes, such as bullying, fights, gangs, and stay home, negative coefficients reflect a better learning environment, indicating students are less likely to report these negative conditions. For

the other outcomes, including safe school, known, and welcome, positive coefficients indicate a better learning environment. Negative β_1 (β_2) coefficients in bullying, stay home, fights, and gangs models indicate top dogs (bottom dogs) reported less bullying, staying home because they feel unsafe, fights, and gangs compared to middle dogs. If β_1 equals −.01 in the fights model, for example, it indicates that top dogs are one percentage point less likely to report frequent physical fights at school (all or most of the time) compared to middle dogs.[7] Positive β_1 (β_2) coefficients in safe school, known, and welcome models indicate top dogs (bottom dogs) reported feeling safer, more known, and more welcome in school compared to middle dogs. If β_1 equals .01 in the safe school model, for example, it indicates that top dogs are one percentage point more likely to report (strongly) agreeing that they feel safe in the hallways, locker rooms, and bathrooms at school compared to middle dogs. We henceforth report estimates as less likely or more likely for the models that estimate the effect of top dog (or bottom dog) status on bullying (and so on).

Heterogeneity by Grade and Grade Span Length

We explore effect heterogeneity to analyze when students obtain the greatest boost from top dog status. We assess heterogeneity of TDBD effects by grade, as follows:

$$BSB_{ist} = \beta_0 + \beta_1{}^{G}TD_{ist} + \beta_2{}^{G}BD_{ist} + \beta_3 G_{ist} + \beta_4 X_{it} + \alpha_i + \mu_{ist}, \quad (2)$$

where all variables are as previously defined, and superscript G indicates that student grade is interacted with the variable. (For example, ${}^{6}TD_{ist}$ takes a value of 1 if a sixth-grade student attends a school in which sixth graders are top dogs—such as K–6 and 3–6 schools—and takes a value of 0 otherwise.) This model will shed light on questions such as whether the benefits of top dog status are greater in eighth grade or sixth grade. The coefficients in the vector β_1 (β_2) capture the relationship between grade and top dog (bottom dog) status.

As suggested previously, the size of the TDBD effect may also depend on grade span length (heap size). We estimate a model in which we interact TDBD status with heap size to test whether longer grade spans (bigger heaps) are associated with larger TDBD effects. In the heap size models, β_1 and β_2 are estimated coefficients of the interaction effect of heap size and TDBD status (similar to the interaction effects outlined previously for grade and TDBD status).[8]

Digging Deeper Into the TDBD Effect

One explanation for the TDBD phenomenon is that it merely reflects bottom dog difficulties adjusting to a new school. Thus, the estimated

bottom dog effect may reflect the relative disadvantage of being new to a school rather than bottom dog status per se. Conversely, one might instead argue that being new to a school is a component of bottom dog status. We estimate how much of the TDBD effect can be explained by new student status using variation in student entry into new schools. Importantly, middle dogs are often new students as well. For example, a student who "graduates" from a K–6 and enters a 6–8 school as a seventh grader is a new middle dog. To explore new student status as a possible explanation for the TDBD effect, we interact TDBD status with new student status to test the extent to which new student status explains the TDBD effects.

Another feature of the TDBD phenomenon is that top dogs tend to be taller than bottom dogs, and, as discussed previously, taller students may have better experiences. Top dogs are in higher grades than bottom dogs within the same school and are usually taller, especially in middle school, when students are still growing. The TDBD effect could be driven or exacerbated by student height as being relatively tall might be a component of top dog status (height could be an explanation or a mechanism). We explore this in two ways. First, we explore the moderating effect of height by interacting TDBD status with relative height in a school. Second, we explore the potential mediating effect by including height as a control variable. We use both zHeight and zHeight squared to allow for possible nonlinearity in the relationship between height and perceptions of the school environment (since there could be distinct advantages to being of average height). Here, we restrict our analyses to the 85% of the sample with height data and reestimate our preferred model.

Effects on Academic Achievement

Finally, we explore the impact of TDBD status on student academic achievement, contributing to the growing grade span literature. We estimate the *causal* relationship between TDBD status and academic performance, changing the outcome variables in Model 2 from BSB_{ist} to $TEST_{ist}$—where $TEST_{ist}$ is the math or ELA exam z-score for student i in school s and in year t, using the same vector of instrumental variables and student fixed effects. The coefficients in the vector β_1 (β_2) now capture the relationship between grade, top dog (bottom dog) status, and academic achievement.

As discussed previously, TDBD status could affect academic achievement through students' perceptions of the school learning environment. Unfortunately, we cannot causally assess the effects of bullying, safety, and belonging on academic achievement. To do so, we would need to estimate student test score, y, as a function of *both* TDBD status and student learning environment. In such a model, however, OLS estimates will be biased because student learning environment, TDBD status, and academic achievement are endogenous. We cannot use the same instrumental

variables strategy used elsewhere in this article to resolve the endogeneity problem because we would need two unique sets of instruments, one for TDBD status and another for school learning environment. But we have only one set of instruments (the vector of variables reflecting grade span of third-grade school). Instead of causal estimates, we offer *descriptive* evidence on the role perceptions of the school environment play in academic achievement, which will complement the *causal* evidence on the impact of TDBD status on both student experiences and academic achievement. Using a student fixed effects model, we estimate the relationship between bullying, safety, and belonging and academic achievement. These models are specified as follows:

$$TEST_{ist}=\gamma_0+\gamma_1 BSB_{ist}+\gamma_2 X_{it}+\alpha_i+\mu_{ist}, \quad (3)$$

where $TEST_{ist}$ is the math or ELA exam z-score for student i in school s in year t, and all other variables are as previously defined. Results from these models provide descriptive evidence of the relationship between bullying, safety, and belonging and academic achievement in sixth, seventh, and eighth grades but do not provide causal evidence that the impact of TDBD status on academic achievement operates directly through perceptions of the school learning environment. For example, it is also plausible that achievement affects student perceptions of the learning environment and TDBD's effect on bullying, safety, and belonging operates through declines in academic achievement (consistent with reduced academic self-concept found in Eccles et al., 1991). Still, these estimates may show that the grade span effect on academic achievement could possibly operate through the TDBD effect on bullying, safety, and belonging.

Results

Baseline Results

Table 3 shows OLS, instrumental variables (IV), and IV with student fixed effects estimates of the TDBD effect in the middle school grades. In the OLS model (Panel A), we estimate that top dogs are less likely to report that there is gang activity in their schools (1.8 percentage point decrease in probability of reporting gangs) and more likely to report feeling safe in hallways, locker rooms, and bathrooms (2.8 percentage point increase in probability of reporting safe school) and that they are known (1.5 percentage point increase in probability of reporting known) than middle dogs. In the OLS model, we further estimate that bottom dogs are more likely to report bullying (2.3 percentage points), gangs (3.9 percentage points), and stay home (1.0 percentage point increase in the probability of reporting staying home from school because he or she feels unsafe) and less likely to report

Table 3

Regression Results, Baseline, Instrumental Variables (IV), and IV Student Fixed Effect (FE) Models

	Bullying	Fights	Gangs	Stay Home	Safe School	Known	Welcome
A. Ordinary least squares							
Top dog	−0.003	0.008	−0.018**	−0.001	0.028***	0.015*	0.006
	(0.010)	(0.014)	(0.008)	(0.003)	(0.010)	(0.009)	(0.006)
Middle dog	—	—	—	—	—	—	—
Bottom dog	0.023**	0.020	0.039***	0.010***	−0.040***	−0.037***	−0.012**
	(0.012)	(0.016)	(0.009)	(0.003)	(0.012)	(0.011)	(0.006)
Top – bottom	−0.026**	−0.012	−0.057***	−0.011***	0.068***	0.052***	0.018***
Student FE	No	No	No	No	No	No	No
IV	No	No	No	No	No	No	No
B. IV							
Top dog	−0.003	−0.047*	−0.044**	−0.014**	0.073***	0.050**	0.016
	(0.021)	(0.029)	(0.017)	(0.007)	(0.020)	(0.022)	(0.013)
Middle dog	—	—	—	—	—	—	—
Bottom dog	0.013	−0.012	0.038***	0.006	−0.026*	−0.075***	0.003
	(0.015)	(0.020)	(0.012)	(0.005)	(0.015)	(0.016)	(0.009)
Top – bottom	−0.016	−0.035	−0.082***	−0.020***	0.099***	0.125***	0.013
Student FE	No	No	No	No	No	No	No
IV	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(continued)

Table 3 **(continued)**

	Bullying	Fights	Gangs	Stay Home	Safe School	Known	Welcome
C. IV student FE							
Top dog	−0.046**	−0.077**	−0.068***	−0.021**	0.105***	0.115***	0.037***
	(0.021)	(0.031)	(0.020)	(0.008)	(0.021)	(0.017)	(0.013)
Middle Dog	—	—	—	—	—	—	—
Bottom dog	−0.020	−0.071***	−0.001	−0.006	0.013	−0.001	0.020**
	(0.014)	(0.017)	(0.011)	(0.006)	(0.013)	(0.012)	(0.009)
Top – bottom	−0.026	−0.006	−0.067***	−0.015**	0.092***	0.116***	0.017
Student FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IV	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	252,687	252,887	252,298	250,513	251,688	259,120	259,892
Students	92,840	92,861	92,751	92,379	92,560	94,273	94,418

Note. Robust standard errors in parentheses clustered by middle school. IV estimates instrument for top dog/bottom dog (TDBD) status using the grade span of student's third-grade school. Model controls include: indicators for female, Black, Hispanic, Asian, other non-White, free lunch eligibility, reduced lunch eligibility, home language is English, limited English proficiency, part-time special education, borough of residence, grade, and student age. Cohort fixed effects are also included in the OLS and IV specifications. Reference group = middle dogs.
*$p < .10$. **$p < .05$. ***$p < .01$.

safe school (–4.0 percentage points), known (–3.7 percentage points), and welcome (–1.2 percentage points) than middle dogs. Top dogs also are less likely to report bullying, gangs, and stay home but more likely to report safe school, known, and welcome than bottom dogs, which we estimate by subtracting the coefficients on bottom dog status from the coefficients on top dog status and testing for significance using *t* tests. Taken together, these results indicate that top dogs perceive a more favorable school environment than bottom and middle dogs.

The main results remain largely unchanged when accounting for student selection into timing of top dog and bottom dog status (as determined by middle school grade span) using the instrumental variables strategy. In the IV model (Panel B of Table 3), we estimate that top dog status decreases a student's likelihood to report fights, gangs, and stay home and increases a student's likelihood to report safe school and known than middle dogs. The estimated effect of bottom dog status is robust to the instrumental variables model for regressions estimating the effect on gangs, safe school, and known. Bottom dog status increases a student's likelihood to report gangs and decreases probability to report safe school and known.

Our estimated effects of top dog status are stronger when we address the endogeneity of selection into middle school and control for time-invariant student characteristics. The results from our preferred models—which include the instrumental variables and student fixed effects—are shown in Panel C of Table 3. We estimate that top dogs compared to middle dogs are 4.6 percentage points less likely to report bullying, 7.7 percentage points less likely to report fights, 6.8 percentage points less likely to report gangs, and 2.1 percentage points less likely to report staying home due to feeling unsafe in school. Furthermore, top dogs are 10.5 percentage points more likely to report feeling safe in hallways, locker rooms, and bathrooms; 11.5 percentage points more likely to report feeling they are known; and 3.7 percentage points more likely to report feeling welcome.

In summary, OLS, IV, and IV student fixed effects models all indicate that top dogs fare better than middle and bottom dogs. These estimated effects are quite large, showing marked changes in perceptions of the learning environment for students who are top dogs. Conversely, as models better address causality, bottom dogs fare similarly to middle dogs but worse than top dogs. This suggests that negative coefficients for bottom dogs in an OLS model might be biased by the effects of selection through, for example, endogenous student mobility.

Heterogeneity by Grade and Grade Span Length

Table 4 presents our preferred model estimates of TDBD effects for each middle school grade. We interact TD and BD with student grade to estimate the differential effects of top dog and bottom dog status in sixth and eighth

grades, finding that sixth graders have a greater bump from top dog status than do eighth graders. We find sixth-grade top dogs face better learning environments than they would as middle and bottom dogs. For example, as a result of top dog status, sixth-grade top dogs are 7.6 percentage points less likely to report bullying and 14.7 percentage points more likely to report safe school than they would as middle dogs (see Top – Middle: Grade 6 in Table 4). Similarly, as a result of their status, sixth-grade top dogs see a 10.6 percentage point decrease in probability of gangs and a 14.6 percentage point increase in probability to feel known as compared to if they were bottom dogs (see Top – Bottom: Grade 6 in Table 4).

Conversely, there is little difference in the student experiences of eighth-grade top dogs and middle dogs. We find a statistically significant impact for only one outcome: feeling known (5.6 percentage point increase compared to middle dogs). There are no other significant differences in bullying, safety, or belonging between top and middle dog eighth-grade students.[9]

While the results shown in Table 4 are mean TDBD impact estimates by grade, they omit indicators for whether students serve as top dogs in short or long grade spans. Figure 2 shows estimates of the relationship between the TDBD effect and heap size (number of grades beneath top dogs in the school). As shown in Figure 2, we find that much of the TDBD effect is explained by students at the top of larger heaps (longer grade spans); as the heap size gets larger, so does the TD effect. For example, we estimate that top dog status has a substantially larger effect on the likelihood students report feeling known in schools with a heap size of 8 (12.4 percentage points) than in schools with a heap size of 2 (7.4 percentage points) compared to middle dogs.

Conversely, there is no effect of longer heap size on the BD effect (shown in Table S4 in the online journal). That is, for example, sixth graders at the bottom of a long grade span do not report bullying at a higher rate than sixth graders at the bottom of a short grade span. Students in larger heaps may benefit from increased premiums on top dog status without further hurting bottom dogs. This provides evidence that longer grade spans (heaps) for middle school students, such as K–8 schools, may improve student experiences.[10]

In sum, we find that there is a larger top dog effect in sixth than eighth grade and for students serving as top dogs over larger compared to smaller heap sizes. Further, we find that long grade spans (larger heaps) do not harm bottom dogs as compared to shorter grade spans (smaller heaps). These results suggest, consistent with developmental theory, that timing of top dog status matters and further, that longer grade spans may help top dogs more than shorter grade spans.

Table 4

Regression Results, Same Grade, Different Schools, Instrumental Variables (IV) and Student Fixed Effects (FE)

	Bullying	Fights	Gangs	Stay Home	Safe School	Known	Welcome
Top dog							
Grade 6	−0.054**	−0.052*	−0.102***	−0.022**	0.116***	0.113***	0.045***
	(0.022)	(0.031)	(0.022)	(0.009)	(0.022)	(0.019)	(0.013)
Grade 8	−0.024***	−0.043***	−0.010**	0.000	0.048***	0.051***	0.008**
	(0.005)	(0.008)	(0.004)	(0.002)	(0.006)	(0.004)	(0.003)
Middle dog							
Grade 6	0.022*	0.060***	0.013	0.007	−0.031***	−0.038***	−0.001
	(0.012)	(0.014)	(0.009)	(0.005)	(0.011)	(0.009)	(0.008)
Grade 7	—	—	—	—	—	—	—
Grade 8	−0.040*	−0.041	−0.042*	0.003	0.041	−0.006	−0.012
	(0.022)	(0.054)	(0.024)	(0.018)	(0.033)	(0.017)	(0.014)
Bottom dog							
Grade 6	−0.003	−0.018***	0.004	−0.001	−0.011**	−0.033***	0.020***
	(0.005)	(0.006)	(0.004)	(0.002)	(0.005)	(0.005)	(0.003)
$Top^6 - Middle^6$	−0.076***	−0.112***	−0.115***	−0.029***	0.147***	0.151***	0.046***
$Top^6 - Bottom^6$	−0.051**	−0.034	−0.106***	−0.021**	0.127***	0.146***	0.025*
$Middle^6 - Bottom^6$	0.025*	0.078***	0.009	0.008	−0.020*	−0.005	−0.021**
$Top^8 - Middle^8$	0.016	−0.002	0.032	−0.003	0.007	0.057***	0.020
Observations	252,687	252,298	250,513	252,887	251,688	259,120	259,892
Students	92,840	92,751	92,379	92,861	92,560	94,273	94,418

Note. Robust standard errors in parentheses clustered by middle school. IV estimates instrument for top dog/bottom dog (TDBD) status using the grade span of student's third-grade school. Controls in all models include indicators for free lunch eligibility, reduced lunch eligibility, home language is English, limited English proficiency, part-time special education, borough of residence, grade, student age, and student fixed effects. Reference group = Grade 7 middle dogs.

*$p < .10$. **$p < .05$. ***$p < .01$.

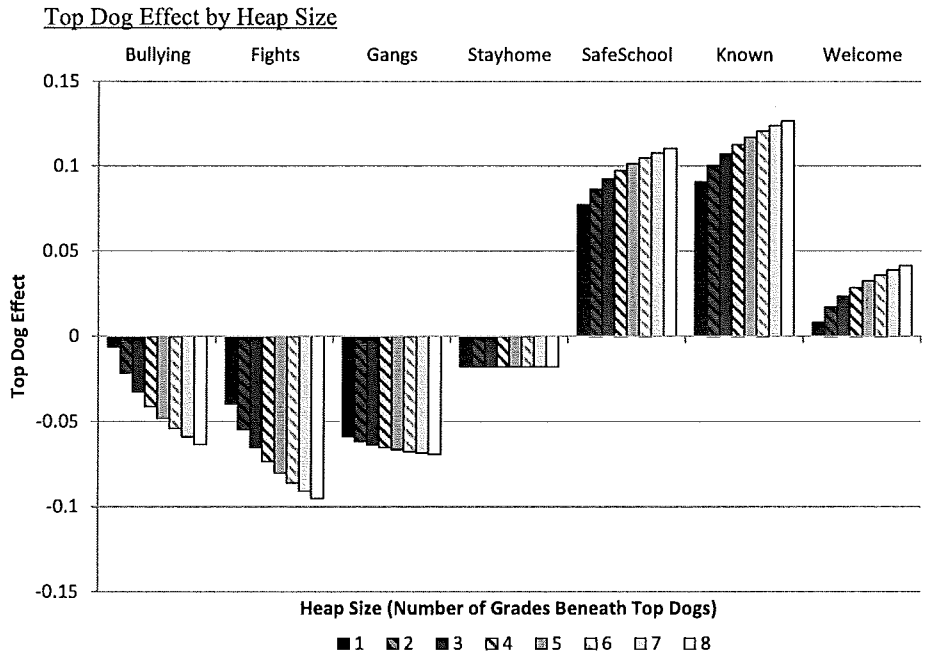

Figure 2. **Regression results by heap size (number of grades underneath top dogs).**

Note. Robust standard errors in parentheses clustered by middle school. Heap is the natural logarithm of the number of grades underneath the top dogs in a school. Instrumental variables (IV) estimates instrument for top dog/bottom dog status using the grade span of student's third-grade school. Controls in all models include indicators for free lunch eligibility, reduced lunch eligibility, home language is English, limited English proficiency, part-time special education, borough of residence, grade, student age, and student fixed effects. Reference group = middle dogs. See Table S4 in the online journal for coefficient estimates and standard errors. $^{*}p < .10$. $^{**}p < .05$. $^{***}p < .01$.

Digging Deeper Into the TDBD Effect

Bottom Dog Effect or New Dog Effect?

Figure 3 shows estimates of the TDBD effect for returning and new students side by side with our preferred model TDBD estimates (Table S5 in the online journal shows results in table form). As shown in Figure 3 Panel A, the top dog effect for returning students is about the same as the top dog effect estimates in our preferred model; all results point in the same direction and are of roughly the same magnitude (though a little smaller). That is, top dog status improves the student learning environment, even among returning students.

The results in Figure 3 Panel B are also consistent with the preferred model estimates: The estimated effect of bottom dog status for new students

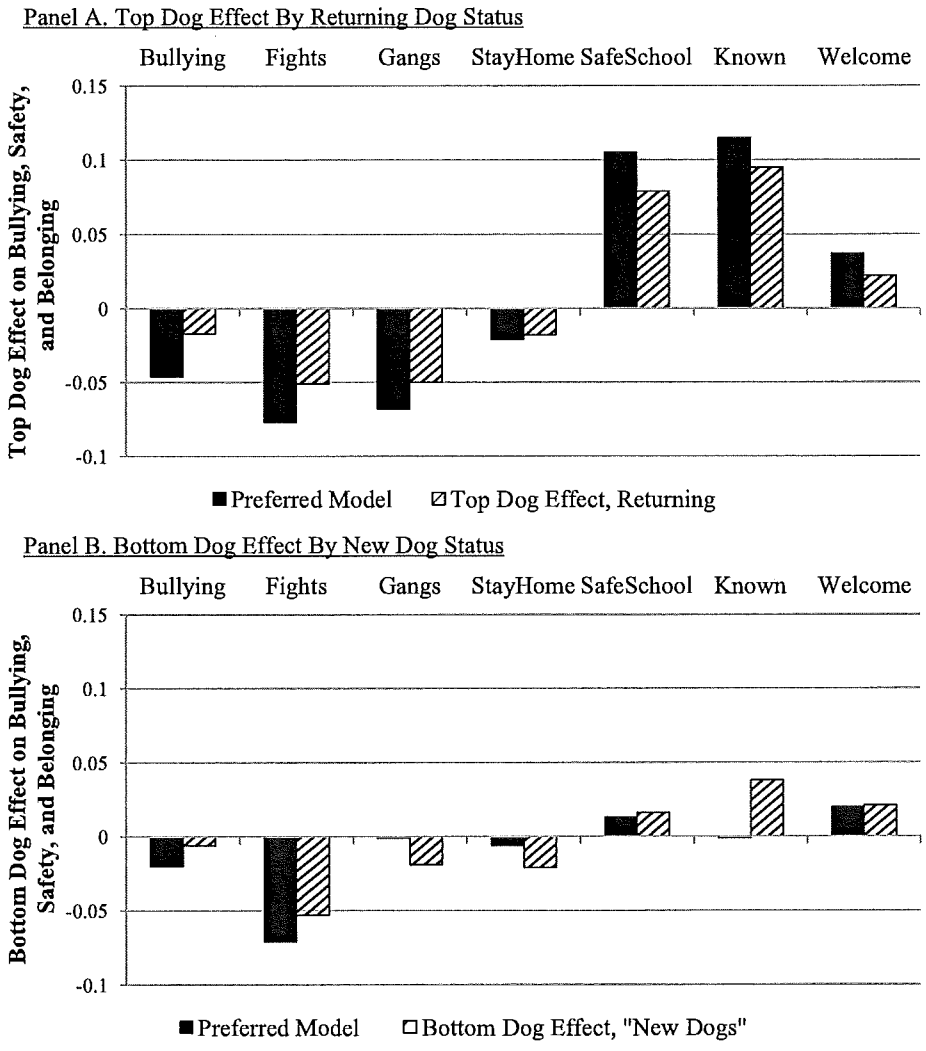

Figure 3. **Digging deeper: regression results, returning and new dogs, and TDBD effect**

Note. New students are in their first year in a school. Returning students are those attending the same school in the previous year. None of the reported estimates are statistically different across models. Instrumental variables (IV) estimates instrument for TDBD status using the grade span of student's third-grade school. Controls in all models include indicators for free lunch eligibility, reduced lunch eligibility, home language is English, limited English proficiency, part-time special education, borough of residence, grade, student age, and student fixed effects. Reference group = middle dogs. Returning bottom dogs and new top dogs are exceedingly rare, and results are not shown here. See Table S5 in the online journal for coefficient estimates and standard errors. TDBD = top dog/bottom dog.

is not statistically different from new middle dogs.[11] Taken together, the results in Figure 3 provide strong evidence that the TDBD effects presented in this article are due to TDBD status and are not moderated by new student status.

Top Dog Effect or Big Dog Effect?

The results shown in Table 5 tease apart the extent to which the TDBD effect is explained by student height. Panel A of Table 5 shows the estimates from our preferred model without height controls, but for the subset of students with height measures. As shown in Panel B, including controls for relative student height (zHeight and the quadratic form) does not change our primary results much. That is, top dogs benefit from their status independent of the role of height.

As shown in Panel C of Table 5, the main TDBD effect holds even with the inclusion of the interaction terms between TDBD status and student relative height. Top dog status improves student perceptions of the school environment as compared to middle and bottom dog status. For example, top dog status decreases the probability of reporting bullying by 8.2 percentage points as compared to middle dog status. While student height matters, it does not explain the TDBD effect on perceptions of the learning environment.[12]

Effects on Academic Achievement

Last, we turn to empirical tests of the hypothesis that the TDBD effect explains observed losses in academic performance at the time of middle school entry by estimating the effect of TDBD status on student academic achievement. Again, our instrumental variables fixed effects estimates allow a causal interpretation. As shown in Table 6, bottom dog status hurts academic performance and top dog status improves academic performance in sixth grade. These results highlight that declines in academic performance during transitions to middle schools are in part a result of transitioning from top dog to bottom (or middle) dog status.

Might TDBD affect student academic outcomes through student experience of the learning environment? While we cannot provide causal estimates to test this, we provide correlational evidence in Table 7, which shows results from models linking academic performance to bullying, safety, and belonging. To be clear, the relationship could be bidirectional, and we are unable to distinguish that here. In Panels A and B of Table 7, we show that students reporting bullying, fights, gangs, and stay home (safe school, welcome, and known) in the middle grades have lower (higher) levels of math and ELA achievement, respectively. Further, as shown in Table 7 Column 8, many of these relationships are robust to controlling for all measures of student perceptions of the school environment simultaneously and all survey responses are correlated with achievement in the intuitively

Table 5

Digging Deeper: Regression Results, Big Dogs, and TDBD Effect

	Bullying	Fights	Gangs	Stay Home	Safe School	Known	Welcome
A. Preferred[a]							
Top dog	−0.068***	−0.123***	−0.085***	−0.028***	0.120***	0.123***	0.053***
	(0.024)	(0.036)	(0.024)	(0.010)	(0.025)	(0.020)	(0.015)
Middle dog	—	—	—	—	—	—	—
Bottom dog	−0.023	−0.071***	0.002	−0.009	0.012	0.000	0.026**
	(0.016)	(0.019)	(0.012)	(0.007)	(0.014)	(0.013)	(0.011)
B. Height							
Top dog	−0.058**	−0.115***	−0.087***	−0.029**	0.112***	0.123***	0.048***
	(0.028)	(0.043)	(0.029)	(0.012)	(0.029)	(0.023)	(0.016)
Middle dog	—	—	—	—	—	—	—
Bottom dog	−0.027*	−0.075***	−0.000	−0.010	0.015	−0.001	0.028**
	(0.016)	(0.019)	(0.012)	(0.007)	(0.014)	(0.013)	(0.011)
zHeight	−0.007	−0.007	0.002	0.001	0.005	−0.004	0.004
	(0.005)	(0.007)	(0.005)	(0.002)	(0.005)	(0.004)	(0.003)
$zHeight^2$	−0.001	−0.001	0.001	0.001**	0.002**	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)

(continued)

Table 5 **(continued)**

	Bullying	Fights	Gangs	Stay Home	Safe School	Known	Welcome
C. Interaction							
Top dog	−0.082***	−0.105***	−0.040***	−0.147***	0.140***	0.101***	0.075***
	(0.0305)	(0.026)	(0.013)	(0.0387)	(0.028)	(0.026)	(0.019)
Middle dog	—	—	—	—	—	—	—
Bottom dog	−0.062***	−0.024	−0.015	−0.116***	0.069***	−0.007	0.037**
	(0.021)	(0.017)	(0.010)	(0.024)	(0.021)	(0.020)	(0.015)
Top Dog × zHeight	−0.007*	−0.001	0.001	−0.009**	0.010**	0.001	0.000
	(0.004)	(0.003)	(0.002)	(0.005)	(0.004)	(0.004)	(0.003)
Middle Dog × zHeight	−0.010*	0.005	0.004	−0.006	0.007	−0.001	0.000
	(0.005)	(0.004)	(0.003)	(0.006)	(0.005)	(0.005)	(0.004)
Bottom Dog × zHeight	−0.011*	−0.003	−0.002	−0.014*	0.011*	−0.007	0.003
	(0.007)	(0.006)	(0.003)	(0.008)	(0.007)	(0.006)	(0.005)
Observations	218,416	218,090	216,512	218,536	217,630	223,809	224,514
Students	82,748	82,651	82,277	82,755	82,531	84,167	84,298

Note. Robust standard errors in parentheses clustered by middle school. Sample includes students with measured height only (over 30,000 observations include no measured height and are included from this analysis). zHeight measures student relative height as compared to other students in the school. IV estimates instrument for TDBD status using the grade span of student's third-grade school. Controls in all models include indicators for free lunch eligibility, reduced lunch eligibility, home language is English, limited English proficiency, part-time special education, borough of residence, grade, student age, and student fixed effects. Reference group = middle dogs. IV = instrumental variables; TDBD = top dog/bottom dog.

[a]Sample restricted to students with height data.

*$p < .10$. **$p < .05$. ***$p < .01$.

Table 6

Regression Results, Impact of Top Dog/Bottom Dog Status on Academic Achievement by Grade, Instrumental Variables Student Fixed Effects

	Reading	Math
Grade 6		
Top dog	0.100***	0.160***
	(0.033)	(0.033)
Middle dog	−0.005	0.017
	(0.021)	(0.026)
Bottom dog	−0.024***	−0.014
	(0.009)	(0.011)
Grade 7		
Middle dog	—	—
Grade 8		
Top dog	0.003	−0.003
	(0.010)	(0.012)
Middle dog	−0.002	−0.116*
	(0.041)	(0.066)
Student fixed effects	Yes	Yes
Instrumental variables	Yes	Yes
Observations	251,566	290,213
Students	86,284	99,591

Note. Robust standard errors in parentheses, clustered by middle school. English Language Arts and math are student z-scores on achievement exams. Instrumental variables estimates instrument for top dog/bottom dog status using the grade span of student's third-grade school. Model controls include indicators for female, Black, Hispanic, Asian, other non-White, free lunch eligibility, reduced lunch eligibility, home language is English, limited English proficiency, part-time special education, borough of residence, grade and student age, and student fixed effects. Reference group = Grade 7 middle dogs.
*$p < .10$. ***$p < .01$.

appealing direction even in cases in which the estimates are not significant. Consistent with the TDBD hypothesis, we find the measures of student experiences jointly significant in predicting math and ELA achievement.

In summary, we find that top dog status improves academic achievement, while bottom dog status is somewhat deleterious to achievement. These estimated effects are quite large, showing marked changes in academic achievement, especially for students who are top dogs. We provide some correlational evidence that this might operate through changes in perceptions of the school learning environment, though other explanations are plausible.

Table 7

Bullying, Safety, and Belonging and Academic Achievement, Sixth, Seventh, and Eighth Grades

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Math								
Bullying	−0.013***							0.001
	(0.004)							(0.004)
Fights		−0.018***						−0.009**
		(0.005)						(0.005)
Gangs			−0.026***					−0.012**
			(0.005)					(0.005)
Stay home				−0.054***				−0.036***
				(0.008)				(0.008)
Safe school					0.020***			0.010**
					(0.005)			(0.005)
Known						0.012***		0.007
						(0.004)		(0.005)
Welcome							0.035***	0.030***
							(0.005)	(0.006)
Constant	−0.119	−0.146	−0.134	−0.129	−0.171*	−0.184**	−0.196***	−0.171*
	(0.097)	(0.097)	(0.097)	(0.097)	(0.097)	(0.078)	(0.075)	(0.099)
N	303,757	303,445	301,570	304,081	302,846	310,189	311,243	283,457
Students	123,499	123,507	123,310	123,545	123,392	124,137	124,329	121,388
R^2	0.861	0.861	0.862	0.861	0.861	0.860	0.860	0.865

(continued)

Table 7 **(continued)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
B. English Language Arts								
Bullying	−0.013***							−0.006
	(0.005)							(0.005)
Fights		−0.011**						0.003
		(0.004)						(0.006)
Gangs			−0.015***					0.002
			(0.006)					(0.006)
Stay home				−0.033***				−0.025***
				(0.007)				(0.008)
Safe school					0.011**			−0.006
					(0.005)			(0.005)
Known						0.006		−0.007
						(0.005)		(0.006)
Welcome							0.018***	0.013*
							(0.006)	(0.007)
Constant	−0.119	−0.128	−0.117	−0.119	−0.143	−0.131	−0.138	−0.153
	(0.111)	(0.107)	(0.106)	(0.107)	(0.106)	(0.102)	(0.101)	(0.132)
N	302,281	301,959	300,124	302,578	301,378	308,674	309,645	282,169
Students	123,259	123,265	123,059	123,297	123,149	123,893	124,077	121,150
R^2	0.780	0.780	0.781	0.780	0.780	0.779	0.779	0.783

Note. Robust standard errors in parentheses clustered by middle school. English Language Arts and math are student *z*-scores on achievement exams. Controls in all models include indicators for female, Black, Hispanic, Asian, other non-White, free lunch eligibility, reduced lunch eligibility, home language is English, limited English proficiency, part-time special education, borough of residence, grade, student age, and student fixed effects.

*$p < .10$. **$p < .05$. ***$p < .01$.

Discussion

This article offers the first credibly causal evidence on the TDBD hypothesis. Using data on sixth, seventh, and eighth graders in NYC public schools, we find that top dogs are less likely to report problems with bullying or safety and are more likely to report feeling welcome and belonging in school compared to bottom dogs. These effects are robust to controls for a variety of student characteristics, student fixed effects, and corrections for potential selection into grade spans. Conversely, bottom dogs are more likely to report bullying, feeling unsafe, and like they do not belong in school than they do as middle or top dogs. Unlike the top dog effect, our results suggest that the bottom dog effect results, at least in part, from student selection. We find moving from elementary to middle school hurts bottom dogs because they lose the top dog status they previously held in their old school. Put differently, the TDBD effect is significant both substantively and statistically.

Our results also suggest that students may benefit from longer grade spans. We find the top dog effect is larger in schools with longer grade spans (larger heap sizes), while the effect on bottom dogs in longer grade spans (at the bottom of larger heap sizes) is no worse than in schools with shorter grade spans. Moreover, in longer grade spans, the closer students are to the top, the better they do; that is, promotion through school improves learning environments.

We also find that there is a larger top dog effect in sixth grade than in eighth grade, which is partially a result of heap size (sixth grade is most often a terminal grade for long grade spans, while eighth grade is most often a terminal grade for short grade spans).[13] In part, this result may reflect the greater ability of eighth graders to adapt to environments in which they do not have top dog status than sixth graders due to developmental differences across early adolescents.

We explore possible mechanisms for the TDBD effect, including (a) student height and (b) whether a student is returning or new to a school. First, we find that the jump in perceptions of learning environment for top dogs comes from the status afforded to them by their grade and not their height. Second, we find the top dog effect holds even when controlling for continued enrollment in the same school. While being a new student and student height affect student experiences, they do not drive or explain the TDBD phenomenon.

We suggest that other plausible explanations for the negative consequences of the middle school environment on the whole are unlikely. First, we estimate the TDBD effect in models that include student fixed effects and therefore estimate the impact of TD and BD status within students over time. In alternative model specifications, we find, for example, that eighth graders in a 6–8 middle school environment have better perceptions of the learning environment than they did as sixth graders in 6–8

schools, suggesting that there is an independent top dog effect in addition to any plausible negative consequences of the middle school environment on the whole. Further, in the context of NYC, the difference in school characteristics between middle schools and elementary schools is not pronounced for students in sixth, seventh, and eighth grades. For example, elementary schools are not better resourced than middle schools in NYC (Rockoff & Lockwood, 2010). Moreover, while there are differences across grade spans in terms of class size and whether students have subject-specific teachers, these differences are negligible for students within the same grade (Rockoff & Lockwood, 2010). For example, sixth-, seventh-, and eighth-grade students attending K–8 schools are typically assigned subject-specific teachers. Thus, we also minimize the possibility of these otherwise plausible explanations for the top dog effect identified in this article.

We also provide evidence on academic achievement. While previous research offers many explanations for drops in student performance at middle school entry, our results suggest that the TDBD phenomenon is an important one of them. We find that top dog status improves academic performance, using the same IV we use for the bullying, safety, and belonging outcomes. We further provide descriptive evidence that the top dog effect on academic performance could plausibly operate through perceptions of the learning environment, though these results simply model the correlations between perceptions of the learning environment and academic achievement. Further work is needed to determine if the TDBD effect on academic achievement operates through perceptions of the school learning environment.

While every school has both top and bottom dogs, grade organization defines when and how frequently students serve as top and bottom dogs. Thus, our results can inform policy decisions on school organization. We find, for example, that the top dog premium increases in the length of the grade span. Moreover, our results offer insight into how school administrators may want to target their resources. We find, for example, that even returning students in the middle of a grade span feel less like they belong (less likely to report they are known or welcome) than top dogs. This suggests benefits to targeting resources to foster more welcoming environments for middle dogs and not just new students. Further, our evidence links TDBD status to academic outcomes, suggesting that fostering safer environments for bottom dogs may ease their transition to middle school and improve academic performance as well.

Our results provide empirical support for the TDBD hypothesis, even after addressing endogeneity of school grade span choice and time-invariant student characteristics. This suggests that the effect of TDBD status on student experiences ought to be considered to make optimal decisions on grade span length. In particular, the evidence in this article suggests that longer grade spans that enable middle grade students to serve as relative top dogs would improve student experiences in school and academic

achievement. Attending a K–8 school as opposed to a 6–8 school, for example, would benefit sixth graders because they would no longer be "new dogs" in the school, would benefit seventh-grade students because they would hold a higher relative position than had they attended a 6–8 school, and would benefit eighth graders because they would hold top dog status over a longer heap size. While wholesale school reorganization nationwide would be costly, there may be more opportunity to make such changes in urban areas, especially if such school districts are growing or declining and K–8 schools provide more efficient building use. Moreover, in places that do not reorganize elementary and middle school grade spans, this article provides strong evidence that resources should be committed to fostering safe learning environments for students who are not top dogs. While we can only speculate on how these policy recommendations would impact elementary-aged students, we are more certain of the positive effects they can have on the experiences and academic achievement of students in the middle grades.

Notes

[1]Students who are top dogs or bottom dogs in seventh grade (K–7, 6–7, 7–8, 7–10, 7–11, and 7–12 schools) are excluded because these grade spans most typically reflect schools that are phasing in or out, respectively. In all, 4,301 seventh-grade students were excluded. While some of these configurations are standard in other school districts (e.g., 7–8), they are not in New York City (NYC). Similarly, students who are bottoms dogs in eighth grade (schools serving eighth graders only and 8–12 schools) are excluded because all schools with these grade spans are being phased out. In all, 612 eighth-grade students were excluded.

[2]We test the sensitivity of the results to additional binary configurations (e.g., bullying takes a value of 0 for students answering never only and a 1 for students answering some of the time, most of the time, or all of the time). The results reported in this article are not sensitive to alternative variable construction and are available upon request.

[3]We assess the uniqueness of these measures using a factor analysis, finding the seven school environment outcomes fall into three main factors but further finding that the uniqueness of these measures are relatively high, ranging from .59 to .92. We therefore see value in reporting the results for the seven individual outcomes and do so throughout this article.

[4]The percentage change better captures how additional grades served affect student relative position than linear measures, but results are similar using both linear and logarithmic heap size.

[5]We use a generalized method of moments (GMM) distance test to assess the endogeneity of the top dog (TD) and bottom dog (BD) variables, comparing ordinary least squares (OLS) results to instrumental variables (IV) results. We reject the null hypothesis that TD and BD are exogenous for all but two of the nine outcomes (the two test score outcomes and the seven survey outcomes) we use in this article, suggesting students sort even conditional on observed student characteristics.

[6]We use a vector of binary variables to instrument for TDBD status, which include indicators for third-grade enrollment in a K–5, K–6, K–8, K–4, 3–6, 3–5, 1–5, or K–12 school, among others, and an interaction of each of these indicators with current grade.

[7]As a reference, when fights is the outcome of interest, the fully specified equation for Model 1 takes the form: $Fights_{ist} = \beta_0 + \beta_1 TD_{ist} + \beta_2 BD_{ist} + \beta_3 G_{ist} + \beta_4 X_{ist} + \alpha_i + \mu_{ist}$.

[8]In addition to the heap size models shown in this article, we also estimate individual TDBD effects for the most common middle school grade spans (i.e., 6–8, K–6, K–8, 6–12,

and 5–8). We estimate the effects of student grades within a given grade span as they are promoted through Grades 6, 7, and 8 as an intention-to-treat model, fixing students to grade span in sixth grade: $BSB_{ist}=\beta_0+\beta_1{}^{GS}TD_{ist}+\beta_2{}^{GS}BD_{ist}+\beta_3 G_{ist}+\beta_4 X_{ist}+\alpha_i+\mu_{ist}$, where all variables are as previously defined and superscript *GS* indicates that student *i*'s grade span in sixth grade is interacted with the variable (e.g., top dog status). These results are consistent with the findings shown in Figure 2 and are available upon request.

[9]We also estimate the impact of eighth-grade top dog status by tracking individual students as they move from seventh to eighth grade (rather than comparing different students in these grades). We find eighth-grade top dog status reduces bullying and gangs over seventh-grade middle dog status (a 4.0 and 4.2 percentage point decline, respectively), suggesting learning environments improve as students age through school.

[10]As noted previously, we also estimate TDBD effects as students move from sixth to eighth grade in common grade spans. Estimates are shown in Table S3 in the online journal. Consistent with the heap size estimates, these results show that schools with longer grade spans (K–8, 6–12, and 5–8) have larger TDBD effects than those with shorter grade spans (6–8). Moreover, student promotion within a grade span improves perceptions of the learning environment as students move from bottom to middle and eventually to top dog status.

[11]Returning bottom dogs and new top dogs are exceedingly rare and may reflect time varying unobserved characteristics of students or their schools. The standard errors for the impact estimates of these two statuses are very large, and the estimates themselves should be interpreted with caution. The purpose of this analysis is to test the robustness of the TDBD effect for returning top dogs (as compared to returning middle dogs) and new bottom dogs (as compared to new middle dogs). Not to estimate, for example, if returning bottom dogs (who almost exclusively attend schools in the process of phase out) differ from new bottom dogs.

[12]Given differences in male and female growth patterns and social norms around height, we estimate the effects of TDBD status and height separately by gender. These results are largely consistent with the results in Table 5 and across both genders. The results of TDBD effect by gender and height are available upon request of the authors.

[13]K–6 is a much more common grade span than 3–6; 6–8 is much more common than K–8 or 5–8.

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The Impact of Alternative Grade Configurations on Student Outcomes through Middle and High School*

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Abstract

We use statewide administrative data from Florida to estimate the impact of attending public schools with different grade configurations on student achievement through grade 10. Based on an instrumental variable estimation strategy, we find that students moving from elementary to middle school suffer a sharp drop in student achievement in the transition year. These achievement drops persist through grade 10. We also find that middle school entry increases student absences and is associated with higher grade 10 dropout rates. Transitions to high school in grade nine cause a smaller one-time drop in achievement but do not alter students' performance trajectories.

JEL Codes: H52, I21, I28

Keywords: Educational production, public schools, grade configuration, middle schools, high schools

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1. Introduction

Among the most basic questions facing education policymakers is how best to group students in different grades across schools. Interestingly, school systems around the world have answered this question in very different ways. In Germany, for example, students typically attend one school through grade 4 before moving to the school in which they will complete their secondary education. Finnish students, known for their strong performance on international assessments of student achievement, attend a single school from grades 2 to 10. The choice of grade configuration at minimum determines the number of structural school transitions students make, the age at which they make these transitions, and the relative age of the peers to whom they are exposed at various ages. While all of these factors could plausibly influence student outcomes, the literature on differences in student achievement across countries (Hanushek and Woessmann 2011) has largely ignored the issue of grade configuration.

In the U.S., a majority of students switch from elementary school to middle school in grade 6 or 7 before entering high school in grade 9. However, alternative paths through primary and secondary schooling were more common historically and remain available to students in many areas. Some American students attend K-8 or even K-12 public schools, while others move after elementary school into schools covering both middle and high school grades. The extent of this variation makes the U.S. a valuable potential source of evidence on the role of grade configuration in education production.

Recent findings from New York City (Rockoff and Lockwood 2010) indicate that entering a middle school causes a sharp drop in student achievement, suggesting that a return to K-8 grade configurations may be beneficial in that setting. However, it remains unclear whether this pattern is evident in other settings and whether the negative effect of middle school attendance persists into high school. The latter consideration is critical as a key rationale for the creation of middle schools was to ease students' transition to high school, and simply having experienced a prior school transition may make students more resilient to transition-related shocks to achievement. It is also unclear from existing evidence whether the transition to high school in grade 9 has negative consequences for students regardless of the grade configurations to which they were previously exposed.

We investigate these issues using statewide administrative data covering all students in Florida public schools from grades 3 to 10 for the school years 2000–2001 through 2008–

2009. To isolate the causal effect of entering middle school in grade 6 or 7 and of entering high school in grade 9, we use student fixed effects and instruments for middle and high school entry based on the grade span of the school each student attended in grades 3 and 6. Our identifying assumption is that selection into schools with different terminal grades prior to a potential transition to middle or high school is not correlated with unobserved student traits that cause changes in achievement coincident with the transition.

We find that students entering middle school in grade 6 or 7 make larger achievement gains prior to middle school entry than those who do not enter middle schools. Moving to middle school, however, causes a substantial drop in their relative performance. Specifically, math achievement falls by 0.124 (0.221) standard deviations and reading achievement falls by 0.086 (0.148) standard deviations for transitions at grade 6 (grade 7). These students' relative performance in both subjects continues to decline in subsequent middle school grades. Although our estimates of the negative effects of middle school attendance are largest in urban settings, they are substantial even in small towns and rural areas. We find little evidence that students who attended middle school make larger achievement gains than their peers' in grades 9 and 10, by which time most students have made another transition into a high school. In addition, students who attended middle schools are 1.4 percentage points (i.e., 18 percent) more likely not to be enrolled in a Florida public school in grade 10 after having attended in grade 9 (a proxy for having dropped out of school by this grade).

Investigating the transition to high school, we find that students who will eventually enter high school make larger gains in math and reading between grades 6 and 8 than students who do not move into a new school in grade 9. From grade 8 to 9 they suffer a small but statistically significant drop in relative achievement of 0.026 standard deviations in math and 0.043 standard deviations in reading. However, their relative achievement trajectories become positive again after this immediate drop at the transition to high school.

The achievement drops we observe as students move to both middle and high schools suggest that structural school transitions (or being in the youngest cohort in a school) adversely impact student performance. The magnitude and persistence of the effect of entering a middle school, however, suggests that such transitions are particularly costly for younger students or that middle schools provide lower quality education than K-8 schools for students in grades 6 to 8. Although administrative data indicate that Florida middle schools spend less per student, have larger student-teacher ratios, and have much larger cohort sizes than K-8 schools, we find little evidence that these differences account for their negative

effect on student achievement. Moreover, data from a recent survey of Florida principals conducted by Rouse et al. (2007) reveal few differences in the educational practices across schools with different grade configurations. The absence of compelling alternative explanations for the negative effects of middle school attendance suggests that adolescents may be more difficult to educate in settings that do not contain younger students.

The paper proceeds as follows. In Section 2 we review the history of grade configuration in the U.S. and previous literature on the effects of middle school attendance. Section 3 describes our data, while Section 4 presents our methodology and main findings concerning the effects of grade configuration on student achievement. Section 5 considers the robustness of these results, heterogeneity in the effects of grade configuration on student achievement, and the effects of grade configuration on attendance and school dropout by grade 10. Section 6 uses administrative and survey data to evaluate potential explanations for our findings. Section 7 concludes.

2. Background and evidence on grade configuration in the U.S.

Conventional wisdom on the optimal grade configuration in the U.S. has evolved over time in response to enrollment pressures and the emergence of new pedagogical theories. Historically, the vast majority of U.S. public school districts had a single elementary school serving grades K-8 and, later, a secondary school serving grades 9-12. Beginning in the early 1900s, many districts responded to growing enrollments by creating junior high schools serving grades 7-9 (or 7-8). Advocates of this approach argued that junior highs made it possible to prepare adolescent students for the academic rigors of high school without exposing them to substantially older students (Juvonen et al. 2004).

By the late 1960s, a loose coalition of reformers argued that by grade 6 (or even grade 5), students had unique social, psychological, and academic needs that were best served by placing them into separate schools (National Middle Schools Association 1995). In "one of the largest and most comprehensive efforts at educational reorganization in the history of American schooling" (George and Oldaker 1985, p. 79), the middle school serving grades 6-8 (or 5-8) rapidly displaced the junior high school starting in grade 7 as the dominant model for adolescent students attending American public schools (see figure 1.). Although a definitive explanation for this change is lacking, it does not appear to have been driven by parental demand: Fewer than 5 percent of American private school students in grades 6 and 7 attend middle or junior high schools (Rockoff and Lockwood 2010).

More recently concerns about the performance of middle schools have led several urban school districts to experiment with a return to the K-8 model (Hough 2005). Evidence suggesting that the relative standing of American students on international assessments of student achievement declines in the middle grades has also contributed to a broader reconsideration of the organization and approach of schools serving adolescent students (see, e.g., Schmitt et al. 1999, Juvonen et al. 2004).

Research on the causal effect of alternative grade configurations through middle and high school is limited, however. Developmental psychologists have documented a decline in achievement-related attitudes and beliefs among students transitioning to middle schools, which some have attributed to a mismatch between the motivational and developmental needs of early adolescents and aspects of the organizational environment in middle schools (Eccles and Midgley 1989). Studies using cross-sectional data have likewise shown that middle school transitions are associated with increased behavioral problems and declines in academic achievement (Allspaugh 1998, Byrnes and Ruby 2007, Cook et al. 2008), but these findings could reflect unobserved differences between students attending schools with different grade configurations. Bedard and Do (2005) use panel data on American school districts to show that increases in the share of 6th graders enrolled in middle schools were associated with small decreases in graduation rates for the relevant cohorts. Their analysis, however, focuses narrowly on whether students in grade 6 should remain in an elementary school or attend a middle school, ignoring the once common K-8 alternative.

The most convincing evidence comparing middle (or junior high) and K-8 grade configurations comes from Rockoff and Lockwood (2010), who develop the identification strategy that we apply in our empirical analysis.[1] In particular, they control for student fixed effects and instrument for middle school entry in New York City public schools with the terminal grade of the school students attended in grade 3. Their results indicate that, in New York City, moving to a middle school in grade 6 or grade 7 causes a large drop in student achievement that persists through the end of grade 8. It remains unclear, however, whether similar patterns hold outside of urban districts or if students attending a K-8 school suffer a larger drop in achievement when moving to high school. Moreover, the effect of the transition

[1] Using earlier data from New York City, Schwartz et al. (forthcoming) also find that, conditional on achievement in grade 4, students attending 5-8 or K-8 schools outperform students attending grades 6-8 or grades 7-8 middle schools in grade 8.

to high school has not, to our knowledge, been investigated in a rigorous manner. Our empirical analysis aims to fill these gaps.

3. Data and descriptive statistics

The data for our analysis are drawn from the Florida Department of Education's PK-20 Education Data Warehouse and contain information on all Florida students attending public schools in grades 3 to 10 from the 2000–2001 through 2008–2009 school years. Our data extract includes the school each student attends and its location; student characteristics such as ethnicity, gender, special education classification, and free lunch status; and annual measures of absences and state math and reading test scores. We normalize these test scores by subject, year, and grade to have a mean of zero and a standard deviation of one.

We construct three different estimation samples, all of which exclude students who were missing school information, were retained in the same grade more than twice, or skipped or moved down a grade. First, to estimate the impact of middle school entry in grade 6 or 7, we construct a balanced panel of students in the four cohorts enrolled in grade 3 between 2001 and 2004 who completed the state test in both math and reading in each of the following five years. Second, to investigate whether the effects of middle school entry persist through grades 9 and 10, we construct a balanced panel of students in the two cohorts enrolled in grade 3 between 2001 and 2002 who were tested in both math and reading each of the following seven years. Finally, to estimate the effect of entering high school in grade 9, we construct a third balanced panel of students in the five cohorts enrolled in grade 6 between 2001 and 2005 who were tested in both math and reading the following four years.

Columns 1 to 3 of Table 1 provide summary statistics for the students in the balanced sample covering grades 3 to 8. At grade 3, 89% of the students in this sample attended a K-5 school, 8% attended a K-6 school, and 3% attended a K-8+ school.[2] Relative to students enrolled in K-5 or K-6 schools, students in K-8+ schools in grade 3 were more likely to reside in towns or rural areas rather than urban fringe communities but equally likely to reside in large cities. Thus, although the vast majority of Florida public school students attend a K-5

[2] K-8+ schools include all schools covering all grade ranges up to grade 8 regardless whether grade 8 is highest grade served by the school or not. Less than one percent of all students attended K-3, K-4 or K-7 schools in grade 3 and are omitted from our analysis.

school followed by a middle school serving grades 6 to 8, there is substantial variation in grade configurations even within similarly sized communities.[3]

Compared with students attending K-6 or K-8+ schools, students in K-5 schools are less likely to be white and more likely to receive free or reduced price lunch. They also have lower test scores but are equally likely to be receiving special education and have similar numbers of absences. Looking at the same students 5 years later, we see that the gap in test scores between students who attended a K-8+ school in grade 3 and students who attended a K-5 school has widened and that K-8+ students are absent less often than their K-5 counterparts. Notably, the percentage of students who were retained in the same grade at any point during this five-year period is very similar across the three groups.

Columns 4 to 6 of Table 1 present summary statistics on the students in the balanced sample covering grades 3 to 10. Sample sizes across all three groups are significantly reduced due to the exclusion of two cohorts of students and students with missing test score data in grades 9 and 10. However, the pattern of differences across groups is very similar to the pattern in columns 1 to 3. In particular, the test-score gap between students who attended a K-8 school in grade 3 and students who attended a K-5 school widens in both subjects between grades 3 and 10.

Table 2 provides summary statistics for our third balanced sample covering grades 6 to 10. Because our strategy to identify the effect of entering high school in grade 9 uses the grade range of schools attended in grade 6 as an instrument, we present these statistics for five different types of schools that students attended in grade 6: 6-8, K-8, K-6, K-12, and 6-10+.[4] Of the grade 6 students in this sample, 88% enrolled in a 6-8 school, 6.7% enrolled in a K-6 school, 2.6% enrolled in a K-8 school, 0.8% enrolled in a K-12 school, and 2% enrolled in a 6-10+ school. Students attending the two school types in grade 6 that would not predict a school change at grade 9 (K-10+ and 6-10+ schools) are more likely to be white and living in towns or rural areas compared to students in the other school types. Students attending K-10+

[3] We identify the grades offered by each school based on the students we observed enrolled in the school in our administrative data. This approach yields grade ranges that differ in only a few instances from those provided by the National Center for Education Statistics' Common Core of Data (CCD). Results using the CCD grade ranges are virtually identical to those presented here and are available from the authors upon request.

[4] Our data do not allow us to identify schools covering grades above grade 10. A very small fraction (less than 1%) of students attends schools with grade ranges not included in Table 2; we drop these students from our analysis.

schools outperform students from all other school types in math and reading in grade 6, while the grade 6 performance of 6-10+ school students is very similar to that of students in 6-8 and K-8 schools. By grade 10 the test-score gap between 6-8 students and K-10+ has decreased slightly, while the gap between 6-8 students and K-6 students has decreased substantially. Moreover, 6-8 students now outperform 6-10+ students but do worse than K-8 students.

4. Empirical analysis

Our strategy for identifying the impacts of alternative grade configurations on student achievement parallels and extends that of Rockoff and Lockwood's (2010) study of New York City middle schools. That is, we focus on variation in achievement within students over time and develop instruments for middle school entry based on the terminal grade of the school each student attended in grade 3. We then conduct an analogous analysis of high school entry using instruments based on the terminal grade of the school attended in grade 6. In taking this approach, we assume that differences across students attending schools with different grade ranges in grade 3 and 6 are, respectively, uncorrelated with deviations from trends in achievement that coincide precisely with students' movements into middle schools and high schools.

To simplify presentation, we focus the discussion of our estimation strategy on the analysis of middle school entry. We model outcome Y_{ig} of student i in grade g as a function of student fixed effects α_i, grade fixed effects δ_g, and a set of dummy variables M_{ig}^{G} indicating whether student i observed in grade g entered middle school in grade G:

$$Y_{ig} = \alpha_i + \delta_g + \beta_g M_{ig}^{G} + \gamma X_{ig} + \varepsilon_{ig}. \quad (1)$$

The control vector X_{ig} includes variables indicating whether student i was retained in grade g, had ever been retained between grade 3 and grade g, and attended a charter school in grade g. The error term in Equation (1), ε_{ig}, includes unobserved individual traits that vary over time and other factors that influence academic outcomes. The grade fixed effects (δ_g) therefore capture patterns of achievement over grades for students who do not enter a middle school in grades 6 or 7.

We allow the coefficient on M_{ig}^{G} to vary across grades in order to estimate relative differences in outcomes between students entering middle schools and students who do not before and after potential middle school entry. This enables us to compare the immediate change in outcomes at potential middle school entry with prior and later trends in outcomes.

As demonstrated below, these comparisons are useful in evaluating the plausibility of our identifying assumption and in gauging the persistence of any impacts of middle school entry.

OLS estimates of Equation (1) could be biased due to the fact that the decision to attend a middle school is endogenous and could be correlated with unobserved shocks to achievement. For example, parents may enroll their child in a middle school in response to an experience (e.g., a bad school experience, a divorce, a residential move) that negatively affects achievement. Alternatively, parents may exploit the opportunity middle schools provide to seek out a higher quality school in which their child could start with a full cohort of new students (c.f., Rivkin et al. 2004). To address these concerns we instrument for middle school entry in grade 6 or 7 using the terminal grade of the school a student attended in grade 3. In doing so, we assume only that any unobserved shocks to achievement are not anticipated and reflected in the choice of a school with a particular grade configuration in grade 3.

We implement this estimation approach by estimating a two-stage least squares (2SLS) model in which the set of first stage equations is given by:

$$M_{ig}^{G} = \phi_i + \kappa_g + \theta_g T_{ig}^{G} + \lambda X_{ig} + \eta_{ig}. \quad (2)$$

The instrument, T_{ig}^{G}, indicates the terminal grade of the school student i attended in grade 3 (6) interacted with an indicator for grade g. For example, we instrument for middle school entry in grade 6 with an indicator for whether the school the student attended in grade 3 ended at grade 5 two years later. We estimate Equation (2) separately for each combination of the grade that students might enter middle school and grade g. Based on these estimations, we obtain predicted values for each $M_{ig}{}^{G}$. In the second stage we then estimate Equation (1) using the predicted values for each indicator variable $M_{ig}{}^{G}$ instead of their actual values and apply the standard procedure to adjust standard errors.

Table 3, which reports regression results based on a simplified version of the first stage, demonstrates that these instrumental variables are strong predictors of actual entry into middle school.[5] Columns 1 to 4 report estimated coefficients on the instruments for entry into middle school in grade 6 and grade 7. In both middle school samples, the estimated coefficients on the instruments for entry into middle school in grade 6 and grade 7 are between 0.6 and 0.7 and highly statistically significant. Column 5 reports the estimated coefficient on the instrument for entry into high school in grade 9, which is based on the

[5] Results from the actual first stage regressions are available from the authors upon request.

terminal grade of the school attended in grade 6.[6] The coefficient on the instrument for entry into high school is 0.724 and also highly significant.

While the first stage results suggest that terminal grades of schools attended in grade 3 and 6 are highly related to middle and high school entry, compliance is not perfect. Thus, our instrumental variables (IV) approach will identify a local average treatment effect (Imbens and Angrist 1994) for the subset of students who switch to middle school (high school) in accordance with their grade 3 (6) schools' grade ranges. This effect might be different from the average treatment effect in the overall population. For example, some parents of children attending K-5 elementary schools might react to the perceived quality of their local middle school by enrolling their children in a K–8 school in grade 6. Alternatively, parents concerned about the academic progress of a child attending a K-8 school during elementary grades might switch to a middle school. Residential moves could also lead to non-compliance when families relocate to areas with different grade configurations. While it is difficult to assess how the local treatment effect that we identify would differ from the average treatment effect in the full sample, the effect for the complier population is of considerable policy interest. This is particularly true in situations where choice among grade configurations is limited and compliance can be expected to be close to one.

To clarify our IV method and preview our findings, we first present reduced-form results showing the effect of predicted middle school entry based on the balanced sample covering grades 3 to 8.[7] Figure 2 charts the math and reading achievement of students attending K-5 and K-6 schools in grade 3 relative to those of students attending K-8 schools in grade 3.[8] As our identification is based on changes in achievement trajectories within students, differences in grade 3 achievement across these groups of students have been normalized to zero. The dashed vertical lines at grade 5 and 6 indicate predicted middle school entry based on the terminal grade of the school students attend in grade 3.

Each panel reveals a positive trend in relative student achievement prior to predicted middle school entry, suggesting that students attending a K-5 or K-6 in grade 3 experience

[6] For the small number of students attending K-6 schools in grade 6, we construct the instruments based on the terminal grade of the school they attended in grade 7.

[7] Reduced-form results based on the balanced sample covering grades 3 to 10 and for the IV estimation of the effect of high school entry are available from the authors upon request.

[8] The differences reported in Figure 2 are based on estimated coefficients of the reduced-form of our IV approach including student fixed effects.

larger gains in achievement prior to their predicted middle school entry than students observed in K-8 schools in grade 3. After predicted middle school entry, however, we observe a sharp break in this trend. Students suffer a sharp drop in relative achievement at the predicted middle school grade that appears to grow in the following year. After predicted middle school entry students observed in a K-5 or K-6 school in grade 3 lag well behind their K-8 counterparts.

The pattern evident in the reduced-form estimates is useful in clarifying our identifying assumption. The grade configuration of the school a student attends in grade 3 is clearly not exogenous. While student fixed effects eliminate differences in achievement levels across students in grade 3, the type of school attended in grade 3 could still be correlated with unobserved student characteristics that affect learning trajectories. It is therefore ambiguous whether the positive trend in relative achievement prior to predicted middle school entry reflects differences in school quality or simply selection into grade 3 school types that is correlated with learning trajectories. Especially given this positive trend, however, we contend that there is no plausible selection into K-5 and K-6 schools in grade 3 based on unobserved student characteristics that would cause a drop in relative achievement in the specific year students enter middle schools.

4.1 The effect of middle school entry on student achievement

We now present our estimates of the causal effect of entering middle school. We begin with results based on the balanced sample covering grades 3 to 8. Recall that our coefficients of interest are the interactions between grade level and having entered a middle school in grade 6 or grade 7 (β_g). These coefficients indicate at each grade level whether the achievement of students entering middle schools differs from that of students who never attend a middle school. Coefficients for these estimates are plotted in Figure 3. The estimates and standard errors (clustered by the school the student attended in grade 3) appear in Appendix Table A-1.

Figure 3 confirms that students who will enter middle school in grade 6 or 7 have positive achievement trajectories in math and reading from grade 3 to 5, relative to their counterparts who never enter middle school. However, achievement in both subjects falls dramatically in grade 6 for students who enter middle school in that grade. In contrast, students who enter middle school in grade 7 continue to improve relative to their K-8 peers

through grade 6, but experience a sharp drop in achievement upon entering middle school in grade 7.

To assess the relative magnitude and statistical significance of the grade-to-grade variation in achievement evident in Figure 3, Tables 4a and 4b report annual changes in estimated coefficients (β_g). Columns 1 and 2 correspond to the estimates based on the balanced sample covering grades 3 to 8 and plotted in Figure 3. The negative effects of entering middle school reported in Tables 4a and 4b are large and statistically significant at both grade 6 and grade 7. Our 2SLS estimates indicate that math achievement falls by 0.12 (0.22) standard deviations and reading achievement falls by 0.09 (0.15) standard deviations for transitions at grade 6 (grade 7).

Consistent with Rockoff and Lockwood (2010), we find that these negative effects persist during middle school grades. While students entering middle schools make larger achievement gains prior to middle school entry than students who never enter middle school, this pattern is reversed after middle school entry. All of the relevant estimates of grade-to-grade changes displayed in columns 1 and 2 of Tables 4a and 4b are negative and most of them are statistically significant.

By grade 8, students entering middle school in grade 6 are estimated to underperform by 0.13 standard deviations in math relative to students who never entered middle school, and students entering middle school in grade 7 are estimated to underperform by 0.13 standard deviations in math and 0.09 standard deviations in reading (see Table A-1). The estimated difference in reading achievement between students entering middle school in grade 6 and students who never entered middle school is also negative but statistically insignificant. Note that these grade 8 comparisons incorporate the positive achievement trends students experienced in elementary schools along with the negative immediate and subsequent impact of middle school entry. Because these positive achievement trends prior to middle school entry could reflect selection into K-5 and K-6 schools related to achievement trajectories, we consider the level differences in achievement at grade 8 lower-bound estimates of the negative effect of experiencing a middle school grade configuration.

As noted above, however, one concern with using these comparisons to evaluate the merits of middle school grade configurations is that they do not reflect what happens upon transition to high school. A unique advantage of the Florida data is their inclusion of state test scores that allow us to study the persistence of middle school effects through grades 9 and 10.

Figure 4 plots estimated coefficients of the interactions between grade level and entering a middle school in grade 6 or grade 7 (β_g) based on the balanced sample covering grades 3 to 10. The point estimates and with corresponding standard errors are shown in Appendix Table A-2 and the corresponding estimates for grade-to-grade gains in achievement are reported in columns 3 and 4 of Tables 4a and 4b. The overall pattern of results through grade 8 is very similar to the pattern in Figure 3, although the estimates are less precise due to the fact that they are based on only two cohorts of students.

We find little evidence that students who attended middle schools make larger achievement gains than students who did not between grades 8 and 9. The lone exception are students entering middle schools in grade 7, who are estimated to make a relative gain of 0.05 standard deviations in reading. These same students, however, were estimated to have experienced a cumulative loss of 0.30 standard deviations in reading between grades 6 and 8. Comparing achievement levels in grade 10, students entering middle schools in grade 6 underperform students who never entered middle school by 0.12 standard deviations in math. Differences in the reading and math achievement of students entering middle schools in grade 7 are negative but are not statistically different from zero. Comparing these differences in grade 10 to the differences just prior to middle school entry, however, we see statistically significant and quite substantial and losses for students entering middle schools in grade 7 relative to students who never enter middle schools.

In sum, our analysis indicates that the negative effects of transitioning to a middle school persist through the first two grades of high school. We find very little support for the hypothesis that students who attended middle schools benefit at the transition to high school from their previous experience with school transition or from the specific educational program available in middle schools.

4.2 The effect of high school entry on student achievement

It remains possible that entering high school in grade 9 affects students' achievement regardless of whether they attended a middle school. To provide evidence on this issue, we apply the 2SLS estimation strategy represented in Equations (1) and (2) with four modifications. First, we redefine M_{ig} to indicate whether student i observed in grade g entered high school in grade 9. Second, our instrument, T_i, now indicates the terminal grade of the school student i attended in grade 6. Third, we estimate the 2SLS model using a balanced sample covering five cohorts of students in grades 6 to 10. Finally, we now cluster standard

errors by the school students attended in grade 6. The presentation of results remains identical. Figure 5 plots the estimated coefficients reported in Appendix Table A-3, while Column 5 of Tables 4a and 4b reports the differences between the estimated coefficients in consecutive grades and their standard errors.

Figure 5 shows that students entering high school in grade 9 make larger gains in math and reading from grade 6 to grade 8 than do students who do not enter high school in grade 9. In grade 9 we observe a small but statistically significant drop in relative achievement: math achievement falls by 0.03 standard deviations and reading achievement falls by 0.05 standard deviations. However, relative achievement begins to increase again after this immediate drop at the transition to high school. From grade 9 to 10, students entering high school in grade 9 gain 0.02 standard deviations in math; relative reading achievement gains are statistically insignificant but have a positive sign. Comparing achievement levels in grade 10, students entering high school in grade 9 are estimated to gain 0.11 and 0.13 standard deviations more in math and reading, respectively, between grades 6 and 10 than students who do not enter high school in grade 9.

The identification strategy has the same justification as before. Given that we observe an increasing trend in relative achievement before high school entry, we cannot think of any reason that enrollment in grade 6 should be correlated with unobserved student characteristics that cause a drop in achievement that coincides with high school entry. Thus, we are confident that the estimated drops in achievement at high school entry reflect a causal effect. In contrast to the immediate drops in achievement at middle school entry, however, the immediate effect of high school entry is relatively small. More importantly, we find no evidence that high school entry alters students' achievement trajectories.

5. Robustness analysis, effect heterogeneity, and behavioral outcomes

In this section, we first examine whether the results reported above are sensitive to various changes in the sample definition and model specification. Having demonstrated the robustness of our preferred estimates, we examine whether the effects of middle school and high school entry vary across student subgroups defined in terms of gender, prior achievement, ethnicity, and community type. Finally, we provide evidence on the extent to which alternative grade configurations also affect outcomes other than standardized test scores including attendance, dropout behavior, and retention in grade 9.

5.1 Robustness analysis

Tables 5a and 5b present results of alternative specifications intended to demonstrate the robustness of our estimates of the effects of grade configuration on student achievement in math and reading, respectively. For each transition, we report changes in relative performance prior to the transition, the immediate change in relative performance at the transition ("drop"), and the changes in relative performance after the transition. For example, for the transition to middle schools in grade 6, the prior trend refers to the total change in relative achievement from grade 3 to grade 5, "drop" refers to the change in relative performance from grade 5 to grade 6, and the post trend represents the change in relative achievement from grade 6 to grade 8. We report the results of our preferred specification in this format in each table's first row.

The first issue we address is the inclusion of charter schools in our estimation samples. Charter schools accounted for nearly half of all K-8 schools in operation in Florida during our analysis period and fewer than 10 percent of middle schools. Although our preferred specification controls for charter school attendance, one might still worry that the substantially higher share of charter K-8 schools influences our results.[9] Row 2 of Tables 5a and 5b, which report the results of specifications which exclude students who attended a charter school in any grade, show that this restriction has a negligible impact on the results.

Another potential concern relates to our definition of middle schools. In our main analysis we identify middle school transitions using only information on the lowest grade that a school serves. For example, we code a student as moving to a middle school in grade 6 if we observe the student switching to a school that begins in grade 6. Although the vast majority of these middle school entries are in fact changes to "true" middle schools which end at grade 8, some students identified as moving to middle schools in fact enter schools that also include high school grades. Row 3 of Tables 5a and 5b confirms that our results are unchanged if we exclude students moving to schools that do not end in grade 8.

Differences in grade retention could also affect our results. In our preferred results we address the problem of selective retention by excluding students retained in the same grade more than twice and by controlling for both whether students were repeating a given grade

[9] Using a student fixed effects approach to study the effectiveness of Florida charter schools, Sass (2006) finds that new charter schools are initially less effective than traditional public schools but that they outperform traditional public schools in reading and are as effective in math by year five.

and whether they had repeated a prior grade. However, to the extent that middle school or high school entry affects students' probability of being retained, it is unclear whether the controls are appropriate. We therefore use two alternative strategies as robustness checks: excluding students retained in any grade and eliminating both retention controls. Rows 3 and 4 of Tables 5a and 5b demonstrate that these changes to the specification and estimation sample do not alter our findings.

Our results could in theory be biased by selective test-taking or other sources of non-random sample attrition. While we cannot observe test scores for students who were not tested, left the state, or enrolled in private schools, we can relax our balanced sample restriction and include students missing test scores in some grade levels. Row 5 of Tables 5a and 5b confirms that doing so does not affect our results. While relaxing the balanced sample restriction is not a definitive test for selection bias, the results of this robustness check again strengthen the causal interpretation of our results.

Finally, we address the possibility that our results reflect differences across school districts that rely on alternative grade configurations by presenting results separately for Dade County (Miami) Public Schools. With more than 345,000 students currently enrolled, Dade County is the largest district in Florida (and the fourth largest in the United States) and includes schools offering a wide range of alternative grade configurations through grade 8. The last row of Tables 5a and 5b, which are based only on students attending Dade County Public Schools, show that the negative effects of middle school entry at grade 6 or grade 7 are, if anything, even more pronounced than they are statewide. These results confirm that our overall findings are not driven by unobserved district characteristics but also raise the possibility that the negative effects of middle school entry are only notable in urban settings, an issue we address in the next section.

5.2 Subgroup analysis

The average effects presented so far could conceal important heterogeneities in the effects of middle school and high school entry. We explore possible heterogeneous effect along four dimensions: school location, prior test performance, ethnicity, and gender. The results of these subgroup analyses are reported in Tables 6a and 6b.

We first take advantage of our statewide database to investigate differences in the effects of middle school and high school entry across communities of varying sizes. Psychologists have hypothesized that the "developmental mismatch" arising at the transition

to middle school is most pronounced for urban youth (Seidman et al. 1994), and virtually all of the research comparing middle and K-8 grade configurations has focused on urban school districts. We use Census Bureau classifications to group students into three categories according to the location of the school they attended in grade 3: large or midsize cities; in the urban fringe of a large or midsize city; and in towns and rural areas. The overall pattern of results (rows 2-4) suggests that the negative effects of entering middle school are in fact most pronounced in cities; this is clearly the case for transitions at grade 6 or 7 in math and at grade 6 in reading. They remain sizeable and statistically significant even in rural areas, however, confirming that the negative effects of middle school grade configurations are by no means limited to urban school districts.

Consistent with this pattern, we find substantially larger negative effects of middle school entry in math for students with below median achievement levels in grade 3 (rows 5-6). Lower-achieving students also experience larger gains in math achievement prior to enrolling in a middle school and larger declines after the initial transition to middle school. Students with below-median test scores in grade 6 also experience a larger drop in math achievement upon the transition to high school. These patterns are consistent with the idea that lower-achieving students have access to fewer educational resources outside of schools and may therefore be more strongly influenced by school transitions or changes in school quality. However, we find no clear indication of differences in effect sizes between higher- and lower-achieving students in reading.

Results for students of different ethnicities (rows 6-8) follow a similar pattern, with traditionally disadvantaged subgroups exhibiting larger effects of grade configuration in math. Black students in particular experience large relative gains prior to middle school entry but then suffer far larger drops both at and following the transition. Again, however, we find only small and statistically insignificant differences between the effects estimated for students of different ethnicities in reading.

Finally, we examine whether the effects of middle and high school transition on student achievement vary with student gender. Although early work in psychology (e.g., Simmons and Blyth 1987) suggested that school transitions might be particularly harmful for the self-esteem of adolescent girls, the Moving to Opportunity housing voucher experiment indicated that girls responded more positively than boys to an intervention involving neighborhood (and often school) transitions (Kling et al. 2005, Sanbonmatsu et al. 2006). Consistent with Rockoff and Lockwood's (2010) findings concerning middle school entry in

New York City, however, we find no differences in effect size for girls and boys (rows 2 and 3).

5.3 Dropout, absences, and grade retention

We supplement our findings on math and reading achievement with similar analyses of the effects of middle school and high school entry on student absences, a proxy for high school dropout by grade 10, and retention in grade 9. Panel A of Table 7 shows the estimated effects on the relative days of absence in a school year of middle- and high school entry. For the smaller sample of students entering middle school in grade 7, we find that absences increase by roughly one day per year upon the transition to middle school and by an additional 0.4 days per year over the following two years, both as compared to students who never enter middle school. Given that the average Florida student is absent 8 days in grade 6, this effect is quite large. However, we find no significant effect on absences for students entering middle school in grade 7, making it unlikely that student absenteeism accounts for more than a negligible share of the effects of middle school attendance on achievement. Interestingly, entering high school in grade 9 appears to decrease student absence by 1.3 days per year, again suggesting that the transition to high school is less disruptive for students than is the transition to middle school.

Grade configuration patterns could also influence the likelihood of dropping out from high school. Although early arguments for the creation of middle schools emphasized their value in promoting student engagement and success in high school, Bedard and Do (2005) find that school districts with a larger share of grade 6 students in middle schools had lower high school completion rates 7 years later. The economic costs to individuals of dropping out are substantial (Oreopolous 2007), and our finding that the effects of middle school attendance on math achievement are most pronounced for lower-achieving students and ethnic minorities also suggests the value of considering dropout as an additional outcome variable.

Unfortunately, our ability to study the effects of middle school attendance on dropout behavior is limited in two ways. First, we do not have a direct indicator that students have dropped out of school. We instead construct a proxy for high school dropout before grade 10 based on whether they are enrolled in a Florida public school in the year after they were in grade 9. Because we do not observe students enrolled in private schools, enrolled in schools in another state, or having transferred to a homeschooling or adult education program, this variable should exaggerate the extent of actual school dropout. And, in fact, while official

statistics indicate that annual grade 10 dropout rates in Florida are between 3 to 4 percent, our proxy measure indicates an annual rate of 8 percent.

Second, as we can only construct this measure of school dropout in grade 10, we can only estimate a cross-sectional version of Equation (1) with our binary dropout indicator as the dependent variable. While we can include grade 3 math and reading achievement as control variables, the identifying assumption of our IV approach becomes more restrictive. We now must assume that enrollment in schools with different grade ranges in grade 3 is not correlated with unobserved student traits that affect dropout probabilities. For this reason, we report OLS estimates of the effect on dropout alongside our IV estimates and admit that we are less confident in the causal interpretation of our results.

With these caveats in mind, we present in Panel B of Table 7 estimates of the effect of middle school and high school entry on school dropout. Our preferred IV results indicate that the probability of dropping out by grade 10 is 1.4 percentage points (or roughly 18 percent) higher among students who entered middle school in grade 6; the OLS results likewise suggest an increase of 1.0 percentage points. The point estimates for the effect of middle school entry in grade 7 are also positive and roughly 60 percent as large as the effects of entering middle school in grade 6, but they are statistically insignificant in both OLS and IV specifications. Introducing controls for grade 9 test scores in math and reading reduces the size of the IV point estimate by almost half (to 0.008) and eliminates its statistical insignificance.[10] This suggests that the relationship we document between middle school entry and early dropout may be driven by the effects of middle school entry on academic achievement, but we cannot rule out the possibility that grade configurations also have a direct effect on high school dropout.[11]

Interestingly, the OLS estimate of the effect of high school entry indicates a large reduction in the probability of dropping out among students moving to high schools in grade 9 but the IV estimate is very close to zero. This likely reflects the fact that several of the Florida schools with non-traditional grade spans at the secondary level are designed for at-risk

[10] These results are available from the authors upon request.

[11] Subgroup analyses available upon request suggest that the relationship between middle school entry and dropout behavior is strongest for black students, for whom IV estimates of the effect of middle school entry were 0.049 and 0.052 (and statistically significant) at grades 6 and 7, respectively. However, the IV estimate of the relationship for grade 6 middle school entry for white students remains large (with a point estimate of 0.015) and statistically significant.

students. Students who attend such schools, but who were not predicted to do so based on their grade configuration in grade 6, are at greater risk of dropping out.

A closely related outcome is retention in grade 9, which has been shown to be a strong predictor of eventually dropping out of school (Allensworth et al. 2005). In Panel C of Table 7 we therefore use similar cross-sectional models to examine how middle school is related to grade 9 retention rates. We find no evidence that middle school entry in grade 6 affects grade 9 retention rates, but middle school entry in grade 7 appears to increase the probability of retention in grade 9 by 1 percentage point. It is unclear why the pattern of results for students entering middle schools in grades 6 and 7 is reversed for this indicator. At a minimum, however, the two sets of results cast doubt on arguments that middle schools, despite their apparently negative effects on student achievement, result in increased high school completion.

6. Potential mechanisms for the effects of middle school entry

The results presented above show that transitions into both middle schools and high schools cause drops in student achievement but that these effects are far larger and persistent only for students entering middle schools. We also find negative effects of transitions on student attendance only for students entering middle school in grade 6. One possible interpretation of this pattern is that school transitions are more disruptive for younger students, possibly because they are more susceptible to the negative influence of older students (Cook et al. 2008). In contrast to Rockoff and Lockwood (2010), however, our point estimates suggest that the effect of middle school entry on student achievement is larger for students entering in grade 7 than for students entering in grade 6. Moreover, the fact that relative achievement continues to decline after students' initial entry into middle schools suggests that average educational quality in Florida is lower in middle schools than in K-8 schools.

To explore why this might be the case, we first present in Table 8 administrative data on several characteristics of Florida elementary, middle, and K-8 schools during the 2005-06 school year.[12] Florida middle schools spend 11% less per student and have larger student/teacher ratios than K-8 schools, suggesting a potential role for differences in overall

[12] Given that our main findings were robust to the exclusion of charter schools (Row 2 of Tables 5a and 5b) and data on school characteristics are unavailable for many charter schools, we exclude these schools from Table 8.

resource levels. In contrast, we find no evidence that differences in observed teacher characteristics could explain our findings. Average teacher experience and average teacher salaries are similar across school types, while the share of the school's instructional staff without prior experience is higher in K-8 schools (26.9% vs. 21.3%). Of course, middle school teachers could still be worse in unobserved ways, a possibility we consider below with survey data. The most striking difference across school types, however, involves cohort sizes. Although middle schools offer fewer grades than K-8 schools, Florida middle schools on average enroll 146 more students than their K-8 counterparts. As a result, their typical grade cohorts are almost three times as large.

We conduct two analyses to shed light on whether these observed differences between middle schools and K-8 schools are likely to contribute to differences in school quality. First, we include each of the variables listed in Table 8 as controls in our IV estimations of the effects of middle school entry on student achievement through grade 8. The results, plotted in Appendix Figure A-1, confirm that the overall pattern of estimates remains quite similar. Second, for the sample of students entering middle schools in grade 6, we separately regressed their grade 6 math and reading test scores on their grade 5 scores and each school characteristic reported in Table 8. In other words, we examined whether the size of the drop in relative achievement suffered by students entering middle schools in grade 6 varied with the characteristics of the middle school they attended. A second set of regression models in each subject controlled additionally for the same characteristic of the elementary school the student attended in grade 5 and therefore relates the size of the middle school drop to changes in the relevant indicator.

The results of the latter exercise are presented in Table 9. Although the potential endogeneity of school resource levels and cohort sizes makes this exercise less than definitive, the estimates again provide little evidence that low middle school quality stems from differences in the characteristics we observe. For example, students moving in grade 6 to middle schools with higher spending levels actually suffered larger drops in relative achievement during this transition. Although average teacher experience is positively correlated with grade 6 achievement, teacher experience levels did not differ significantly across school types. Finally, larger middle school cohort sizes were positively related to changes in achievement from grade 5 to grade 6. The one exception in which a variable on which middle and K-8 schools differed was correlated with grade 6 achievement such that the difference might explain lower middle school quality is student/teacher ratio, but the

estimated relationship is too small to account for more than a fractional amount of the effects of middle school entry on student achievement.[13]

Middle schools could also differ in their educational practices from K-8 schools in ways that lead to lower student achievement gains. To explore this possibility, we draw on a unique survey of Florida school principals of conducted in 2003-04 to document responses to the state's high-stakes accountability system (Rouse et al. 2007). The survey's confidentiality restrictions preclude us from linking survey responses to specific schools, but we can nonetheless document any differences in the average responses offered by principals of different school types.

Table 10, which presents data from relevant survey items by school type, reveals few statistically significant differences in the educational practices of middle and K-8 schools. In particular, we observe no differences in the length of the school day or in any of three indexes measuring the extent to which schools had adopted specific policies to help low-performing students, policies to improve the performance of ineffective teachers, and incentives to reward highly effective teachers. If anything, these measures suggest that middle schools are more likely to have policies aimed at improving student achievement. We also find no differences across school types in an index measuring the degree of teacher autonomy. A battery of questions related to scheduling and staffing policies indicates that middle schools are more likely than K-8 schools to provide teachers with common preparation periods (81% vs. 70%), more likely to organize teachers into teams (92% vs. 76%), and less likely to have teachers "loop" with the same classroom of students across multiple grades (14% vs. 31%). These differences are relatively modest in size, however, and we are unaware of any research suggesting that the practices in question are related to student achievement gains.

A final set of survey items asked not about specific policies or practices but about the school's overall climate. On these items, middle school principals expressed significantly lower levels of agreement with statements indicating that their new and veteran teachers were excellent, suggesting that teachers in these schools may be less well equipped to deal with the challenges presented by their students. More middle school principals also expressed also agreed with the statement that parents are worried about violence in the school. Although

[13] Table 8 indicates that the average student/teacher ratios in middle schools exceeded those in K-8 schools by only 1.4. Taken at face value, the estimate in column 2 of Table 9 would suggest that this difference would lead students to perform 0.006 standard deviations lower.

differences on the remaining items were statistically insignificant, they consistently point in the direction of middle schools having less favorable school climates than K-8 schools.

In short, we find little evidence that the negative effects of middle school attendance are attributable to differences in resources, cohort sizes, or educational practices. We do, however, find suggestive evidence that the overall climate for student learning is worse in middle schools. This suggests a final potential interpretation of our results that is directly related to the choice of grade configuration: Students may benefit from being among the oldest students in a school setting that includes very young students, perhaps because they have greater opportunity to take on leadership roles. This interpretation could account both for the gains in relative achievement made by K-5 and K-6 students prior to entering middle schools and for the superior performance of K-8 students relative to their middle school peers. As Rockoff and Lockwood (2010) note, this interpretation is impossible to test due to the fact that the separation of students by age is inherent in the use of elementary and middle schools.

7. Conclusion

The most common grade configurations in American school districts lead public school students to make two structural school transitions, entering a middle school in grade 6 or 7 and a high school in grade 9. This pattern reflects the influence of enrollment pressures and pedagogical theories that, over the past half-century, all but eliminated the K-8 school from the American educational landscape. However, a small fraction of students attend more comprehensive schools encompassing grades K-8, 6-12, or even K-12. Our paper exploits this variation by comparing the achievement trajectories of students entering middle school and high school relative to those of their peers who do not.

We find that Florida students entering middle school in grade 6 or 7 experience a large drop in student achievement in math and English relative to their peers who do not enter middle schools. Our preferred estimates indicate that, middle school entry causes achievement to decline by at least 0.124 and 0.086 standard deviations in math and reading, respectively, for the predominant group of students entering middle schools in grade 6. The analogous effects for students entering middle schools in grade 7 are even larger, at 0.221 and 0.148 standard deviations. The economic importance of these effects is evident from the fact that they are comparable to or exceed the magnitude of other educational interventions that have been studied in the literature. For example, the average estimate of the benefits of increasing

teacher effectiveness by one standard deviation in the studies reviewed by Hanushek and Rivkin (2010) is 0.17 standard deviations in math and 0.13 in reading.

The relative achievement of students entering middle school in grade 6 or 7 continues to fall while they remain in middle school and shows little sign of recovering in grades 9 and 10. Moreover, the effects are not limited to urban areas and in math are generally more pronounced for students in the bottom half of the achievement distribution and for ethnic minorities. We also find that students entering high school in grade 9 experience a smaller one-time drop in relative achievement, but that in contrast to the middle school transition their relative achievement improves in grade 10.

Taken as a whole, these results suggest that structural school transitions lower student achievement but that middle schools in particular have adverse consequences for American students. Especially when considered along those of other recent studies (e.g. Bedard and Do 2005, Cook et al. 2008, Rockoff and Lockwood 2010, Schwartz et al. forthcoming), our findings clearly support ongoing efforts in urban school districts to convert standalone elementary and middle schools into schools with K-8 configurations. They are also relevant to the expanding charter school sector, which has the opportunity to adopt alternative grade configurations without the potential disruption caused by school conversions. More research is needed to explain the negative effects of middle schools. In the meantime, however, the lack of a definitive explanation should make policymakers cautious about their ability to take steps to mitigate these effects while maintaining existing grade configurations.

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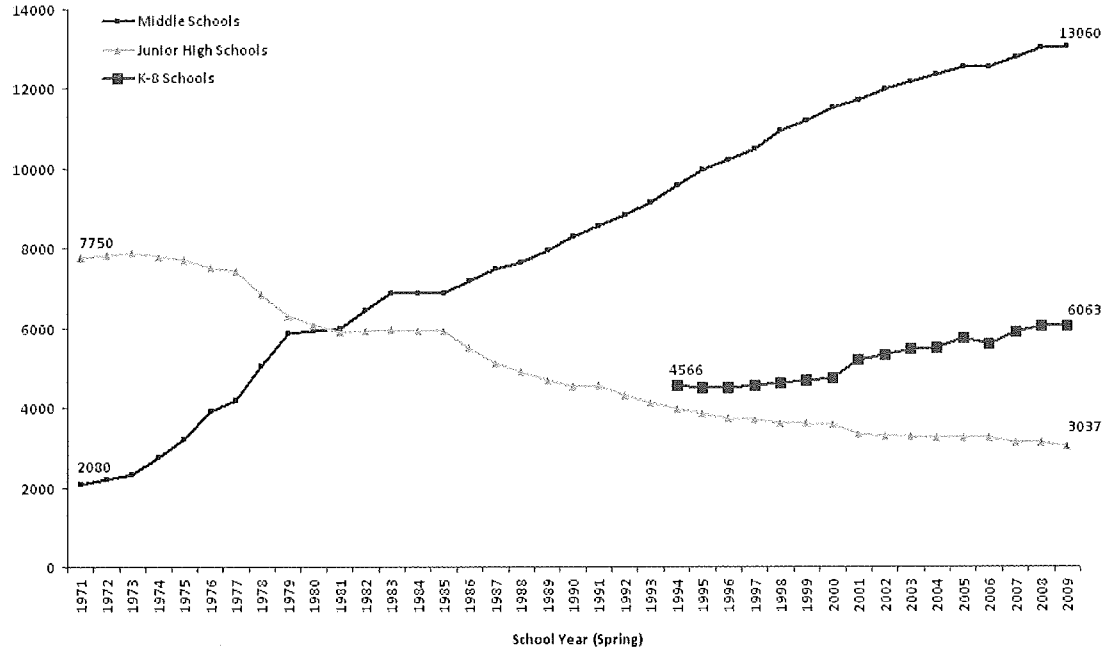
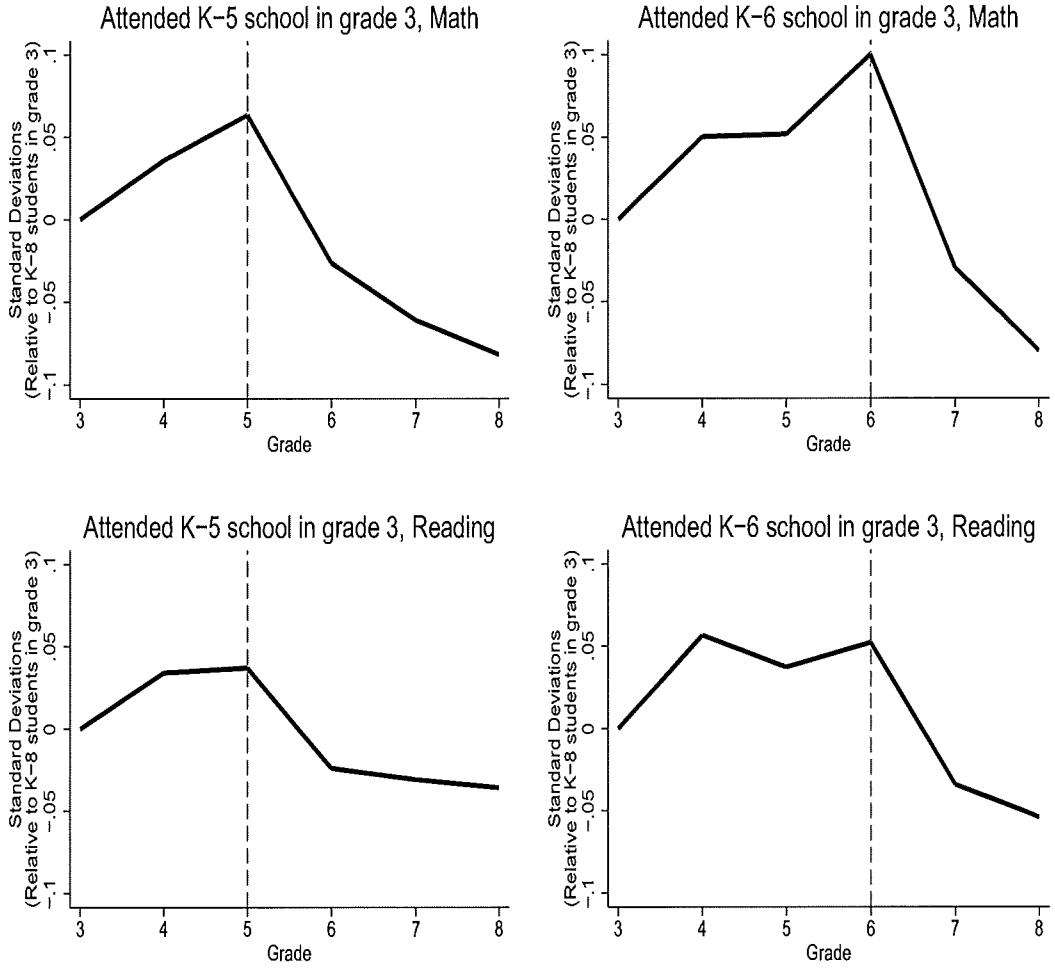
Figure 1: Number of U.S. Public Schools, by type, 1970-2009



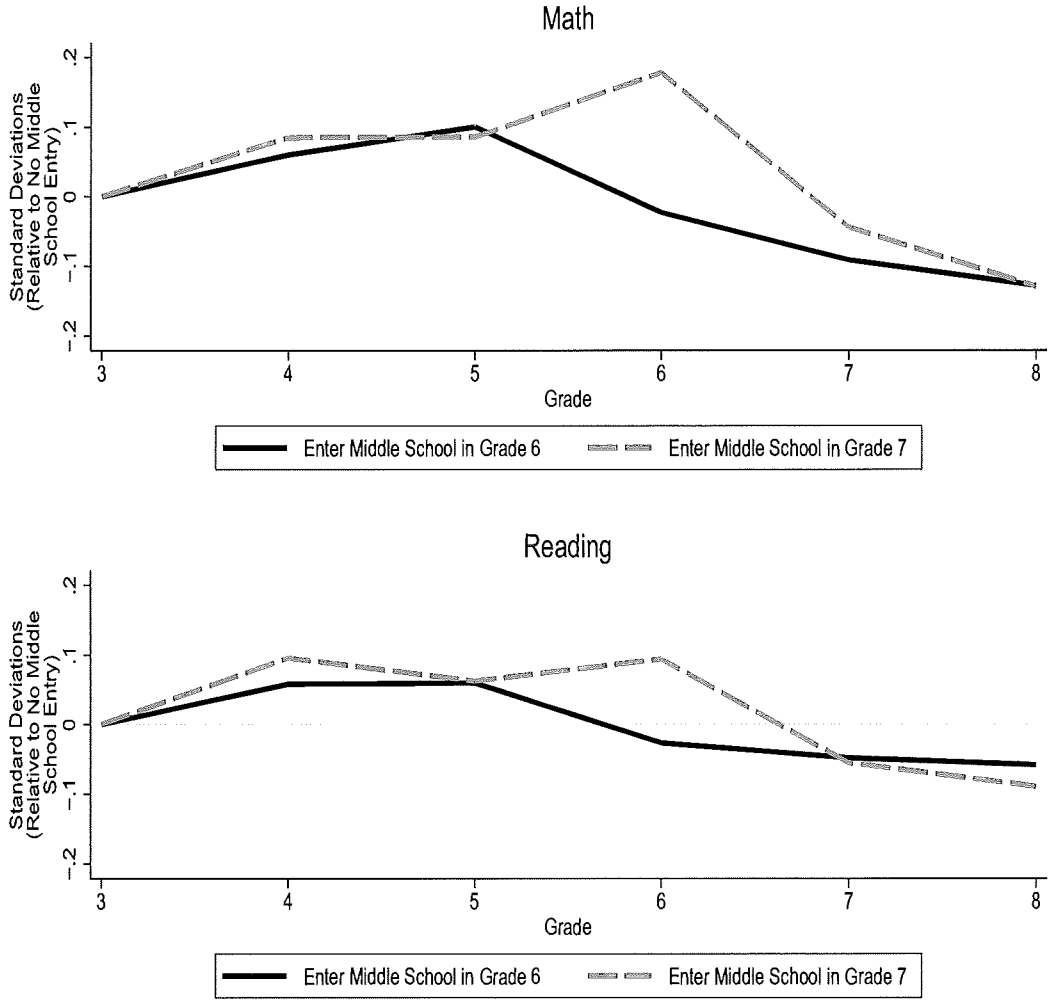
Note: School types are defined by grade span as follows: Middle School: grade 4, 5, or 6 to grade 6, 7, or 8; Junior High School: grade 7 to grade 8 or 9; K-8: grade PK, K, or 1 to grade 8. Source: National Center for Education Statistics, Digest of Education Statistics, 1995-2010.

Figure 2: Reduced-form estimates of grade 3 school type on student achievement
[Grades 3 to 8 balanced sample]



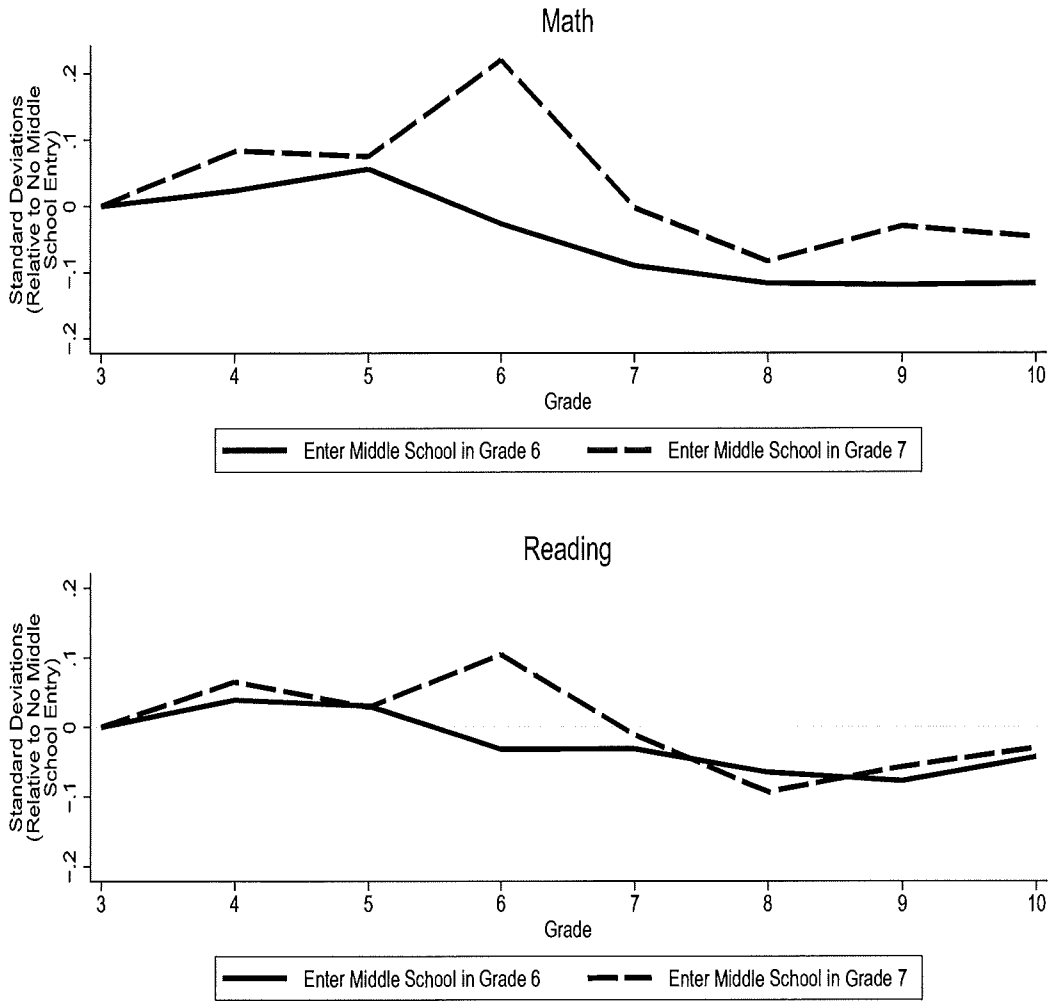
Note: Figures plot reduced-form coefficient estimates for grade interacted with an indicator for the type of school entered in grade 3. Reduced-form regressions include student fixed effects, grade fixed effects, and controls for whether the student attends a charter school, for whether the student was retained that year, and for whether the student was retained in any previous year. Standard errors are clustered by school attended in grade 3. All plotted coefficients are significantly different from zero.

Figure 3: IV estimates of the impact of entering middle school on student achievement [Grades 3 to 8 balanced sample]



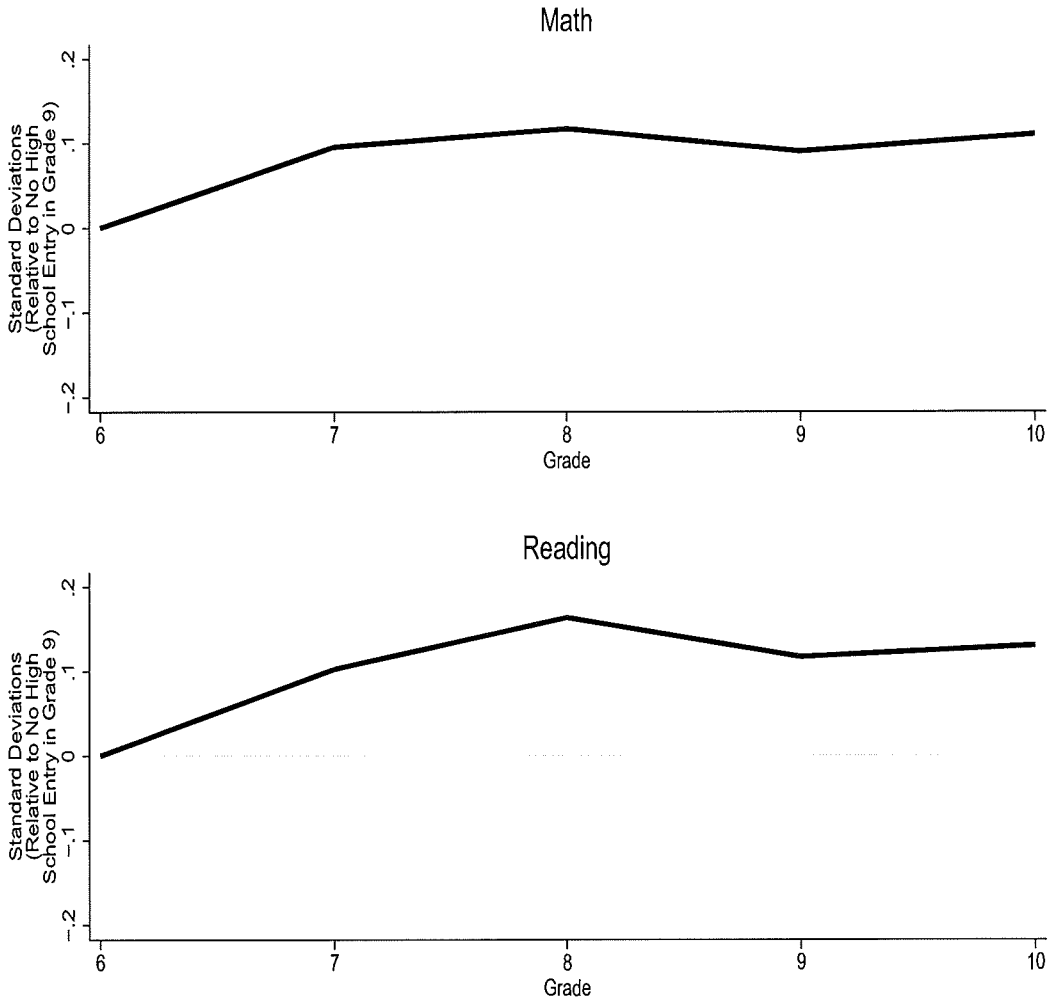
Note: Figures plot coefficient estimates for grade interacted with an indicator for the grade in which a student enters middle school. The plotted coefficients and their standard errors are given in Appendix Table A-1. All regressions include student fixed effects, grade fixed effects, and controls for whether the student attends a charter school, for whether the student was retained that year, and for whether the student was retained in any previous year.

Figure 4: IV estimates of the impact of entering middle school on student achievement [Grades 3 to 10 balanced sample]



Note: Figures plot coefficient estimates for grade interacted with an indicator for the grade in which a student enters middle school. The plotted coefficients and their standard errors are given in Appendix Table A-2. All regressions include student fixed effects, grade fixed effects, and controls for whether the student attends a charter school, for whether the student was retained that year, and for whether the student was retained in any previous year.

Figure 5: IV estimates of the impact of entering high school on student achievement [Grades 6 to 10 balanced sample]



Note: Figures plot coefficient estimates for grade interacted with an indicator for the grade in which a student enters high school. The plotted coefficients and their standard errors are given in Appendix Table A-3. All regressions include student fixed effects, grade fixed effects, and controls for whether the student attends a charter school, for whether the student was held back that year, and for whether the student was held back in any previous year.

Table 1: Summary statistics on students in sample, by grade 3 school structure

	Balanced sample Grades 3 to 8			Balanced sample Grades 3 to 10		
	Range of school, grade 3					
	K - 5	K - 6	K - 8+	K - 5	K - 6	K - 8+
Panel A: Static attributes						
Number of students	409,221	34,583	12,901	136,391	12,507	3,890
White	50 %	55 %	57 %	54 %	57 %	62 %
Black	22 %	22 %	14 %	20 %	20 %	12 %
Hispanic	22 %	19 %	25 %	21 %	19 %	22 %
Location of grade 3 school						
City	24 %	24 %	24 %	23 %	24 %	22 %
Urban fringe	60 %	61 %	37 %	57 %	58 %	36 %
Town or rural	16 %	15 %	39 %	20 %	17 %	42 %
Panel B: Dynamic attributes,	*grade 3*			*grade 3*		
Free or reduced lunch	51 %	44 %	41 %	44 %	39 %	35 %
Special education	15 %	15 %	15 %	11 %	11 %	11 %
FCAT math	-0.01	0.06	0.01	-0.01	0.05	0.02
	(1.00)	(0.99)	(1.00)	(1.00)	(0.98)	(0.96)
FCAT reading	-0.01	0.07	0.07	-0.01	0.07	0.09
	(1.00)	(1.00)	(1.01)	(1.00)	(1.00)	(0.99)
Absences per year	6.90	6.74	6.91	6.55	6.43	6.47
	(6.84)	(6.35)	(6.49)	(6.07)	(5.94)	(5.73)
Panel C: Dynamic attributes,	*grade 8*			*grade 10*		
Ever held back	9 %	10 %	9 %	5 %	6 %	5 %
Free or reduced lunch	45 %	39 %	38 %	35 %	31 %	27 %
Special education	11 %	11 %	12 %	8 %	8 %	9 %
FCAT math	-0.01	0.06	0.10	-0.01	0.09	0.11
	(1.00)	(0.98)	(0.98)	(1.01)	(0.93)	(0.96)
FCAT reading	-0.01	0.05	0.11	-0.01	0.08	0.12
	(1.00)	(0.99)	(1.02)	(1.00)	(0.97)	(1.01)
Absences per year	9.05	8.17	8.47	8.67	8.12	8.16
	(9.17)	(8.26)	(8.41)	(9.48)	(8.70)	(8.38)

Note: Sample includes a balanced panel of students who attended grade 3 between the school years 2000-2001 and 2003-2004 and were tested in Florida public schools for the following five years. Test scores are normalized within year-grade cells. Where relevant, standard deviations are shown in parentheses.

Table 2: Summary statistics on students in sample, by grade 6 school structure
[Grades 6 to 10 balanced sample]

	Range of school, grade 6				
	6 - 8	K - 6	K - 8	K - 10+	6 - 10+
Panel A: Static attributes					
Number of students	409,887	31,176	12,335	3,788	9,510
White	54 %	63 %	56 %	77 %	71 %
Black	20 %	17 %	12 %	13 %	15 %
Hispanic	21 %	16 %	29 %	5 %	11 %
Location of grade 6 school					
City	24 %	26 %	21 %	28 %	16 %
Urban fringe	58 %	59 %	40 %	17 %	35 %
Town or rural	18 %	15 %	39 %	53 %	49 %
Panel B: Dynamic attributes, grade 6					
Free or reduced lunch	42 %	36 %	39 %	29 %	41 %
Special education	12 %	12 %	13 %	17 %	13 %
FCAT math	-0.02	0.21	-0.03	0.23	-0.02
	(1.00)	(0.95)	(0.97)	(1.05)	(1.00)
FCAT reading	-0.01	0.16	-0.00	0.30	-0.01
	(1.00)	(0.98)	(0.99)	(1.03)	(1.00)
Absences per year	7.04	6.37	6.68	6.74	7.16
	(6.84)	(5.93)	(6.26)	(6.87)	(6.72)
Panel C: Dynamic attributes, grade 10					
Free or reduced lunch	33 %	26 %	32 %	24 %	34 %
Special education	9 %	9 %	10 %	11 %	11 %
FCAT math	-0.01	0.09	0.02	0.23	-0.09
	(1.00)	(0.94)	(0.97)	(1.10)	(1.00)
FCAT reading	-0.01	0.06	0.03	0.26	-0.07
	(1.00)	(0.97)	(0.99)	(1.09)	(1.01)
Absences per year	8.41	8.03	8.20	8.40	9.52
	(9.27)	(8.39)	(8.71)	(8.67)	(9.72)

Note: Sample includes a balanced panel of students who attended grade 6 between the school years 2000-2001 and 2004-2005 and were tested in Florida public schools for the following four years. Test scores are normalized within year-grade cells. Where relevant, standard deviations are shown in parentheses.

Table 3: School structure as a predictor of middle and high school entrance

Balanced Sample	Grades 3 to 8		Grades 3 to 10		Grades 6 to 10
	Enter middle school in grade 6	Enter middle school in grade 7	Enter middle school in grade 6	Enter middle school in grade 7	Enter high school in grade 9
Instrument for grade 6 middle school entry	0.661***		0.670***		
	[0.022]		[0.028]		
Instrument for grade 7 middle school entry		0.627***		0.641***	
		[0.030]		[0.036]	
Instrument for grade 9 high school entry					0.724***
					[0.029]
Constant	0.299***	0.015***	0.293***	0.014***	0.258***
	[0.022]	[0.001]	[0.028]	[0.001]	[0.029]
R^2	0.421	0.473	0.444	0.497	0.459
Observations	456,705		152,788		471,270

* p<0.10, ** p<0.05, *** p<0.01

Note: The instrument for grade 6 middle school entry is whether a student was enrolled in a K-5 school in grade 3; likewise the instrument for grade 7 middle school entry is enrollment in a K-6 school in grade 3. The instrument for grade 9 high school entry is whether a student was enrolled in grade 6 in a school with grade 8 as highest grade covered. If students attend a 3 to 6 elementary school in grade 6, the instrument for grade 9 high school entry is whether a student was enrolled in grade 7 in a school with grade 8 as highest grade covered. Standard errors (in brackets) are clustered by school attended in grade 3 in columns 1 to 4 and clustered by school attended in grade 6 in the last column.

Table 4a: Impacts of Grade Configuration: Gains in Relative Math Achievement

	Annual gains in normalized math achievement scores, relative to students who do not enter middle school in grades 6 or 7				high school in grade 9
	Balanced sample grades 3 to 8		Balanced sample grades 3 to 10		Balanced sample grades 6 to 10
	Students entering middle school		*Students entering middle school*		*Students entering high school*
	in grade 6	*in grade 7*	*in grade 6*	*in grade 7*	*in grade 9*
Grade 3 to 4	0.060**	0.085**	0.024	0.084**	
	[0.029]	[0.036]	[0.031]	[0.038]	
Grade 4 to 5	0.040*	0.001	0.033	-0.008	
	[0.021]	[0.027]	[0.031]	[0.037]	
Grade 5 to 6	**-0.123*** **	0.093***	**-0.083*** **	0.145***	
	[0.020]	[0.026]	**[0.029]**	[0.036]	
Grade 6 to 7	-0.068***	**-0.222*** **	-0.063***	**-0.223*** **	0.096***
	[0.015]	**[0.020]**	[0.022]	**[0.027]**	[0.017]
Grade 7 to 8	-0.037***	-0.085***	-0.027	-0.081***	0.022*
	[0.013]	[0.015]	[0.017]	[0.020]	[0.013]
Grade 8 to 9			-0.003	0.053***	**-0.027** **
			[0.017]	[0.020]	**[0.012]**
Grade 9 to 10			0.002	-0.017	0.020**
			[0.015]	[0.018]	[0.009]

* p<0.10, ** p<0.05, *** p<0.01

Note: Point estimates reflect differences between estimated coefficients of IV specifications reported in Tables A-1 to A-3. Standard errors (in brackets) and significance levels are based on linear combination tests between estimated coefficients for subsequent grades. Tests are conducted against the null hypothesis that coefficients for consecutive grades are identical. Estimates in bold represent immediate impacts of entering middle or high school.

Table 4b: Impacts of Grade Configuration: Gains in Relative Reading Achievement

	Annual gains in normalized reading achievement scores, relative to students who do not enter middle school in grades 6 or 7				high school in grade 9
	Balanced sample grades 3 to 8		Balanced sample grades 3 to 10		Balanced sample grades 6 to 10
	Students entering middle school		*Students entering middle school*		*Students entering high school*
	in grade 6	*in grade 7*	*in grade 6*	*in grade 7*	*in grade 9*
Grade 3 to 4	0.058**	0.096***	0.039	0.065*	
	[0.026]	[0.031]	[0.027]	[0.033]	
Grade 4 to 5	0.002	-0.033*	-0.008	-0.037	
	[0.014]	[0.019]	[0.024]	[0.029]	
Grade 5 to 6	**-0.086*** **	0.032*	**-0.062*** **	0.076***	
	[0.014]	[0.018]	**[0.020]**	[0.024]	
Grade 6 to 7	-0.022	**-0.149*** **	0.000	**-0.115*** **	0.103***
	[0.015]	**[0.019]**	[0.024]	**[0.029]**	[0.014]
Grade 7 to 8	-0.010	-0.034**	-0.034*	-0.082***	0.061***
	[0.012]	[0.014]	[0.018]	[0.021]	[0.012]
Grade 8 to 9			-0.012	0.036	**-0.047*** **
			[0.023]	[0.025]	**[0.016]**
Grade 9 to 10			0.034*	0.027	0.014
			[0.019]	[0.022]	[0.011]

* p<0.10, ** p<0.05, *** p<0.01

Note: Point estimates reflect differences between estimated coefficients of IV specifications reported in Tables A-1 to A-3. Standard errors and significance levels are based on linear combination tests between estimated coefficients for subsequent grades. Tests are conducted against the null hypothesis that coefficients for consecutive grades are identical. Estimates in bold represent immediate impacts of entering middle or high school.

Table 5a: Robustness Checks, Math

	Middle school entry grade 6			Middle school entry grade 7			High school entry grade 9		
	prior trend	drop	post trend	prior trend	drop	post trend	prior trend	drop	post trend
Grades	*3 to 5*	*5 to 6*	*6 to 8*	*3 to 6*	*6 to 7*	*7 to 8*	*6 to 8*	*8 to 9*	9 to 10
Baseline									
	0.100 ***	-0.123 ***	-0.105 ***	0.178 ***	-0.222 ***	-0.085 ***	0.117 ***	-0.027 **	0.020 **
	[0.036]	[0.020]	[0.016]	[0.046]	[0.020]	[0.015]	[0.022]	[0.012]	[0.009]
Robustness									
no charter	0.121 ***	-0.111 ***	-0.085 ***	0.199 ***	-0.207 ***	-0.071 ***	0.122 ***	-0.039 ***	0.025 ***
schools	[0.037]	[0.019]	[0.017]	[0.047]	[0.020]	[0.015]	[0.024]	[0.012]	[0.009]
no other	0.092 ***	-0.124 ***	-0.108 ***	0.172 ***	-0.223 ***	-0.086 ***	-	-	-
6+ schools	[0.035]	[0.020]	[0.016]	[0.048]	[0.021]	[0.016]	-	-	-
no retained	0.084 **	-0.119 ***	-0.100 ***	0.170 ***	-0.211 ***	-0.087 ***	0.116 ***	-0.022 *	0.019 **
students	[0.037]	[0.021]	[0.017]	[0.047]	[0.020]	[0.015]	[0.023]	[0.012]	[0.009]
no retention	0.099 ***	-0.124 ***	-0.105 ***	0.181 ***	-0.222 ***	-0.084 ***	0.115 ***	-0.027 **	0.021 **
controls	[0.036]	[0.020]	[0.016]	[0.046]	[0.020]	[0.015]	[0.022]	[0.012]	[0.009]
unbalanced	0.106 ***	-0.141 ***	-0.098 ***	0.163 ***	-0.218 ***	-0.071 ***	0.115 ***	-0.037 ***	0.029 ***
sample	[0.035]	[0.021]	[0.016]	[0.045]	[0.018]	[0.016]	[0.020]	[0.012]	[0.011]
Miami	0.113	-0.230 ***	-0.061 **	0.277 **	-0.228 ***	-0.117 ***	-	-	-
Dade	[0.090]	[0.040]	[0.031]	[0.125]	[0.047]	[0.034]	-	-	-

* p<0.10, ** p<0.05, *** p<0.01

Note: Row labels indicate the type of robustness check. Results are based on 2SLS models. Our preferred results are reported in the first row.

Table 5b: Robustness Checks, Reading

	Middle school entry grade 6			Middle school entry grade 7			High school entry grade 9		
	prior trend	drop	post trend	prior trend	drop	post trend	prior trend	drop	post trend
Grades	*3 to 5*	*5 to 6*	*6 to 8*	*3 to 6*	*6 to 7*	*7 to 8*	*6 to 8*	*8 to 9*	9 to 10
Baseline									
	0.060 **	-0.086 ***	-0.032 *	0.094 ***	-0.149 ***	-0.034 **	0.164 ***	-0.047 ***	0.014
	[0.024]	[0.014]	[0.018]	[0.035]	[0.019]	[0.014]	[0.020]	[0.016]	[0.011]
Robustness									
no charter	0.073 ***	-0.077 ***	-0.027	0.110 ***	-0.151 ***	-0.029 *	0.167 ***	-0.053 ***	0.016
schools	[0.026]	[0.014]	[0.019]	[0.035]	[0.019]	[0.015]	[0.018]	[0.017]	[0.012]
no other	0.056 **	-0.086 ***	-0.032 *	0.088 **	-0.140 ***	-0.028 *	-	-	-
6+ schools	[0.024]	[0.014]	[0.018]	[0.037]	[0.020]	[0.015]	-	-	-
no retained	0.055 **	-0.088 ***	-0.029	0.088 **	-0.150 ***	-0.031 **	0.168 ***	-0.048 ***	0.014
students	[0.024]	[0.015]	[0.019]	[0.035]	[0.020]	[0.015]	[0.020]	[0.017]	[0.012]
no retention	0.059 **	-0.088 ***	-0.032 *	0.098 ***	-0.149 ***	-0.033 **	0.161 ***	-0.047 ***	0.014
controls	[0.024]	[0.014]	[0.018]	[0.035]	[0.019]	[0.014]	[0.019]	[0.016]	[0.011]
unbalanced	0.048 *	-0.089 ***	-0.022	0.082 **	-0.144 ***	-0.020	0.145 ***	-0.046 ***	0.021 *
sample	[0.025]	[0.014]	[0.019]	[0.034]	[0.019]	[0.015]	[0.018]	[0.013]	[0.012]
Miami	0.067	-0.181 ***	-0.008	0.088	-0.111 ***	-0.084 *	-	-	-
Dade	[0.041]	[0.033]	[0.042]	[0.075]	[0.036]	[0.046]	-	-	-

* p<0.10, ** p<0.05, *** p<0.01

Note: Row labels indicate the type of robustness check. Results are based on 2SLS models. Our preferred results are reported in the first row.

Table 6a: Subgroup Results, Math

	Middle school entry grade 6			Middle school entry grade 7			High school entry grade 9		
	prior trend	drop	post trend	prior trend	drop	post trend	prior trend	drop	post trend
Grades	*3 to 5*	*5 to 6*	*6 to 8*	*3 to 6*	*6 to 7*	*7 to 8*	*6 to 8*	*8 to 9*	9 to 10
Baseline									
	0.100 ***	-0.123 ***	-0.105 ***	0.178 ***	-0.222 ***	-0.085 ***	0.117 ***	-0.027 **	0.020 **
	[0.036]	[0.020]	[0.016]	[0.046]	[0.020]	[0.015]	[0.022]	[0.012]	[0.009]
Subgroups									
city	0.099	-0.191 ***	-0.125 ***	0.158 *	-0.273 ***	-0.080 ***	0.114	-0.033	0.017
	[0.083]	[0.054]	[0.029]	[0.082]	[0.034]	[0.029]	[0.077]	[0.030]	[0.028]
urban	0.005	-0.125 ***	-0.131 ***	0.088	-0.241 ***	-0.102 ***	0.170 ***	-0.030	0.027 *
fringe	[0.050]	[0.031]	[0.027]	[0.074]	[0.034]	[0.023]	[0.030]	[0.020]	[0.015]
town or	0.147 ***	-0.081 ***	-0.067 ***	0.137 **	-0.147 ***	-0.052	0.066 **	-0.036 **	0.009
rural	[0.043]	[0.029]	[0.024]	[0.062]	[0.039]	[0.033]	[0.028]	[0.017]	[0.013]
> median	0.061	-0.079 ***	-0.090 ***	0.173 ***	-0.185 ***	-0.079 ***	0.098 ***	-0.014	-0.005
test score	[0.038]	[0.020]	[0.016]	[0.048]	[0.022]	[0.016]	[0.032]	[0.013]	[0.009]
<= median	0.143 ***	-0.179 ***	-0.126 ***	0.211 ***	-0.271 ***	-0.095 ***	0.110 ***	-0.048 ***	0.044 ***
test score	[0.047]	[0.026]	[0.021]	[0.058]	[0.027]	[0.024]	[0.022]	[0.016]	[0.015]
white	0.069 **	-0.105 ***	-0.090 ***	0.138 ***	-0.184 ***	-0.078 ***	0.085 ***	-0.025 *	0.008
	[0.031]	[0.022]	[0.019]	[0.038]	[0.020]	[0.016]	[0.024]	[0.013]	[0.010]
black	0.338 ***	-0.223 ***	-0.191 ***	0.357 ***	-0.397 ***	-0.069 *	0.154 ***	-0.049 **	0.044 *
	[0.071]	[0.057]	[0.036]	[0.105]	[0.050]	[0.039]	[0.035]	[0.025]	[0.025]
hispanic	0.092	-0.134 ***	-0.090 ***	0.347 ***	-0.256 ***	-0.097 ***	0.209 ***	-0.025	0.028
	[0.068]	[0.039]	[0.027]	[0.092]	[0.039]	[0.034]	[0.041]	[0.024]	[0.023]
males	0.076 *	-0.117 ***	-0.123 ***	0.163 ***	-0.244 ***	-0.094 ***	0.134 ***	-0.033 **	0.029 **
	[0.039]	[0.020]	[0.021]	[0.050]	[0.022]	[0.019]	[0.024]	[0.014]	[0.012]
females	0.122 ***	-0.128 ***	-0.088 ***	0.190 ***	-0.200 ***	-0.077 ***	0.102 ***	-0.021 *	0.013
	[0.036]	[0.025]	[0.019]	[0.048]	[0.023]	[0.017]	[0.024]	[0.012]	[0.011]

* p<0.10, ** p<0.05, *** p<0.01

Note: Row labels indicate the type of subgroup analysis. All results are based on 2SLS models. Our preferred results are reported in the first row. Above and below median test score refers to the test score in grade 3 in columns 1 to 6 and to the test score in grade 6 in columns 7 to 9. Location information refers to the location of the school attended in grade 3 in columns 1 to 6 and in grade 6 in columns 7 to 9 and is based on Census Bureau definitions.

Table 6b: Subgroup Results, Reading

	Middle school entry grade 6			Middle school entry grade 7			High school entry grade 9		
	prior trend	drop	post trend	prior trend	drop	post trend	prior trend	drop	post trend
Grades	*3 to 5*	*5 to 6*	*6 to 8*	*3 to 6*	*6 to 7*	*7 to 8*	*6 to 8*	*8 to 9*	9 to 10
Baseline									
	0.060 **	-0.086 ***	-0.032 *	0.094 ***	-0.149 ***	-0.034 **	0.164 ***	-0.047 ***	0.014
	[0.024]	[0.014]	[0.018]	[0.035]	[0.019]	[0.014]	[0.020]	[0.016]	[0.011]
Subgroups									
city	0.103 **	-0.165 ***	0.028	0.132 *	-0.135 ***	-0.010	0.081 *	-0.007	-0.013
	[0.052]	[0.037]	[0.023]	[0.071]	[0.030]	[0.025]	[0.042]	[0.024]	[0.026]
urban	0.011	-0.113 ***	-0.094 ***	-0.006	-0.197 ***	-0.053 *	0.206 ***	-0.073 ***	0.008
fringe	[0.036]	[0.022]	[0.032]	[0.048]	[0.032]	[0.029]	[0.043]	[0.025]	[0.018]
town or	0.055	-0.035 *	-0.057 ***	0.087 *	-0.126 ***	-0.042	0.117 ***	-0.042 **	0.006
rural	[0.034]	[0.018]	[0.022]	[0.050]	[0.029]	[0.027]	[0.018]	[0.021]	[0.015]
> median	0.045 *	-0.092 ***	-0.031 *	0.074 **	-0.139 ***	-0.040 **	0.138 ***	-0.060 **	0.011
score	[0.027]	[0.016]	[0.019]	[0.034]	[0.023]	[0.017]	[0.021]	[0.023]	[0.013]
<= median	0.046	-0.083 ***	-0.039	0.116 **	-0.166 ***	-0.025	0.150 ***	-0.031 *	0.012
test score	[0.030]	[0.020]	[0.024]	[0.046]	[0.022]	[0.022]	[0.024]	[0.016]	[0.015]
white	0.059 **	-0.072 ***	-0.039 **	0.108 ***	-0.160 ***	-0.029 **	0.126 ***	-0.052 ***	0.006
	[0.024]	[0.016]	[0.016]	[0.031]	[0.018]	[0.013]	[0.019]	[0.018]	[0.013]
black	0.137 ***	-0.109 ***	0.032	0.137 **	-0.101 ***	0.010	0.121 ***	-0.035	0.019
	[0.037]	[0.036]	[0.035]	[0.069]	[0.036]	[0.041]	[0.032]	[0.024]	[0.021]
hispanic	0.085 **	-0.110 ***	-0.051	0.199 ***	-0.160 ***	-0.042	0.222 ***	-0.021	-0.004
	[0.040]	[0.027]	[0.038]	[0.058]	[0.039]	[0.036]	[0.040]	[0.029]	[0.028]
males	0.043	-0.067 ***	-0.045 **	0.095 **	-0.169 ***	-0.026	0.170 ***	-0.044 **	0.030 **
	[0.029]	[0.018]	[0.023]	[0.039]	[0.025]	[0.020]	[0.021]	[0.018]	[0.015]
females	0.075 ***	-0.104 ***	-0.021	0.093 ***	-0.130 ***	-0.044 **	0.156 ***	-0.048 ***	-0.002
	[0.025]	[0.017]	[0.020]	[0.036]	[0.019]	[0.018]	[0.021]	[0.017]	[0.011]

* p<0.10, ** p<0.05, *** p<0.01

Note: Row labels indicate the type of subgroup analysis. All results are based on 2SLS models. Our preferred results are reported in the first row. Above and below median test score refers to the test score in grade 3 in columns 1 to 6 and to the test score in grade 6 in columns 7 to 9. Location information refers to the location of the school attended in grade 3 in columns 1 to 6 and in grade 6 in columns 7 to 9 and is based on Census Bureau definitions.

Table 7: Absences, School Dropout, and Grade 9 Retention

	Middle school entry grade 6	Middle school entry grade 7	High school entry grade 9
Panel A: Days of Absence			
prior trend	-0.484 ***	-0.032	0.265
	[0.169]	[0.238]	[0.226]
drop (i.e. increase)	0.967 ***	-0.259	-1.266 ***
	[0.193]	[0.221]	[0.219]
post trend	0.412 **	0.053	0.068
	[0.208]	[0.182]	[0.139]
Panel B: School Dropout in Grade 10			
OLS	0.010***	0.006	–0.061***
	[0.003]	[0.004]	[0.010]
IV	0.014**	0.008	–0.004
	[0.006]	[0.007]	[0.015]
Panel C: Retention in Grade 9			
OLS	0.002	0.010***	–0.002
	[0.002]	[0.002]	[0.002]
IV	0.002	0.010**	0.005*
	[0.003]	[0.004]	[0.003]

* p<0.10, ** p<0.05, *** p<0.01

Note: Panel A reports results of estimating a 2SLS specification identical to our main specification, but with student absence in a school year as dependent variable. Panel B and C report OLS and IV results from estimating a cross-sectional model. The specifications in Panels B and C in columns (column) 1 and 2 (3) include controls for grade 3 (6) test scores, race, gender, year of birth, indicators for whether a student received free or reduced lunch in grade 3 (6), and an indicator for whether a student was classified as a special education student in grade 3 (6). The dependent variable in Panel B is a proxy for high school dropout in grade 10 that indicates whether a student was not enrolled in any public school in Florida in the year when the student should have entered grade 10. The dependent variable in Panel C indicates whether a student repeated grade 9. Standard errors (in brackets) are clustered by school attended in grade 3 (6) in columns (column) 1 and 2 (3).

Table 8: Mean Characteristics by School Type (Administrative Data)

	Elementary	Middle	K-8	p-value of middle-k8 difference
Expenditure per student ($)	7,381	6,752	7,563	0.02
Student/teacher ratio	15.16	17.32	15.92	0.00
Average teacher experience (years)	12.58	12.07	11.93	0.79
Average teacher salary ($)	41,833	41,813	41,177	0.26
New instructional staff (%)	20.78	21.33	26.93	0.01
Number of students	714	1,040	894	0.02
Cohort size				
Grade 6	88	333	118	0.00
Grade 7	.	363	125	0.00
Grade 8	.	360	117	0.00
N	1,577 - 1,595	427 - 484	43 - 48	

Note: All characteristics are measured in the 2005-2006 school year. Cohort sizes by school type are based on the Common Core of Data. All other characteristics stem from the Florida Department of Educations Return on Investment/School Efficiency Measure website (http://roi.fldoe.org/index.cfm). Charter schools are excluded from the sample.

Table 9: Correlates of Grade 5 to 6 Achievement Gains, Students entering Middle School in Grade 6

	Outcome: Normalized achievement scores in grade 6			
	Math		Reading	
Expenditure per student ($100)	–0.0018***	–0.0015***	–0.0015***	–0.0013***
	[0.0002]	[0.0002]	[0.0002]	[0.0002]
Student/teacher ratio	–0.0034***	–0.0041***	–0.0028***	–0.0037***
	[0.0009]	[0.0009]	[0.0008]	[0.0008]
Average teacher experience (years)	0.0059***	0.0056***	0.0039***	0.0032***
	[0.0008]	[0.0008]	[0.0006]	[0.0007]
Average teacher salary ($100)	0.0001	0.0001	0.0002***	0.0002***
	[0.0001]	[0.0001]	[0.0001]	[0.0001]
New instructional staff (%)	0.0001	0.0001	0.0002*	0.0002*
	[0.0001]	[0.0001]	[0.0001]	[0.0001]
Cohort size	0.0001***	0.0001***	0.0000**	0.0000
	[0.0000]	[0.0000]	[0.0000]	[0.0000]
Math score in grade 5	yes	yes	no	no
Reading score in grade 5	no	no	yes	yes
Grade 5 school characteristics	no	yes	no	yes
Observations	386,307	382,289	386,307	382,289
R^2	0.717	0.718	0.651	0.651

* p<0.10, ** p<0.05, *** p<0.01

Note: All regressions control for student characteristics including gender, year of birth, race, whether a student received free or reduced lunch, whether a student is coded as special education student, and whether a student ever repeated a grade. Regressions in columns 2 and 4 additionally control for characteristics of the school attended in grade 5. Standard errors (in brackets) are clustered by school attended in grade 6.

Table 10: Mean Characteristics by School Type (Survey Data)

	Elementary	Middle	K-8	p-value of middle-k8 difference
Length of school Day (minutes)	378.00	398.14	393.30	0.36
Index measures of school policies (Mean=0, SD=1)				
policies to help low-performing students	0.06	0.10	-0.01	0.45
policies to improve low-performing teachers	0.05	-0.04	-0.16	0.40
incentives to reward teacher performance	-0.04	0.11	-0.06	0.23
extent of teacher autonomy	0.01	-0.05	-0.05	0.98
Scheduling and Staffing (share of schools using...)				
block scheduling	0.35	0.34	0.38	0.64
common preparation periods	0.93	0.81	0.70	0.09
subject matter specialist teachers	0.64	0.58	0.58	0.97
teachers organized into teams	0.97	0.92	0.76	0.00
looping	0.44	0.14	0.31	0.00
multi-age classrooms	0.29	0.42	0.47	0.50
School climate (average agreement, 1-5 scale)				
staff morale is low	1.70	1.98	1.84	0.36
staff support/encourage each other	4.30	4.11	4.29	0.14
teachers understand expectations	4.45	4.27	4.32	0.60
new teachers are excellent	3.84	3.65	4.00	0.00
veteran teachers are excellent	4.07	3.94	4.13	0.11
student disruption interferes with learning	1.97	2.39	2.25	0.38
parents worry about violence	1.52	2.07	1.45	0.00
parents monitor academic progress	3.26	3.14	3.29	0.33
N	1,178-1,210	377-429	46-56	

Note: Average characteristics by school type are based on a principal survey conducted in 2004. Length of school day is measured in grade four for elementary schools and grade seven for middle and K-8 schools.

Table A-1: Achievement Regression Results [Grades 3 to 8 balanced sample]

	Normalized achievement scores, relative to students not entering middle school			
	Math		Reading	
	2SLS	OLS	2SLS	OLS
Students entering middle school in grade 6				
Grade 4	0.060**	0.026***	0.058**	0.025***
	[0.029]	[0.010]	[0.026]	[0.009]
Grade 5	0.100***	0.065***	0.060**	0.038***
	[0.036]	[0.012]	[0.024]	[0.008]
Grade 6	−0.023	−0.035**	−0.027	−0.019*
	[0.037]	[0.014]	[0.028]	[0.011]
Grade 7	−0.091**	−0.058***	−0.048	−0.029**
	[0.038]	[0.015]	[0.036]	[0.013]
Grade 8	−0.128***	−0.070***	−0.058	−0.035**
	[0.038]	[0.014]	[0.040]	[0.014]
Students entering middle school in grade 7				
Grade 4	0.085**	0.032**	0.096***	0.038***
	[0.036]	[0.014]	[0.031]	[0.012]
Grade 5	0.085*	0.025	0.062**	0.031***
	[0.045]	[0.016]	[0.030]	[0.011]
Grade 6	0.178***	0.117***	0.094***	0.073***
	[0.046]	[0.019]	[0.035]	[0.014]
Grade 7	−0.044	−0.024	−0.055	−0.049***
	[0.046]	[0.018]	[0.043]	[0.015]
Grade 8	−0.129***	−0.068***	−0.089*	−0.081***
	[0.046]	[0.018]	[0.047]	[0.016]

* p<0.10, ** p<0.05, *** p<0.01

Note: The number of observations in each regression is 2,781,333. All regressions include student fixed effects, grade fixed effects, and controls for whether the student attends a charter school, for whether the student was retained that year, and for whether the student was retained in any previous year. Standard errors (in brackets) are clustered by school attended in grade 3.

Table A-2: Achievement Regression Results [Grades 3 to 10 balanced sample]

	Normalized achievement scores, relative to students not entering middle school			
	Math		Reading	
	2SLS	OLS	2SLS	OLS
Students entering middle school in grade 6				
Grade 4	0.024	0.001	0.039	0.024*
	[0.031]	[0.015]	[0.027]	[0.013]
Grade 5	0.056	0.040**	0.030	0.038***
	[0.044]	[0.019]	[0.026]	[0.012]
Grade 6	–0.027	–0.061***	–0.032	–0.018
	[0.047]	[0.022]	[0.030]	[0.014]
Grade 7	–0.089*	–0.083***	–0.031	–0.022
	[0.048]	[0.023]	[0.039]	[0.017]
Grade 8	–0.116**	–0.088***	–0.065	–0.030
	[0.047]	[0.021]	[0.045]	[0.019]
Grade 9	–0.119**	–0.081***	–0.077**	–0.039**
	[0.048]	[0.021]	[0.039]	[0.017]
Grade 10	–0.117**	–0.081***	–0.043	–0.021
	[0.052]	[0.022]	[0.047]	[0.020]
Students entering middle school in grade 7				
Grade 4	0.084**	0.021	0.065*	0.025
	[0.038]	[0.019]	[0.033]	[0.017]
Grade 5	0.075	0.012	0.028	0.031*
	[0.055]	[0.025]	[0.032]	[0.016]
Grade 6	0.220***	0.109***	0.104***	0.091***
	[0.059]	[0.028]	[0.036]	[0.018]
Grade 7	–0.002	–0.033	–0.011	–0.031
	[0.056]	[0.027]	[0.047]	[0.021]
Grade 8	–0.083	–0.068***	–0.093*	–0.081***
	[0.055]	[0.025]	[0.053]	[0.023]
Grade 9	–0.030	–0.032	–0.057	–0.049**
	[0.056]	[0.025]	[0.047]	[0.021]
Grade 10	–0.047	–0.041	–0.030	–0.042*
	[0.061]	[0.026]	[0.056]	[0.025]

* p<0.10, ** p<0.05, *** p<0.01

Note: The number of observations in each regression is 1,230,144. All regressions include student fixed effects, grade fixed effects, and controls for whether the student attends a charter school, for whether the student was retained that year, and for whether the student was retained in any previous year. Standard errors (in brackets) are clustered by school attended in grade 3.

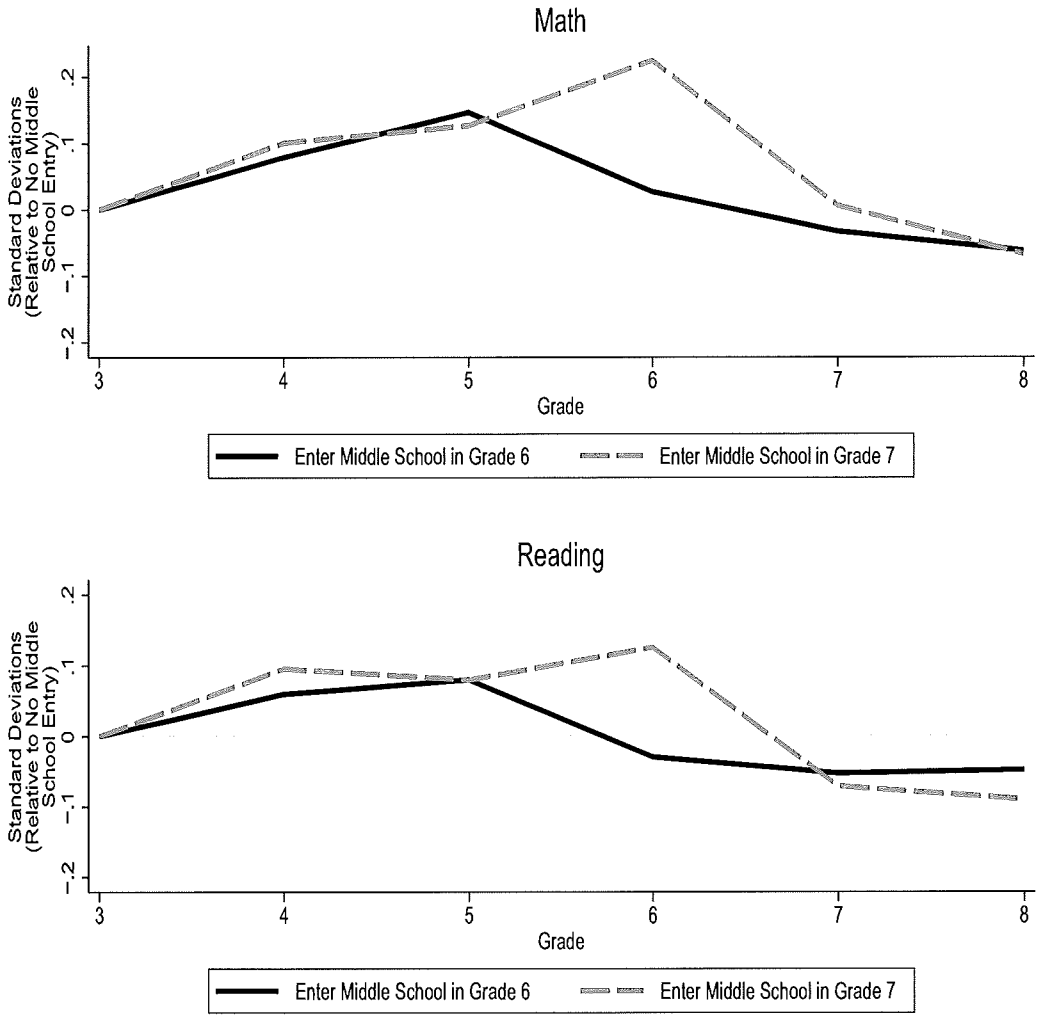
Table A-3: Achievement Regression Results [Grades 6 to 10 balanced sample]

	Normalized achievement scores, relative to students not entering high school in grade 9			
	Math		Reading	
	2SLS	OLS	2SLS	OLS
Students entering high school in grade 9				
Grade 7	0.096***	0.063***	0.103***	0.064***
	[0.017]	[0.010]	[0.014]	[0.008]
Grade 8	0.117***	0.088***	0.164***	0.125***
	[0.022]	[0.013]	[0.020]	[0.012]
Grade 9	0.090***	0.077***	0.117***	0.098***
	[0.020]	[0.012]	[0.020]	[0.011]
Grade 10	0.111***	0.094***	0.131***	0.128***
	[0.022]	[0.013]	[0.025]	[0.016]

* p<0.10, ** p<0.05, *** p<0.01

Note: The number of observations in each regression is 2,371,373. All regressions include student fixed effects, grade fixed effects, and controls for whether the student attends a charter school, for whether the student was retained that year, and for whether the student was retained in any previous year. Standard errors (in brackets) are clustered by school attended in grade 6.

Figure A-1: IV estimates of the impact of entering middle school on student achievement with controls for school resources
[Grades 3 to 8 balanced sample]



Note: Figures plot coefficient estimates for grade interacted with an indicator for the grade in which a student enters middle school. All regressions include student fixed effects, as well as controls for grade, for whether the current school is a charter school, for cohort size, for the average teacher experience in years, for the average teacher salary, the expenditure per student, the student/teacher ratio, the share of new instructional staff, for whether the student was retained that year, and for whether the student was retained in any previous year.

(3)

Grade Configuration Among Middle School Students Isn't the Problem

Deborah Kasak is the executive director for the National Forum to Accelerate Middle-Grades Reform.

June 18, 2012

Rearranging the grades or changing to just elementary and high schools buildings is not the "golden" answer. In fact, research suggests that grade configuration is not a factor in student performance. What we should focus on instead is providing young adolescents strong academics in settings that are developmentally responsive and socially equitable no matter where they are housed.

> Research suggests that academic achievement of eighth graders is a better predictor of college and career readiness than anything that happens academically in high school.

The middle school years are pivotal to a student's future success so we need to take the education of young adolescents seriously. Research suggests that academic achievement of eighth graders is a better predictor of college and career readiness than anything that happens academically in high school, including grade point average, advanced/honors courses, the quality of instruction, homework or the amount of effort students put into their courses. What's more, sixth graders who exhibit even one of following early warning signals has a significantly diminished chance of graduating from high school: a failing grade in reading or math; attendance below 80 percent for the year and a final "unsatisfactory behavior" mark in at least one class.

The good news is we do know what works; the challenge is to universally put that knowledge into action. Instead of trying to put students in one place or another, we need to address the real issue: making the education of young adolescents a priority. We must give them what they need to learn, grow and flourish.

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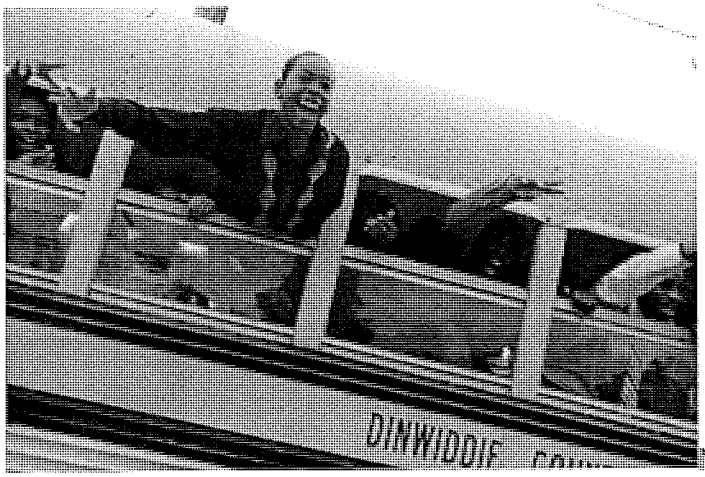
June 18, 2012

The Middle School Conundrum

Introduction



Middle school students celebrate the last day of school in Dinwiddie County, Va.Patrick Kane/The Progress-Index, via Associated Press

Many fifth graders have walked out the doors of their elementary schools for the last time, or will do so this week, starting new schools in the fall. The transition to middle school can be a blessing or a curse for these young children on the verge of becoming teenagers

You don't have to have to read all the studies to know that the ages between 10 and 13 are socially awkward ones. But they are also important ones academically, crucial in determining college and career outcomes. Would these preteens be better off staying in an elementary school that covers kindergarten through eighth grade? Or is there a reason why this age group needs to be sectioned off into a separate middle school?

Read the Discussion »

What does the research say about middle school grade configuration (grade 6-8)?

Thank you for your request to Ask a REL. The information below represents rigorous research, reviews of existing research, meta-analyses, and/or policy/research briefs. The following references and resources have been selected based on date of publication (with a preference for research from the last ten years), source and funding, and accessibility. Abstracts and executive summaries are copied directly from the reports when possible to ensure accuracy.

References

Byrnes, V., & Ruby, A. (2007). Comparing achievement between K-8 and middle schools: a large-scale empirical study. *American Journal of Education, 114*(1), 101–135.

Available from: http://www.csos.jhu.edu/new/Comparing%20Achievement.pdf

This study compares middle schools to K-8 schools, as well as to newly formed K-8 schools that are part of a K-8 conversion policy. The outcome is student achievement, and out sample includes 40,883 eighth-grade students from 95 schools across five cohorts. The analysis uses multilevel modeling to account for student, cohort, and school-level variation, and it includes statistical controls for both population demographics and school characteristics. The results find that older K-8 schools perform significantly better than middle schools, and this advantage is explained by differing student and teacher populations, average grade size, and school transition. Newer K-8 schools did not enjoy the same advantage despite having smaller graders and lower transition rates, due to their more disadvantaged populations.

Silvernail, D. L. (2006). *Preliminary analysis: the cost and characteristics of Maine's higher performing public schools.* Gorham, ME: Center for Education Policy, Applied Research, and Evaluation.

Available from: http://files.eric.ed.gov/fulltext/ED509476.pdf

In Spring 2005 the Maine Legislature passed legislation establishing an isolated small school adjustment in the Essential Programs and Services (EPS) funding formula. The adjustment for isolated small high schools (i.e. under 200 pupils) was a reduction in student-teacher ratios in the formula calculations, and in the case of isolated elementary schools (i.e. fewer than 15 pupils per grade level), the adjustment amounted to a 10% transition adjustment for the 2005-06 EPS per pupil rate. Island schools received an additional adjustment for operating and maintenance costs, and transportation costs. A more complete description of the adjustments appears in Appendix A. In approving these adjustments, the Legislature directed the Maine Education Policy Research Institute (MEPRI) to conduct a review of high performing, cost-effective small schools. A four phase study was conducted to fulfill this Legislative directive. These included: (1) An examination of the applicability to Maine of some fairly widely held assumptions about the benefits of small schools; (2) The identification of higher performing Maine schools, of all sizes; (3) A calculation of the cost of different size higher performing schools in Maine; and (4) An analysis of characteristics of higher performing Maine schools. Based on the results of these analyses, a proposed adjustment to the cost components of EPS has been developed and is presented in the final section of this report. Appendices include: (1) Isolated Small School Adjustment; (2) Selected References; (3) Calculating Cost of Four-Year High School Graduate; (4) Four-Year Cost Per Graduate for Maine Public High Schools; (5) MEA Score Analysis by Economically Disadvantaged and Advantaged Youth; (6) Characteristics of Middle and High Schools of Different Sizes; and (7) Criteria for Higher and Lower Performing Maine School.

Dove, M. J., Pearson, L. C., & Hooper, H. (2010). Relationship between grade span configuration and academic achievement. *Journal of Advanced Academics, 21*(2), 272–298.

Available from: http://files.eric.ed.gov/fulltext/EJ880581.pdf

The relationship between grade span configuration and academic achievement of 6th-grade students as measured by the Arkansas Benchmark Examination, which is the approved NCLB criterion-referenced annual assessment, was examined. The results of a one-between two-within analysis of variance for the 3-year state-wide study of 6th graders' combined population scores revealed no statistically significant difference for grade span configuration and the interaction of grade span configuration and year, but statistically significant differences were found over the 3 years for both mathematics and literacy percent scores.

McFarland, V. (2007). *Middle level grade configuration: impact on Hawai'i's schools.* Honolulu, HI: Hawai'i Educational Policy Center.

Available from: http://files.eric.ed.gov/fulltext/ED526341.pdf

This report highlights the importance of addressing the unique set of needs of middle-level students. The struggle over structuring and content of middle-level education–the K-8 versus middle-school/junior-high argument–mirrors to a considerable extent the broader recurring battle of traditionalism versus progressivism. There are few empirical studies on what constitutes the "best practices" for middle-level configuration. This question relates to a complex set of variables that deserve further study. Thus, the author recommends a longitudinal study to look at what configuration best serves middle-level students in the state of Hawai'i. This study provides extensive evidence that small schools have major benefits over large ones, particularly in promoting higher attendance and graduation rates; higher levels of academic achievement; fewer students dropping out; and a stronger sense of connectedness. The study also indicates that creating a stronger sense of community meets the social and psychological development needs of middle-level students. Thus, it appears that the research would strongly recommend downsizing Hawai'i's middle schools and working to create programs that encourage a stronger sense of community. It is these efforts that work to transform the social relationships among children that will most benefit middle-level students–regardless of their school configuration. Appended are: (1) Hawai'i Charter School Middle-Level Configuration; and (2) Hawai'i Middle-School Disciplinary Actions.

Kieffer, M. J. (2013). Development and reading and mathematics skills in early adolescence: do K-8 public schools make a difference? *Journal of Research on Educational Effectiveness, 6*(4), 361–379.

Available for purchase from: http://www.tandfonline.com/doi/full/10.1080/19345747.2013.822954#tabModule

Educators and policymakers are paying increased attention to the academic outcomes of students in the middle grades (i.e., Grades 6–8). One reform proposed to improve outcomes for these students is to replace middle schools (with Grade 6–8, 7–8, or 7–9 configurations) with K-8 schools. This longitudinal study evaluated the effects of continuously attending a K-8 school, rather than transitioning from an elementary school to a middle school, on Grade 8 reading and mathematics achievement. Drawing on nationally representative data from the Early Childhood Longitudinal Study–Kindergarten 1998 cohort (N = 8,237), the study used propensity score stratification to control for observable selection bias. Findings indicated that K-8 schools produce small, significant effects for reading (effect size = 0.15 or approximately 6–8 months of schooling), but nonsignificant effects for mathematics. Results were robust to several alternative specifications, including accounting for nesting of children within schools and using different approaches for propensity score matching. Findings provide conditional support for K-8 schools, highlight the need for cost-effectiveness research on this topic, and raise questions about the specific mechanisms for K-8 schools' advantages.

Stevenson, K. R. (2006). *School size and its relationship to student outcomes and school climate: a review and analysis of eight South Carolina state-wide studies.* Washington, DC: National Clearinghouse for Educational Facilities.

Available from: http://files.eric.ed.gov/fulltext/ED495953.pdf

The author reviews eight school size studies performed by doctoral students and graduate faculty at the University of South Carolina. These studies examine the relationship of South Carolina school size to academic achievement and to costs per student at all grade span groupings, including elementary, middle, and high school. The studies are categorized by grade span covered, and their methodology and findings summarized. Results of the studies are varied and sometimes contradictory, and additional issues arise such as poverty, differing results in grade spans, cost versus outcomes, middle and elementary school climate factors, and variance of the South Carolina findings from those in other states. Smaller middle schools appeared to produce better student outcomes, and where larger elementary and high schools appear to perform better, there is evidence that results vary dramatically depending on the children served.

Stewart, L. (2009). Achievement differences between large and small schools in Texas. *The Rural Educator, 30*(2), 20–28.

Available from: http://files.eric.ed.gov/fulltext/EJ869305.pdf

The purpose of this study was to determine whether there exists a relationship between student achievement in Texas, as measured by the Texas Assessment of Knowledge and Skills (TAKS) test, and the size of the high school at different socioeconomic levels. This study compared five size categories of Texas high schools to determine which size high school had the highest percentage of eleventh grade students passing all four sections (reading, writing, math, and science) of the TAKS test. Data were examined for statistical significance using an ANOVA and a post hoc Scheffe test. The findings indicate that smaller rural schools experience higher percentages of students passing all four parts of the eleventh grade TAKS test in Texas than the larger urban and suburban schools where 25 % or more of the students are living in low socioeconomic situations.

Weiss, C. C., & Kipnes, L. (2006). Reexamining middle school effects: a comparison of middle grades students in middle schools and K-8 schools. *American Journal of Education, 112*(2), 239–272.

Available from: http://www.onteora.k12.ny.us/cms/lib01/NY24000036/Centricity/Domain/14/10-11TaskForceResearch/ReexaminingMSEffects.pdf

The period of the middle grades has seen numerous reforms to improve education for students in early adolescence. However, although several current reforms seek to overhaul middle schools, only a handful of studies have directly compared the effects of different configurations of grades. Our analysis uses district and student data from one of the few American urban districts that contain both middle schools and K-8 schools. We compare student outcomes in eighth grade, finding few differences by school type. Only self-esteem and perceived threat differ by type of eighth-grade school. We also show that students' self-esteem benefits academic outcomes, a benefit that primarily accrues to students in middle schools.

Zoda, P., Combs, J. P., & Slate, J. R. (2011). Elementary school size and student performance: a conceptual analysis. *International Journal of Educational Leadership Preparation, 6*(4), 1–20.

Available from: http://files.eric.ed.gov/fulltext/EJ974350.pdf

In this article, we reviewed the empirical literature concerning the relationship between school size and student performance with a focus was on determining the extent to which school size, specifically elementary school size, was related to student academic achievement. Most of the extant literature was on secondary school size with fewer studies published on elementary school size and even fewer studies published on middle school size. In this review, we provide a critical analysis of the available research on school size. Moreover, the benefits and disadvantages of small versus large schools were analyzed. Despite an abundance of published research studies, definitive answers regarding school size and student performance remain unanswered. Decisions about school size appear to be complex and involve a variety of factors such as costs, community support, and students with special educational needs.

Search Process

DATABASES AND WEBSITES

Institute of Education Sciences Resources: Regional Educational Laboratory Program (REL); IES Practice Guides; What Works Clearinghouse (WWC); Doing What Works (DWW); Institute of Education Sciences (IES); National Center for Education Research (NCER); National Center for Education Evaluation and Regional Assistance (NCEE); National Center for Special Education (NCSER); National Center for Education Statistics (NCES)

Other Federally Funded Resources: The Assessment and Accountability Comprehensive Center; The Center on Innovation and Improvement; The Center on Instruction; The National Comprehensive Center for Teacher Quality; National Center for Research on Evaluation, Standards, and Student Testing; National Center for Performance Incentives; National Research and Development Center on School Choice, Competition and Achievement; National Research Center for Career and Technical Education; National Research Center on the Gifted and Talented

Search Engines and Databases: EBSCO Databases; ERIC; Google, Google Scholar; General Internet Search

For more information

For further questions, contact the REL Central Help Desk at relcentral@marzanoresearch.com or 1-888-840-8510.

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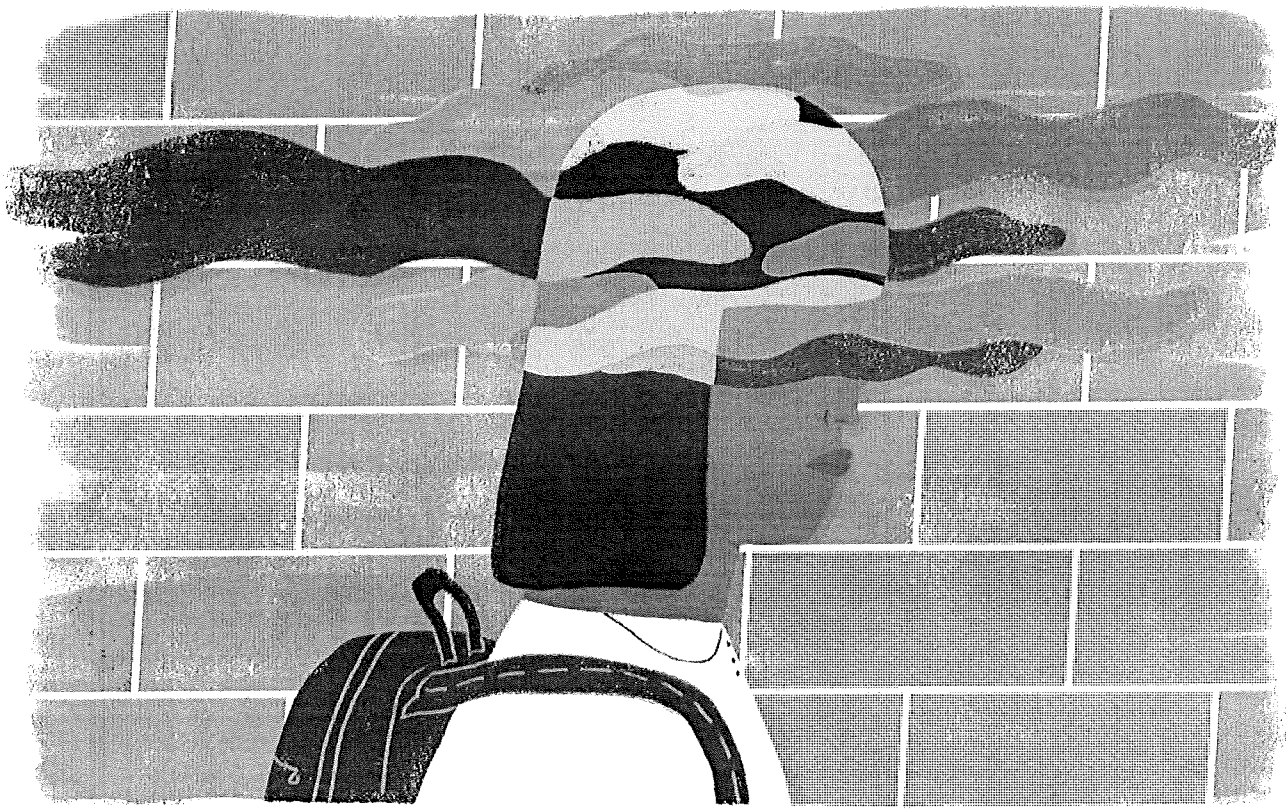
5

KQED News

MindShift How we will learn.

TEENAGE YEARS (HTTPS://WW2.KQED.ORG/MINDSHIFT/CATEGORY/TEENAGE-YEARS/)

How Can Middle Schools Best Organize to Help Young Adolescents Thrive?



Middle school is a particularly stressful time for young adolescents. (*LA Johnson/NPR*)

By Kat Lonsdorf, NPR
OCTOBER 10, 2016

SHARE

Middle school is tough. Bodies change. Hormones rage. Algebra becomes a reality. But there are things schools can do to make life easier for students — like this big study we wrote about (http://www.npr.org/sections/ed/2016/09/19/494232646/sixth-grade-is-tough-it-helps-to-be-top-dog) showing that K-8 schools may be better for kids than traditional middle schools.

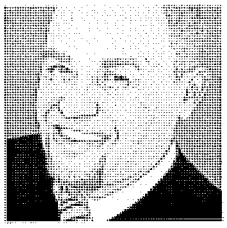
But aside from re-configuring an entire school system, are there other ways to make the sixth-grade experience better?

To answer that question, I called up Dru Tomlin, a director at the Association for Middle Level Education (https://www.amle.org/) — an organization that's been researching best practices for middle grade students for decades. Tomlin knows middle school: He's been a middle school teacher, an administrator, and he's the parent of a seventh-grade student.

What do you think about the idea of K-8 schools as opposed to the traditional 6-8 middle school set up?

Our research shows that when the school is made to feel smaller, that's when young adolescents flourish more. With a K-8 school

you have potentially more students in the school because you have all the way from 5-year-olds to 13- and 14-year-olds.



Dru Tomlin, Ph.D. Director of Middle Level Services Association for Middle Level Education. *(Illustration by Lara Tomlin/Courtesy of Dru Tomlin)*

An effective middle school, or middle grades, program needs to go beyond the grade configuration change. You can change the grade configuration of a school all day long. But you can also do some other things, and should do some things, that are developmentally responsive to young adolescents.

Of course safety and security is paramount, so we want students to not feel like they're going to be bullied or picked on or harassed in a school setting. But if you just change it to a K-8 school from a 6-8 school it doesn't guarantee that there is going to be less bullying and less transition issues for kids. There need to be other characteristics in place.

So how can we design middle schools to make the sixth-grade experience better?

It starts with identifying what their unique characteristics are. Identifying that they are trying to achieve not just academically or cognitively, but they're achieving and really working on social, emotional, behavioral, psychological, ethical — all that stuff at one time in a rapid way. So, we start with that understanding, plus a shared vision of what type of programs and what type of people we need to have in our buildings to serve those kids, that's where it really begins.

Without a common language, a common understanding and a common passion, then it's really not going to work as well as it should. It might function, but it won't help them flourish.

You talk about keeping schools small — what does that look like?

There are a couple of different structures that a middle grades program can put into place to make the learning community smaller. One of those key structures is called interdisciplinary teaming. It has both an academic focus as well as a social and emotional learning focus. Interdisciplinary in place of departments, because that's the junior high model, where you have separate departments that really never meet.

Instead, you take a large student body and you create a smaller learning community through interdisciplinary teams. Those teams can be two people. So for instance on a sixth-grade team, you have two teachers: One teaches English, language arts, reading and social studies and the other teaches math and science. Then, they can just really focus on those kids.

So how do you make a K-8 school feel small?

What it takes to make that happen is a master bell schedule (https://www.amle.org/BrowsebyTopic/MiddleSchoolConcept/MSCDet/TabId/193/ArtMID/817/ArticleID/515/Scheduling-Time-for-Interdisciplinary-Collaboration.aspx) that provides common planning. Which sounds like a mundane logistical piece, but that's where really creative work happens in a middle grades program — to have a schedule where those grade level teachers can meet across the content areas.

But the point is if it's just about the grade configuration but no attention is paid to interdisciplinary teaming or other developmentally responsive programs and initiatives, then you're really just putting more grades in the building.

What are some other structures that would help?

Another structure that is imperative, I think, is something called advisory or advisement. In the Utopian sense of it, it [a middle school] really should have a dedicated time during the day when students are meeting with an adult advocate in the building. That could be a teacher that they have or, it could be a teacher that they don't have that just meets with them. In these advisory periods, they work on social-emotional learning, behavioral issues, they work on skill development, they work on character education.

That's the environment in which young adolescents flourish: When they feel like they have a personal connection and someone who really cares about them. It's that old adage of they don't care to learn, unless they learn that we care.

When sixth-graders go to a new school they may not have those relationships that they had at their old elementary school. Is that part of the problem?

It really depends on what they call the "feeder patterns" of the school, so how the elementary schools matriculate up to the middle school. I've been in a middle school where they had five elementary schools feed into the school. That can be an issue. So that means even more that there needs to be a dialogue between elementary and middle grades to make sure those transitions are smooth.

Now in a K-8 structure, those conversations still need to happen, but the benefit of that is that everyone's in the same building. Transition conversations need to happen to ease the transition of sixth-grade students regardless of a 6-8 school or a K-8 school or whatever it is.

Sixth grade can be a rough time. Is being a sixth-grade student just always hard?

Well, they're a young adolescent first. So a young adolescent has unique characteristics (https://www.amle.org/BrowsebyTopic/MiddleSchoolConcept/MSCDet/TabId/193/ArtMID/817/ArticleID/455/Developmental-Characteristics-of-Young-Adolescents.aspx) that the school needs to recognize and respond to. For instance, they're undergoing the most rapid physical and cognitive change in their life in this grade. The only other time that it's this fast is birth to 3.

So, having a difficult time as a sixth-grader is in some ways regardless of the grade configuration. They're going through a massive identity shift with friends, with family, with their relationship to academics, to other adults in their lives, to other kids in their lives, trying to figure it all out.

Having difficulty in the sixth grade is part of that young adolescent journey. How we respond to and support them on that journey starts with an awareness that they're on it.

Quite honestly, one of the first things that a middle grades program needs to do is just to remember that. Have the teachers and administrators and staff members in the school take those characteristics of young adolescents that they have and remember what they were like at this age too.

EXPLORE: TEACHING STRATEGIES (HTTPS://WW2.KQED.ORG/MINDSHIFT/CATEGORY/TEACHING-STRATEGIES/), TEENAGE YEARS (HTTPS://WW2.KQED.ORG/MINDSHIFT/CATEGORY/TEENAGE-YEARS/), ADOLESCENTS (HTTPS://WW2.KQED.ORG/MINDSHIFT/TAG/ADOLESCENTS/), MIDDLE SCHOOL (HTTPS://WW2.KQED.ORG/MINDSHIFT/TAG/MIDDLE-SCHOOL/)

(https://ww2.kqed.org/mindshift/2016/10/10/how-can-middle-schools-best-organize-to-help-young-adolescents-thrive/?share=facebook&nb=1)

(https://ww2.kqed.org/mindshift/2016/10/10/how-can-middle-schools-best-organize-to-help-young-adolescents-thrive/?share=twitter&nb=1)

(https://ww2.kqed.org/mindshift/2016/10/10/how-can-middle-schools-best-organize-to-help-young-adolescents-thrive/?share=linkedin&nb=1)

(https://ww2.kqed.org/mindshift/2016/10/10/how-can-middle-schools-best-organize-to-help-young-adolescents-thrive/?share=pinterest&nb=1)

(https://ww2.kqed.org/mindshift/2016/10/10/how-can-middle-schools-best-organize-to-help-young-adolescents-thrive/?share=google-plus-1&nb=1)

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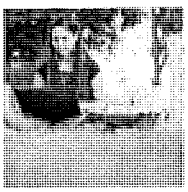

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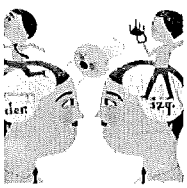

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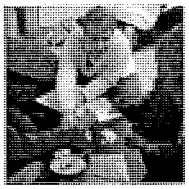

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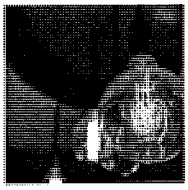

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Facilitating the Transition to Kindergarten

WHAT ECLS-K DATA TELL US ABOUT SCHOOL PRACTICES THEN AND NOW

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Abstract

Leveraging data from two nationally representative cohorts from the ECLS-K (Early Childhood Longitudinal Study–Kindergarten), we examine the types of transition practices that schools use to ease children's adjustment to formal schooling. The transition to kindergarten is a critical juncture in a child's life that entails a host of social, behavioral, and academic changes. We find a modest increase between the two cohorts in the number of transition practices that schools offer children and their families, although we also find that fewer of these practices are offered in traditionally underserved schools. We conclude with a discussion of the implications of these findings and suggest areas for future research.

ECLS-K kindergarten transition school readiness kindergarten readiness assessment

The transition to kindergarten represents a critical juncture in the lives of children (**LoCasale-Crouch et al., 2012**; **McIntyre, Eckert, Fiese, DiGennaro, & Wildenger, 2007**; **Pianta, Cox, Taylor, & Early, 1999**). When children first step foot into their kindergarten classrooms, they are often entering a new world that entails unfamiliar social, behavioral, and academic expectations (**Pianta & Cox, 1999**).

Given a robust body of evidence suggesting that children's early educational experiences can have cascading effects on school and later life outcomes, schools have a strong incentive for helping to smooth this transition (**Barnett, 2011**; **Chetty, Friedman, Hilger, et al., 2011**; **Chetty, Friedman, & Rockoff, 2011**; **Claessens, Duncan, & Engel, 2009**; **Duncan & Magnuson, 2013**; **Jenkins, Farkas, Duncan, Burchinal, & Vandell, 2016**; **Magnuson, Ruhm, & Waldfogel, 2007a**, **2007b**). In this article, we focus on two types of transition practices: (a) the transition activities that elementary schools offer children and their families prior to and at the beginning of the kindergarten year, as well as (b) schools' use of readiness assessments to identify the skills that students bring with them. Between these two categories of transition practices, we examine the use of eight ways in which schools seek to smooth the transition into kindergarten. By drawing on data from two nationally representative cohorts in the Early Childhood Longitudinal Study–Kindergarten (ECLS-K), we further examine changes in schools' transition practices over time.

The purpose of this article is not to evaluate the efficacy of transition practices for improving academic and noncognitive skills in early grades. That will need to be addressed by others using a different study design. Here, we are interested in revealing the prevalence of different transition practices, the distribution of those practices across varied school settings, and any changes in their use over time. Consistent with previous studies, our findings suggest that schools continue to be much more likely to report using low-intensity practices, such as sending information home to parents, than high-intensity practices, such as having a preschool class visit a kindergarten classroom. Additionally, we find that the use of readiness assessments is common among elementary school principals, who report using assessment results to individualize instruction and to identify children in need of additional testing. We also find a modest increase in the overall number of transition activities used by elementary schools between 1998–1999 and 2010–2011, as well as changes in the proportion of schools using specific types of transition activities. Apart from changes in the types of activities used, we find substantive shifts in the ways that kindergarten readiness assessments have been used over the 12 years studied. Finally, we find that schools serving traditionally underserved student populations report using fewer transition activities, meaning that the students who could benefit most from such activities are the least likely to receive them. In the following sections, we motivate the need for this study, review the extant literature on transition practices, and present our data, methods, and results. Finally, we conclude by placing the findings in the context of current policy discussions.

Literature Review

A large body of evidence points to the importance of early educational experiences on proximal and distal outcomes. In fields from education and psychology to neuroscience and economics, studies have shown that children's early educational experiences are highly consequential and have lasting effects throughout their educational careers and later stages of life (**Barnett, 2008**; **Campbell et al., 2014**; Chetty, Friedman, Hilger, et al., 2010; **Claessens & Engel, 2013**; **Phillips & Shonkoff, 2000**; **Watts, Duncan, Siegler, & Davis-Kean, 2014**; **Watts et al., 2015**). While much attention has been

given to early childhood interventions such as preschool (**Barnett, 2008, 2011**; **Campbell et al., 2014**; **Curran, 2015**; **Jenkins et al., 2016**; **Magnuson et al., 2007a, 2007b**), studies have demonstrated that the experiences of students during the first year of formal schooling—kindergarten—are also highly predictive of immediate and later outcomes (**Chetty, Friedman, Hilger, et al., 2011**; **Claessens & Engel, 2013**; **Claessens, Engel, & Curran, 2014**; **Fusaro, 1997**; **Morgan, Farkas, Hillemeier, & Maczuga, 2016**; **Watts et al., 2015**). For instance, structural characteristics, such as the length of the kindergarten school day and class size, are associated with increased achievement through the early years of elementary school (**Cooper, Allen, Patall, & Dent, 2010**; **Krueger & Whitmore, 2001**). Furthermore, features of the kindergarten experience, such as the quality of the teacher, as well as some of these structural characteristics (e.g., class size), have recently been shown to influence outcomes as remote as college attendance and earnings nearly two decades later (**Chetty, Friedman, Hilger, et al., 2011**; **Dynarski, Hyman, & Schanzenbach, 2013**).

The ability of students to fully engage in and benefit from their kindergarten experiences has been shown to depend on the degree to which they successfully transition into kindergarten, and the success of that transition is at least partially predicated on their home and early educational backgrounds. Evidence from **Rimm-Kaufman, Pianta, and Cox (2000)**, for example, indicates that 48% of children have difficulty adjusting to school, and these difficulties are most prevalent for children from low socioeconomic backgrounds. One third of the teachers surveyed for the study reported that more than half of their students had difficulty following directions, lacked basic academic skills, and struggled to work independently.

Difficulties in transitioning to kindergarten may only be exacerbated by recent shifts in the orientation of kindergarten to focus more on academic content. New research has documented the increasing focus on academics during the kindergarten year; specifically, evidence shows an increase in the academic expectations of teachers, the level of literacy and mathematics content taught, and the use of teacher-directed instruction in kindergarten between 1998–1999 and 2010–2011 (**Bassok, Latham, & Rorem, 2016**; **Bowdon & Desimone, 2014**). Additionally, kindergarten has undergone structural changes over this period, with the majority shifting from part- to full-day programs (**Bassok et al., 2016**). Each of these changes might be expected to increase the difficulty that kindergartners have adjusting to school.

Understanding the importance of kindergarten, school leaders have sought ways to smooth the school transition to help children make the most of their early-grade experiences. We focus in this article on two such approaches: (a) the transition activities that schools offer children and their families at the beginning of the kindergarten year and (b) schools' use of readiness assessments to identify the skills that students bring with them. For our purposes here, *transition activities* include steps taken by the school or teacher—such as hosting an orientation night, sending home information about kindergarten, or visiting students' homes—to help ease children's transition into kindergarten. *Readiness assessments* refer to testing instruments administered to gauge students' incoming skills and provide information that teachers and administrators can use to determine placement or

individualized instruction. Together, these *transition practices* involve ways that schools provide information outward to parents, caregivers, and children about kindergarten and receive information about incoming students to best serve their needs. We now turn to review the existing literature on each of these approaches, beginning with transition activities and moving onto readiness assessments.

Kindergarten Transition Activities

The most comprehensive study of kindergarten transition activities and their prevalence comes from the National Center for Early Development and Learning. Published in 1999, the study draws on data from the 1996–1997 academic year and suggests that nearly all kindergarten teachers utilize some transition activities but that there is considerable heterogeneity in the use of specific types of activities (**Pianta et al., 1999**). Moreover, "high intensity" activities, or those that involve individualized contact with parents and occur before the first day of school, are less common than "low intensity" activities, such as sending information home via a flyer (**Daley, Munk, & Carlson, 2011**; **Pianta et al., 1999**). Furthermore, studies document fewer high-intensity activities in schools serving lower-income students or located in larger districts (**Daley et al., 2011**; **Pianta et al., 1999**).

Such variation in the use of activities may have important implications for student success, given findings that link their use to student outcomes. After controlling for socioeconomic and demographic factors, **Schulting, Malone, and Dodge (2005)** found, using the ECLS-K 1998–1999 data, that the number of transition activities that a school employs is associated with higher student achievement scores at the end of kindergarten. Furthermore, the authors found that the effect of transition activities was stronger for low-income students than more affluent students. Given that the number of transition activities offered by a school was associated with increased academic achievement in kindergarten, a key contribution of this article will be to examine if the total number of activities that schools offer has changed over time and, if so, for which types of schools.

Apart from **Schulting et al. (2005)**, we could find no other study in the literature that evaluated the effects of commonly practiced transition activities on student outcomes. There is additional research, however, that considers longer-term and/or more intensive school transition programs. Evidence from a randomized controlled trial of a comprehensive transition orientation program, for example, found that the program improved teachers' ratings of the transition to the social aspect of kindergarten for girls. The study also found that children who experienced the transition intervention with the same teacher that they would have in kindergarten were better able to adjust to kindergarten routines (**Berlin, Dunning, & Dodge, 2011**). The program was a 4-week intervention that focused on parental engagement, school routines, and preliteracy and prenumeracy skills; specifically, it involved providing rising kindergartnerers 4 weeks of classroom time with kindergarten teachers and teaching assistants, during which students were exposed to curriculum specific to developing social competence and understanding school routines (**Berlin et al., 2011**).

Several federally supported transition programs, such as those associated with Project Head Start, have also been evaluated. Like the orientation program described above, these programs generally represent much more comprehensive interventions than those offered by individual schools (**Kagan & Neuman, 1998**). They include Head Start with Follow Through, which provides an aligned, continuous curriculum spanning preschool through early elementary years; Project Developmental Community, which provides pre- and in-service teacher training on transition practices; and the Head Start Transition Project, which arranges kindergarten classroom visits prior to the start of school as well as summer activity lists for children (**Kagan & Neuman, 1998**). Evidence suggests that the implementation of transition activities matters. Studies have demonstrated that coordination between preschool and primary school teachers around transitions are important (**Ahtola et al., 2011**; **Desimone, Payne, Fedoravicius, Henrich, & Finn-Stevenson, 2004**).

The evidence on transition activities suggests that at least some of these activities may be effective for improving student outcomes in kindergarten. Nevertheless, the evidence on the effects of transition activities is not very specific, with studies focusing on comprehensive transition programs or the aggregate number of transition activities that a school uses, as opposed to specific individual activities (**Pianta et al., 1999**; **Schulting et al., 2005**). There is, however, theoretical evidence from **Pianta and colleagues (1999)** that high-intensity activities that make individualized connections and span across time will be most effective. Research from the 1990s and early 21st century suggested that, at the time, such high-intensity activities were less common than lower-intensity activities and that transition activities in general were less available for underserved student populations (**Daley et al., 2011**; **Pianta et al., 1999**). That said, little research has examined the prevalence and distribution of transition activities in more recent data, despite numerous changes to the nature and policy context of kindergarten (**Bassok et al., 2016**; **Bowdon & Desimone, 2014**).

Kindergarten Readiness Assessments

Far less research has examined schools' administration of kindergarten readiness assessments and the use of the data that they produce. The primary focus of the existing literature on the topic is on the technical aspects of defining school readiness and issues regarding the instrumentation of specific readiness measures (**Mashburn & Henry, 2004**; **Snow, 2006**). Although 21 states required the use of universal readiness assessments in kindergarten in 2011 (**Howard, 2011**), we are unaware of any studies, peer reviewed or otherwise, examining the prevalence of school readiness assessments at the district or school level or the range of ways in which schools utilize data from them. Furthermore, in the competition for Race to the Top—Early Learning Challenge, a core priority for funding was for states to "administer a kindergarten entry assessment, aligned with the Early Learning and Development standards, to all children entering a public school kindergarten" (**U.S. Department of Education, 2011**). Elsewhere, we are conducting a review of agency websites in the 50 states and the U.S. Department of Education to reveal how many states today require an assessment for all or a subset of its kindergarten students (**Little & Cohen-Vogel, 2016**).

The Present Study

This study makes several important contributions to the literature on kindergarten transition practices. First, much of our current understanding of the prevalence of kindergarten transition activities (e.g., parent orientations, home visits) comes from data collected during the 1996–1997 academic year as part of the National Center for Early Development and Learning (**Pianta et al., 1999**). Nearly 20 years later, much has changed in terms of what we know about the importance of early educational experiences and with regard to what kindergartners are being asked to do. In the context of No Child Left Behind and increased accountability pressure, there is evidence that kindergarten teachers and their administrators faced significant pressure to prepare students for mandatory tests in mathematics and reading in third grade (**Booher-Jennings, 2005**; **Cohen-Vogel, 2011**; **Grissom, Kalogrides, & Loeb, 2014**; **Jacob, 2005**). In fact, in a comprehensive analysis of changes in kindergarten between 1998 and 2010, **Bassok et al. (2016)** found substantial changes in terms of kindergarten teachers' beliefs about school readiness, time spent on academic and nonacademic content, classroom organization, pedagogical approach, and use of standardized assessments. Finally, the demographic composition of public schools has changed dramatically over the past 20 years, with the proportion of Hispanic students increasing from 14% to 27% (**U.S. Department of Education, n.d.**). Together, these changes have likely led schools to expand and retool the ways that they transition students.

The current study leverages survey items—common to both the 1998 and the 2010 versions of the ECLS-K—about transition practices to examine whether and how things have changed. We include all of the school-based transition measures that are available in the ECLS-K surveys, but it is important to point out that schools may engage in other practices not included in the survey—practices such as sharing student records between prekindergarten and kindergarten teachers and coordinating the prekindergarten and kindergarten curricula (**LoCasale-Crouch, Mashburn, Downer, & Pianta, 2008**). That said, the transition practices that we cover in this article represent the majority of practices that have been examined in previous literature (**Pianta et al., 1999**) and extend on that work to include readiness assessment use.

In this article, we address the following four research questions:

> *Question 1:* What transition activities do elementary schools employ, and which activities are most common?
>
> *Question 2:* How do educators use data from kindergarten readiness assessments?
>
> *Question 3:* How has the prevalence of transition activities and the use of readiness assessments changed over time?
>
> *Question 4:* Are school-level geographic, structural, and demographic factors associated with schools' use of transition practices?

Answering these questions has the potential to inform our understanding of the prevalence of kindergarten transition practices while providing insight into the degree to which the use of these practices has changed over time and varies across school contexts. These answers can inform policy makers and educators as they continue their work to improve the kindergarten experience for all students regardless of where they live or what their family background is.

Conceptual Model

We rely on the ecological and dynamic model of transition outlined by **Rimm-Kaufman and Pianta (2000)** to conceptualize the transition from preschool to kindergarten. As Rimm-Kaufman and Pianta note, the ecological and dynamic model of transition "defines the transition to school in terms of the dynamic qualities of the transition ecology—the interconnectedness of relationships among child characteristics; and peer, family, school and neighborhood contexts—and how these connections develop and change" (p. 492). This framework builds on a range of similar ecologically orientated systems theories, such as **Bronfrenbrenner and Morris's (1998)** bioecological model and **Pianta and Walsh's (1996)** developmental/ecological framework.

At the center of this model is the child (see **Figure 1**). According to the model, characteristics of the child, such as temperament and intelligence, are affected by external factors, such as family, neighborhood, teachers, and peers. These external factors interact, and these interactions can in turn affect child-level outcomes. The development of a strong family-teacher bond, for example, has been shown to help foster positive outcomes for children (**Crosnoe, 2004**; **Epstein & Sanders, 2000**). Guidance from the ecological and dynamic model of transition helped us to conceptualize the various practices examined in our study as potentially representing the interconnectedness of factors shaping the school transition process. Some of the practices in which schools engage to facilitate transition appear to better recognize and foster the interconnectedness of contextual factors. Having preschool students and their parents visit a kindergarten classroom together before the start of the school year honors these interconnections by bringing children, families, teachers, and peers together for a shared experience. Sending a notice home with a child—a notice that cannot be read by a child of preschool age—is an activity that does little to recognize the ecology of the transition process. The classroom visit described here is an example of a transition practice that **Pianta et al. (1999)** termed *high intensity* because of its recognition of interconnections described in the ecological and dynamic model of transition; in contrast, practices that do not recognize the interconnections are deemed *low intensity* and include hosting adult-only parent orientation nights and sending information home.

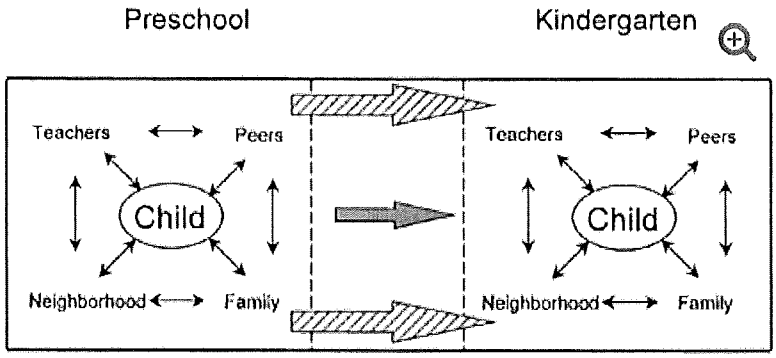

Figure 1. Download figure | Open in new tab | Download powerpoint

Conceptual framework (**Rimm-Kaufman & Pianta, 2000**).

The **Rimm-Kaufman and Pianta (2000)** model also conceptualizes the transition process as evolving over time. The authors noted that "knowledge of only the direct and indirect effects of contexts on children's adjustment to school provides an incomplete picture of school transition. The transition process, by nature, begins in the year before kindergarten entrance and continues through the kindergarten year" (p. 500). In essence, the transition process, according to these scholars, spans a 2-year time frame. In response to the model's guidance, we recognize the importance of conceptualizing kindergarten transition as a multiyear process and do what we can through our analysis to examine it as such. As described in full in the Method section, five of the six survey items on which this study is based contain a temporal component. While imprecise, they do give us the ability to reveal the percentage of schools that offer transition practices during the preschool year, in the summer before kindergarten starts, and at the beginning of the kindergarten year.

Method

Data

In this study, we leverage data from the 1998–1999 and 2010–2011 kindergarten cohorts of the Early Childhood Longitudinal Study (i.e., the ECLS-K). Both ECLS-K surveys provide nationally representative data on children beginning in kindergarten. In both surveys, a wealth of information was collected about kindergarteners, through parent, teacher, and school administrator surveys as well as one-on-one assessments of children. While the ECLS-K 2010–2011 is not an exact replication of the ECLS-K 1998–1999, numerous survey items are the same and enable comparison between two cohorts of kindergarteners over 10 years apart (**Mulligan, Hastedt, & McCarroll, 2012**; **Tourangeau, Nord, Lê, Sorongon, & Najarian, 2009**). Since transition practices included in the ECLS-K are schoolwide, the unit of analysis in this study is the school. Additionally, we limit our sample to public schools. For both the 1998–1999 and 2010–2011 cohorts, the sample of schools is nationally representative in the base year. Our analytic samples include 630 public schools from the 1998–1999 cohort and 725 public schools from the 2010–2011 cohort.

The ECLS-K surveys employed a complex multistage sampling strategy to produce nationally representative estimates. Sampling took place in a three-stage process. In the first stage, the country was divided into primary sampling units (PSUs), and PSUs were then sampled (100 PSUs in 1998–1999 and 90 PSUs in 2010–2011). In the second stage, public and private schools were sampled in each sampled PSU. Finally, in the third stage, children enrolled in kindergarten programs in the selected schools were sampled (**Mulligan et al., 2012**; **Tourangeau et al., 2009**). Due to this complex sampling design, a school-level sampling weight (W2SCH0) was required to produce nationally representative estimates and adjust for the effect of differential nonresponse. Additionally, corresponding replicate weights (W2SCH1-W2SCH80) were used with the jackknife replication method to yield accurate standard errors for estimates.[1]

Measures

Transition Activities

In the fall of kindergarten in both ECLS-K cohorts, teachers completed surveys about their backgrounds, teaching practices, beliefs, and students' performance. In both the 1998–1999 and 2010–2011 fall kindergarten surveys, teachers were asked if their schools used any of six listed transition activities:

1. "I (or someone at the school) phone or send home information about the kindergarten program to parents."
2. "Preschoolers spend some time in the kindergarten classroom."
3. "The school days are shortened at the beginning of the school year."
4. "Parents and children visit kindergarten prior to the start of the school year."
5. "I (or another teacher) visit the homes of the children at the beginning of the school year."
6. "Parents come to the school for orientation prior to the start of the school year."

In addition to including each of these six binary (yes or no) transition activity measures in our analysis, we developed an aggregate measure for the total number of activities offered. The 2010–2011 survey included a new response option that asked teachers if their schools staggered school entry where kindergarteners start the school year in smaller groups before meeting with the full class. We included this item in our analysis focusing on only the 2010–2011 data but not when comparing changes from 1998–1999, as this item is not common to both data sets.

While these transition activities were reported from individual teachers, they are largely implemented at the school level. Thus, we developed school-level transition variables from the teacher-level reports. We computed school-level transition variables by averaging the responses of all teachers within a particular school. As expected, the internal consistency among teachers within schools was

high, with an intraclass correlation of 0.91. All other measures included in this analysis were originally school-level variables.

Readiness Assessments

The school administrator survey, which was completed by administrators in the same schools as the teachers, included a set of items related to schools' use of readiness assessments near the beginning of kindergarten. With our conceptual model in mind, we see readiness assessments as part of the dynamic transition process where schools come to know their students and cater instruction and services according to their needs (**Rimm-Kaufman & Pianta, 2000**). First, administrators were asked if their schools administered a readiness assessment before or shortly after the start of the school year; if so, they were then prompted to answer six questions about how they utilize the assessment results:

1. to determine eligibility for enrollment when a child is below the cutoff age for kindergarten,
2. to determine children's class placements,
3. to identify children who may need additional testing (e.g., for a learning problem),
4. to help teachers individualize instruction,
5. to support a recommendation that a child delay entry for an additional year, and
6. other purposes.

For each item, the response options were yes or no. The ECLS-K provides only general information regarding whether or not a school reported using a readiness assessment and how it used the data from the assessment. We do not have specific information on the type of readiness assessment used.

Covariates

We included a set of school-level measures from the 2010–2011 cohort to investigate factors that have been found to be associated with the use of transition activities and kindergarten readiness assessments. Our selection of covariates was driven primarily by (a) measures used in prior research on transition practices and (b) measures that reflect the significant changes in early-grade education between 1998 and 2010. First, we included an indicator variable to designate if the school was located in an urban area. In **Pianta and colleagues' (1999)** study, the number and type of transition practices that children received were found to vary per the geographic location of a school, so we included the location variable to see if the disparities still exist and if the relationship translates to the use of readiness assessments. For the same reason, we included a continuous measure of the level of poverty in each school's district. The district poverty variable comes from the Small Area Income and Poverty Estimates and measures the percentage of children aged 5 to 17 years who are in poverty, by school district (**Tourangeau et al., 2009**).

We also included more refined measures of school demographics, including continuous variables for the percentage of students eligible for free lunch, the percentage of students of color, and the percentage of English language learners (ELLs) in each school. Given the significant demographic changes in public schools since the 1998–1999 ECLS-K cohort (**Kena et al., 2015**), it is important to understand how these factors may be associated with the availability of transition activities and the prevalence of readiness assessment administration itself. Furthermore, since many transition practices involve communication with parents, the increase in ELLs in public schools may pose challenges for schools to conduct certain practices (**Kena et al., 2015**).

In addition to the demographic changes in public schools between the two ECLS-K cohorts, there has been a dramatic shift in the provision of early care and education (**Barnett, Carolan, Squires, & Brown, 2014**; **Curran, 2015**). To examine how these changes may covary with transition practices and readiness assessment use, we included a variable that indicates if the school's kindergarten program is full day, as well as a variable that indicates if the school hosts a prekindergarten program.[2] We hypothesized that these early childhood education characteristics may be associated with the provision of transition activities or the use of readiness assessments. For example, if an elementary school hosts a prekindergarten program, that school may be more likely to provide opportunities for preschoolers to spend time in a kindergarten classroom.

Last, we included a continuous measure of the number of students enrolled in each school's kindergarten program and an indicator variable for whether or not the school met adequate yearly progress (AYP) in the preceding academic year.[3] We hypothesized that transition activities and readiness assessment use may vary per the enrollment of the kindergarten due to efficiency constraints. For example, larger kindergartens may be more likely to use readiness assessments because there are simply too many students to efficiently address readiness skills through other means. Additionally, prior research suggests that high-intensity practices (e.g., home visits) are less common in high-enrollment districts (**Daley et al., 2011**; **Pianta et al., 1999**). That said, since some readiness assessments may be time intensive, it could be that larger districts are less likely to use them. We included the measure of whether or not the school met AYP due to the increased accountability pressures under which schools operate (**Hamilton, Stecher, Marsh, McCombs, & Robyn, 2007**). For example, as compared with schools that did meet AYP, schools that did not may feel more pressure to better prepare students for state assessments in the third grade, which is the first year that annual testing is required for accountability purposes. Thus, these schools may focus on ensuring successful transitions and relying on data from earlier tests, such as the kindergarten readiness assessment, to identify areas for improvement and instructional focus.

Analytic Strategy

We began our analysis by generating basic descriptive statistics for all of the measures from the 1998–1999 and 2010–2011 cohorts. Additionally, to examine the extent to which the prevalence of

transition activities and the use of readiness assessments have changed between the two ECLS-K cohorts, we calculated independent sample *t* tests.

Next, we sought to understand how public schools' use of transition activities and readiness assessments varied according to the school-level covariates in our data set. To understand the unconditional differences, we ran bivariate regressions between each dependent and independent variable. For our purposes, *unconditional differences* mean that the relationship between each school-level covariate and transition practice is modeled without controlling for any other factors. The unadjusted models convey the actual gaps that are present in the world. Such unadjusted gaps are analogous to unadjusted achievement gaps that present the Black-White gap or the gap between affluent and less affluent individuals (**Fryer & Levitt, 2004**; **Reardon, 2011**). While it is true that such gaps may be reduced by controlling for other covariates, it is important and policy relevant to illuminate the gaps as they actually exist before exploring the degree to which other covariates explain the gap. This approach is consistent with prior work on transition practices that also presented unadjusted comparisons to illuminate disparities across independent variables (**Pianta et al., 1999**).

We then moved from unconditional bivariate regressions to models that included all covariates, contemporaneously, to explore the degree to which any gaps in the unconditional models were explained by the inclusion of covariates. These models enabled us to understand not only how the use of transition activities and readiness assessments vary across school-level factors but how these factors are associated when holding constant school demographics, program type, and whether or not the school met AYP. Using ordinary least squares regression, we first modeled the total number of transition activities that a school utilized. Then, we ran linear probability models predicting each binary outcome. The models took the following general form:

For the linear probability models, the coefficient is the change in the probability that the outcome variable is equal to 1 for a unit change of the independent variable. Because the outcome is dichotomous, linear probability models are inherently heteroskedastic, so we use robust standard errors when generating estimates (**Wooldridge, 2009**). To better capture the magnitude of the observed associations, we standardized all continuous independent variables into *z* scores with a mean of 0 and a standard deviation of 1.

Robustness and Sensitivity Tests

For all of the models with binary outcomes, we first ran logistic regression models and examined the magnitude of the odds ratios to determine whether or not our primary estimation method should be linear probability models or logistic regression models (**Von Hippel, 2015**). While this analysis supported our use of linear probability models, we present the results from the logistic regression models in **Tables A1⇓⇓–A4** as a robustness check. While the interpretation of the odds ratios is not directly comparable to linear probability regression coefficients, the results indicate nearly identical

directions of association and statistical significance. A statistically significant odds ratio >1 suggests a positive association between the predictor and the binary outcome. Conversely, a significant odds ratio <1 suggests a negative association between the predictor and the binary outcome (**Kleinbaum & Klein, 2010**).

For the models with the total number of transition practices as the outcome, we also ran Poisson regression models, which are suited for the discrete values of a count outcome. The results for the Poisson regressions indicated that our ordinary least squares results were robust to this alternative estimation strategy. Finally, we explored the extent to which variation across states or school districts may drive the observed relationships. We ran models with state and district fixed effects and found qualitatively similar results. That the results are robust to restricting to variation within states or within districts suggests that the observed results are not being driven by policies at such higher levels of governance.

Results

Question 1: What Transition Activities Do Elementary Schools Employ, and Which Activities Are Most Common?

We find that the use of at least some transition activities is a common occurrence in schools but that the frequency of use varies greatly by activity. Descriptive statistics for all transition practices are presented in **Table 1**. As shown for the 2010–2011 cohort, most public schools used at least one of the seven surveyed transition activities (only 1.1% reported using none of the practices). On average, schools reported using 3.17 kindergarten transition activities. Of the seven individual transition activities, the most commonly reported activities included a school sending information home about kindergarten (95%), using child/parent visits prior to the start of the school year (87%), and hosting a parent orientation before school begins (81%). According to our conceptual model, the latter two activities recognize the transition as a dynamic process that occurs over time. There was a large difference in the proportion of schools implementing these three most commonly reported transition activities and the proportion implementing the other four. The next-most frequent transition activity was having preschoolers spend some time in a kindergarten classroom before the start of the year (33%), while the other three activities occurred in ≤10% of schools.

Question 2: How Do Educators Use Data From Kindergarten Readiness Assessments?

We find that the use of readiness assessments was a commonly reported practice but that schools using them varied in how the results of such tests were utilized. As shown in **Table 1**, a significant majority of administrators in the sampled schools reported that their schools used a student readiness assessment at the beginning of kindergarten (72%). Of schools utilizing such an assessment, the most commonly reported uses were related to decisions about the students' learning environment. For instance, the majority of schools utilized assessment data to help teachers individualize instruction (93%), to identify children in need of further testing (65%), or to determine class placements (41%).

A nontrivial proportion of schools used the readiness assessment results to make decisions regarding whether students should even enroll. For instance, one in four schools utilized the assessments to support a recommendation to delay entry for an additional year, and almost one in five schools used

the assessment to determine eligibility for enrollment if the child was below the cutoff age for kindergarten entry.

Question 3: How Has the Prevalence of Transition Activities and the Use of Readiness Assessments Changed Over Time?

We find that, overall, the use of transition activities has increased between 1998–1999 and 2010–2011, with the most frequently used activities becoming more common and most of the least frequently used activities becoming less common. The final column in **Table** 1 provides mean differences for all practices between the 1998–1999 and 2010–2011 ECLS-K cohorts. Of transition activities listed on the survey, we found a statistically significant increase between the two cohorts in the total number of activities that schools reported using (from 2.96 to 3.07).[4] The three most common reported practices in 1998–1999 were also those that increased the most between that time and 2010–2011. Specifically, between 1998–1999 and 2010–2011, there was a significant 11–percentage point increase (from 76% to 87%) in the reported usage of visitation programs, wherein children and/or parents were encouraged to visit the school before the start of the academic year. Sending information home about kindergarten also increased substantially, with 86% of schools reporting doing so in 1998–1999 and 95% in 2010–2011 (a 9–percentage point increase), as did hosting parent orientations before the start of school (+5%).

Over this same period, there was a significant reduction in the percentage of schools that reported implementing two of the three least common transition practices of 1998–1999 and no change in the third. Reports of having preschoolers visit a kindergarten class fell from 41% in 1998–1999 to 33% in 2010–2011, a drop of 8 percentage points. According to educators' reports, the practice of beginning the year with shortened school days also dropped during this time, from 15% in 1998–1999 to 9% in 2010–2011 (a decrease of 6 percentage points). There was no significant change in the least common transition practice—teachers visiting the child at home.

In contrast to the use of transition activities, overall utilization of readiness assessment results stayed stable between the two survey administrations, although the frequency of a number of such assessments did shift (see **Table 1**). Reports of using data specifically to determine eligibility for enrollment when a child is below the cutoff age for kindergarten did not change; 17% of school administrators in both years reported that their schools applied readiness assessment data in this way.

However, significant changes were found regarding the other five applications of readiness assessment data. Between the two most commonly reported assessment data applications in 1998–1999, the use of one spread to a greater proportion of schools, while the use of the other contracted. With regard to using readiness assessment data to help teachers individualize instruction—the most commonly reported application in both 1998–1999 and 2010–2011—the percentage of administrators reporting using the practice in their schools went from 86% in 1998–1999 to 93% in 2010–2011, an increase of 7 percentage points. Additionally, the percentage of school administrators in 2010–2011

who reported using assessment data for determining children's class placements was 41%, a statistically significant 13–percentage point increase as compared with 1998–1999 (28%). Reports of using data for "other uses" also increased, from 11% to 34%, suggesting that future surveys be revised to capture additional applications.

The second-most commonly reported application of readiness assessment results in 1998–1999, identifying children for additional testing (e.g., for a learning disability), decreased by 15 percentage points in 2010–2011 (from 80% to 65%). While surprising, this decrease might be explained by an increase in the use of other instruments designed expressly for these purposes. For example, a skills assessment may not be the best way to diagnose learning disabilities, but we do not have access to data that would allow us to test this explanation here. Additionally, we found a significant 9-point reduction in the number of school administrators reporting that educators in their schools use readiness assessment data to support a recommendation that a child delay entry for an additional year—from 35% in 1998–1999 to 26% in 2010–2011.

Question 4: Are School-Level Geographic, Structural, and Demographic Factors Associated With Schools' Use of Transition Practices?

We present the results for Question 4 in two subsections. These results report the associations between school-level covariates and transition practices in the 2010–2011 ECLS-K. The complete list of school-level covariates and descriptive statistics on these covariates are shown in **Table 2**. In the first section, we summarize the bivariate associations between our dependent and independent variables. The bivariate regressions, which are shown in **Tables 3** and **4**, provide information on the degree to which the use of transition practices varies across contexts. For instance, the bivariate regression between urbanicity and transition practices indicates whether urban schools use more or fewer practices than do nonurban schools. Following the bivariate regressions, we summarize results from the full covariate-adjusted regression models, which are shown in **Tables 5** and **6**. The covariate-adjusted models provide insight into the degree to which relationships persist after controlling for other predictors of transition practices. For instance, they provide insight into the degree to which urbanicity predicts the use of transition practices after accounting for differences such as the demographics of students served or structural characteristics of the school (e.g., enrollment).

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Bivariate Models

In general, we find that the use of transition activities differs across urban and nonurban environments and that schools serving less advantaged groups of students tend to use fewer such practices. The bivariate regression results for the transition activities are presented in **Table 3**. In terms of geographic location, we find that schools located in urban areas are 11 percentage points less likely to have preschoolers spend time in a kindergarten class and have the parent/child visit kindergarten before the start of the year. Conversely, urban schools are 11 percentage points more likely to shorten school days at the beginning of the academic year.

We find that schools located in districts with higher percentages of students living in poverty provide fewer overall transition activities ($b = -0.16$). Consistent with **Pianta et al. (1999)**, we find that schools located in districts with higher percentages of children in poverty are less likely to send information

home about kindergarten (b = −0.03), have the child/parent visit kindergarten before the start of the year (b = −0.06), and host a parent orientation before school (b = −0.08).

In terms of school-specific demographic factors, we find that, similar to our findings for district poverty level, schools with traditionally disadvantaged students are also less likely to provide transition practices. For each of the three school demographic measures—the percentage of students qualifying for free lunch, the percentage who are students of color, and the percentage classified as ELLs—higher percentages are associated with fewer total practices offered by a school.

School's early education programming—that is, whether kindergarten is full day and whether or not the school hosts a prekindergarten program—is generally unrelated to the use of transition practices, with one exception. We find that schools with a full-day kindergarten program are 11 percentage points less likely to host a parent orientation before the start of the school year.

Neither kindergarten enrollment nor AYP status in the prior academic year was consistently related with a school's transition activities. Schools with higher enrollments were more likely to host a parent orientation before the start of the school year (b = 0.06), and schools that met AYP in the previous academic year were more likely to have a parent/child visit the school prior to the start of kindergarten (b = 0.10). Additionally, schools that met AYP offer more total transition activities (b = 0.26).

With regard to the use of readiness assessments, we find few associations with the likelihood to use such assessments but a number of differences in how they are used across school characteristics. **Table 4** displays the bivariate regression results for the readiness assessment measures. First, only district poverty and kindergarten enrollment size are associated with the overall use of readiness assessments, and the magnitude of the coefficients is moderate.

Schools that are located (a) in urban areas and (b) in districts with higher poverty levels and that have higher percentages of (c) students eligible for free lunch and (d) students of color are all less likely to use readiness assessment data to determine eligibility for kindergarten enrollment if the child is below the cutoff age. In terms of utilizing assessment data to determine class placements, schools in urban areas are less likely to do so (b = −0.13), and schools with higher enrollments are more likely to do so (b = 0.11). Schools with higher percentages of ELL students are less likely to use readiness assessment data for diagnostic purposes (e.g., to identify learning problems; b = −0.08).

We find that urban schools, schools in higher-poverty districts, schools with higher percentages of students eligible for free lunch, and schools with higher percentages of minority students are all less likely to use assessment data to support a recommendation that a child delay entry into kindergarten. The magnitude of these associations is largest for schools in urban districts (b = −0.20) and schools with higher percentages of minority students (b = −0.13).

The results in **Tables 3** and **4** highlight unconditional associations, speaking to the degree to which these practices vary across contexts. It is possible, however, that these associations confound one

another. For instance, significant relationships for urban schools may be a function of differences in the demographics of students served. In the next section, we present our findings from models that include a full set of covariates, allowing for an exploration of the degree to which the relationships observed in the bivariate regressions persist when controlling for other characteristics of the school.

Full Models

Results from our full covariate-adjusted models with the transition activities are shown in **Table 5**. While many of the relationships are qualitatively similar to those in the bivariate models, there are a number of notable changes with the inclusion of all variables as covariates. First, while schools located in urban areas are still >10 percentage points more likely to have shortened school days at the beginning of the year, they are 16 percentage points more likely to host a parent orientation before school begins after controlling for other covariates. Additionally, urban schools offer more practices overall (b = 0.31), a result that was previously insignificant. In terms of district poverty level, all three of the significant relationships from the unconditional comparisons became insignificant, although we do find that schools in more impoverished districts are more likely to stagger school entry in the full model (b = 0.05).

The percentage of students eligible for free lunch is not significantly associated with any of the transition activities in the full model. The percentage of non-White students, however, remains negatively associated with a number of transition activities—including sending information home about kindergarten (b = −0.03), having preschoolers visit kindergarten (b = −0.13), having parent/child visit kindergarten before the start of the year (b = −0.05), using staggered entry (b = −0.05), and providing fewer overall transition activities (b = −0.34). The percentage of ELL students in a school is also negatively related to some transition activities; however, this relationship is less pronounced as compared with the unadjusted models, and the magnitudes of the significant associations are small.

With the exception of enrollment size, structural characteristics of kindergarten remain weak predictors of transition activities. Whether or not the school offers full-day kindergarten or hosts a prekindergarten program is not significantly associated with any of the transition activities. As compared with the bivariate models, the enrollment of a school's kindergarten remains positively associated with several transition activities and becomes a significant predictor of overall number of transition activities utilized.

Results from our full covariate-adjusted models with the readiness assessment measures are shown in **Table 6**. As in the bivariate models, kindergarten enrollment is positively associated with schools' use of readiness assessments (b = 0.06). Additionally, we observe a positive relationship between district poverty level and the use of readiness assessments (b = 0.06). For both the aforementioned independent variables, the association is stronger in the full models than the bivariate models. In terms of the specific uses of the assessment data, schools in higher-poverty districts are more likely to use the data to individualize instruction (b = 0.05). Similar to the transition activities, the percentage of students eligible for free lunch is not significantly associated with readiness assessment uses.

Schools with higher percentages of non-White students are less likely to use the data to determine eligibility if a child is below the cutoff age for enrollment ($b = -0.11$) or to advise that the child delay entry ($b = -0.13$). Consistent with the estimate from the bivariate model, schools with higher percentages of ELL students are less likely to use readiness assessments for diagnostic purposes ($b = -0.07$) but more likely to use the data to support delaying entry into kindergarten ($b = 0.06$). Last, schools with larger kindergarten enrollments are more likely to utilize readiness assessment data to make classroom placements ($b = 0.10$).

Discussion

The decade and a half between the late 1990s and early 2010s saw significant shifts in the practices and expectations of early education. For instance, state-funded preschool programs have expanded rapidly, with a corresponding increase in student attendance in early childhood education (**Curran, 2015**). Kindergarten, in particular, has undergone major shifts in both structure and design. For instance, there has been a large increase in the proportion of students attending full-day as opposed to half-day kindergarten, as well as an increased focus on academic content (**Bassok et al., 2016**; **Bowdon & Desimone, 2014**). The result is that, on average, the experiences that students bring into kindergarten and the expectations put on these students once they arrive look much different today than they did at the time of the original ECLS-K survey.

At the same time, the nation's public schools have witnessed major policy shifts as a result of the passage and implementation of No Child Left Behind and state accountability initiatives. It is a shift that may have substantive yet nuanced implications for the way that schools approach the transition to kindergarten. Among its many components, NCLB resulted in an increased emphasis in standardized testing and accountability for academic achievement (**Booher-Jennings, 2005**; **Cohen-Vogel, 2011**; **Grissom et al., 2014**; **Jacob, 2005**). The underlying goal of these policy changes is that student achievement data will be used by school administrators to help inform teacher practice and boost high-quality instruction (**Wachen, Harrison, & Cohen-Vogel, 2015**).

Taken as a whole, these changes in the educational environment over the past decade and a half suggest the possibility of large shifts in the practices around kindergarten transition. The increased prevalence of preschool may prompt kindergartens to approach transition differently, under the assumption that more students have had exposure to a structured learning environment. Likewise, the increased emphasis on testing and academics could prompt shifts in the use of assessments and choices about how to use such assessment data. The focus on equitable educational outcomes potentially means that schools serving larger proportions of disadvantaged or at-risk student groups may have differentially changed transition practices to attempt to improve the outcomes of these students. In short, there are a number of reasons to believe that the extant research on kindergarten transition practices, most of which was conducted in the mid-1990s, may not accurately reflect the current context of the 2010s.

Indeed, as a whole, our findings indicate significant differences in the prevalence of transition practices—activities and readiness assessments—across time and update findings regarding differences across school contexts. While the use of transition activities has increased slightly over the decade between the two ECLS-K surveys, schools serving greater proportions of traditionally disadvantaged student groups still utilize significantly fewer of such activities. Similarly, while the prevalence of readiness assessments is similar in both surveys, we found significant changes in how the data from these assessments are used. When we array our findings against the recommendations of previous authors and expert panels, some troubling patterns emerge.

First, results of our bivariate regression models appear to corroborate prior research by **Pianta et al. (1999)** and others (e.g., **Daley et al., 2011**), showing that schools with larger proportions of low-income children provide fewer kindergarten transition activities overall. Additionally, our findings suggest that schools serving larger percentages of students of color and ELLs utilize fewer transition activities. In short then, it appears that, due to such differences across schools serving different populations, students who may be the most at risk when transitioning to kindergarten are, in fact, receiving fewer services to facilitate their transition. Given that the number of transition activities that a school provides has been empirically linked to positive academic outcomes (especially for less advantaged students; **Schulting et al., 2005**), the discrepancy is alarming and may contribute to further exacerbation of inequities across these groups.

In addition to finding disparities across student groups, we find that the transition activities engaged in across the spectrum tend to be what **Pianta and Walsh (1996)** term *low-intensity activities*. For instance, like **Pianta and colleagues (1999)**, we find that the most common transition activity in which schools engage is, by far, sending written information home about kindergarten. While there are no rigorous studies comparing the efficacy of individual transition practices, the likelihood is low that a written message from the school—a message that may or may not make it home and is not able to be read by the kindergartner himself or herself—is as effective or more as a visit to the school or kindergarten teacher prior to the start of school. Higher-intensity practices, such as having a teacher visit the child's home, are rarer. This suggests, then, that schools may not be engaging in the activities that could have the greatest impact on easing the transition to kindergarten.

Third, how schools are reportedly using data produced by kindergarten readiness assessments appears to contradict key recommendations of the National Research Council (NRC). Published in 2008, an NRC report cautioned against using assessments for high-stakes decisions, such as delaying children's entry into kindergarten (**Snow & Van Hemel, 2008**). Our analysis reveals that approximately one quarter of public school administrators who administer readiness assessments reportedly use the results to support decisions to delay kindergarten entry by an additional year. That said, the proportion who report using the data for these decisions decreased by 9 percentage points between 1998–1999 and 2010–2011. Furthermore, these data were collected only 2 years after the publication of the NRC recommendations, so future research should examine if this downward trend has continued.

A significant proportion of schools also report using data in what is arguably a high-stakes decision—to determine children's class placements. Given the widely accepted finding that the quality of a student's teacher and his or her peers has a significant impact on academic achievement (e.g., **Rockoff, 2004**; **Sanders & Rivers, 1996**), class placement is, in our view, a high-stakes proposition. Of concern to us, the use of readiness assessment data for determining class placements rose by 12 percentage points between survey administrations. In 2010–2011, more than four in 10 school administrators in schools using readiness assessments reportedly used such assessments to assign students to classes. Research shows that tracking of students can exacerbate educational inequalities and reduce student performance (**Hanushek & Wößmann, 2006**; **Oakes, 1985**). Although it is unclear from the available data in the ECLS-K whether readiness assessments are being used to facilitate either tracking or better matching between teachers and students, the large use in readiness assessments for this class placements necessitates research (a) to understand how and for what purposes schools are sorting students on the basis of test scores in kindergarten and (b) to protect against practices that may do harm.

Other recommendations in the NRC report stressed that assessment data be used to provide teachers with information necessary to individualize instruction and drive program improvement (**Snow & Van Hemel, 2008**). Here, we have good news. The two most commonly reported applications—using data to individualize instruction and to identify students who may need additional testing—appear to conform to these guidelines.

Limitations

There are several data limitations to consider when interpreting these results. First, while ECLS-K measures provide guidance on transition practices and readiness assessments, the measures are somewhat general. For example, the data allow us to know whether a school hosts an orientation for kindergarten parents but do not provide any information about what the orientation covers. The same is true of the readiness assessments. The data tell us nothing specific about the readiness assessments used and the particular skills or content domains they cover. Subsequent research should address this limitation with a combination of methods to understand what types of assessments states are using, which students are assessed, what domains are covered, and how the data from these assessments are used. We are currently working on a review of kindergarten readiness assessment policies in the 50 states and supplementing these findings with in-depth interviews of school administrators from North Carolina (**Little & Cohen-Vogel, 2016**).

Another limitation is that data regarding readiness assessments in the ECLS-K come from the school administrator survey. Consequently, we are unable to understand how teachers are using the data to shape their practice. Recent evidence from **Wachen et al. (2015)** suggests that even if a school has a so-called culture of data, teachers struggle to translate information from student data into individualized instructional modifications. As readiness assessments become more common, attention

must turn to how these efforts shape instructional practice and the ultimate goal of improved academic outcomes for all students.

Conclusion

The transition to kindergarten is a critical starting point in students' educational trajectories and one that can have an impact through the use of transition practices by the schools receiving these students. This study has provided information on the use of such transition practices, focusing on the activities that schools employ as well as their use of readiness assessments. We have documented changes over time in the use of transition practices as well as variation in the use of these practices across school characteristics. In doing so, we provide the most comprehensive examination of kindergarten transition activities since work conducted in the mid- to late 1990s (**Pianta et al., 1999**) and provide some of the first evidence on the prevalence and use of school readiness assessments.

Our findings point to critical discrepancies in the way that transition activities are utilized across schools as well as discrepancies between the recommended use of readiness assessments and the use reported by school administrators. The finding that schools serving greater percentages of students of color, ELLs, and students from economically disadvantaged backgrounds provide fewer transition activities suggests a need for an improved focus on equity in the transition to kindergarten. In particular, educators working in these settings may consider adding additional transition activities, while policy makers may consider allocating additional resources to facilitate such provision of activities. Though it is encouraging that the use of transition activities has increased slightly over time, it is critical that these increases include the most high-impact activities and that these activities are available to all students.

Similarly, discrepancies between the use of school readiness assessments and recommendations by the NRC suggest the need for further work on readiness assessments. Our results point to a large increase in the use of such assessments for class placements; however, further research is needed to explore the degree to which such placements are either increasing or decreasing educational opportunity.

In short, our findings lay a foundation for further research in the area of kindergarten transitions. The importance of kindergarten for future outcomes is clear (**Chetty, Friedman, Hilger, et al., 2011**). Better understanding the practices that facilitate a successful transition to this environment therefore holds the potential to have lasting impacts on student outcomes. Further research should provide more nuanced examinations of how such practices are used, how they vary across teachers within schools, and how they relate to proximal and distal student outcomes.

Appendices

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Notes

- 1. The percentage of missing values per variable in our data set ranged from 1% to 32%. Consequently, we performed multiple imputation to address the bias associated with missing data when analyzing complete case data (**Royston, 2004**; **Rubin, 2004**). Multiple imputation replaces each missing value with a set of possible values that represent the uncertainty about the correct value to impute. Our imputation model included both dependent and independent variables, and 20 imputed data sets were generated (**Young & Johnson, 2010**).
- 2. In cases where a school offered both full- and partial-day programs, we coded the school as if it had only a full-day program.
- 3. Adequate yearly progress was a provision of No Child Left Behind to determine if schools were successfully educating their students and making progress toward the law's goal of 100%

proficiency in 2014. Each state set targets for progress toward this goal, and a school met adequate yearly progress if at least 95% of students in each subgroup were tested and all students and subgroups met the state's proficiency targets (**U.S. Department of Education, n.d.**).

- 4. The six items that were common between the two cohorts are included in this comparison. The seventh item, staggering school entry (which was added in the 2010–2011 cohort), was excluded.

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The primary years agenda
Strategies to guide district action

David Jacobson

Abstract

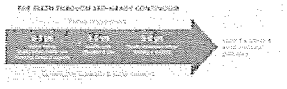
School districts on the leading edge of the Birth through Third Grade movement have demonstrated unprecedented success raising the achievement of low-income students by developing coherent strategies focused on the early years of learning and development. These communities are not merely improving preschool. Rather, they are building aligned, high-quality early education systems. Building such systems requires that school and district leaders embrace improving early education as a strategic priority and provide leadership in implementing three overarching strategies in their communities.

> Momentum is growing to improve learning and care during the early years, creating significant opportunities for schools and districts to address gaps.

School districts on the leading edge of the Birth through 3rd-Grade movement have demonstrated unprecedented success raising the achievement of low-income students by developing coherent strategies focused on the early years of learning and development. These communities aren't merely improving preschool. Rather, they're building high-quality early education systems that align services from birth through age 9.

Two U.S. school districts on the leading edge of the Birth-3rd movement have shown striking results based on this approach.

- Sprawling Montgomery County, Md., just outside Washington, D.C., has improved results for all students while significantly reducing gaps between affluent and low-income students. The district has achieved remarkable rates of kindergarten readiness (90%), 3rd-grade reading proficiency (88%), and high school graduation (90%).
- Union City, N.J., is a heavily low-income and Latino urban district that outperforms the New Jersey state averages in reading and math in one of the highest performing states in the country and graduates 90% of its students.



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Common to both districts are aligned systems of education and care that begin early and continue through the elementary school years, providing strong foundations for continued academic success (Childress, Denis, & Thomas, 2009; Kirp, 2013; Marietta, 2010; Marietta & Marietta, 2013a).

Birth-3rd

Inspired by a mounting and compelling body of research and examples of pioneering communities, the Birth-3rd movement includes the 120-community Campaign for Grade-Level Reading, a range of philanthropic efforts, and vigorous activity by state governments. At the federal level, the Race to the Top-Early Learning Challenge funding program and President Obama's proposal to expand preschool for all four-year-olds indicate growing recognition of the importance of the foundational first nine or so years of education and care.

Given the current demands on principals and district leaders, there is perhaps a natural temptation to respond to the idea of improving education and care in the early years with a detached hopefulness that students will soon arrive at kindergarten with higher levels of readiness. Yet Montgomery County and Union City did much more than improve preschool. They built systems that included K-3 as well. Building such systems

requires that school and district leaders embrace improving early education as a strategic priority and provide leadership in implementing three overarching strategies in their communities.

Why a Birth-3rd strategy?

Gaps between low-income and middle-class children appear early and increase over time. Such gaps in social-emotional and academic readiness for kindergarten lead to gaps in literacy and math proficiency by 3rd grade, which in turn lead to gaps in high school graduation rates and college- and career-readiness (Heckman, 2012; Torgesen, 2004; Hernandez, 2011).

High-quality early childhood services can effectively address these gaps. A preponderance of evidence demonstrates that quality home-visiting, preschool, and early literacy programs yield large gains in children's learning and development (Heckman, 2012; Yoshikawa et al., 2013; Pressley, 2005).

Aligned systems of education and care that begin early and continue through elementary school can provide strong foundations for continued academic success.

Multiple supports are required. Addressing large gaps requires improving the quality of services for children at each level of development and integrating and aligning these services in order to have the most effect. (See continuum graphic above.)

Leading edge communities demonstrate the power of comprehensive approaches. The Child-Parent Centers in Chicago, the Harlem Children's Zone, Montgomery County, Union City, and the Strive Program in Cincinnati have demonstrated impressive results, fueling increased financial support for birth-3rd services, policy change, and innovative projects at the federal, state, and community levels (Kirp, 2013; Jacobson, Jacobson, & Blank, 2012; Tough, 2012; Sullivan-Dudzic, Gearns, & Leavell, 2010; Marietta & Marietta, 2013b).

Role of schools and districts

Drawing on the experience of Birth-3rd initiatives in Massachusetts and leading edge sites around the country, I suggest that schools and districts implement three strategies to form a comprehensive, integrated approach to improving early learning outcomes for children. These strategies entail significant coordination responsibilities. Given the demands on building principals and school leadership teams, districts — ideally with state support — must take the lead in spearheading each of these strategies, with principals providing critical support by contributing ideas, supporting implementation in their buildings, and developing the capacity and expertise to lead improvement in early years teaching and learning.

#1. Improve (early) elementary school teaching and learning.

The early elementary grades often suffer from relative neglect. These are untested grades. School and district leaders may have less knowledge about early childhood education, and, in many districts, early childhood does not have as much internal political power as other departments. Often low-performing teachers are moved from tested grades to kindergarten, 2nd-grade, and even 1st-grade classes. Inadequate funding for full-day kindergarten, despite its clear benefits, is a further instance of neglect (Children's Defense Fund, 2012).

School district leaders must make improving early education a strategic priority.

Massachusetts provides an example of how one state began addressing the need for early grades improvement. A few years ago, the state began by creating a small grant project to support the alignment of curriculum, instruction, and assessment in preK-3 in over 40 districts. Districts were required to create vertical preK-3 teams that would conduct needs assessments of the early learning pathways in their districts and develop strategies to address high-priority needs.

While Massachusetts is a high-performing state and has long had rigorous 3rd-grade tests, these teams nonetheless identified a range of important needs: gaps in expectations between preK and kindergarten and between kindergarten and 1st grade, misaligned curricula and assessments, lack of consistent instructional approaches across the early grades, and inadequate attention to oral language development, vocabulary instruction, and development of social-emotional skills. Family engagement and improving the transition from preschool were also identified as critical areas of improvement (Jacobson, 2011).

To address such needs, schools, districts, and states need to improve curricula, formative assessments, and student progress monitoring mechanisms, taking into account how young children best learn and the full range of developmental domains: cognitive development and general knowledge, social and emotional development, language and communication development, approaches toward play and learning, and

physical development and well-being (NAEYC, 2002). Importantly, they then need to enact these improvements by supporting teachers through professional development, coaching, and professional learning communities, using them to improve developmentally appropriate teaching and learning in classrooms (Jacobson, 2010). Creating and enacting such teaching and learning "guidance systems" is a critical component of school improvement, as is a robust family engagement strategy, including supporting families in supporting their children's learning and development (Bryk, 2010).

The small grants that Massachusetts awarded to districts set off a flurry of activity. In many cases, educators had never had the chance to work together across grades and welcomed the opportunity. The participation of general education and special education educators enhanced the opportunity further, as did the state's validation of the importance of the work. Once they identified their core issues, many teams undertook ambitious projects, especially given the small size of the grants — mapping curricular expectations, developing common formative assessments and rubrics, implementing response-to-intervention systems, developing cross-grade instructional approaches (e.g., Six Trait Writing), creating home-visiting programs, and strengthening the oral language, vocabulary components, and social-emotional components of the early grades curricula.

Improving teaching and learning in public school early grade classrooms and collaborating with community-based providers to improve preschool quality are two critical elements in Birth-3rd efforts.

These preK-3 projects also led to important strategic and organizational shifts, including greater recognition of early learning as a priority among senior district leadership and greater collaboration across district departmental silos (Jacobson, 2011).

As districts develop and improve their early elementary guidance systems through the kinds of projects suggested by the Massachusetts vertical teams, they build their capacity to fulfill their early learning leadership role in their communities more effectively.

#2. Improve early childhood education through public/private collaboration.

In the U.S., preschool education and care are provided by a mixed delivery system of family day care, community-based preschool centers, Head Start, and school districts, all supported by a complex maze of funding streams. Much work is underway by states improving quality, including through Quality Rating Improvement Systems screening and assessment systems, and improved training and certification (Christie & Rose, 2012). This state-level work is crucial, but building capacity and improving quality throughout a community also requires aligned systems and effective professional development at the community level. School districts can help build such structures by partnering with community-based providers to form early education collaboratives with the goal of improving preK-3rd education across community-based and public settings (Wat & Gayl, 2009).

While school and district leaders have enough on their plates without actively engaging with their preschool communities, it is this collaboration that has been key to improving readiness for kindergarten and 1st grade in Montgomery County, Union City, and other communities. (Marietta, 2010; Mead, 2009; Kirp, 2013; Sullivan-Dudzic, Gearns, & Leavell, 2010). For early childhood collaboratives to be effective, districts must make early education a strategic priority and provide significant district support from superintendents, directors of curriculum and instruction, literacy coaches, and early childhood coordinators. States, in turn, can facilitate such district support by providing targeted funding, technical assistance, and opportunities for communities to exchange best practices (Christie & Rose, 2012; Wat, 2012; Jacobson, 2011).

School and district leaders must establish a climate of mutual respect when working with preschool providers and emphasize the two-way nature of the learning collaboration. Differences in compensation, resources, and status notwithstanding, community-based preschools value relationships with public schools and have early childhood expertise to bring to the table. Partnerships often begin by working on alignment and transition with reference to new Common Core State Standards and state ratings improvement systems. First steps may include discussing preschool and kindergarten learning standards, designing transition forms, and making cross-site classroom visits. Public prekindergarten and kindergarten teachers can serve in boundary-spanning roles, connecting with their community-based early childhood counterparts as well as their public school colleagues in grades 1-3. Done with care, these valuable initial activities build mutual respect and a sense of joint efficacy that can provide a foundation for more ambitious plans and projects, including joint professional development for teachers and leaders.

Union City developed a communitywide preschool curriculum and a cadre of master prekindergarten teachers who provided extensive support both to district and community-based teachers. These master preK teachers then helped redesign kindergarten as well (Kirp, 2013). In Springfield, Mass., district and community-based educators are working jointly on an alignment team to select a common preschool

curriculum and formative assessments for the community and to provide common professional development experiences for preK and kindergarten teachers. Boston began by developing a highly effective preK curriculum and coaching model that has secured some of the best preschool outcomes in a large program in the country (Weiland & Yoshikawa, 2013). Based on this success, the district is supporting community-based preschools in implementing the model. Further, the early childhood department has now developed a kindergarten curriculum and professional development model and is working with the district to expand its work to include grades 1-3.

Improving teaching and learning in public school early grade classrooms and collaborating with community-based providers to improve preschool quality are two critical elements in Birth-3rd efforts. Yet addressing the needs of students who grow up in poverty and other stressful circumstances requires more than high-quality learning experiences; it requires the integrated provision of health and social services to support families and children at each developmental stage: birth to age 3, preK, and K-3 (and beyond).

#3. Provide support services through community partnerships before birth and through 3rd grade — and beyond.

Two clear and related strategies for providing comprehensive services for children in an aligned fashion have emerged:

- Developing communitywide early childhood partnerships with the wherewithal to implement a comprehensive vision and strategic plan; and
- Coordinating the provision of integrated services at the school or early childhood center site.

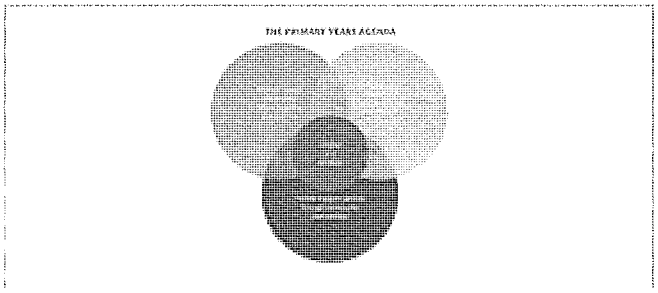
Cross-sector partnerships — In Montgomery County, a nonprofit Collaboration Council for Children, Youth, and Families developed a comprehensive early childhood plan and a Children's Agenda of seven actionable goals for the county. This plan led to an aligned system that includes center-based comprehensive services for the neediest children and their families from birth to age 5, aligned Head Start and preschool classrooms, and targeted summer and afterschool programming for early elementary school students (Marietta, 2010).

Momentum is growing at the federal, state, and community levels to improve learning and care during the primary years.

Likewise, as mentioned, over 120 communities across the country have created early learning partnerships with the specific goal of improving reading by 3rd grade in association with the Annie E. Casey Foundation's Campaign for Grade-Level Reading. For example, in Pittsfield, Mass., a 60-member group of civic leaders has committed to the Pittsfield Promise — a goal of 90% reading proficiency by 2020. The community has developed five broad objectives in pursuit of this goal, and the local United Way is providing critical functions by coordinating groups working on home visits, community awareness, family engagement, and improving preschool education.

Full-service schools and early childhood centers — Communitywide partnerships create structures for effectively engaging the full range of community institutions in early childhood efforts, including preschool director associations, hospitals, pediatrician and nursing groups, libraries, and museums. An effective way of reaching students directly and in an integrated fashion is by coordinating services at the school or center site. One example of such integration is through the fast-growing model of the community school.

Community schools supplement their traditional academic offerings with a suite of services in partnership with community organizations. Principals collaborate with partners through a cross-sector leadership team and a resource coordinator who coordinates a range of services, including health, mental health, after-school, early childhood, summer programming, and mentoring and tutoring (Melaville, Jacobson, & Blank, 2011). Community schools have expanded greatly in recent years, scaling to encompass large numbers of schools in Chicago, Tulsa, and Cincinnati. Since adopting this strategy, Cincinnati has become the highest-performing urban district in Ohio, narrowing achievement gaps and improving graduation rates (Jacobson, Jacobson, & Blank, 2012).



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Momentum around three strategies

Momentum is growing at the federal, state, and community levels to improve learning and care during the primary years. Sustaining this momentum in the current fiscal climate and in an environment wary of increased government spending will require that educators make the case for investment by demonstrating the effect of their programs. In turn, achieving such demonstrations will require innovative program design, rigorous implementation, and mid-course correction using performance benchmarks and rigorous evaluation (Lesaux, 2010; Kauerz & Coffman, 2013). These challenges notwithstanding, the Birth-3rd movement creates a highly promising opportunity for school, districts, and communities to reduce gaps while raising achievement and life chances for all children through three strategies: improving preK-3rd education in elementary schools; raising the quality of preschool education and care throughout a community through early education collaboratives; and providing comprehensive health and social services to young children through community partnerships.

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Ready or Not, Here Come the Preschoolers!

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Richard G. Lambert

Abstract

Elementary school principals say they value having preschoolers in their buildings, but they need more preparation and support to improve the experience.

When a state establishes universal preschool, one of the first questions is where to put all these new pupils. Largely for practical purposes, many new preschool classes are placed in existing elementary schools. But this decision raises further questions. How can preK teachers and their pupils best be assimilated into the elementary school culture? Should preK teachers be assigned bus duty? Should preschool children even ride the regular elementary buses? What about sharing the school cafeteria?

There are many other issues. For example, in many states, the sanitation codes for elementary schools are different from those for early childhood environments. And preschool teachers typically hold an entirely different teaching license and adhere to a separate set of learning standards than traditional elementary school teachers. The quantity and complexity of these issues are often beyond anything for which elementary principals trained.

In North Carolina, over 700 elementary schools housed preschool classrooms in the 2009-10 school year. The More at Four program, first funded in 2001, serves children who are four years old by Aug. 31 of the program year, will be entering kindergarten the following year, and are at risk of experiencing poor school outcomes. Factors that put children at risk include low family income, limited English proficiency, identified disability, chronic health condition, and developmental or educational need. Children of active-duty military families are also eligible. Priority is given to eligible children who have not been served in any other preschool or childcare program. It operates in 100 counties throughout the state in public schools, private childcare centers, and Head Start agencies.

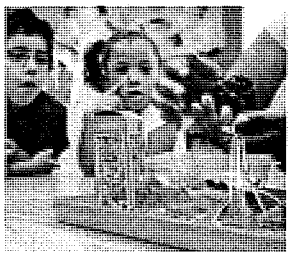
In fall 2009, we surveyed principals to learn how they were handling the increased number of three- and four-year-olds in their elementary schools. All of the principals who responded held administrative licenses from accredited institutions, and all had training at or above a master's degree, but only 9% had ever worked with preschoolers before becoming principals. A significant majority, 88%, reported that they had no training in their principal preparation programs that addressed administering a preschool program. Sixty-two percent reported that they never had any content that addressed early childhood development, and 59% had no professional development to administer preschool classes.

We also found that many elementary school administrators in North Carolina appear to be unfamiliar with the different standards for preschool, different credentialing requirements, and the new realities of assimilating these children and their teachers into the existing elementary school culture. Many expressed concern that elementary schools were even an appropriate place to house these new classrooms. Thirty-five percent were unaware that North Carolina had adopted preschool standards. Forty percent were not familiar with the document delineating these standards, and 53% did not use the document to make curricular decisions. Sixty-one percent of these elementary principals did not incorporate the standards into their teacher performance appraisals, and 44% were unaware of the National Association for the Education of Young Children (NAEYC) accreditation process.

The vast majority of our 174 principal respondents were in favor of having preK students on their campuses. They reported many benefits for students, their parents, and the staff at the school. The most cited benefit was that preK eased the transition to kindergarten for these students. Some principals reported that preK students in the More at Four classes were "more ready for kindergarten than the students who did not attend preK" even though the More at Four students had been labeled "at risk." One principal stated that preK helped More at Four students with social and developmental skills. The children also became familiar with the campus. "By kindergarten, they were familiar with the media center, the cafeteria, and general school procedures. They got to

know other students, and they got to know staff members, so they felt more comfortable coming to the school for kindergarten."

Principals also reported that parents became more comfortable with the school early on by having their child attend preschool on their elementary campus. One principal wrote, "Students and parents have the opportunity to begin to learn the rules of a public school setting, such as arriving and departing on time, academic focus, school appropriate behaviors, as opposed to what they may have been used to in a home or daycare setting." Overall, attending the preK classes on campus made embarking on kindergarten the following year much less fearful. It allowed for "a more seamless transition to 'big school' and removed the shock factor that comes with going from such a small environment to a much larger one." Also, with the greatly reduced adult-child ratios (15 to 1 in North Carolina) in preK, the preK teachers felt better able to help the younger children feel comfortable with their first day of "school" than did kindergarten teachers.



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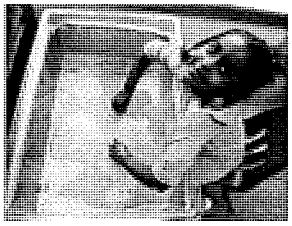
FACILITIES, LOGISTICAL WORRIES

Very few negative aspects were reported for housing preK on elementary campuses. Most of the negative replies concerned the additional resources required for the new special needs students. Another concern was whether preK students should ride on buses with older children. Some principals cited it as an occasional problem, while others saw it as a plus and noted that it was a way for the younger students to meet more of the older elementary school children. Some principals did not feel that it was appropriate for preK students to be "mingling" with the K-5 students anywhere, and they felt that elementary schools were not designed to separate out one grade. One principal responded, "The guidelines for preK classes are unreasonable for the public school setting. For example, students must wash their hands prior to eating. If they touch anything, their face, clothes, others, they wash their hands again. Our campus is very large and old. Trying to get students from their bathroom to the cafeteria without touching anything is ludicrous." Another wrote, "Code differences for sanitation and safety (playgrounds) cause extra work for principals... . Principal pay sometimes is not adjusted well for having preK programs."

Most principals saw advantages for students, parents, and teachers to having preschoolers on their campuses.

Another difficulty concerned playground provisions and facilities in general. Tables, chairs, and playground equipment were generally too big. One principal wrote, "The tables are too tall for the preK (students) so we get points deducted for that." Another said:

It presents a liability issue, a funding issue, and issues with space... . The guidelines that govern the programs are strenuous. It takes extra effort on the part of the custodians to make sure the room is up to standard. The need for a certain amount of room between students at rest is an obstacle within the confines of the room and all the



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centers the program calls for.

Most of the principals responded that the preK teachers are considered as just another grade level at their school and are generally treated the same as other teachers. They serve on committees and school improvement teams and attend meetings just as any other staff member would. One principal commented that the kindergarten teachers were especially involved with the preK teachers, which helped tremendously with the transition to kindergarten. The children are included in school assemblies and awards programs and, as one principal noted, "they are part of every function we have."

The principals noted that their primary concern was their lack of preparation for the preschoolers. "I did not think that myself, the teacher, or the school was adequately prepared. We had many building alterations to make and did not get furniture or materials until late in the summer." Another commented that the lack of knowledge of preschool regulations was "frustrating" and that it has "not been the easiest to adjust to." One principal pointed out that they could not just assign a preK teacher to bus duty because regulations for the younger children mandated the presence of two teachers in the preK room at all times. Another complaint was that "they bring along lots of additional paperwork with them."

Twenty-six percent of the responding principals stated specifically that they needed more preparation in early childhood education and developmental milestones and more information on early childhood curriculum and standards. They requested additional professional development on these topics. When asked if they thought that principal preparation programs should include information on early childhood education, 88.46% responded "yes." If these elementary principals are to provide instructional leadership, their licensure preparation programs must address these needs.

RECOMMENDATIONS

All in all, the benefits must be considered well worth the trouble for these elementary principals in North Carolina. To be ready for preschoolers in their buildings, elementary principals need more training to understand the standards for early learning, the requirements to make their schools ready, and the professional teaching standards for early childhood teachers. In addition, they need to know the developmental needs of young children.

Administrator preparation and supervision programs must work with early childhood and child development colleagues to prepare candidates who understand what high-quality early childhood classrooms look like and what early childhood teachers need in order to continue to develop as professionals. Models of professional development for these new teachers are emerging, and they should be incorporated into preparation programs.

The purpose for moving young children from daycare to preschool settings is to improve school readiness before they arrive at kindergarten. However, early childhood education must be of high quality if the programs are to be successful. The preparation and instructional leadership of principals are essential to creating and maintaining high-quality programs.

Effective instructional leadership includes setting the overall climate of the building, creating and maintaining high-quality learning environments, setting high expectations, and including all teachers in a schoolwide team that works together to fulfill the common mission. Today, this scene includes preschoolers, ready or not.

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Grade Configuration:

WHO GOES WHERE?

BY REQUEST.... | JULY 1997

CATHERINE PAGLIN AND JENNIFER FAGER

JULY 1997

NORTHWEST REGIONAL EDUCATIONAL LABORATORY

By Request...
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FOREWORD

This booklet is the fifth in a series of "hot topic" reports produced by the Northwest Regional Educational Laboratory. These reports briefly address current educational concerns and issues as indicated by requests for information that come to the Laboratory from the Northwest region and beyond. Each booklet contains an explanation of the topic's importance, a sampling of how Northwest schools are addressing the issue, suggestions for adapting these ideas to schools, selected references, and contact information.

One objective of the series is to foster a sense of community and connection among educators. Another objective is to increase awareness of current education-related themes and concerns. Each booklet will give practitioners a glimpse of how fellow educators are addressing issues, overcoming obstacles, and attaining success in certain areas. The series' goal is to give educators current, reliable, and useful information on topics that are important to them.

Other titles in the series include:

- Service Learning in the Northwest Region
- Tutoring: Strategies for Successful Learning
- Scheduling Alternatives: Options for Student Success
- Alternative Schools: Approaches for Students at Risk
- All Students Learning: Making It Happen At Your School

INTRODUCTION

What is the best configuration of grades for K-12 schooling? Is it an elementary school, followed by a middle school, followed by a four-year high school? Or are there advantages to a K-8 school, followed by a four-year high school? Which middle-school configuration better promotes social adjustment—grades six through eight, five through eight, seven through eight, or seven through nine? Are there advantages to alternative grade spans at the elementary level, such as K-3 and four through six? What is the function of a ninth-grade center? In which setting do sixth- or eighth-graders achieve best? Why do we have age-related grades?

Research has not provided definitive answers to the myriad possible questions about grade span, but the questions have never gone away. They are questions which arise whenever school reform, increasing or declining enrollment, or financial considerations bring about a reorganization of existing schools, the building of new schools, or consolidation of districts. As one article on the subject puts it, "Grade organization remains a controversial topic in American education as it has for at least 80 years" (Jenkins & McEwin, 1992).

A quick glance at the grade spans of schools in the Northwest region reveals a variety of configurations including traditional forms of grade organization. This variety reflects the fact that each community considers different factors when making grade span decisions and that no one grade configuration is right for all. Thus it is not the intent of this booklet to hold up any one grade configuration as superior, or to discuss in depth each of the grade

configurations that exist. It is meant instead, to increase awareness and understanding of grade span as an issue, provide examples of ways schools have addressed concerns associated with particular grade spans, and suggest avenues for further inquiry.

HISTORICAL TRENDS IN GRADE CONFIGURATION

As noted above, when it comes to grade span, diversity rules. One study found that seventh- and eighth-graders in the United States attend schools with about 30 different grade spans (Mac Iver & Epstein, 1993). At some schools grade span comes about by choice, at others as a result of practical and administrative considerations such as building costs, enrollment trends, or distance from other schools.

Despite this diversity, some trends have emerged. The major changes in grade organization in the 20th century are clearly the rise and decline of the junior high (typically grades seven through nine) and the rise of the middle school (typically grades six through eight). Junior highs, which emerged in the first few decades of the century, grew in number until the early 1970s (Hough, 1995). In 1920, four out of five high school graduates had attended a K-8 elementary school and a four-year high school. By 1960, four out of five had attended an elementary school, a three-year junior high, and a three-year senior high (Alexander & McEwin, 1989). The decline of the junior high coincided with the rise of the middle school which came on the scene in the mid 1960s. Today, the middle school is the dominant form of middle grades education in terms of numbers of students enrolled.

The middle school trend reflects not only a shift in the placement of the sixth- and ninth-grader but also a conceptual change. The junior high was conceived of as a preparation for high school and usually imitated the structure of one, with departmentalized classes and uniform daily class periods. The middle school, on the other hand, was conceived as a more child-centered institution with "responsive practices" such as interdisciplinary team teaching, advisory programs, and flexible scheduling. The middle school also offers a more varied curriculum and more electives or exploratory classes than are usually available at junior high schools.

What are the trends of the future? Anecdotal evidence indicates some districts and experts are taking a second look at the K-8 and "elemiddle" configurations, the latter defined as a school that meets the needs of young adolescents but includes lower grades (Hendrie, 1996; Hough, 1995). Ninth-grade-only campuses are also turning up in some areas, and not always as a result of space and enrollment considerations (Viadero, 1993).

CONTEXT

A grade span that is desirable or possible in one setting may be undesirable or not possible in another. For instance, some experts on rural schools feel that in a rural setting the middle school concept is inappropriate and can actually damage community values. This is because when a middle school is opened the local elementary school often becomes too small for state support and must eventually be consolidated, thus undermining the sense of community identity, the feeling of ownership, and the levels of parent participation associated with a local elementary school (DeYoung, Howley, & Theobald, 1995).

In a rural area the grade-span issues may be very different from those in an urban area. Most parents will not be in favor of their child attending a larger middle school or high school if it involves the child having to commute long distances everyday or to live elsewhere during the

week. In such a case, whatever expanded course offerings and social opportunities the larger, more distant school might provide, a school closer to home will still likely be seen as preferable.

Another example in which context may play a role is socioeconomic status, as was found in one study that looked at achievement differences between sixth-graders in elementary schools as opposed to those in middle schools:

> "Becker (1987) reported a significant advantage to locating the sixth grade in the elementary, rather than middle, grade span. Interestingly, Becker also found that the elementary-school advantage declined as student socioeconomic status (SES) rose. In fact, sixth-graders in the upper tail of the SES distribution performed slightly better in non-elementary settings" (Wihry, Coladarci, & Meadow, 1992).

Becker speculated that the student achievement differences his study revealed might be related to differences in teacher training and expectations in elementary and middle schools.

GRADE-SPAN RESEARCH AND ISSUES

Schools or districts may seek information about grade span when a new school is being built, an existing school is changing grade span, or a school is improving its program to make it more appropriate for the particular grade span.

Most of the research on grade span focuses on the middle grades. Much of that research identifies practices associated with certain grade spans—for instance that schools with grades six through eight have more interdisciplinary teaming than those with grades seven through nine or offer more electives than K-8 schools. Even results such as these may vary depending on the scope and location of the study. (Compare Epstein & Mac Iver, 1990 to Hough, 1995). Very little research attempts the more difficult task of determining if a cause-and-effect relationship exists between grade configuration and academic achievement, while controlling for other factors such as school size, student socioeconomic status, teacher experience, and so on (Wihry, Coladarci, & Meadow, 1992).

Even the studies that do attempt to isolate the effect of grade span by controlling for other variables are suggestive rather than definitive. Different studies control for different variables and their results do not translate into clear policy guidelines. For instance, if a controlled study showed that sixth-graders had higher achievement test scores or fewer discipline problems in a K-6 school than in a middle school setting, we would still not have information about how this configuration affects students at other grade levels. The topic of grade span is a complex one. Issues associated with grade span include the following:

- **Which grades should be grouped together in one school?**
  Considerations might include whether the oldest students will function as positive or negative role models, whether the academic and social needs of each grade level can be met in a developmentally appropriate manner, and whether the grouping is consistent with community needs and values. Factors that may affect a decision about grade span may be the interests and training of the staff, the size and design of the

building, financial resources, the size of the student population, and the location of the school in relation to other schools.

- **How many grades should be in one school and how many classrooms per grade?**
  Schools with many grade levels will have more opportunities for cross-age activities such as older students helping out in younger students' classrooms and participating in tutoring activities. Schools with big grade spans may be able to sustain more parent involvement in the upper grades than is typical in middle or high schools. On the other hand, because schools with very wide grade spans usually have fewer students and classrooms per grade, there may be fewer opportunities for elective or exploratory courses. In addition, fewer classrooms per grade means fewer opportunities to match students to teachers according to learning and teaching styles, to place students with others with whom they work well, or to separate students who don't get along. Opportunities for teacher collaboration or mentoring at a specific grade level are also reduced.

One-and two-grade schools present the challenge of how to preserve a sense of continuity and stability when all or half of the student population turns over every year. On the other hand they may offer the opportunity for a special focus on problems particular to that grade level, such as the high dropout rate of ninth-graders (Viadero, 1993).

- **How many school transitions will students make during the K-12 years?**
  The smaller the number of grades in each school within a K-12 system, the more transitions students will make during their schooling. Transitions can be stressful. These stresses can be mitigated by practices such as between-school visits, mentoring by students from the school at the more advanced level, special assemblies for new students, communication between the faculties and administrations of the two schools, and grouping students into teams or houses in large schools.

"[A]lthough grade organization has some important connections to particular programs and practices, on average, grade span need not be the determinant of responsive education," (Epstein & Mac Iver, 1990) concludes one pair of writers on the subject. Yet neither is grade-span irrelevant. In fact, as seen in the "Northwest Sampler" section of this booklet, the characteristics of a grade span must be carefully considered in shaping an effective instructional program.

TIPS FOR IMPLEMENTATION

Following are some broad tips for starting a school with a grade span new to a K-12 system, reorganizing the grade configuration of an existing school, or revamping an existing program:

- Read grade-configuration literature (see "References" section) while keeping in mind that sound educational practices are more important than grade span
- Visit or call other schools with the same configuration for information sharing about what works and what doesn't
- Consider what configuration fits best with community geography and values
- Be aware of developmental differences or similarities between students at different grade levels when developing curriculum, scheduling, and behavioral expectations; also consider how building layout and staff interests and training might best dovetail with these developmental characteristics
- Develop articulation and transition activities between schools in the K-12 sequence

The list of questions on pages 10-11 suggests the types of issues schools should examine

when contemplating any sort of grade-span actions.

GRADE-SPAN CONSIDERATIONS

Some factors to weigh and think about, many of them interrelated, include the following:

1. Will the configuration increase or decrease transportation costs? How far will students have to travel? This may be a more important issue in a community with a very dispersed population.
2. Will the configuration likely increase or decrease parent involvement? The proximity and size of the school may be factors, as well as the motivation and interest level of the parents.
3. How many students will be enrolled at each grade level and what implications does this have for course offerings and instructional grouping?
4. Are any data available that suggest whether the configuration might boost achievement scores for a significant portion of the community's students or depress the performance of others? For instance, some studies suggest that some middle-level students—low socioeconomic background sixth-graders in Pennsylvania, and eighth-graders in Maine, a predominantly rural state—benefit significantly from an elementary rather than middle school setting (Becker, 1987; Wihry, Coladarci, & Meadow, 1992).
5. Will the configuration lead to the loss of a neighborhood school or the closing of other schools in the system?
6. How many points of transition and articulation will occur in the K-12 system? How will these be addressed? What mechanisms or channels of communication will be used to ensure that students move smoothly through the system, in terms of both academics and social and emotional adjustment?
7. Does the configuration allow for interaction between a range of age levels and a variety of grouping options? A school with more than one or two grade levels has the opportunity to increase the self-esteem and responsibility of older students by using them as tutors or mentors for younger students.
8. How will the presence or absence of older students affect younger students in a particular school? A school with few grade levels may benefit because older students are not present to model negative behaviors associated with their age group; on the other hand it may suffer from the lack of older role models for academic excellence and leadership.
9. Is the design of the school building(s) suited to managing students in the selected grade span? For instance, does it have several wings, useful for dividing a large middle school into "houses" or for keeping younger students in self-contained classrooms?

CONCLUSION

No particular sequence of grade spans is perfect or in itself guarantees student achievement and social adjustment. With thought and effort effective practices can be implemented in a variety of grade configurations. What is important—as seen in the following "Northwest Sampler"—is to be aware of the potential benefits and difficulties of different configurations and to make each configuration, whether it comes about from choice or necessity, work as well as possible for all students.

THE NORTHWEST SAMPLER

Much can be learned about the challenges of serving particular grade spans from the experiences of individual schools. This booklet's "Northwest Sampler" features schools of different grade spans from around the region. The descriptions focus on information such as the following:

- How the school's grade span came about
- How the school is structured to meet the needs of the particular grades it contains
- Potential weaknesses or problems of the grade span and how the school addresses them
- Learning opportunities offered by the grade span and how the school takes advantage of them
- Activities to facilitate transition from the previous school or to the next school in the K-12 sequence
- Observed outcomes and keys to success (these are as reported by the principal, and not necessarily based on quantitative information or empirical research)

The sampler features eight schools with seven different grade spans. The schools range in size from 82 to 1,200 students and are found in settings ranging from urban to rural and isolated. The number of grades in the schools ranges from one to 11. Because schools of different grade spans often face similar grade-configuration issues, the sampler can be of value even to readers whose particular grade-span interest is not represented.

THE NORTHWEST SAMPLER - ALASKA

Location
Girdwood School
P.O. Box 189
Girdwood, AK 99587

Contact
Jim Cox, Principal
Phone: 907/742-5300
Fax: 907/742-5320

Grade span: K-8
Girdwood, Alaska, is a ski resort and bedroom community 30 miles from Anchorage. Girdwood Elementary is a K-8 school with 142 students. Though all grades are housed in one building, the seventh and eighth grades are run in a manner similar to a junior high, separate from the other grades.

Younger Girdwood students spend most of the day in self-contained classrooms. Specialists are in charge of P.E., music, and the library. Junior high students begin the day in one room with 20 to 30 minutes of planning, then group and regroup for classes on a flexible schedule. For the most part the seventh- and eighth- graders are grouped together based on personalities—which students cooperate and work well with each other. Arrangements vary depending on the year's enrollment. The teachers (1.5 FTE) do some teaming on particular units of study, depending on the subject and the interests of the students. The school is currently considering, and the principal favors, combining the sixth, seventh, and eighth grades for greater flexibility in scheduling and to better use staff skills and expertise.

The school is too small to offer ongoing elective classes, but teachers try to make arrangements for independent study or community experiences based on students' individual interests. Though the school has its own library, a municipal library attached to the school building is a useful resource for students, especially those at the junior high level.

Girdwood has high parent involvement, which adds tremendous resources and support to the school. This involvement does not drop off in the middle grades as often happens when

students attend stand-alone middle schools. Parents help out with activities such as sports, spelling bees, reading programs, and a Career Day for junior high students. Teachers know the families in Girdwood and look out for all the students. Raising children is truly a community process.

After eighth grade, Girdwood students must make a 1.5 hour bus ride every morning to the nearest high school. During the year Girdwood teachers have ongoing dialogue with those at the high school about individual students and which programs and courses would be most appropriate in high school. The community is discussing adding a ninth grade to Girdwood Elementary, and possibly the other three high school grades, so that students would not have to make the long commute.

Observed Outcomes

- Some children become too familiar with the school setting and don't expand their horizons socially and academically; they don't get exposure to a wide array of teachers, teaching styles, and specialty fields
- High school teachers report to Girdwood staff that, in general, Girdwood students perform well
- Parents of students at all grade levels are very involved with the school

Keys to Success

- The staff communicates well with each other and with the community
- The staff is flexible and willing to take on new challenges and responsibilities
- The school's smallness results in a family atmosphere; the principal feels the K-8 school might not work as well with a larger enrollment because younger children might feel overwhelmed
- The school receives much support and help from parents and other community members

THE NORTHWEST SAMPLER - IDAHO

Location
Elk City School
P.O. Box 419
Elk City, ID 83525

Contact
Susan Borowicz, Principal
Phone: 208/842-2218
Fax: 208/842-2225

Grade span: K-10

Elk City School, with 82 students at 11 different grade levels, is located in a remote logging area, a one-and-a-half hour drive from the nearest four-year high school. The school currently has a morning kindergarten; a first-and-second grade blend in the morning with first-graders alone in the afternoon and second-graders with third-graders in the afternoon; one teacher each for the fourth and fifth grades; one-and-a-half teachers for seventh and eighth grade and 0.5 FTE for the two high school grades which depend heavily on distance learning. These class arrangements vary depending on each year's enrollment.

For the upper two high school grades, students must take a bus to one of two four-year high schools and board with another family during the week. The transition is a difficult one socially and emotionally; about one of every three students who leave after the sophomore year do not graduate.

The principal describes the small school as having a family atmosphere, with both the advantages and disadvantages that suggests. Parents volunteer in other classes besides those of their own children. Students are close; the older ones look after the younger ones, but they also bicker as family members do. Over the years, teachers communicate to each other about individual students—what worked and what didn't work, and what the student's strengths and problems are. The downside of the familiarity is that it may be difficult for a student to get a fresh start.

The six teachers and one principal/teacher work as a schoolwide team, meeting at least once a week after school to discuss classroom activities and to integrate the arts into all areas of the curriculum.

The school makes the most of its large grade span through cross-age activities, ability grouping, and schoolwide activities. Fifth- and sixth-graders are grouped for science. Certain seventh-, eighth-, ninth-, and 10th-graders are grouped for an enriched language arts class. High school students help out in the primary and intermediate grades with tutoring activities. Once a month the school has a morning arts assembly at which all classes perform. All classes start the day with 20 minutes of sustained silent reading and each class memorizes at least one poem a month. Using three grants and financial assistance from the local mill, the school has instituted a curriculum that integrates the arts with writing and literature across the curriculum. The science and social studies curriculum revolves around schoolwide thematic units that are interwoven with art and literature.

Though the school is not able to offer electives, it covers the basics. Providing K-10 education plays an important role in keeping families in the community. Ten years ago, before distance education was available, the school was K-8. At that time many families left town when their children were in the middle school grades because they did not want their children to have to live away from home beginning in ninth grade.

Because freshman and sophomores can now be educated in Elk City, more families are staying. The state has also granted pilot status to Elk City School to offer more than the allowable number of distance courses. The community and the major employers in the area—the U.S. Forest Service and the logging industry—are hoping the school can eventually be extended to cover all four high school grades, perhaps by using courses available on the Internet.

Observed Outcomes

- Students are comfortable with technology and are accustomed to many instructional delivery methods. Middle school students have courses from live teachers and by satellite. High school students also take correspondence courses and computer-driven courses which link them by computer to a teacher.
- Older students become role models for younger students.
- The transition to high school, the only school transition in 11 years, looms large for students' entire school career and is stressful and can cause conflict even before it happens.

Keys to Success

- The staff works well together and stays focused upon what's best for children
- The district administration supports the teachers and the mission of the school
- An integrated K-10 program promotes continuity from grade to grade
- The staff is flexible and committed to serving students of all age levels
- A high degree of teamwork is necessary for the success of a small K-10 school; a trusting atmosphere enables students and teachers to take risks and tackle new challenges
- Teachers have weekly collaborative time built into their schedule

THE NORTHWEST SAMPLER - MONTANA

Location
Monforton Elementary
6001 Monforton School Road
Bozeman, MT 51798

Contact
LeeAnn Amberson, Principal
Phone: 406/586-1557
Fax: 406/587-5049

Grade span: K-8

Monforton School is located in a rural, bedroom community of Bozeman with a highly diverse socioeconomic makeup. For funding purposes, Monforton is three schools—a K-2, three through six, and seven through eight. However, in all other respects it is run as a single K-8 elementary school with 215 students in two adjacent buildings, one for K-2 and one for three though eight. All teachers are certified elementary teachers with many holding master's degrees. The district hires elementary-certified staff both for scheduling flexibility and because it prefers the "whole child" approach such teachers bring with them. The staff of 17 meets weekly as a K-8 staff and works as a team on all decisions about curriculum and procedures. The school does not ring class period bells. The schedule is flexible, with teachers often extending or shortening classes.

At the beginning and middle of the school year each teacher meets with the teacher at the next grade level. They confer about the strengths and weaknesses of the class that has just progressed and about particular students.

Monforton's K-5 grades are taught in a self-contained setting. The teachers work together to plan activities and thematic units. Monforton's middle school grades, six through eight, are semi-departmentalized. Each of the three middle grades' teachers is assigned to both a grade level and a subject area—social studies, mathematics, or science. At grade level they teach reading, writing, English, keyboarding, spelling, and study hall. Students are taught music, P.E., and library skills by specialists. Some ability grouping is done in reading and math. (Qualifying eighth-graders have the opportunity to take algebra.)

The older children are held to different requirements and have different consequences than the younger ones. They are expected to be leaders in the school, to exhibit responsible behaviors, and to take care of the younger children. They know they will be held accountable

if they pick on a younger student. The sixth- through eighth-graders are accountable for completing their work and turning it in on time. Every Friday they receive a slip telling them if all their work is in. If it is not, they must complete it by Monday at 3:15. If students continue to neglect their work, they lose privileges, receive tutoring, and their parents are called every day.

The principal feels this system of keeping track of students and their work, though it requires much effort, works well. Students don't fall through the cracks and they meet with a great deal of success and support.

Monforton has many cross-age activities. Second-and fifth-grade book buddies write and illustrate books together, sit together at assemblies, and do research projects in the library. Eighth-graders work with first- and second-graders on the computer. In addition, a Big Brother-Big Sister program matches honor students at Bozeman High School with at-risk children at Monforton. The high school students visit Monforton twice a week for an hour each time, and once a month the Monforton students venture to the high school to meet with their mentors. The mentors assist their mentees with school assignments, eat lunch with them, play with them on the playground, and call them at home once a week just to visit. Group activities are held throughout the summer months.

The principal would like to do more activities with the high school that would ease the transition to this institution of 1,700 students. This spring, the high school is implementing a "shadowing" program for all rural eighth-graders. Eighth-grade students will be matched with a high school student for one full day. They will attend classes together, have lunch together, and meet the following fall for a welcome to the new school and new year.

Observed Outcomes

- The local high school finds Monforton students as well or better prepared than others, especially in technology and writing
- A survey of graduates from the past 10 years found former students highly satisfied with the caring atmosphere and academic preparation at Monforton
- Test scores are always above the state averages

Keys to Success

- The school is run as a partnership with parents, community, and staff
- The school has low staff turnover; the principal attributes this to teachers' high degree of autonomy in curriculum planning and other areas, and to good salaries

THE NORTHWEST SAMPLER - OREGON

Location
Damascus Middle School
14151 S.E. 242nd Avenue
Boring, OR 97009

Contact
Steve Powell, Principal
Phone: 503/658-3171
Fax: 503/658-6275

Grade span: Five through eight

Damascus Middle School became a four-year middle school many years ago because the local elementary school no longer had room for the fifth grade. Since that time, the middle school has developed practices to address the diverse needs of its 370 students who range in age from 10 to 14. Fifth- and sixth-graders have a program more like that of a traditional elementary school while seventh- and eighth-graders have a program with many of the recognized middle school features.

Damascus fifth- and sixth-graders are in a wing of the school separate from the seventh- and eighth-graders. They have homeroom teachers for most of the day. Their art, music, computer, and P.E. classes, lunch period, and recess are separate from those of the seventh- and eighth-graders. Some classes are blended fifth and sixth grade and others are fifth or sixth only. All fifth- and sixth-grade teachers have elementary education certificates. Fifth- and sixth-grade students attend all school activities except school dances.

Fifth- and sixth-grade math classes have two components—a computational part for which students are grouped homogeneously, and an open-ended, problem-solving part for which students are grouped heterogeneously. For the three days a week of computation, homogeneously grouped students meet in separate classrooms; for the two days a week of open-ended math, a lead teacher and two support teachers hold class in the cafeteria with a heterogeneous group of 60 students.

In the seventh and eighth grades, some classes are blended heterogeneously, while others are taught at grade level. Math classes—pre-algebra, algebra, and integrated algebra—are grouped by ability rather than grade level. Some teachers are in interdisciplinary teams. Teachers who are more comfortable teaching traditional subject matter specialties do so, but coordinate with other teachers; for instance, a history teacher and an English teacher, though not team teaching, might schedule their course material so that students are learning about World War II in history class while reading Anne Frank's Diary of A Young Girl in English class.

The principal wants to use the precepts of good middle schools, but also wants teachers to teach to their strengths. He sees both pros and cons to blended classes and is looking at the alternative of looping grade-level classes so as to allow for more depth in the curriculum while maintaining continuity for students by keeping them with the same teacher for two years.

The principal is working toward more coordination between the fifth-sixth and seventh-eighth grade schedules to allow for the most options for staff and students. For instance, partial coordination now allows two seventh- and eighth-grade teachers to participate in the computational element of fifth- and sixth-grade math, during which time a teacher from the lower grades offers an elective drama class to seventh- and eighth-graders. For the upper grades, the principal would like to switch from an eight-period day to one with fewer, longer periods and an advisory period, but is constrained from doing so by the fact that the school uses two teachers from the local high school part time and the day must be structured around their schedules.

Every staff member, including the principal, is a "portfolio manager" for 15 students. The portfolio managers meet with students at least monthly to review their progress toward meeting state benchmarks and to help them prepare their portfolios for student-led

conferences.

Observed Outcomes

- Having grades five through eight together has minimized some negative behavior often seen in older students in this age range
- Through specific school activities, younger students are exposed to older role models and older students increase self-esteem by helping out in the school

Keys to Success

- Older and younger students are separated in different sections of the building
- Small school size allows students to be recognized and valued
- Teachers have time to plan and to interact with colleagues

Location
Hollyrood Elementary School
3560 N.E. Hollyrood Court
Portland, OR 97212

Contact
Margaret Dey, Administrator
Phone: 503/916-6766
Fax: 503/916-2635

Grade span: K-3

In 1986, staff at Hollyrood School—which had been a K-5 school—voted to become a K-3 school so that they could focus more intensively on the developmental needs of the young child. To this end the school's eight full-time and three part-time teachers have pursued extensive professional development focusing on school restructuring, Tribes learning groups, mixed-age classrooms (of which the school has several), math/science/ technology integration, and arts integration.

The Hollyrood staff attempts to create a learning environment that is experiential and developmentally appropriate. Teaching strategies include cooperative learning, inquiry-based science and math, and the storyline strategy—an interdisciplinary approach to organizing the primary school subjects of reading, writing, and mathematics around social studies or science concepts such as the family or community.

The school administrator feels that the smaller age span makes it easier to create a learning community. Teaching strategies and student interests for K-3 are more similar from grade to grade compared to the upper primary grades when there is a heavier emphasis on content areas. A key to developing a strong learning community at Hollyrood is Tribes, a process whereby changing learning groups of three to six students of diverse backgrounds and social and academic abilities work together developing collaborative problem solving and decisionmaking skills. Teachers, who have all taken Tribes training, use Tribes activities daily in the classroom, weekly at staff meetings, and monthly at site council meetings. One staff meeting a month is designated Tribes inservice; the Tribes philosophy is also a part of

the parenting program the school offers.

Though Hollyrood is a small school with a small grade span, its programs reach beyond the school to involve students with people of different ages and backgrounds. Every day, at least 10 students from neighboring Grant High School provide mentoring and tutoring at the school in return for community service credit. As well, the school has 15 reading buddy volunteers from the Northeast Senior Service Center who help students who have reading difficulties on a weekly basis. An in-school banking program through Washington Mutual Savings Bank provides math and economics experiences.

Hollyrood students must make two transitions before high school, first to the local K-5 school for fourth and fifth grade and then to middle school. The school has a number of activities to ease transition anxiety for both students and parents. These include pen pals, pairing third-graders with buddies from the third grade at Laurelhurst Elementary (the school to which Hollyrood students will be going for fourth and fifth grade), site visits, an all-school field trip to Laurelhurst, having students from Laurelhurst come to Hollyrood to answer questions, and a parent-to-parent night.

Hollyrood's statistics are impressive. Third-grade students scored number one in the city on reading tests and second in math in 1996; statewide, scores were in the top 10 percent. The parents of the 200 students contribute more than 5,000 volunteer hours annually. They help out in the classroom, with a year-round ecology and science gardening project, and with numerous special events and programs, including a Women's History Week project.

Observed Outcomes

- Increased teacher satisfaction is reflected in low staff turnover
- Student test scores increased significantly after the changeover to the K-3 structure, particularly in the last four years
- Parents convey their high satisfaction and support of the school and its mission; 100 percent of parents are involved in some aspect of the school
- The outside community recognizes and supports the school
- Staff and parents have a positive attitude despite the negative effects of budget cuts
- The school has minimal discipline problems

Keys to Success

- The region director, site council, PTA, parents, and school board support the school
- An ongoing staff development program focuses on integrated instruction
- Coordinated, long- and short-range lesson planning across the grades is ongoing; collaborative, team lesson planning allows teachers to use their depth of experience and new skills creatively
- The transition to the K-5 school is carefully planned
- Teachers use authentic assessment practices
- The PTA provides extensive classroom program support; parents lead numerous after-school activities

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Location
Oregon City High School
Moss Campus

19761 S. Beavercreek Road
Oregon City, OR 97045

Contact
Sharon Rodgers, Principal
Ray Taroli, Vice-Principal
Phone: 503/657-2437
Fax: 503/657-2429

Grade span: Ninth grade only

Like some other ninth-grade centers around the country, the Oregon City High School's freshman campus, housing 539 students, was created in response to practical considerations. The school, operating since 1990 as a ninth-grade center, was previously a junior high (grades seven through nine). When the district wanted to convert its junior highs to middle schools with grades seven through eight it formed a task force, visited ninth-grade centers elsewhere, and decided to convert two of its junior highs to middle schools while placing its ninth-graders at the third building. Curriculum between the freshman and the senior high school campuses is well-coordinated and some teachers teach at both campuses. Both campuses use a block schedule.

The freshmen only campus allows the ninth-graders to have a high school experience without the constraints of dealing with younger students. School staff characterize the school atmosphere as positive, with no older students to pick on the ninth-graders and no younger children to be picked on. There is very little fighting. When students move on to the senior high they have had a year to gain confidence and they know everyone at their grade level instead of only the one-third they would have known from a feeder school.

Teachers at the freshman campus enjoy being with the younger students. In the early years of the school the students were eager to be involved in activities at the senior high; now they prefer to be more independent and feel comfortable where they do not have to worry about older students as a threat.

Advantages to the single-grade school are that teachers can focus on freshman behavior and in the smaller school can deliver lessons to all students on issues such as harassment, AIDS, and substance abuse. Parents of female students seem to appreciate that older males are not present.

Disadvantages to the school are that the curriculum focuses mainly on academic requirements and ninth-grade-level teaching; few electives are offered. Students who excel are not able to take more advanced classes on the campus. The school does offer band, choir, drama, and sports activities, and students can go to the senior high, which is four miles away, for assemblies, dances, and sports events. The vice-principal feels the students do not mature as quickly when placed with their own age group, possibly because they lack older role models for behavior and academic challenge.

If the district can pass a bond measure it will phase out the ninth-grade center and build another high school.

Observed Outcomes

- The ninth-grade center has less fighting than did the previous junior high school.
- Lack of older role models can be both positive and negative. On one hand, ninth-graders do not have to deal with the intimidation that often comes from older students, but on the other hand when a particular ninth-grade class does not have a strong student leadership base, negative peer pressure can produce inappropriate attitudes toward academic achievement and positive behavior.

Keys to Success

- Curriculum is coordinated with that of grades 10-12.
- The staff wants to teach ninth-graders.
- Freshmen are frequently transported to the senior high for assemblies. They have the opportunity to be involved in co-curricular and extra-curricular activities at the 10-12 campus as well.
- Teachers at the two high schools have opportunities to collaborate.
- The administration is integrated so as to promote seamless policies, curriculum, and expectations.
- The high school site councils work together. Oregon City High School has a freshman site council that meets once a month and a senior high site council that meets once a month. The two groups combine once a month in order to collaborate, maintain programs that are seamless, and ensure that both campuses have the same goals and philosophy.
- Freshman who are very advanced in certain subject areas have the opportunity to complete one or more courses at the senior high.

THE NORTHWEST SAMPLER - WASHINGTON

Location
Eckstein Middle School
3003 N.E. 75th Street
Seattle, WA 98115

Contact
Lynn Caldwell, Principal
Phone: 206/281-6120
Fax: 206/281-6693

Grade span: Six through eight

With close to 1,200 students, Eckstein Middle School is the largest of Seattle's middle schools. Eckstein has adopted structures and practices that create a positive, student-centered learning environment, making it one of the most desirable of the city's middle schools with a waiting list of 100 to 200 students every year.

Like many large middle schools, Eckstein is divided into three grade-level houses. Each house has its own administrator and counselor and each is divided into interdisciplinary teams with 120 students assigned to a team of teachers—math, language arts, and social studies at the sixth- and seventh-grade level, and language arts and social studies at the eighth-grade level. The team members collaborate to help students achieve academic and personal goals. The school believes the team structure improves student-teacher relationships, motivation, attendance, behavior, attitudes toward school, peer relationships, and understanding of individual student needs. Perceived advantages for teachers are

increased intellectual stimulation, improved student discipline and instructional delivery, and personal relationships with colleagues. Protecting the integrity of the teams is the school's highest priority.

The teachers on a team have a common prep time and are usually housed in the same wing of the school so that students do not have to go far for most classes. A half-hour period in the morning with one of the team teachers or an elective teacher serves as an advisory, homeroom, or study period.

To ease transition for sixth-graders the school devotes the first day of the school year to orientation and has a weekly house assembly for sixth-graders only. Aside from P.E., sixth-graders take classes only with other sixth-graders. Seventh- and eighth-graders take electives with mixed grades. Within the team structure, Eckstein has language arts and social studies for capable students and honors math at each grade level.

The curriculum at Eckstein is structured to assure that the door to higher education stays open for all students. For instance, all eighth-grade students—no matter what math class they take—are exposed to algebra concepts. All sixth-graders take a 10-week foreign language exploratory class in which they are exposed to French, German, Japanese, and Spanish. Students are encouraged to hold aspirations to higher learning; for instance, they attend precollege activities such as college fairs, usually attended only by high school students.

Observed Outcomes

- Eckstein students ranked above average in feeling safe at school, according to the district's annual student survey
- The Eckstein faculty is highly professional
- The relationship between staff and students is better than average for the district, according to the district's annual student survey; teachers "treat students like their own kids"
- Scores on standardized tests of reading, language, math, and science are above average for the district and the state
- The percentage of students performing at a "satisfactory" level (based on grade point average, course completion, and test scores) is higher than that of other district middle schools

Keys to Success

- The staff is committed to the team structure and house organization
- The faculty promotes appropriate course-taking patterns that leave the doors open to education beyond high school

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Location
Komachin Middle School
3650 College Street, S.E.
Lacey, WA 98503

Contact
Norm Bykerk, Principal
Phone: 360/438-8800

Fax: 360/438-8802

Grade span: Seven through eight

Komachin Middle School is a two-year school with a socially and ethnically diverse population of 780 students. Komachin divides its students into three houses of mixed seventh- and eighth-graders, each in a wing of the school. Each house has at least two teachers in each of four content areas: science, math, language arts, and social studies. The house teachers work as a team. Four of the eight teachers at a time have a common prep period. All classes, except for P.E., exploratory mini-courses, and other enrichment such as music, take place in the wing. The school has assigned a counselor to each house. The counselor for the house has an office in the wing and is available to students full time. The day begins with a 31-minute advisory period for orientation activities, transition activities, fund raising, service learning projects, and other activities.

Before the school opened in 1992, staff members found they could not define any significant learning differences between seventh- and eighth-graders. As a result, they decided to reorganize the district's existing curriculum by integrating content areas. For instance, in other district middle schools life sciences is taught in seventh grade and physical sciences in eighth grade. At Komachin the two are blended in a two-year science class and organized around broad themes along with social studies, language arts, and math. For the 1996-97 school year the themes for the core courses were explorations (the self), connections (the group), and changes (the community). Curriculum threads include environmental education (quality of life), the idea of diversity (recognizing and appreciating differences), and the idea of service (doing for others).

The grade levels as well as the curriculum at Komachin are integrated. Each class is composed of 50 percent seventh-graders and 50 percent eighth-graders. The curriculum occurs in a loop, but one year is not a prerequisite to the next or a progression from the last. If seventh-graders start school during the second year of the curriculum, they will do the first year as eighth-graders.

Komachin tries to create as much continuity as possible during the students' brief stay by placing them with the same group of teachers for the entire two years. The school also tries to delay high school transition activities until as late in the eighth-grade year as possible. This way students don't have the sense that their time at the school is over before it actually is.

Komachin does not offer many electives. The focus is on the integrated curriculum. The applied technology and art teachers, for example, do not teach their own self-contained classes but work full time on a flexible schedule with the team teachers to support content areas.

Observed Outcomes

- Students learn to work well in groups. They have a sense of what quality is, and they are comfortable with public speaking because of Komachin's emphasis on performance-based assessment. The high schools have noted these qualities.
- Test scores are as good or better than those of other middle schools in the district.

Keys to Success

- The faculty maintains a clear vision and keeps its focus on curriculum and instruction. For instance, the staff does not have traditional faculty meetings. They have content meetings.
- Because of levy failure teachers no longer have a weekly late start day for planning; however, the principal feels that such planning time is especially important when teachers are using an integrated curriculum and performance-based assessment.

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(10)

WAYLAND PUBLIC SCHOOLS

Elementary Building Use Task Force Final Report

December 12, 2013

Plus:

The Superintendent's Recommendation

Excerpted from the FY15 Budget Book: December, 2013

With:

Appendix: Elementary Building Use Options:

Comparison by Variable (September, 2013)

WAYLAND PUBLIC SCHOOLS
Elementary Building Use Task Force Final Report
December 12, 2013

I. The Context and the Needs

The Wayland Public Schools last changed its elementary grade configuration beginning the 2008-2009 School Year. At that point in time, the organization changed from a system in which there were three K-5 schools to the current configuration in with Claypit Hill and Happy Hollow each house Grades 1 through 5 and Loker houses all kindergarten students. This change was driven in response to projections of reduced enrollment and a call for cost efficiencies. Clearly, some in the community felt this was a necessary and wise decision, while others greeted the change and/or the decision-making process with a good deal of consternation. Four years ago, a full day tuition-based kindergarten pilot was introduced, which was subsequently adopted.

As time passed, the families with young children had an opportunity to experience the advantages and disadvantages of the new configuration, including what it was like to have a school with an early childhood focus that housed one grade in its entirety. In this context, four issues (in addition to the lingering feelings of a community that felt it lost its neighborhood school) emerged, which necessitated a renewed study of Wayland's elementary grade school configuration. They are as follows:

1. <u>There was a concern that enrollment was significantly increasing, which would create a need for classroom space that could not be supported under the current configuration.</u> This concern was supported by an unexpected increase in the kindergarten enrollment during the 2012-2013 School Year. As a result, questions were raised about the accuracy of past projections, especially in light of new construction in town.

2. <u>There was a concern about the space needs at Happy Hollow in particular.</u> TBA architects were employed first to conduct a study of the space utilization at Happy Hollow, Loker, and Claypit Hill. Employing the Massachusetts School Building Authority's recommendations for new construction, TBA reviewed the current use of each space in each building. Considering both time (in use) and space, the study described whether rooms were fully utilized to capacity, or whether they were under- or over-utilized. This included a review of the core academic classroom, special education, art, music, health, physical education, media center, dining and food service, medical, administration, guidance, custodial and maintenance areas. Although there were a few regular classrooms spaces that were over-utilized, the primary areas of concern involved specialist and common areas. Of the three schools, Happy Hollow was of greatest concern – particularly the cafeteria, gymnasium, art, music and nurse's rooms. A subsequent study charged TBA with coming up with construction proposals which would mitigate the space problems at Happy Hollow without any redistricting or grade reconfigurations. TBA proposed five projects that would collectively relocate and/or

expand the art room, cafeteria, the music room, the computer tech area, the specialist offices, special education classrooms, and the nurse's office.

3. There was concern about the size of the enrollment at the Claypit Hill School. With an enrollment of 577 students, Claypit Hill is large in comparison to elementary schools throughout the state. In general, smaller schools lend themselves to environments in which students feelings of belonging and being known are enhanced. In addition, given administrative staffing, resources can become stretched. Larger elementary schools often have more administrative support, such as an assistant principal, than is assigned to Claypit Hill currently.

4. There was a concern that the current model left little room for future flexible use of space, whether for enrollment or programmatic reasons. Currently, both Happy Hollow and Claypit Hill have little future flexibility for increased classrooms. To state the obvious, in spite of projections and current programmatic offerings, the future remains an unknown. We want to position Wayland to be able to adapt to any needed changes.

II. Elementary Building Use Task Force: Phase I

In order to analyze and address the issues listed above, the Superintendent formed the Elementary Building Use Task Force, which first met in the Fall of 2012. The charge of the Task Force was to identify options and priorities regarding the utilization of elementary space, and conduct a cost/benefit analysis for each option to ensure an equitable, high quality educational program for all students. Its composition was as follows:

- **3 Parents** – one current parent from each of the three elementary schools
- **3 Community Members** – one community member from each of the three elementary school districts as they were previously constituted
- **3 Teachers** – one teacher or counselor from each of the three elementary schools
- **3 Elementary Principals** – the three current elementary school principals
- **3 Central Office Administrators** – the Director of Student Services, the Assistant Superintendent, and the Superintendent
- **1 School Committee Member**

The membership, by name, is listed below.

Name	Representative
John Penrose	Claypit Hill Community
Moira Breen-Smith	Claypit Hill Parent
Debbie Bearse	Claypit Hill Principal
Bernadette Vanaria	Claypit Hill Teacher
Tracy Scheidemantel (replaced by Stephanie Leong during Phase 2)	Happy Hollow Community
Alexia Obar	Happy Hollow Parent
James Lee	Happy Hollow Principal
Kori Rogers	Happy Hollow Teacher
Kate MacDonald	Loker Community
Pam Cerne	Loker Parent
Brian Jones	Loker Principal
Eileen McManus	Loker Teacher
Ellen Grieco	School Committee
Brad Crozier	Assistant Superintendent
Marlene Dodyk	Student Services Director
Paul Stein	Superintendent

The Task Force held 10, approximately two-hour long, meetings over the Fall and Winter months. In order to better inform the Task Force, Don Kennedy from NESDEC conducted a new analysis of the enrollment projections. He noted a slight upward movement in the kindergarten enrollment, although the overall enrollment trends remained flat. In addition, a Wayland town staff member employed his expertise with the GIS system in order to develop new large-scale residency maps showing households with students, by grade level. In addition, the Task Force felt it was important to solicit community input, and it did so first by sending out a press release that yielded email correspondence from community members directly to the Task Force. It also sent out a progress update to the staff requesting similar feedback. Faculty meetings were held with the Superintendent to solicit additional comments. On October 24, an open forum was held at Wayland High School at which a presentation was made updating the public regarding the work to date.

At the outset, the Task Force worked to identify key variables that it felt would directly impact on their judgment of any options under consideration. These evolved over time, with certain categories being split in two while others were combined into one. They were, as follows:

- Impact on the whole child, along with specific implications for children, staff, families, and community
- Academic Impact
- Overall cost
- Class size
- Staffing needs
- Future flexibility
- Implications for implementation and roll out of any changes
- Educational equity
- Resulting use of existing space & any construction requirements
- Transportation
- Feasibility given enrollment
- Redistricting

Much debate ensued regarding the relative pros and cons of each option in relation to each variable, confounded by the fact that some elements were considered positive by certain Task Force members and negative by others. While this was being sorted out, the Task Force brainstormed various options, and each option was considered in light of the variables. By mid-October, prior to the first public forum, the Task Force narrowed its list and settled on six options. They were as follows:

- **Grade Level Schools** – Each of the three buildings would house two grade levels: K-1, 2-3, 4-5.
- **K -5 Schools** – Each building would house a K-5 school.
- **Current Configuration** – The current grade configuration would remain unchanged. Loker would house kindergarten students, while Claypit Hill and Happy Hollow would house Grades 1-5.

- **Current Plus a Grade 1 Split** – This would add to Loker's kindergarten students the Grade 1 students in the Happy Hollow District. Happy Hollow would house Grades 2-5, and Claypit Hill would house Grades 1-5
- **Lower Elementary** – Loker would house all of kindergarten and Grade 1, while Claypit Hill and Happy Hollow would house Grades 2-5.
- **Upper Elementary** – One school would house Grades 4-5, the other two schools would house Grades K-3.

These options were presented to the faculty and the public in email correspondence, in faculty meetings, and at the October Forum. As a result of what they learned at the Forum, the Task Force members reviewed the Wayland Public Schools' core value statements, the district's mission and core value statements, and other documents to ensure that the variables aligned with the vision of elementary schooling in Wayland. In addition, it weighed each variable, assigning a percent value to each variable, which added together totaled 100 percent. These were averaged to arrive at a weighted value for each variable. The variables (above) are listed from greatest to least weight. Finally, the Task Force acknowledged that these were rough approximations of a scientific review and analysis, yet appropriate to the timetable at hand.

After further study, analysis, and debate of the options and weighted variables, the Task Force made two major decisions regarding the timetable and the list of options. It first determined that is was unwise and unnecessary to rush a decision – as there was no need to move to a new configuration by the 2013-14 School Year. Secondly, the options were narrowed to three:

- **K -5 Schools** – Each of the three buildings would house students in Grades K-5, within its geographic catchment area.
- **Lower Elementary** – Loker would house all K and Grade 1 students. Claypit Hill and Happy Hollow would each house Grades 2-5.
- **Upper Elementary** – Either Loker or Happy Hollow would house all the students in Grades 4-5. The remaining two buildings would each house students in Grades K-3.

III. Elementary Building Use Task Force: Phase Two

At the February 25, 2013 School Committee meeting, the Superintendent presented the recommendation of the Task Force, including the three top options, along with a recommendation to convene a "phase 2" of the Task Force to conduct a closer look at each option. The Committee supported this next step. The charge of the reconstituted Task Force was set as follows:

> The Superintendent's Elementary Building Task Force (Phase 2) will research the elementary space options recommended by the first Task Force, conduct a detailed cost/benefit analysis for each option and continue to solicit public and staff input.
>
> Based on this information, the Task Force will recommend to the Superintendent the preferred option with a proposed implementation timeline in a written report which summarizes the reasons for its recommendation.

The underlying goal is to ensure an equitable, high quality educational program for all elementary students.

Thanks to the good will and sacrifice of the individual members of the Task Force, all but one member (due to a change in jobs) agreed to continue in Phase 2. A new parent from the Happy Hollow community agreed to join in her stead. The Task Force began its work in the Spring of the 2012-13 School Year. It quickly set about the following tasks:

- The Task Force reviewed the demographic enrollment information in relation to determine the number of regular education classrooms required per grade level town-wide.
    - Based on the revised projections, the Task Force determined that, for planning purposes, it needed to anticipate at least 9 classrooms at each grade level, or 54 elementary classrooms in all.

School Year	K	1	2	3	4	5	Total
2014-15	164	172	212	206	196	201	1151
2014-15	9	9	10	9	8	9	54
2015-16	155	174	181	218	212	200	1140
2015-16	8	9	9	10	9	9	54
2016-17	172	165	184	187	226	217	1151
2016-17	9	9	9	9	10	9	55
2017-18	166	183	174	190	194	232	1139
2017-18	9	10	8	9	8	10	54
2018-19	163	177	193	180	197	199	1109
2018-19	9	9	9	9	8	8	52
2019-20	166	174	187	200	186	202	1115
2019-20	9	9	9	9	8	9	53
2020-21	165	177	184	194	207	191	1118
2020-21	9	9	9	9	9	8	53
2021-22	166	176	187	190	201	212	1132
2021-22	9	9	9	9	9	9	54
2022-23	165	177	186	194	197	206	1125
2022-23	9	9	9	9	8	9	53

    - This information had a significant impact on the K-5 option under consideration. Essentially, the Task Force had learned that Wayland's demographics will not support a K-5 Model that has 3 classrooms per grade at Happy Hollow, 3 at Loker, and 4 at Claypit Hill. That would equal 60 classrooms.

- As a result, it was determined that if Wayland went to a K-5 model, there were essentially two options:
  - The 2,3,4 K-5 Option: In this option, Claypit Hill would have 4 classrooms per grade, or 24 classrooms total. Either Loker or Happy Hollow would have one school of 2 classrooms per grade, or 12 classrooms total. The remaining school would have 3 classrooms per grade or 18 total.
  - The 3,3,3 K-5 Option: In this option, all three schools would have 3 classrooms per grade, or 18 total.

	Happy Hollow	Loker	Claypit Hill
K-5 (3-3-3)	18	18	18
K-5 (2-3-4)	12	18	24
K-5 (3-2-4)	18	12	24
Upper Elementary	16	18	20
Lower Elementary	16	18	20
Status Quo	20	9	25

- A subset of Task Force members conducted a review of relevant research studies regarding the relative merits of various elementary grade school configurations. They drew the following impressions from their search:
  - The research indicated that decisions to change grade configurations at any level is typically driven by enrollment, building options, and budget, rather than as a means to improve student achievement.
  - The factors that a school district should consider during grade configuration changes include the demographics/population of community, preferred school size, site availability, impact on transportation costs, length of bus ride, desired number of transitions, and parent involvement.
  - There's relatively limited research on elementary school grade configurations in peer reviewed journals.
  - Existing research seems focused on the middle years, with a trend toward supporting a K-8 model.
  - Transitions have negative effects on student outcomes and parent involvement.
  - Narrower grade spans result in a larger school feel for the students in any particular grade.
  - School configurations such as the lower or upper elementary models are more successful if staff members work closely together, hold joint development sessions, and hold regular planning meetings.

There is a separate field of research on small schools or small learning communities which indicates that small schools have a positive impact on achievement. There is also research which correlates student achievement with parent involvement. However, the Task Force did not conduct a separate review of this literature.

With the noteworthy exception of the reference to the negative impact of transitions on achievement and on parent involvement, there was not a compelling argument based on the research we reviewed for choosing one configuration over another – especially because some of the research was conducted in communities quite different than Wayland. Clearly, if the Lower or Upper Elementary model was chosen, careful consideration would have to be made in planning transitions for students to mitigate those effects on achievement. If the K-5 model was chosen, careful attention would have to be paid to assure that the developmental needs of students at the upper and lower grade levels were met.

- The Task Force identified Massachusetts school districts which were similar to the Lower and Upper Elementary models under consideration. It subsequently sent visiting teams to Georgetown (which held a school with Pre-K, K and Grade 1 students, and another school with students in Grades 2-5) and Norton (which held two K-3 schools and one 4-5 school). At each school, the visiting team met separately with the principal, teachers, and parents, and it gathered information about the pros and cons of each model. Briefly:

  Georgetown was in the initial stages of transitioning from an early elementary model to a K-6 model. Pros of the early education model presented to the delegation focused primarily on the developmental specialization of the PreK-1 school. Cons included the disconnect between the lower elementary and upper elementary schools regarding curriculum, placement and relationships with students and families along with the lack of opportunity for cross grade interactions.

  In Norton, the district was once a K-5 model, but currently has two K-3 schools of very different sizes and one 4-5 school. Pros related to the Norton model include the opportunity for students to merge into one building at an earlier developmental point which may facilitate the formation of new peer relationships as well as the opportunity to ease students into the transition to middle school while still retaining an elementary model. Cons presented include logistical challenges to both vertical alignment as well as grade level alignment across the two K-3 schools, the relatively short time (two years) in the 4-5 school in which to build a cohesive group prior to the next transition, and the potential that the 4-5 school could prematurely feel like a middle school setting. Norton's two elementary schools are of very different sizes and have different start times, unique aspects of their district that exacerbate some the challenges in their model.

- The Task Force fine-tuned the pros and cons of each variable and created a chart that summarized these findings. (See Appendix.)

- The administration developed cost estimates for both the annual operating budget and for capital expenditures.

Options	Annual Additional Operating Costs ESTIMATED					
K – 5	Classroom Teachers	1	$ 63,245	Principal	0.7	$ 77,600
	Librarian	0.4	$ 25,298	Building Sub	1.5	$ 36,465
	Specialist	0.8	$ 73,382	Secretary	1	$ 24,310
	Special Education	3	$ 189,735	Custodian	1	$ 43,800
	Guidance	0.5	$ 31,623			
	Speech	0.2	$ 12,649			
	ELL	1	$ 63,245			
	Busing	0	$ -	**TOTAL**		**$641,352**
Lower	Classroom Teachers	0	$ -	Principal	0.7	$ 77,600
	Librarian	0.4	$ 25,298	Building Sub	1.5	$ 36,465
	Specialist	0.4	$ 36,691	Secretary	1	$ 24,310
	Special Education	1.5	$ 94,868	Custodian	1	$ 43,800
	Guidance	0.3	$ 18,974			
	Speech	0.2	$ 12,649			
	ELL	0.3	$ 18,974			
	Busing	1	$ 50,000	**TOTAL**		**$439,628**
Upper	Classroom Teachers	-2	$ (126,490)	Principal	0.7	$ 77,600
	Librarian	0.4	$ 25,298	Building Sub	1.5	$ 36,465
	Specialist	0.4	$ 36,691	Secretary	1	$ 24,310
	Special Education	2.5	$ 158,113	Custodian	1	$ 43,800
	Guidance	0.5	$ 31,623			
	Speech	0.2	$ 12,649			
	ELL	1	$ 63,245			
	Busing	1	$ 50,000	**TOTAL**		**$433,303**

Additional one-time expenses and capital costs have been identified and estimated as follows:

Loker Kitchen and Cafeteria Renovation	$211,400
Happy Hollow Cafeteria and Art Room Renovation	$200,000
Happy Hollow Nurses Area (approved: Spring, 2013 Town Meeting)	$85,000
Moving Expenses	$37,500
Library Upgrades	$23,600
TOTAL	$557,500

In addition, there will be a need to upgrade the technology infrastructure at Loker – work already completed at Happy Hollow and Claypit Hill. This may cost up to $85,000 depending on the final configuration. There will also be costs for classroom supplies, a computation which will also vary depending on the final configuration.

- In preparation for the public forum, the Task Force identified the key strengths and challenges of each model, as follows:

K-5 (3,3,3) Option

5 Strengths

1. No transitions Grades K through 5
2. Transportation efficiency for bus routes and parents.
3. Wide grade span keeps siblings together and eases vertical alignment (peer modeling, shared communication among staff, continuity in relationships)
4. Equal resource allocation and staffing
5. Strong sense of school community

2 Challenges

1. Redistricting will impact many families; need for ongoing buffer zones.
2. Limited long range flexibility for two of the schools.

K-5 (2,3,4) Option

5 Strengths

1. No transitions Grades K through 5
2. Strong vertical alignment (peer modeling, shared communication among staff, continuity in relationships)
3. Strong sense of school community
4. More students are closer to home
5. Flexibility for future changes in population in two schools.

2 Challenges

1. The "2" School will have fewer academic and social configurations.
2. Redistricting will impact many families; need for ongoing buffer zones.

Lower Elementary Option

5 Strengths

1. Efficient use of building space, flexibility in two schools
2. Fosters strong early childhood community culture
3. Most flexibility with full day kindergarten
4. Optimized class sizes and educational groupings in Grades K-1.
5. Easiest transition to implement

2 Challenges

1. Grades 1-2 Transition, Vertical Alignment
2. Longer bus rides for students in Grades K-1

Upper Elementary Option

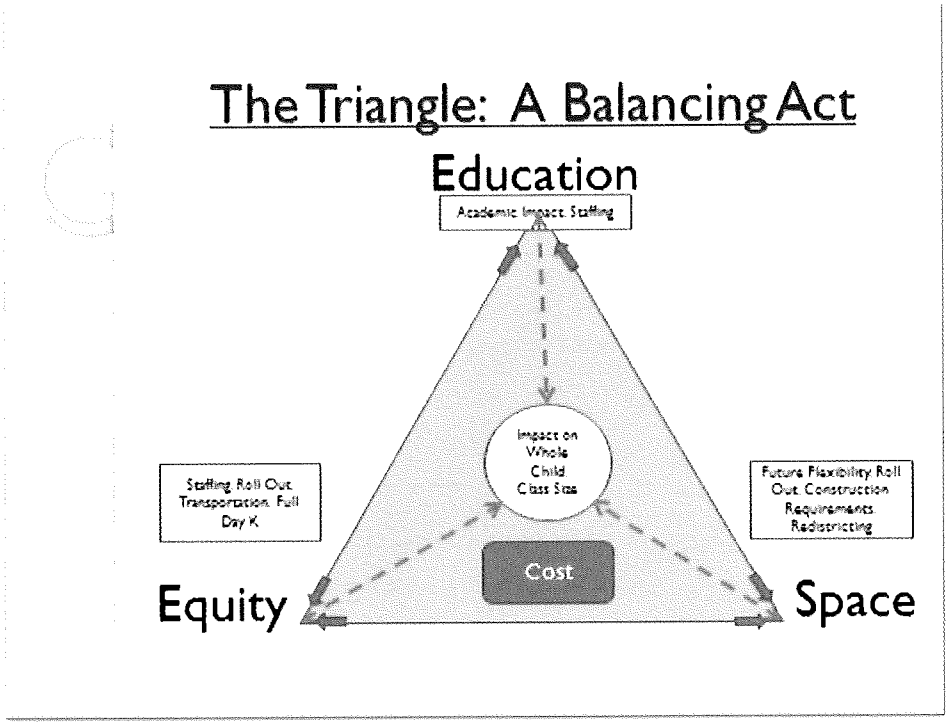
5 Strengths

1. Grade 4-5 School is better able to focus school on developmental needs of older elementary students
2. Strong teacher collaboration at Grades 4-5
3. Equitable resources for Grades 4-5.
4. K-3 provides for early childhood communities, with expanding community for students in Grades 4-5 prior to middle school
5. Optimized class sizes and educational groupings in Grades 4-5

2 Challenges

1. Grades 3 to 4 transition, vertical alignment
2. Longer bus rides for students in Grades 4-5

- The Task Force held a very well attended open forum for community members on September 30, 2013 at the Loker School. It conducted a similar forum for faculty members.
    - As individual Task Force members, as well as members of the community and the faculty, argued passionately for one option over the other, the Task Force developed the following graphic meant to help balance and keep all points of view in perspective. The following triangle depicts a need to balance issues of equity, education, and space.



- The Task Force subsequently received dozens of notes of email correspondence from both parents and faculty members, each weighing in on the options.

- The Task Force also discussed possible transition options should the recommendation turn out to be one of the K-5 options. The following chart presents a number of scenarios stretching from a one year to a five year transition:

	Loker	Happy Hollow	Claypit Hill
2014-15	All K Grade 1	Grade 1 (New) Grades 2-5 (Current)	Grade 1 (New) Grades 2-5 (Current)
# Classrooms 2,3,4	11	19	24
# Classrooms 3,2,4	12	18	24
2015-16	All K Grades 1,2	Grades 1,2 (New) Grades 3-5 (Current)	Grades 1,2 (New) Grades 3-5 (Current)
# Classrooms 2,3,4	13	18	23
# Classrooms 3,2,4	15	16	23
2016-17	All K Grades 1,2,3	Grades 1-3 (New) Grades 4-5 (Current)	Grades 1-3 (New) Grades 4-5 (Current)
# Classrooms 2,3,4	15	17	22
# Classrooms 3,2,4	18	14	22
2017-18	Grades K – 4 (New)	Grades K-4 (New) Grade 5 (Current)	Grades K-4 (New) Grade 5 (Current)
# Classrooms 2,3,4	10	19	25
# Classrooms 3,2,4	15	14	25
2018-19	Grades K-5 (New)	Grades K-5 (New)	Grades K-5 (New)
# Classrooms 2,3,4	12	18	24
# Classrooms 3,2,4	18	12	24

Although the Task Force remained torn between the options, it felt that one option could be eliminated from consideration. Specifically, it decided to eliminate the Upper Elementary Option. The key reasons for this decision were 1) its lack of community support, 2) concerns with the Grade 3 to 4 transition (even in contrast to a Grade 1 to 2 transition), 3) the general disruption to the entire community required by the move to this model, 4) longer bus rides, and 5) some discomfort with creating a "lower middle school" which clustered students in this age range.

IV. The Task Force's Final Meeting

The Task Force met one final time on November 26. It, once again, reviewed the remaining three options: Lower Elementary, K-5 (2,3,4), and K-5 (3,3,3).

After some deliberation, it recommended the elimination of the K-5 (3,3,3) option from consideration. Essentially, this option would have resulted in Happy Hollow and Loker Schools both being filled to capacity while Claypit Hill was underutilized. In addition, it would have required a significant redistricting of Claypit Hill's historic school community. It was felt that each of the remaining options was preferable.

The Task Force also discussed the pros and cons of the two K-5 (2,3,4) options. One option would make Loker the smaller school (12 classrooms, 2 per grade); the other option would make Happy Hollow the smaller school.

The Task Force could not reach consensus regarding a preferred option. There was more interest in the K-5 (2,3,4) option in which Loker would be the 12-classroom school than the Lower Elementary option. It is fair to say that the individual Task Force members appreciated the strengths and weaknesses of each option – regardless of where their preference lied. If an official vote were taken, it would have been close.

In the end, the Task Force can be proud of having crafted two strong options – each of which could serve Wayland well. The Superintendent accepted this outcome with great appreciation for all the time, effort, and deliberation that went into this effort. Each and every Task Force member is to be highly commended for their service to the Town of Wayland and its schools.

Addendum
The Superintendent's Recommendation
Excerpted from the FY15 Budget Book: December, 2013

K-5 Schools: A New Elementary Grade School Configuration

The Superintendent's Recommendation: The Elementary Building Use Task Force – a community group consisting of parents, community members, faculty, principals, and other administrators – worked diligently over the past 16 months. It held many meetings, identified variables, reviewed research, conducted site visits, held community and staff forums, and debated the pros and cons of each model. With careful consideration and thought, the Task Force brainstormed options for consideration and slowly narrowed these options down to a K-5 model and a Lower Elementary model (in which Loker would house all kindergarten and Grade 1 students). The journey and deliberations of the Task Force are detailed in its final report, which can be found on the district website in the Superintendent's section under "Administration." That report puts the superintendent's recommendation in context, and it shows the great lengths the Task Force members took to get this decision right. After weighing everything in that report, the superintendent is recommending the following:

1. **K-5 Schools:** The Wayland Public Schools move to a K-5 elementary grade school configuration beginning the 2014-2015 School Year.

2. **School Size:** The districting lines are drawn in such a way as to result in enrollments which support two classrooms per grade at Loker, three per grade at Happy Hollow, and four per grade at Claypit Hill. This will result in a total of 12 classrooms at Loker, 18 at Happy Hollow and 24 at Claypit Hill. Loker has been selected as the smaller school because in this scenario, staff will focus on the creation of *one* new school. (If Happy Hollow was reduced to a 12 classroom school it would essentially be like creating *two* new schools – one at Happy Hollow and one at Loker.) In addition, the geographic catchment areas would be more evenly distributed given differences in housing density. Finally, this scenario will result in catchment areas more closely aligned to those in Wayland when it last had K-5 school communities.

3. **Buffer Zones:** The redistricting plan will include buffer zones so that the enrollment is divided among the three K-5 schools in a way that minimizes the need to add classes. This approach helps level out class size, maintain class size guidelines, and reduce costs. (Note: A buffer zone is usually defined as an area for which individual addresses may be assigned to one of two elementary schools. Parents and guardians of students residing in a buffer zone would request either one of the two designated elementary schools in the zone. The requests would then be granted based on space availability. Students in these zones do not have a designated home school until such time as they are assigned a school. Any child beginning kindergarten who has a sibling who already attends an elementary school will be guaranteed the right to attend that same elementary school unless a parent requests otherwise.)

4. **Transition Plan:** The current Grade 4 students remain at Happy Hollow and Claypit Hill in Grade 5. This transition plan assures that no students will be required to move to a new school for one year only. All other grades will move to the new grade school configuration next year.

The Rationale: Choosing between two strong options is challenging – but it is a good problem to have. Here are the superintendent's reasons for choosing the K-5 option:

- **Educational Achievement:** In the K-5 model, students have no transitions from school to school for six years. The research shows that transitions can have a negative impact on parent involvement and student achievement.

- **Sense of Community:** Since students remain in their school for six years, a sense of community is more readily formed and sustained. Stable long-term relationships are formed and maintained with grade-level peers, peers in other grades, and staff members. Families subsequently more readily identify with their elementary school as "our school."

- **Vertical Alignment:** Since students remain in the same building, staff can more easily facilitate the transition from grade to grade. Teachers can readily communicate and convey important understandings about their students not only at the point of transition, but as issues arise. They can also more easily collaborate on curricular transitions and expectations regarding content knowledge and standardized testing. Students are comforted by their familiarity with the school and with their previous teachers.

- **A Wide Grade Span:** A six year grade span creates more opportunities for inter-age interactions, peer modeling, and programs like reading buddies.

- **Improved Transportation**: The K-5 model, on average, reduces the distance between students' homes and their schools. This, in turn, reduces the need for buses and the length of bus rides. It reduces mileage and increases opportunities for walking.

- **Future Flexibility:** This model provides some future flexibility, particularly at Loker and Claypit Hill. Happy Hollow will have little room for expansion, and Loker would absorb any unexpected enrollment increases in the southern sections of town.

- **Strong Parental Support:** There has been a call by many parents to return to K-5 schools. This model fosters parent involvement and investment, which is important to a successful school. In addition, this option limits the number of schools that a family sends its children to, therefore easing family logistics.

The Transition Issues: There are three key transition issues, named here to acknowledge the challenge that they present as well as to assure that they will be closely addressed. They are as follows:

1. **Remaining Attentive to the Developmental Needs in the Primary Grades:** One of the big advantages of the Lower Elementary model was that it would have created a school that could focus on (and tailor itself to) the developmental needs of early childhood. One of the goals of the transition to K-5 schools is to assure that time, thought, and programming be developed to make sure that these developmental needs are addressed within this model.

2. **Carefully Planning the Logistics of a Smooth Rollout:** The transition to a K-5 model will be disruptive to all three schools and to many children and families. Logistic tasks include determining the redistricted catchment areas, reassigning staff, developing specialist schedules, establishing an essentially brand new school at Loker, welcoming the kindergarten at Claypit Hill and Happy Hollow, redesigning bus routes, and generally redistributing resources. Given the timing of town meeting, all of this will need to be accomplished in a very short window of time.

In addition, a number of capital projects will need to be completed over time, including moving the Happy Hollow art room, redesigning the Happy Hollow cafeteria and nurse's office, and expanding the Loker kitchen. One-time costs also include moving expenses and refitting the Loker library.

3. **Maximizing the Strengths and Addressing the Challenges of a Small School:** Although small schools are often beloved, they also present unique challenges since they don't necessarily have the economy of scale available to larger schools. Great care will have to be made in grouping students, scheduling part-time specialists, and generally assuring equitable resources.

The Trade Offs: There are trade-offs in choosing a K-5 model. If a transition to this model is endorsed by this community, parents will need to understand what is at stake. Specifically, there are two trade-offs that will undoubtedly have significant impact on a limited number of families:

1. **Limitations in Full Day Kindergarten Slots:** There will be a marked increase in the number of children who may wish to enroll in Full Day Kindergarten (FDK), but may not be able to. This has to do with the decreased number of kindergarten classes at any particular school – making it less likely that the percentage of parents requesting FDK will match the percentage of FDK slots available.

2. **The Uncertainty Created by Buffer Zones:** Families who move into homes that are within a buffer zone will live with the uncertainty of not knowing to which elementary school their first child will be assigned.

The Costs of this Proposal: The following operating expenses are included in this recommended budget:

Operating Budget Costs		
Librarian	0.4	$ 24,456
Specialists	0.8	$ 73,382
Special Ed. Teachers	2	$122,280
Special Ed. Teacher Assistants	2	$ 47,482
Guidance	0.5	$ 30,570
Speech/OT	0.4	$ 24,456
Special Ed. Team Leader Stipend		$ 3,636
ELL Teacher Assistant	1	$ 23,741
Principal	0.7	$ 77,600
Building Sub	1.5	$ 36,465
Secretary	1	$ 24,798
Custodian	1	$ 44,679
Moving Expenses (one year only)		$ 37,500
Library Upgrades (one year only)		$ 23,600
TOTAL		**$594,645.00**

Additional one-time capital costs, which will be spread over two years, have been identified and estimated as follows:

Loker Kitchen and Cafeteria Renovation	$211,400
Happy Hollow Cafeteria and Art Room Renovation	$200,000
Happy Hollow Nurses Area (approved: Spring, 2013 Town Meeting)	$85,000
TOTAL	$496,400

The Road Ahead: As one weighs his or her own feelings about the pros and cons of a decision of this magnitude, it is easy to get lost in the details. Wayland's students and its schools will continue to thrive under a renewed K-5 model. The community can anticipate this change with excitement for what lies ahead. As the district settles into this configuration and builds new school communities, it will undoubtedly open new opportunities throughout the district. In the process, the hope is that Wayland residents will justly feel proud and unified to step along this new path.

Appendix
Elementary Building Use Options:
Comparison by Variable (September, 2013)

The Elementary Building Use Task Force has been reviewing each of the three proposed options for a new elementary grade school configuration in Wayland. These are:

- **K -5 Schools –** Each of the three buildings would house students in Grades K-5, within its geographic catchment area.
- **Lower Elementary** – Loker would house all K and Grade 1 students. Claypit Hill and Happy Hollow would each house Grades 2-5.
- **Upper Elementary** – Either Loker or Happy Hollow would house all the students in Grades 4-5. The remaining two buildings would each house students in Grades K-3.

This document takes a look at the pros and cons of the K-5, Lower Elementary, and Upper Elementary Models through the lens of each of the following variables:

- **Impact on the whole child**
- **Academic impact**
- **Staffing**
- **Class size**
- **Future flexibility**
- **Transportation**
- **Implications for transition to new model from current model**
- **Redistricting**
- **Space Use**
- **Annual additional costs ROUGHLY ESTIMATED (One-time costs still to be determined.)**

Options	Impact on the Whole Child
K - 5	PRO • This option limits the number of schools that a family could send its children to, therefore making it relatively easy for family logistics. Since students remain in the school for six years, a sense of community would be more readily formed and sustained, and families identify with their elementary school as "our school." Stable long-term relationships can be formed and maintained with peers, staff, and peers outside of grade level. • The wider grade span creates more opportunities for inter-age interactions, modeling, and programs like reading buddies. • This option requires the fewer transitions than the other two models, which research shows is more beneficial to students. CON • This option is more disruptive in terms of reorganization and redistricting than the Lower Elementary, but less disruptive than the Upper Elementary Option. • This model can result in larger differences in class size compared to the other two models. • This model may have the most negative impact on the district's ability to offer both Full Day Kindergarten and Traditional classes, creating waiting lists. • Relatively small grade level cohorts over six years may limit friendships more than the other models.
Lower	PRO • This option allows the building to be structured with a more targeted focus on the developmental aspects of early elementary aged students. • This option is the least disruptive in terms of reorganization and redistricting of the three models. • Class size in Grade K and 1 is optimized, resulting in more equal class sizes in these grades. • This model best supports the Full Day Kindergarten/Tradition Classroom split because all K classes are in the same building. CON • This option requires an additional transition to a new school in comparison to the K-5 model. • Students in this model are separated into two different schools between Grades 1 and 2, which may impact friendships negatively. • The narrow grade span creates few opportunities for inter-age interactions, modeling, and programs like reading buddies in the K-1 building, although opportunities remain in the 2-5 buildings. • Relative to the K-5 model, students are in each of the schools for fewer years, impacting the ability to build community.
Upper	PRO • This option allows the building to be structured with a more targeted focus on the developmental aspects of upper elementary aged students and be designed to assist in the transition to the middle school model. • Students in this model are brought together from two different schools in Grade 4, which may impact friendships positively. • Class size in Grades 4 and 5 is optimized, resulting in more equal class sizes in these grades. CON • The narrow grade span creates few opportunities for inter-age interactions, modeling, and programs like reading buddies in the 4-5 building, although opportunities remain in the K-3 buildings. • This option is the most disruptive in terms of reorganization and redistricting of the three models. • This option requires an additional transition to a new school in comparison to the K-5 model. • This model may have some negative impact on the district's ability to offer both Full Day Kindergarten and Traditional classes, creating waiting lists -- although less of an impact than the K-5 model. • Relative to the K-5 model, students are in each of the schools for fewer years, impacting the ability to build community.

Options	Academic Impact
K - 5	The following variables may have an impact on academic achievement, each of which is rated in relation to the other two models as high (1), moderate (2), or low (3) : horizontal alignment (3) vertical alignment (1) standardized testing (1) location and type of special education and ELL services (2) number of faculty at a grade level for collaboration (RTI, professional development, PLC's...) (3) age span (1) NOTE: We have not found research which helps determine which of the three models, as a whole, has the most positive impact on academic achievement.
Lower	The following variables may have an impact on academic achievement, each of which is rated in relation to the other two models as high (1), moderate (2), or low (3) : horizontal alignment (1) vertical alignment (3) standardized testing (3) location and type of special education and ELL services (2) number of faculty at a grade level for collaboration (RTI, professional development, PLC's...) (1) age span (3) NOTE: We have not found research which helps determine which of the three models, as a whole, has the most positive impact on academic achievement.
Upper	The following variables may have an impact on academic achievement, each of which is rated in relation to the other two models as high (1), moderate (2), or low (3) : horizontal alignment (1) vertical alignment (3) standardized testing (2) location and type of special education and ELL services (2) number of faculty at a grade level for collaboration (RTI, professional development, PLC's...) (1) age span (3) NOTE: We have not found research which helps determine which of the three models, as a whole, has the most positive impact on academic achievement.

Options	Staffing
K - 5	This model requires additional staff relative to the current staffing. These are ESTIMATED as follows: .7 Principal 1.5 Building Subs 1.0 Secretary 1.0 Custodian 1.0 Classroom teacher .4 Librarian .8 specialist increase: .2 in PE, Music, Art, Technology 3.0 Special education .5 Guidance .2 Speech 1.0 ELL staff
Lower	This model requires additional staff relative to the current staffing. These are ESTIMATED as follows: .7 Principal 1.5 Building Subs 1.0 Secretary 1.0 Custodian 0 Classroom teachers .4 Librarian .4 specialist increase: .2 in PE, Music, Art, Technology 1.5 Special education .3 Guidance .2 Speech .3 ELL staff
Upper	This model requires additional staff relative to the current staffing. These are ESTIMATED as follows: .7 Principal 1.5 Building Subs 1.0 Secretary 1.0 Custodian -2 classroom teachers .4 Librarian .4 specialist increase: .2 in PE, Music, Art, Technology 2.5 Special education .5 Guidance .2 Speech 1.0 ELL staff

Options	Class Size
K - 5	Class sizes will show the greatest variance amongst the schools. Class sizes will be contingent on the particular demographics of a catchment area each year. Relative to the other models, this may result in outlier grade levels at individual schools that have either relatively larger or smaller class sizes than their counterparts.
Lower	Class sizes will show less variance than the K-5 model. Class size in Grades K and 1 is optimized, resulting in more equal class sizes in these grades. Class sizes in Grades 3-5 will be contingent on the particular demographics of a catchment area each year. Relative to the K-5 model, this may result in fewer outlier in these grade levels.
Upper	Class sizes will show less variance than the K-5 model. Class size in Grades 4 and 5 is optimized, resulting in more equal class sizes in these grades. Class sizes in Grades K-3 will be contingent on the particular demographics of a catchment area each year. Relative to the K-5 model, this may result in fewer outlier in these grade levels.

Options	Future Flexibility
K - 5	Future flexibility is dependent on districting and planned school enrollment. Claypit Hill has the most flexibility in this model because with more sections, they can more readiliy absorb fluctuations in enrollment. They also have the ability to expand the number of classrooms by at least two sections while maintaining space for specialists and other programs. Loker and Happy Hollow have less flexibility when compared to Claypit Hill. Loker will have slightly more flexibility than Happy Hollow, especially if they are assigned fewer class sections per grade level.
Lower	Happy Hollow and Claypit Hill jointly have the most flexibility in this model, depending on districting and the number of sections per grade in each building. They also have the ability to expand the number of classrooms by at least two to four sections in each of these buildings while maintaining space for specialists and other programs. Loker will have less flexibility. (Loker is assumed to be the K-1 school in this model.)
Upper	Claypit Hill and the other K-3 building will jointly have the most flexibility in this model, depending on districting and the number of sections per grade in each building. They also have the ability to expand the number of classrooms by at least two to four sections in each of these buildings while maintaining space for specialists and other programs. The 4-5 building will have less flexibility.

Options	Transportation
K - 5	This option provides the most efficient transportation because it requires less busing, less driver time, and less mileage -- and more walking.
Lower	Long bus rides for younger students, resulting in a significant impact given twice as many students would be coming to Loker from North Wayland. There would be more buses, more mileage, and more driver time. This potentially would require 3-4 more buses at a cost of $150,000 - $200,000.
Upper	Long bus rides for older students, similar to the Lower Elementary option. This would potentially require 3-4 more buses, at a cost of $150,000 - 200,000. This may change depending on which school houses Grades 4 and 5.

Options	Implications for Transition to New Model from Current Model
K - 5	Transition to this model, if done all at once, would be highly disruptive to incoming Grades 2 to 5, especially for students (and their families) in these grades who would attend Loker. Incoming Grades K and 1 would have minimal relative impact. This model would be highly disruptive to staff. There is no easy way to gradually phase in this model given space considerations, although we could work out a plan that would grandfather the incoming Grade 4 and/or 5 students.
Lower	Transition to this model, if done all at once, would be least disruptive to all Grades. This model would be most disruptive to Grade 1 staff. This is no need to phase this transition given the ease of switching to a Lower Elementary model.
Upper	Transition to this model, if done all at once, would be highly disruptive to incoming Grades 4 to 5 if Loker is the Upper Elementary School. It would be highly disruptive to Grades 1 to 5, except for 4th and 5th Graders at Happy Hollow (although it is disruptive to them in a different way) if the the Upper Elementary School is at Happy Hollow. This model would be highly disruptive to staff. A gradual transition to this model would require Grade 4 students to be alone in a building for a year, which is not ideal.

Options	Redistricting
K - 5	This requires redistricting. However, to maximize future flexibility, district lines may be drawn differently than past catchment area lines. It is also dependent on the targeted school population size for each building. It may require the use of buffer zones.
Lower	Redistricting would me minimal in this model, and mostly be undertaken in order to balance school enrollment given targeted school population size.
Upper	If the Upper Elementary was Loker, there would not be any need for redistricting (beyond efforts to meet enrollment targets). If the Upper Elementary was Happy Hollow, redistricting would be required.

Options	Space Use
K - 5	If enrollment necessitates having 9 sections amongst the buildings, there are two scenarios: -- A division of 4, 3, and 2 classes per grade level. -- A division of 3, 3, and 3 classes per grade level. In this model, there is adequate space in each building. However, there will be underutilized space in either Loker or Claypit Hill, depending on the division.
Lower	In this model, Loker will be at capacity. Happy Hollow will be able to gain space and resolve some of its common space issues. Claypit will be underutilized unless other programs/offices are brought into the building.
Upper	In this model, the Upper Elementary School will be at capacity. Happy Hollow will be able to gain space and resolve some of its common space issues if Loker would be the Upper Elementary School. Alternately, Loker would have adequate space if Happy Hollow were the Upper Elementary School. Claypit will be underutilized unless other programs/offices are brought into the building.

Options	Annual Additional Costs ROUGHLY ESTIMATED (One-time costs still to be determined.)						
K - 5	Classroom Teachers	1	$ 63,245	Principal	0.7	$ 77,600	
	Librarian	0.4	$ 25,298	Building Sub	1.5	$ 36,465	
	Specialist	0.8	$ 73,382	Secretary	1	$ 24,310	
	Special Education	3	$ 189,735	Custodian	1	$ 43,800	
	Guidance	0.5	$ 31,623				
	Speech	0.2	$ 12,649				
	ELL	1	$ 63,245				
	Busing	0	$ -				
						TOTAL	**$ 641,352**
Lower	Classroom Teachers	0	$ -	Principal	0.7	$ 77,600	
	Librarian	0.4	$ 25,298	Building Sub	1.5	$ 36,465	
	Specialist	0.4	$ 36,691	Secretary	1	$ 24,310	
	Special Education	1.5	$ 94,868	Custodian	1	$ 43,800	
	Guidance	0.3	$ 18,974				
	Speech	0.2	$ 12,649				
	ELL	0.3	$ 18,974				
	Busing	1	$ 50,000				
						TOTAL	**$ 439,628**
Upper	Classroom Teachers	-2	$ (126,490)	Principal	0.7	$ 77,600	
	Librarian	0.4	$ 25,298	Building Sub	1.5	$ 36,465	
	Specialist	0.4	$ 36,691	Secretary	1	$ 24,310	
	Special Education	2.5	$ 158,113	Custodian	1	$ 43,800	
	Guidance	0.5	$ 31,623				
	Speech	0.2	$ 12,649				
	ELL	1	$ 63,245				
	Busing	1	$ 50,000				
						TOTAL	**$ 433,303**