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Achievement Growth in K-8 Catholic Schools Using NWEA Data

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Abstract: Using a national sample of kindergarten to eighth grade students from Catholic and public schools who took MAP Growth assessments, we examine achievement growth over time between sectors. Our findings suggest that while Catholic school students score higher in math and reading than public school students on average, they also enter each school year at a higher level. Public school students close this gap to some degree during the school year. Additionally, these patterns varied by age and subject. Catholic school students in the earlier grades show less growth in both reading and math during the academic year compared to their public school peers, but in middle school, growth patterns in math were comparable across sectors.

Keywords: academic achievement, sector differences, Catholic schools, elementary schools, middle schools

Catholic schools are often regarded as a high-quality, low-cost private schooling option, with a reputation for holding students to high academic standards, fostering student values and discipline, and providing religious instruction (Bryk et al., 1993; Sikkink, 2012; Trivitt & Wolf, 2011). Several studies comparing academic achievement in Catholic and public schools have noted a positive Catholic school effect on academic outcomes at the high school level (Bryk et al., 1993; Carbonaro & Covay, 2010; Coleman & Hoffer, 1987; Greeley, 1982; Morgan, 2001; Neal, 1997). These studies were done several decades ago and more recent research finds mixed effects

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at the elementary and middle school levels (Carbonaro, 2003, 2006; Elder & Jepsen, 2014; Hallinan & Kubitschek, 2010, 2012; Reardon et al., 2009).

The inconsistency of findings across school levels and the age of many of these studies suggest the need for further and updated comparisons of academic achievement between Catholic and public schools. A decrease in the number of Catholic school students and schools (McDonald & Schultz, 2019) and the possibility for growth through state-funded school choice policies creating vouchers and tax credit scholarships for use in Catholic schools (EdChoice, 2019) provide an impetus for understanding differences in academic outcomes by sector, from both school context and public policy perspectives.

In response to this need, this study provides an initial descriptive examination of differences in student growth between the two sectors over multiple years and cohorts. We compare academic growth in reading and math for students in grades K-8 in Catholic and public schools using longitudinal student achievement data from NWEA's Measures of Academic Progress (MAP) assessment. By focusing on achievement growth rather than scores, we attempt to measure what happens in schools over time, controlling for gaps at student entry. While limitations with the data set did not allow for the consideration of student selection into Catholic schools, we believe that this study can advance the current understanding of differences in academic outcomes by sector for the field, and as such, lead to a rich vein of future work.

This article considers the following research questions: (1) How do student test scores in Catholic and public schools compare? (2) Are there differences in student growth patterns between Catholic and public schools? We find that although Catholic school students, on average, score higher than public school students in math and reading, they also enter each school year at a higher level and demonstrate less growth on average in reading in grades K-8 and math in grades K-6. While this work suggests that U.S. Catholic school students on average are doing well, they may not be experiencing as much growth during the school year as their public school peers.

Background

Catholic School Context

Private schools educate roughly 10% of students in the United States, and Catholic schools make up the largest system of private schools in the United States, enrolling 45% of private school students (National Center for Education Statistics, 2016a, 2016b). Currently, U.S. Catholic schools serve close to 1.8 million students in over 6,000 schools, with two-thirds of this student population in schools that typically include students from preschool or kindergarten through eighth grade (McDonald & Schultz, 2019). The majority of U.S. Catholic elementary schools are parochial schools attached to a single Catholic parish. Other models include inter-parish schools with one

school supported by multiple Catholic parishes following school consolidation, diocesan schools which are sponsored and supported by the local diocese, and independent Catholic schools which are not attached to a parish or diocese but are recognized as a Catholic school by the local bishop (McDonald & Schultz, 2019).

Although the dominant perception is that Catholic schools serve wealthier White populations, a high percentage of Catholic schools serve students and families historically marginalized, particularly in states that provide school choice funding. Students of color comprise nearly 40% of all Catholic school students nationally, and 39% of Catholic schools are in urban locations, with high concentrations of schools in metro areas like Los Angeles, Chicago, Philadelphia, and New York. In addition, nearly 20% of Catholic school students identify as non-Catholic (McDonald & Schultz, 2019).

Catholic schools are described in the research literature as communal organizations with a focused academic curriculum, decentralized governance, and shared norms and beliefs that place emphasis on the concern for the human dignity of each individual student within a religious ideology (Bryk et al., 1993). These schools, on average, are smaller in size than public schools and offer the potential for overlapping social influences of home, church, and school that have been posited to impact student social capital and in turn achievement (Coleman & Hoffer, 1987). Catholic schools are private schools funded by student tuition. While private and now state-funded scholarships exist, Catholic schools enroll a smaller proportion of students who qualify for free and reduced lunch programs and serve a smaller proportion of students who qualify for special education services (National Center for Educational Statistics, 2019). Catholic school leaders have considerable autonomy and local governance, with the ability to make school-level decisions that are not subject to district or state mandates in the same manner as traditional public schools (Bryk et al., 1993).

In recent years, the Catholic school sector has decreased in size, with drops in enrollment that, among other reasons, may be attributed to the rising cost of student tuition and the introduction of charter schools into the educational market (Waddington, 2012). Demographic evidence suggests that the enrollment change has primarily impacted the number of middle-class students served (Murnane et al., 2018); this is because, Catholic schools are more likely to serve students from high-income families who can afford tuition as well as students from low-income families who - in some states - are able to qualify for tuition vouchers (e.g., Indiana, Louisiana, Washington, DC) or tax credit scholarships (e.g., Arizona, Florida), which help to defray the cost of attendance (EdChoice, 2019). Thus, there may be changes to school context and demographics in recent years as well as an increase in local and state accountability pressures, as more Catholic schools receive funding through school choice programs and policies that could impact how Catholic schools operate and educate students.

Catholic School Effects Research

Research on sector effects from the 1980s and 1990s found that students in Catholic high schools outperformed their peers in public high schools on standardized academic achievement tests (Bryk et al., 1993; Coleman & Hoffer, 1987; Coleman et al., 1982; Greeley, 1982). Using nationally representative High School & Beyond data, these studies found significant positive effects for attending Catholic schools in both reading and math when controlling for student and family characteristics. More recent examinations using different data continue to find positive effects in math (Carbonaro & Covay, 2010; Gamoran, 1996) and reading (Hoffer, 1998) for Catholic high school students compared to their public school peers.

The research on Catholic elementary schools is less straightforward. Several researchers have examined cross-sectional student achievement data from the National Assessment of Educational Progress (NAEP) to compare differences between sectors. These studies examined differences in aggregate achievement scores for different years of test administration and found higher scores on average for students in the Catholic schools compared to public schools (Lee & Stewart, 1987; Marks & Lee, 1989; Perie et al., 2005). Analysis of the 2003 NAEP data, which explored both student-and school-level effects, resulted in mixed findings — with one study finding students in Catholic schools with higher average reading and math scores in fourth and eighth grades compared to public school students (Braun et al., 2006) and another finding small to moderate negative differences in fourth and eighth grade math scores in Catholic schools compared to public schools (Lubienski & Lubienski, 2006).

More recent studies examine school sector differences in achievement growth using data from the nationally representative Early Childhood Longitudinal Study (ECLS-K). A study on achievement in kindergarten and first grade found that students in Catholic schools, when compared to students with similar backgrounds and the likelihood of attending private schools, had achievement gains in reading and math that were roughly similar to their public school counterparts (Carbonaro, 2006). Other researchers using these data have compared student achievement gains from kindergarten through fifth grade with methods that attempt to account for student selection into schools. These studies provide evidence of no differences in achievement gains in reading between Catholic and public schools (Elder & Jepsen, 2014; Reardon et al., 2009), and estimate less growth in math for students in Catholic schools compared to public schools, with a gap between Catholic and public schools students' math achievement in the range of four to five months by the fifth grade (Lubienski et al., 2008; Reardon et al., 2009).

Additional research studies the achievement in middle grades (six through eight). Using longitudinal student achievement data from Chicago Public Schools and schools in the Archdiocese of Chicago, Hallinan & Kubitschek (2012) also found mixed effects. In the sixth-grade analyses,

they did not find any differences in reading or math achievement gains between Catholic and public school students. In the eighth-grade analyses, however, they found some evidence of a slight advantage in the Catholic sector for achievement gains in reading and a clear advantage in the public sector for achievement gains in math.

In sum, aggregate scores in reading and math suggest that students in Catholic elementary and middle schools score higher than students in public schools. Other analyses that take into account student background and selection into schools using longitudinal data find that on average, student growth in reading may be similar in both sectors and that public school students may experience more math growth than Catholic school students.

Data Availability, Student Selection, and Achievement Growth

Research on how academic outcomes differ by sector is limited by the availability of comparable data from each sector. In response to mandates related to school accountability, public school systems have developed increased capacity around the centralized organization of student- and school-level data at the district and state levels. Catholic school data systems have not progressed in a similar centralized fashion within diocesan districts. Schools within a single diocese often take different achievement tests with a limited amount of student- and school-level data housed in central offices (Svarovsky et al., 2019). Further, very few Catholic schools take the state assessment, making direct comparisons to public-school achievement possible in only a handful of places. Thus, comparisons of Catholic and public school academic outcomes have mainly been possible through examining national datasets collected by the U.S. Department of Education (e.g., ECLS-K, HSB, NAEP, NELS, etc.).

Catholic schools are increasingly adopting interim standardized testing tools, taken at multiple times during the academic year to monitor and evaluate student progress over time. One such assessment is MAP Growth, which is currently administered in public and private schools, including nearly 20% of U.S. Catholic schools. These data provide the opportunity for a comparison of a larger national sample of Catholic and public schools with multiple testing points per year.

It is important in any comparison of schools, or groups of schools, to acknowledge that there are some factors that schools cannot control. In many cases, students' incoming achievement is one of these factors. Several authors (e.g., Costello et al., 2008; Raudenbush & Willms, 1995) have noted that, for this reason, a school's average test score is an unfair measure of quality. While student achievement at a single point in time is an important point on the path toward college or career readiness, growth is important because it can illuminate outstanding performance that would be obscured if we limited our focus to attainment alone (Braun, 2005). This is not to suggest that growth cannot be poorly measured; growth has measurement challenges associated with extrapolation or comparison of schools in different contexts (Raudenbush, 2005). The

main impetus for implementing a growth model is (or should be) to avoid comparing schools (or teachers) based on things they do not control. Growth has been found to be a useful metric related to subsequent life outcomes. For example, students assigned to high-growth teachers are more likely to attend college, earn higher salaries, and are less likely to have children as teenagers (Chetty et al., 2014).

As students are not randomly assigned into Catholic and public schools, taking into account student selection into schools (i.e., differences between students who enroll in private schools compared to public schools) is an important aspect of any sector effect study. We caution that this study is not able to fully address selection issues due to limited student demographic information available in the data. Thus, our analysis provides exploratory and descriptive aggregate differences in achievement scores and growth between the two sectors and cannot determine whether these differences are attributable to the school or students' family background.

Data and Analytic Strategy

Growth Research Database

We use data from the Growth Research Database (GRD) at NWEA, which houses results from NWEA's flagship assessment MAP Growth. MAP Growth is administered to over 12 million students across the United States in primary and secondary grade levels. Students are usually tested multiple times during the school year (fall, winter, spring). Test scores are reported on the RIT (Rasch unIT) scale, which is a linear transformation of the logit scale units from the Rasch item response theory model. MAP Growth is a computer-adaptive test that adjusts to each student's responses and means students receive content matched to their estimated achievement level. This is particularly useful when measuring students who perform well above or well below grade level. Furthermore, these attributes mean that growth can be estimated on a comparable scale for all time periods and grades in this study (Soland, 2019; Thum & Hauser, 2018).

We examined MAP Growth scores in both reading and mathematics. The reading test assesses students in three primary areas: (1) reading strategies and comprehending literacy text, (2) word meaning and relationships, and (3) comprehending informative and persuasive text. The math assessment evaluates areas of mathematical reasoning and measurement to problem-solving, algebra and geometry, among other topics: "In mathematics, standards now include a deep focus on conceptual understanding, procedural skills and fluency, and application of skills in problem solving situations" (NWEA, 2011, p. 24).

Because of the adaptive design, the reliability of MAP Growth scores is high. The assessment is an untimed test but generally takes 40-60 minutes to complete depending on the subject area and grade level, and students typically answer 40-53 items per session. Coupled with the adaptivity,

the test is long enough that the student-specific standard measurement error is typically very small (Thum & Hauser, 2015). Additionally, estimates of test-level reliabilities (Cronbach's alpha) for MAP Growth generally exceed .95 (NWEA, 2011).

Sample

This study uses data from 1,659 Catholic schools and 1,476 public schools in the United States that administered MAP Growth in kindergarten through eighth grade between the 2015-16 and 2017-18 school years. The number of public schools that partnered with NWEA during these school years is actually quite a bit larger (closer to about 20,000 public schools), but to maintain similar numbers of schools within the Catholic and public school samples we randomly sampled 500 schools per year from the overall set of public schools with MAP Growth data. Within each grade, we pool across students who have test events within the fall and spring of that grade during the 2015-16, 2016-17, or 2017-18 school years. The resulting sample contains over 355,000 unique Catholic school students and 606,000 unique public school students.

Table 1 provides the number of students observed in each grade as well as the racial/ethnic and gender breakdown within the Catholic and public samples. On average, there were approximately 69,000 Catholic and 139,000 public school students within each grade level. Overall, the Catholic school student sample is less racially diverse than the public school sample. The percentage of White students within the Catholic school sample (54-59% across grades) was higher than the corresponding percentage in public schools (43-50%), whereas the percentage of Black and Hispanic Catholic school students (7-10% and 11-13%, respectively) is lower than the percentage of Black and Hispanic public schools students (16-20% and 17-18%, respectively).

Analytic Strategy

We first calculate the means and standard deviations (SDs) within each grade and term (fall and spring) separately for the Catholic and public school samples. These estimates allow for a comparison of average achievement by school type across the K–8 grade span. Using these means and SDs, we calculate the standardized mean difference (or effect size) within a term and grade between the Catholic and public school students. For students testing in the fall (F) in grade g, the standardized difference is calculated as

$$\frac{\overline{RIT}_{Fg,Cath} - \overline{RIT}_{Fg,Pub}}{\sqrt{\frac{(N_{Fg,Cat} - 1)SD^2_{Fg,Cath} + (N_{Fg,Pu} - 1)SD^2_{Fg,Pub}}{N_{Fg,Cath} + N_{Fg,Pub} - 2}}},$$

where $\overline{RIT}_{Fg,Cath}$ is the average fall test score for the students in Catholic schools, $\overline{RIT}_{Fg,Pub}$ is the average fall test score for students in public schools, $SD_{Fg,Cath}$ and $SD_{Fg,Pub}$ are the fall SDs for Catholic and public school students, and $N_{Fg,Cath}$ and $N_{Fg,Pub}$ are the observed sample size in the Catholic and public school students, respectively.

Table 1

Descriptive Statistics for the Catholic and Public School Sample

	Catholic						Public					
Grade	N	White	Black	Asian	Hispanic	Male	N	White	Black	Asian	Hispanic	Male
K	49,732	0.55	0.10	0.04	0.13	0.50	51,410	0.43	0.20	0.04	0.18	0.51
1	56,350	0.57	0.09	0.03	0.13	0.49	61,351	0.44	0.19	0.04	0.18	0.51
2	69,010	0.59	0.08	0.03	0.11	0.49	75,904	0.46	0.17	0.04	0.18	0.51
3	75,401	0.58	0.08	0.03	0.11	0.49	78,123	0.45	0.17	0.04	0.19	0.51
4	77,572	0.58	0.07	0.03	0.12	0.49	76,700	0.47	0.16	0.04	0.19	0.51
5	77,766	0.58	0.08	0.03	0.12	0.49	77,848	0.46	0.16	0.04	0.19	0.51
6	77,247	0.57	0.08	0.04	0.12	0.50	65,182	0.47	0.16	0.04	0.18	0.51
7	70,845	0.58	0.08	0.04	0.12	0.50	61,761	0.47	0.17	0.04	0.19	0.51
8	69,756	0.54	0.08	0.03	0.12	0.50	60,400	0.47	0.17	0.04	0.18	0.51
K	50,641	0.55	0.10	0.04	0.13	0.50	48,363	0.45	0.20	0.04	0.17	0.52
1	56,941	0.56	0.09	0.03	0.13	0.49	56,425	0.46	0.19	0.04	0.17	0.51
2	69,538	0.59	0.08	0.03	0.11	0.50	71,425	0.46	0.19	0.04	0.17	0.51
3	75,671	0.58	0.08	0.03	0.12	0.49	75,962	0.47	0.17	0.04	0.18	0.51
4	77,329	0.58	0.07	0.03	0.12	0.49	73,678	0.48	0.17	0.04	0.18	0.51
5	77,094	0.58	0.08	0.03	0.12	0.49	76,689	0.48	0.17	0.04	0.18	0.51
6	76,347	0.58	0.08	0.04	0.12	0.50	73,538	0.50	0.16	0.04	0.18	0.51
7	70,316	0.58	0.08	0.04	0.12	0.50	71,327	0.50	0.16	0.04	0.18	0.51
8	68,584	0.54	0.08	0.03	0.12	0.50	69,920	0.50	0.17	0.04	0.18	0.51

Second, we estimate average growth during the school year. For each grade level and school type, we estimate the standardized mean difference between fall and spring. The means and SDs that we use in the effect size calculation are estimated pooling all students within a term (fall or spring), ignoring any differences in when students test within a term. The standardized gain is calculated separately for Catholic and public school students, so we do not subscript the following equations by school type. The standardized gain between fall and spring is

$$\frac{\overline{RIT}_{Sg} - \overline{RIT}_{Fg}}{\sqrt{\frac{(N_{Sg}-1)SD^2_{Sg} + (N_{Fg}-1)SD^2_{Fg}}{N_{Sg}+N_{Fg}-2}}},$$

where $\overline{RIT}_{Sg}$ is the average spring test score in grade g, $\overline{RIT}_{Fg}$ is the average fall test score in grade g, SD_{Sg} and SD_{Fg} are the SDs in the spring and fall of grade g, and N_{Sg} and N_{Fg} are the observed sample size in the spring and fall of grade g respectively.

While the calculation of standardized gains described above is routinely used to measure growth in an interpretable SD unit, a limitation of this approach within the context of MAP

Growth is that it does not account for variation across students when they test within a term. Given we observe that testing within a term (either fall or spring) is spread across a one-to two-month window, it is important to also measure growth accounting for how much time students have been in school between test events. We estimate an additional growth effect size to account for individual differences in the amount of time passed between two test events. Specifically, we calculate the average monthly gain between the fall and spring as

$$\frac{\sum_{i=1}^{N_g} \frac{RIT_{Si}-RIT_{Fi}}{Mon_i}}{N_g},$$

where RIT_{Si} is student i's spring test score, RIT_{Fi} is student i's fall test score, Mon_i is the number of months elapsed between the student's fall and spring test event, and N_g is the number of unique students with a fall and winter test score observed in grade g. Each effect size is calculated separately within the Catholic and public school sample.

Results

Table 2 presents the means and SDs by grade, term, and subject for the Catholic and public school sample of NWEA schools. Additionally, Figure 1displays the mean trends by school type across the nine grade levels. Across all terms and grades, students in Catholic schools are scoring higher on average than public school students. Figure 2 displays the standardized achievement gaps between Catholic and public schools, as well as the estimated 95% confidence intervals, by grade and term. Across all grades and terms, there is a statistically significant difference by school type favoring Catholic students.

Notably, there is a sizable difference between the observed gaps in the fall and spring testing terms. When students enter school in the fall of kindergarten, the gap between students in Catholic and public schools is approximately 0.50 standard deviations in both math and reading. However, the gap shrinks during the school year to 0.26 SDs in math and 0.27 SDs in reading by the spring assessment. This pattern of shrinking gaps between Catholic and public school students replicates across each grade level examined, though the achievement gap does not disappear in later grades because the gap appears to be widening (with Catholic students pulling ahead) during the summer. The difference between the fall and spring standardized achievement gaps appears to be largest in math and among elementary school students. There is far less fluctuation across testing seasons in the gap between Catholic and public school students' test scores in the middle school grades, with the Catholic student advantage holding more steadily across terms.

It is important to note that the results in Table 2 are cross-sectional and not following the same group of students across grade levels, which somewhat limits the inferences we can make about across-grade trends. However, these preliminary findings indicate that initial advantages that

Table 2

Means and Standard Deviations for the Catholic and Public School Sample

Subject	Grades	Effect Sizes		Catholic Sample						Public School Sample					
				Fall			Spring			Fall			Spring		
		Fall	Spring	N	M	SD	N	M	SD	N	M	SD	N	M	SD
Math	K	0.51	0.26	40,063	146.9	10.7	49,399	162.9	11.8	74,560	141.5	10.5	88,361	159.6	12.8
	1	0.4	0.23	51,621	165.2	11.5	56,488	180.2	11.6	101,829	160.3	12.9	105,762	177.2	13.6
	2	0.39	0.21	62,689	180.8	12.0	68,447	193.1	11.7	129,101	175.8	13.8	130,968	190.3	13.9
	3	0.33	0.15	69,200	193.5	11.4	73,349	204.2	11.7	137,538	189.2	13.7	132,269	202.1	14.3
	4	0.26	0.12	70,706	204.4	11.6	75,130	213.9	12.7	133,701	200.8	14.4	127,979	212.0	15.9
	5	0.24	0.12	71,331	213.8	12.7	75,506	222.6	14.5	131,897	210.3	15.9	125,898	220.6	17.7
	6	0.3	0.22	70,750	220.1	13.1	74,529	227.2	14.4	133,589	215.4	16.3	125,804	223.5	17.8
	7	0.31	0.28	64,879	227.4	14.3	67,394	233.7	15.3	128,731	222.2	18.0	121,432	228.8	19.1
	8	0.38	0.3	62,764	234.4	15.1	61,863	238.9	16.5	120,766	227.7	18.9	111,174	233.2	20.0
Reading	K	0.49	0.27	40,794	143.2	10.1	50,900	157.8	12.4	71,069	138.3	9.6	87,886	154.5	12.5
	1	0.39	0.31	52,301	161.0	12.5	57,717	176.4	13.2	101,890	156.0	13.0	108,047	172.0	14.4
	2	0.42	0.32	64,321	179.4	15.2	69,870	191.4	14.1	132,384	172.8	16.4	138,225	186.4	16.3
	3	0.38	0.28	70,269	193.7	14.7	74,713	202.3	13.7	141,068	187.5	17.1	141,682	197.9	16.5
	4	0.36	0.29	71,268	203.4	13.7	75,691	209.8	13.2	138,994	197.7	16.8	138,232	205.5	16.2
	5	0.34	0.28	71,354	210.6	13.3	75,289	215.8	13.0	140,705	205.3	16.6	137,465	211.6	16.1
	6	0.37	0.34	70,408	216.0	12.9	73,845	220.2	12.8	131,485	210.4	16.4	127,279	215.1	16.2
	7	0.38	0.37	64,751	220.8	12.8	66,830	224.2	12.8	123,374	214.9	16.6	117,058	218.6	16.5
	8	0.44	0.37	62,593	225.3	12.5	60,258	227.6	12.8	119,100	218.6	16.6	109,552	221.9	16.3

Figure 1

Comparison of RIT score means from Catholic and public school students across kindergarten to 8th grade

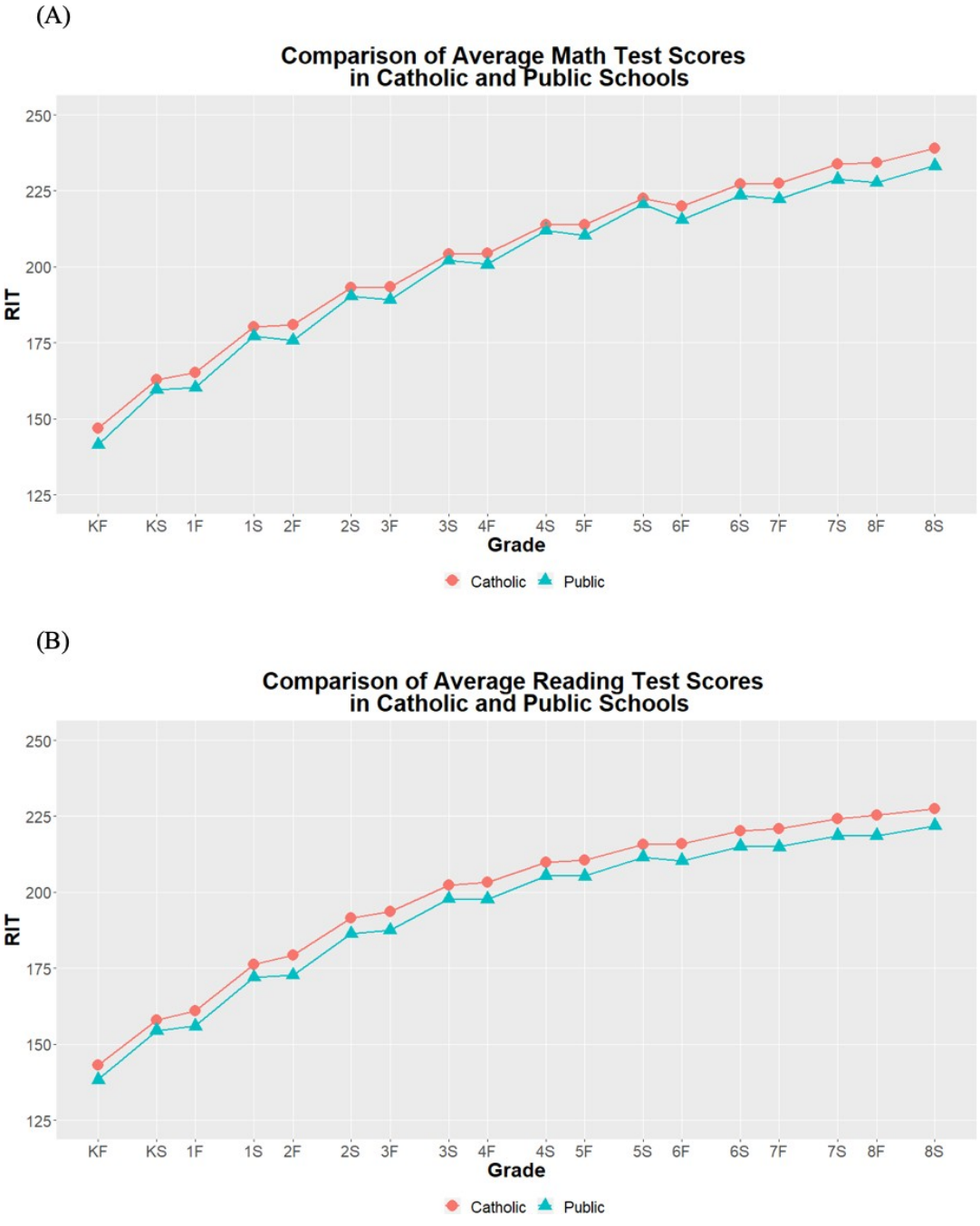
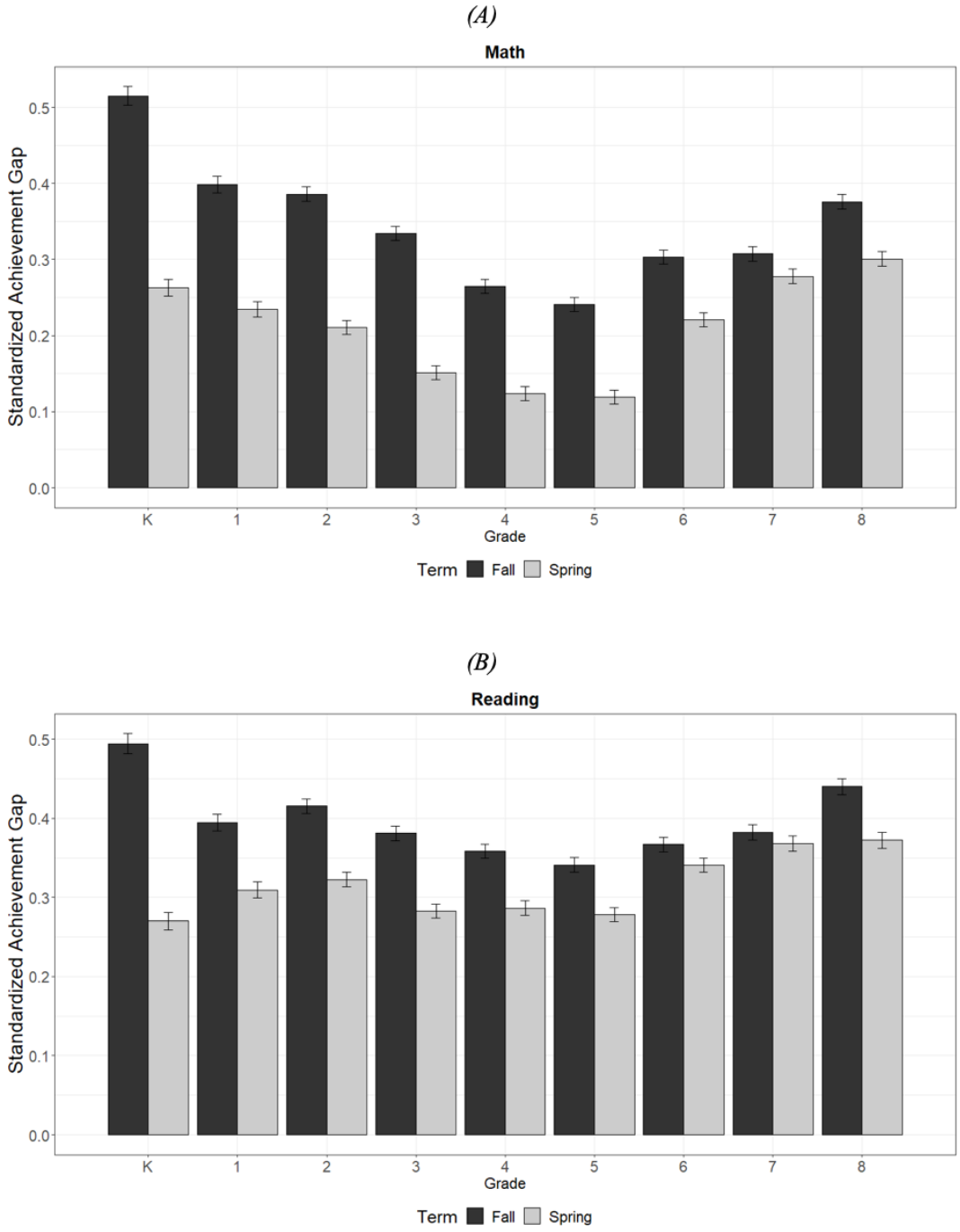


Figure 2

Estimates of the standardized gap in test scores between Catholic and public school students across kindergarten to 8th grade. The vertical lines on each bar display the 95% confidence interval for each estimate.



students within Catholic schools enter with are reduced moderately as students move through the school year.

We now turn to an examination of growth trends within Catholic and public schools. Table 3 presents the standardized fall-to-spring gains and average RIT gain per month by school type. Within the elementary school grades (kindergarten through fifth grade), students in public schools show significantly higher growth (both in terms of overall gains and growth rate per month) than students in Catholic schools. For example, the average standardized gain for kindergarten math skills is 1.29 SDs in Catholic schools and 1.57 SDs in public schools. In reading, the growth rates for public school students continue to be higher throughout the middle school years, but the standardized growth rates for math are not significantly different across school types in seventh and eighth grade. The average RIT gains per month (right half of Table 3) provide a consistent story with the standardized gaps, with public school students gaining more per month across the school year.

Discussion and Concluding Remarks

What do these analyses tell us? First, on average, Catholic school students score significantly higher than public school students across all grades. This resonates with previous findings from cross-sectional analyses of NAEP exams (Braun et al., 2006; Lee & Stewart, 1987; Marks & Lee, 1989; Perie et al., 2005). Second, the gaps between Catholic school students and public school students shrink during the year. Third, Catholic school students experience less growth during the school year in reading and math compared to public school students, particularly in the elementary school grades. This finding also resonates with past research that used growth models and found less growth in math in grades K-5 for Catholic school students (Lubienski et al., 2008; Reardon et al., 2009). In grades 7-8, Catholic school students experience less growth during the school year in reading but similar growth in math compared to their public school peers. This extends previous middle school findings that show similar growth in reading and math in sixth grade but less growth in math in eighth grade for Catholic school students compared to public school students (Hallinan & Kubitschek, 2012).

These initial and exploratory findings suggest that while Catholic school students score higher than public school students on average, they also enter each school year at a higher level. Public schools seem to be successful at closing this gap to some degree during the school year, only for the gaps to appear to widen again during the summer months. Future research should explore more closely what is happening during the school year and during summer months in both Catholic and public elementary and middle schools using a longitudinal design that follows cohorts across multiple time points and multiple years to contextualize these findings further.

Table 3

Growth Estimates by Grade and School Type

		Standardized fall-to-spring gains				Average RIT gain per month			
		Catholic		Public Schools		Catholic		Public Schools	
Subject	Grade	M	SE	M	SE	M	SE	M	SE
Math	K	1.293	0.008	1.526	0.006	2.266	0.005	2.493	0.004
	1	1.046	0.008	1.296	0.005	2.026	0.005	2.277	0.003
	2	0.903	0.008	1.054	0.004	1.723	0.005	1.979	0.003
	3	0.783	0.007	0.958	0.004	1.518	0.004	1.812	0.002
	4	0.679	0.008	0.745	0.004	1.395	0.004	1.580	0.002
	5	0.566	0.008	0.628	0.004	1.343	0.004	1.518	0.002
	6	0.474	0.007	0.496	0.004	1.194	0.004	1.329	0.002
	7	*0.368*	*0.008*	*0.361*	*0.004*	1.100	0.004	1.169	0.002
	8	*0.239*	*0.008*	*0.251*	*0.004*	1.009	0.004	1.106	0.002
Reading	K	1.189	0.007	1.469	0.006	2.152	0.005	2.352	0.004
	1	0.963	0.008	1.181	0.005	2.145	0.006	2.188	0.003
	2	0.706	0.007	0.847	0.004	1.801	0.006	1.950	0.003
	3	0.496	0.007	0.625	0.004	1.430	0.005	1.632	0.003
	4	0.406	0.007	0.480	0.004	1.220	0.005	1.376	0.003
	5	0.338	0.007	0.378	0.004	1.106	0.004	1.228	0.002
	6	0.276	0.007	0.309	0.004	1.023	0.004	1.120	0.002
	7	0.215	0.008	0.264	0.004	0.955	0.004	1.089	0.003
	8	0.134	0.008	0.229	0.004	0.880	0.004	1.070	0.003

Note. M=mean, SE=standard error. These estimates are calculated with the subset of students who had observed test scores in both the fall and the spring within a school year. The fall-spring gains that are not statistically significant between Catholic and public school students are italicized.

Although Catholic school students appear to be experiencing less growth in both reading and math in the younger grades and in reading in the middle grades, Catholic school students have similar growth rates in math in the middle grades. Overall, however, growth in the middle grades in both Catholic and public schools is smaller. This too is an area that requires further analysis. While Catholic schools may not need to focus on bringing students up to grade level, there may be missed opportunities within the sector to challenge students beyond grade-level standards. Catholic school educators may wish to consider opportunities for extending the curriculum in ways that further challenge students and encourage greater student growth during the school year. This may be an area where professional development is needed.

Catholic school teachers may also need additional support in understanding, interpreting, and using the data provided by standardized tests such as MAP Growth. An increasing number

of Catholic schools are administering formative assessments multiple times during the academic year in order to monitor and evaluate student progress. The adaptive nature of these tests and the quick access to results allow teachers to make immediate changes to classroom instruction and offer students greater support in some areas and extension in others. Catholic school teachers, however, may need additional professional development related to interpreting student scores and determining ways to differentiate instruction to make full use of these assessments.

Due to limited demographic data available, these analyses are not able to control for selection into schools or school-specific characteristics (e.g., percentage of students in poverty). Thus, we are not able to take into account student and family background, which is known to be associated with student achievement in school. In addition, these analyses should be considered cross-sectional rather than longitudinal, as they do not follow the same students as they progress each year (though they are linked within a given year). Future work will consider the use of a longitudinal growth model as well as ways to consider more local comparisons. Additional comparisons should involve matching on school location and size, student pretest scores, and any available demographics to examine whether similar students in comparable schools experience similar growth rates over time.

We want to stress the aggregate nature of these findings. Some research suggests that Catholic schools have different effects on student achievement and growth based on student background (Hallinan & Kubitschek, 2010; Morgan, 2001). More student demographic information is needed to better examine and compare achievement gaps along the lines of race/ethnicity, gender, and socioeconomic status in Catholic and other sector schools. Often, schools do not provide the full set of demographic data to the testing companies during student rostering and registration. Although providing these data is optional for schools and likely requires an investment of time for school personnel, the benefits of providing this information include increased opportunities for research and analysis at the school, diocesan, and national levels. Understanding how different groups of students perform in Catholic schools is also important for policymakers as they consider current and future state-funded school choice programs and for parents as they consider which schooling environment might best fit the needs of their children.

Although descriptive, these findings provide a current baseline comparison of Catholic and public school student achievement and growth in grades K-8 nationally. While this work suggests that U.S. Catholic school students on average are doing well, they may not be experiencing as much growth during the school year as their public school peers. With additional analyses and data, we hope to expand on these findings and provide additional comparisons of these two school sectors in ways that can be used to benefit all students.

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