Madison Education Partnership

RESEARCH BRIEF

Madison Metropolitan School District Four-year-old Kindergarten Program: Patterns of Enrollment

Authors

Jaymes Pyne
Eric Grodsky
University of Wisconsin – Madison

Elizabeth Vaade
Madison Metropolitan School District

Eric Camburn
Dominique Bradley
University of Wisconsin – Madison

Madison Education Partnership

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MEP receives support from the UW–Madison School of Education's Wisconsin Center for Education Research and the Madison Metropolitan School District.

Content Contact

Dr. Eric Grodsky
(608) 262-4896
grodsky@wisc.edu

Suggested Citation:

Pyne, J., Grodsky, E., Vaade, E., Camburn, E., Bradley, D. (2017) *Madison Metropolitan School District Four-Year-Old Kindergarten Program: Patterns of Enrollment*. Madison, WI: Madison Education Partnership. pp.1-13.

Executive Summary

This report describes patterns of enrollment in the Madison Metropolitan School District (MMSD) four-year-old kindergarten (4K) and serves to highlight program features and inform kindergarten readiness work presented in subsequent MEP reports. Throughout the report, we differentiate between 4K programs that are run by the district within MMSD elementary schools ('MMSD school sites') and 4K programs run by private or nonprofit organizations that partner with the district (early care and education or 'ECE' sites). This report addresses the following questions:

1. Does MMSD 4K reach those students least advantaged and/or most at risk of low levels of kindergarten readiness?
2. Do MMSD school and ECE sites serve similar populations?
3. Is the time of day that MMSD 4K is offered associated with patterns of enrollment?
4. How does 4K enrollment in MMSD compare to enrollment in similar public school districts elsewhere in Wisconsin?

We begin by situating MMSD 4K in the context of Wisconsin's efforts to expand 4K programming across the state. Next, we use MMSD administrative data to describe variation in student participation in 4K by student and family characteristics (e.g., race/ethnicity, family income, parental education), as well as across different types of 4K sites (MMSD school and ECE sites). Then we explore potential differences in the attributes of students attending morning and afternoon sessions and across different site settings. Finally, using administrative data collected by the Wisconsin Department of Public Instruction, we compare patterns of 4K enrollment in MMSD to patterns of enrollment in the state as a whole and in other urban school districts in the state. **We report the following key findings:**

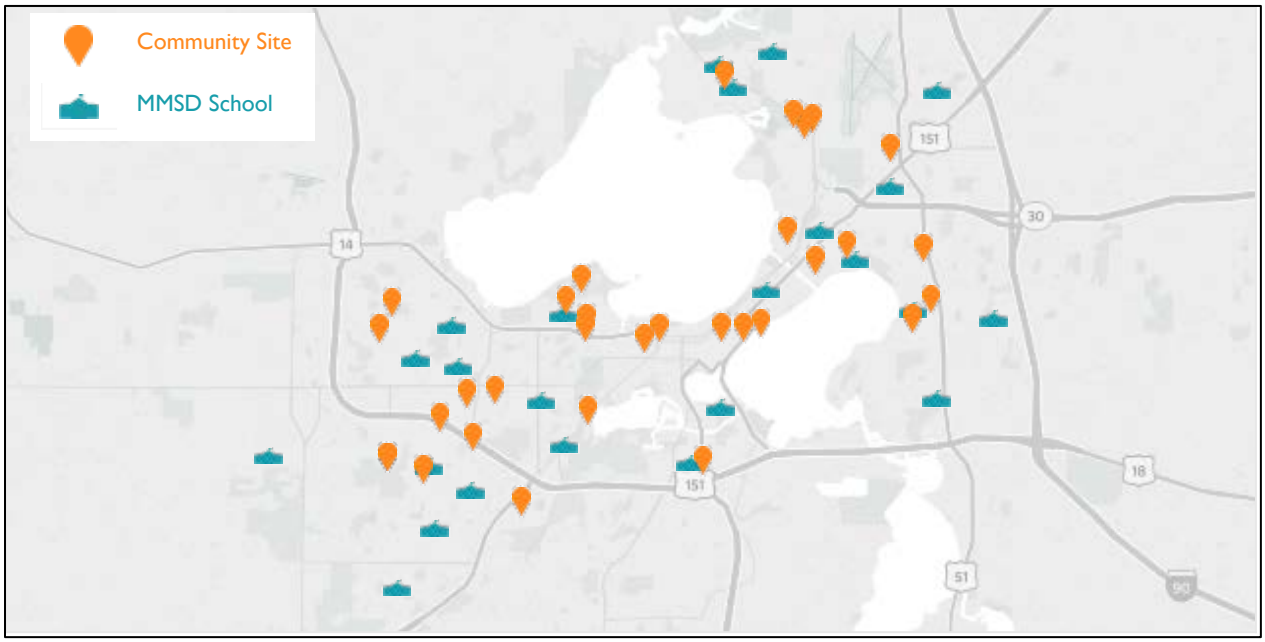
- **MMSD 4K is an equity-enhancing program.** Students from historically disadvantaged racial and ethnic groups and students from less advantaged backgrounds (lower parental education, eligible for free/reduced price lunch) were *more likely* than non-Hispanic white or more socioeconomically advantaged students to participate in the district's 4K program.
- **MMSD school 4K sites serve a slightly more diverse population of students than ECE sites.** Low-income students, English Language Learners, and students with disabilities who participated in 4K were more likely to attend an MMSD school site than an ECE site.
- **Afternoon 4K classes typically serve more advantaged students.** Families with higher income and parental education were slightly more likely to enroll in afternoon classes than morning classes. While these patterns were apparent throughout the program, they were more pronounced at ECE sites than MMSD school sites.
- **Patterns of enrollment for MMSD and other comparable districts are similar**. MMSD may be slightly more likely to enroll African American students and English Language Learners and slightly less likely to enroll Asian students compared to non-Hispanic white students, than are comparable districts in the state.

Background

In 1984, the state of Wisconsin enacted state funding for 4K programs in public school districts. The number of school districts in Wisconsin offering 4K programs increased rapidly from 72, in 1995-1996, to 391, in 2014-2015 (out of 424 school districts). The coverage offered by Wisconsin's 4K programs is highly variable, and includes both half-day and full-day models and instruction from two to five days per week (The Wisconsin Council on Children and Families, 2010; Wisconsin Department of Public Instruction). The Wisconsin Department of Public Instruction (DPI) requires 4K programs receiving state support to provide at least 437 hours of instruction per school year.

Madison is fortunate to have a variety of public and private early childhood programming options; however, not all schools or private providers participate in the district's 4K program. All MMSD 4K teachers are required to be licensed and certified to teach kindergarten through the Wisconsin DPI, regardless of site type. MMSD first offered 4K in 2011 with free enrollment,[1] serving 1,904 students. In 2016-17 the program served 1,749 students in 24 school sites and 25 participating ECE sites (mapped in Figure 1). School sites use *Creative Curriculum*, a play-based curriculum, to support the socioemotional and academic development of students prior to 5-year-old kindergarten (kindergarten) entry. The district encourages but does not require ECE sites to use the same curriculum. Classes are typically 3 hours long and offered in either the morning or afternoon. The district provides transportation to students who qualify under the district's transportation policy, dropping off (morning) and picking up (afternoon) from either a location near the student's residence or a childcare center in the school's attendance area.

Fig.1 MMSD 2016-17 4K Site Locations and Demographics.
Source: MMSD Research & Program Evaluation Office

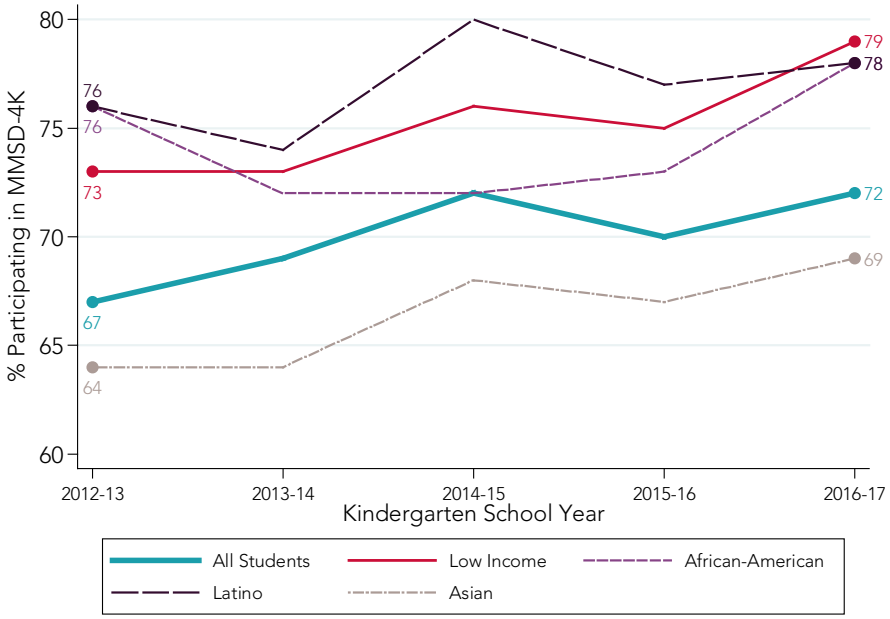


[1] Families pay a $40 materials fee. Private ECE sites might not reduce tuition, so families could be expected to pay the difference between state allocations and tuition charged by the center.

Enrollment in MMSD 4K

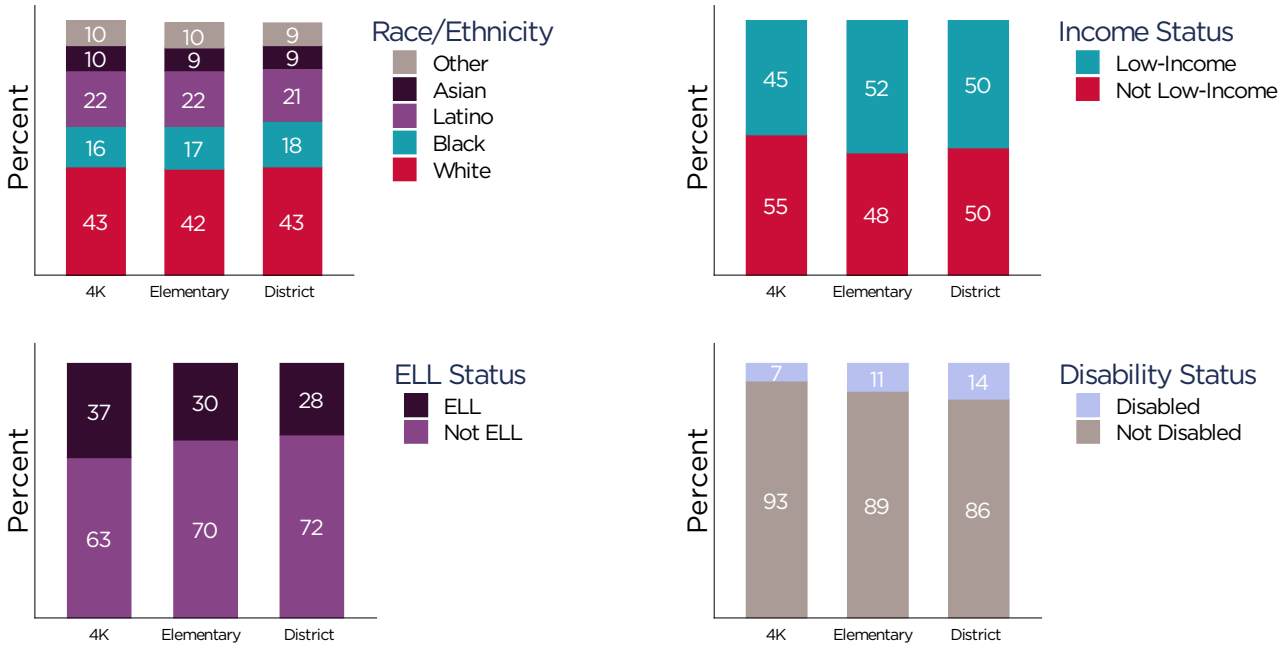
Enrollment in MMSD 4K has changed modestly since it began in 2011, fluctuating between 1,700 and 2,100 total students served per year. During this period, the percentage of students entering kindergarten who participated in MMSD 4K the prior year rose from 67% in the 2012-2013 school year to 72% in 2016-2017 overall, and also rose among low-income students[2] and students of color (Figure 2).

Fig.2 Percent of MMSD Incoming Kindergarten Students Who Attended MMSD 4K the Prior Year



MMSD school sites served 58% of participating students while the rest attended ECE sites. Nearly 40% of students attended morning 4K classes and 60% attended afternoon 4K. The racial/ethnic composition of children attending MMSD 4K mirrored that of students enrolled in MMSD elementary school or K-12 more broadly in 2016-2017 (Figure 3).

Fig. 3 MMSD 4K, Elementary, and District Enrollment Patterns by Group in 2016-2017

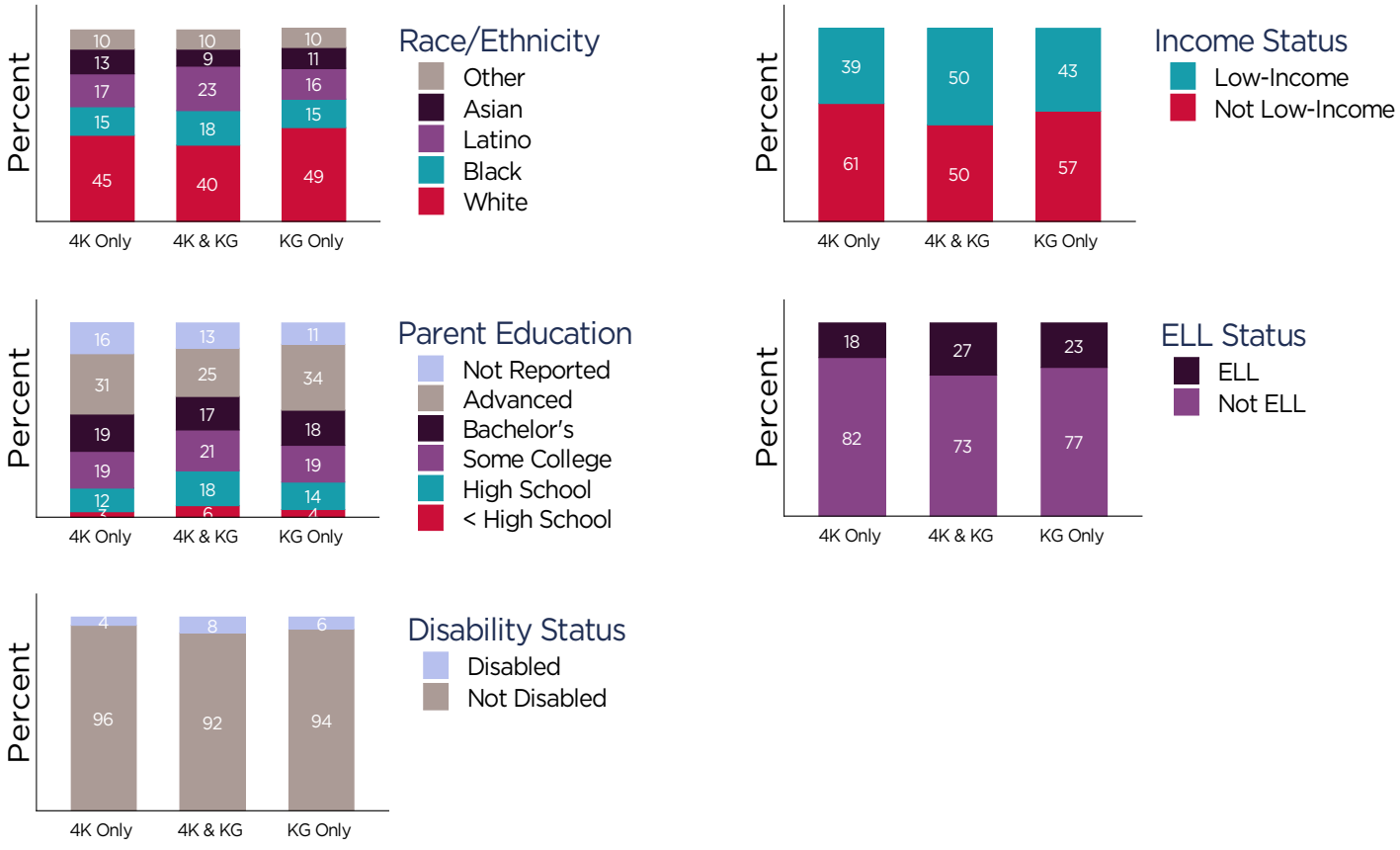


[2] "Low-income" refers to student's eligible for free or reduced price lunch by virtue of living in household with income levels at or below 185% of federal poverty guidelines. In 2016-17 the poverty threshold was $24,300 for a household of four, therefore students living in households earning less than $44,955 annually would qualify for free and reduced price lunch.

The 4K program served fewer students with disabilities and English Language Learners (ELL) than MMSD elementary schools and the district as a whole (Figure 3). This discrepancy is likely due in part to opportunities for diagnosing disabilities and the fact that students move out of ELL classification as they spend more time in the district.

Not all students in MMSD 4K continued on to kindergarten in the district. Likewise, some students entered kindergarten who had not attended MMSD 4K the previous year. Since the program began in 2011, about one in five 4K students (1,927) did not enter MMSD kindergarten following their 4K enrollment. Figure 4 compares 2016-2017 kindergarten students who attended only MMSD 4K, those who attended both MMSD 4K and kindergarten, and those who attended MMSD kindergarten only. Among this group of students, 16% (403) attended only MMSD 4K, 60% (1,504) attended both MMSD 4K and kindergarten, and 24% (593) attended MMSD kindergarten only. Compared to 4K students who attended MMSD kindergarten in 2016-2017, those who did not continue in the district were slightly more likely to be white or Asian, less likely to be low-income, and less likely to be classified as either an English Language Learner or a student with a disability. Similarly, kindergarten students who did not attend MMSD 4K were more likely to be white or Asian, more economically advantaged, and were less likely to be classified as ELL or students with disabilities than those who attended MMSD 4K and subsequently enrolled in kindergarten.

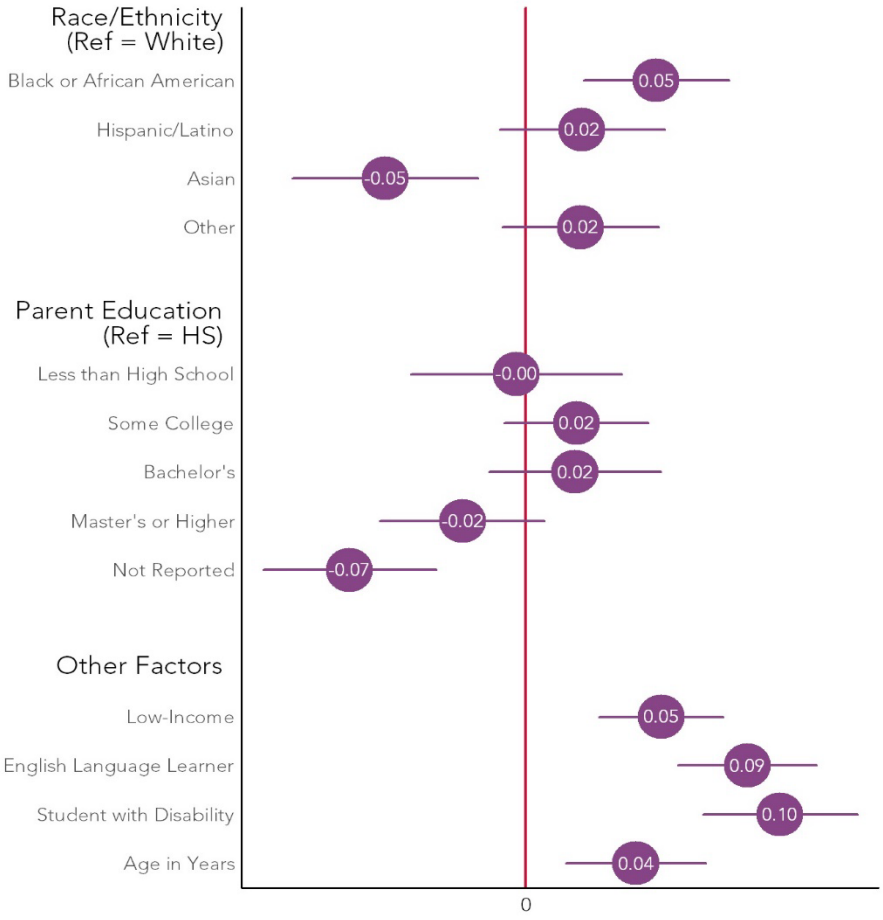
Fig. 4 MMSD 4K and Kindergarten Enrollment by Group in 2016-2017



Net Patterns of MMSD 4K Enrollment

We estimated a statistical model to predict who among those enrolled in kindergarten previously enrolled in MMSD's 4K program. This model seeks to distinguish the contributions of different child and family characteristics to the likelihood that a child participated in MMSD 4K. The coefficients from this model, called a linear probability model, indicate the average change in the probability of enrolling in 4K after adjusting for differences in other characteristics. We estimate these associations across all years of data[3] (Figure 5). In Appendix B we present results separately by year of kindergarten entry.

Fig. 5 MMSD 4K and Kindergarten Enrollment by Group



African American kindergartners were five percentage points more likely to attend MMSD 4K than non-Hispanic white kindergartners and Asian kindergartners were five percentage points less likely to do so net of differences in low-income households, parental education, ELL status and special education designations. Low-income students were five percentage points more likely to attend MMSD 4K than those not eligible. Adjusting for other characteristics of students and their families, parental education was not associated with 4K attendance among students whose parents reported their educational attainment to the district; however, those whose parents did not report their educational attainment were seven percentage points less likely to attend MMSD 4K[4]. English Language Learners and those with disabilities were nine and ten percentage points more likely to attend, respectively. Students who were older at the beginning of their kindergarten school year were more likely than their younger peers to have enrolled in MMSD 4K the prior year.

[3] In addition to coefficients presented in the text, all models adjust for the distance between the child's home and the closest ECE or MMSD school site participating in 4K.

[4] In Appendix A we discuss patterns in missingness in parent educational attainment data.

Next, we explore patterns of participation across ECE and MMSD school sites among all students who attended MMSD 4K (both those who continued on to kindergarten and those who did not). Figure 6 shows results for models predicting the probability of attending an MMSD 4K school site versus an ECE site.

African American and Hispanic students were five and nine percentage points less likely to attend an MMSD school site over an ECE site compared to white students, net of differences among students in family income and parental education, ELL status, disability status, age, and other student-level predictors. Low-income students, ELL, and those with disabilities were more likely than otherwise similar 4K participants to attend an MMSD school site rather than an ECE site.

Fig. 6 Probability of Kindergarten Student Enrolling at an MMSD School Site

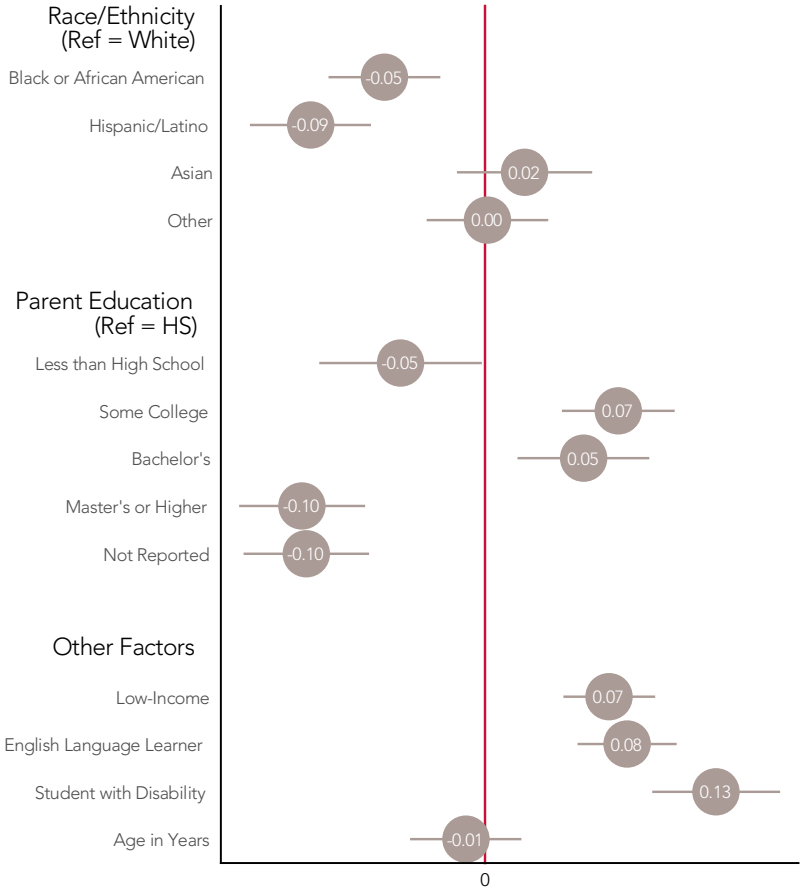
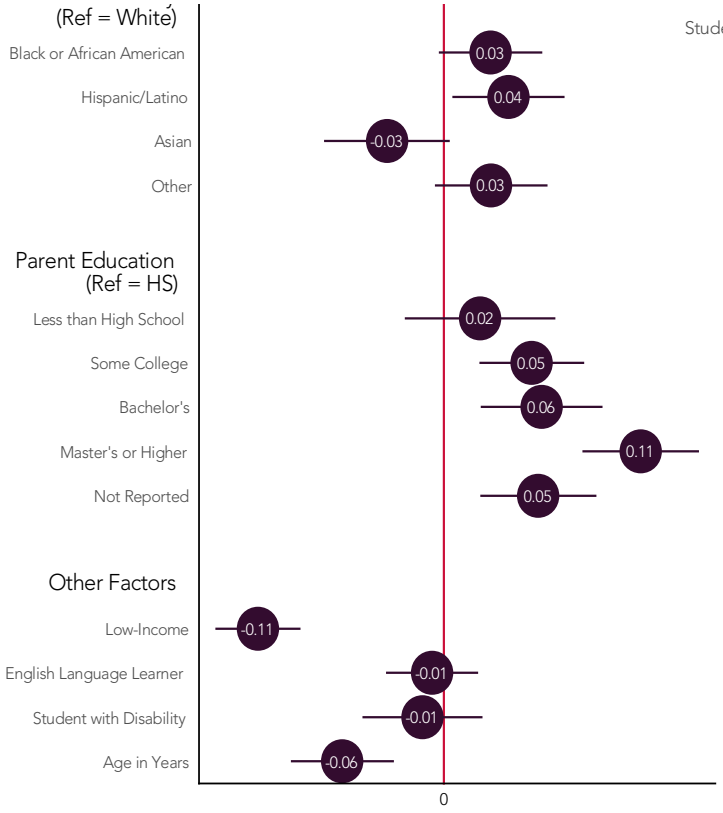


Fig. 7 Probability of Kindergarten Student Enrolling in Afternoon 4K



Looking at the time of day students participate in 4K (Figure 7), we find that African American and Hispanic students who enrolled in 4K were three and four percentage points, respectively, more likely to attend in the afternoon than white students who enrolled in 4K. Low-income students were eleven percentage points less likely than more economically advantaged students to attend afternoon 4K, all else equal. Parental education was related to afternoon attendance among those enrolling in 4K, with the probability of afternoon participation five percentage points higher for children of parents with some college and 11 percentage points higher for children of parents with a graduate degree than children of parents who ended their formal education after completing high school. Younger students were more likely to attend afternoon classes as well; the probability of attending afternoon 4K decreased by three and a half percentage points with every six-month increase in age. ELL and special education designation were not associated with the time of day participating students attended 4K, net of other student characteristics. For a breakdown of the probability of attending afternoon 4K by school and ECE sites see Appendix C.

MMSD 4K in Context

Finally, we draw on data from the Wisconsin Department of Public Instruction to compare patterns of 4K participation in MMSD to patterns of participation in other urban districts in the state. Along with MMSD, the nine districts included in this comparison served almost three-quarters of the African American students in the state as of the 2016-17 school year.[5] We examine data from kindergarten students from the 2012-2013 through the 2015-2016 academic years.

Fig. 8 Probability of Kindergarten Students Enrolling in 4K in MMSD and Other Similar Wisconsin School Districts

Figure 8 displays results from these comparisons, with MMSD estimates in teal and comparison district estimates in red. Note that MMSD estimates here differ slightly from other results in this report because these models are based on DPI data and DPI does not collect parent education. African American and Latino students were similarly likely to enroll in MMSD 4K as they were to enroll in 4K in other districts. However, an enrollment gap between Asian and white students exists. White students were more likely then Asian students to enroll in MMSD by five percentage points and more likely than white students to enroll in other districts by five percentage points. Students from low-income families in MMSD and other urban districts were seven to eight percentage points more likely to enroll in 4K than their peers. Although students with ELL designation were less likely to enroll in 4K elsewhere, these students were more likely to enroll within MMSD. Older students had a lower probability of enrolling in MMSD compared to other districts. The chance of enrollment increased over time, but less steeply in MMSD than the average of comparable districts.

[5] Comparison districts include Beloit, Brown Deer, Green Bay Area Public, Kenosha, Milwaukee, Racine Unified, Wauwatosa and West Allis-West Milwaukee.

Conclusion

Since initially offering 4K in 2011-12, MMSD has enrolled an increasing share of its students in the program. About three-quarters of the students who enroll in five-year-old kindergarten now participate in 4K prior to kindergarten. MMSD has been relatively successful in enrolling African American and Latino students, students with disabilities, low-income and ELL students in 4K. MMSD does as well as or better than peer urban districts in the state in serving African American and Latino students, low-income students and ELL students. To the extent that the educational experiences afforded students in 4K are as good as or better than the services those children would have experienced absent 4K, we believe the district's program *enhances equity among entering students*. Although we cannot provide reasonable estimates of the causal effect of 4K, in a separate report we discuss the association between participation in 4K and both early literacy skills, as measured by the kindergarten Phonological Awareness Literacy Screening (PALS), and socioemotional learning skills, as measured by kindergarten teacher report card scores.

Among students participating in 4K, differences in enrollment in ECE versus MMSD school sites and morning versus afternoon programs were not patterned in a very consistent way. For example, while African American and Latino students were *less likely* than otherwise similar white students to attend a school site, low-income students were *more likely* to attend a school site. Likewise, parental education gradients in school site attendance were not linear; children of parents with a graduate credential were *less likely* and children of parents with a bachelor's degree *more likely* to attend a school site than an ECE site. These patterns may reflect differences in the perceived quality of the early childcare experiences available across sites, the hours of service, convenience to parents' work and commuting schedules or other programmatic features for which we do not have data.

Finally, while racial/ethnic differences in morning versus afternoon enrollment were quite modest net of other student and family characteristics, low-income students were appreciably *less likely* and children of more educated parents *more likely* to participate in an afternoon rather than a morning program. Whether these pronounced differences in enrollment times matter is unclear. If there are systematic differences in the quality of 4K, or in the hours of 4K, between morning and afternoon programs, then we recommend that the district work to understand why these disparities occur and to remedy them if at all possible. However, if there are no discernible differences in quality or quantity of 4K by time of day, we would suggest that the district not invest more time in understanding or resolving these disparities in the time of enrollment among participating students.

Overall, this report suggests an equitable, if not progressive, distribution of 4K services in the district. The district certainly has room to grow the program, as three out of four students that enroll in kindergarten are former participants in MMSD 4K. However, the district might do well to further explore why one in five students that participate in 4K enroll elsewhere for kindergarten. Where do these students enroll in school? Are these students geographically clustered on the perimeter of the district? Is there more the district could or should do to keep these students enrolled in MMSD programs? The substantial number of students who participate in 4K but move on thereafter may represent a sizable loss in district enrollment worth addressing.

APPENDIX A

Missingness in Data on Parental Education

Twelve percent of students in our data had no information about parental education. Table A1 displays the percentage of kindergarten students missing parental education data by various observed characteristics. Overall, students of color, economically disadvantaged students, and those with limited English proficiency or disabilities had the highest rates of missingness on parental education. Six percent of white families did not report parental education compared to 15% of African American, 14% of Hispanic and 10% of Asian families. Fourteen percent of low-income students were missing parental education compared to 6% who were not low-income. Students with limited English proficiency had higher rates of missingness on parental education than English proficient students (13% and 9%, respectively). Fifteen percent of students with disabilities were missing values on the variable compared to 10% of students without disabilities. Rates of missingness declined over time from 13% in the 2012-2013 kindergarten school year to 8% in the 2016-2017 school year.

Table A1. Missing Parent Education Data Among Kindergartners

	% MissingParent Education
Race/Ethnicity	
White	6%
Black or African American	15%
Hispanic or Latino	14%
Asian	10%
Multiracial or Other	10%
Low Income	
No	6%
Yes	14%
English Language Proficiency	
Proficient	9%
Limited	13%
Student with Disabilities	
No	10%
Yes	15%
Year of Kindergarten Entry	
2012-2013	13%
2013-2014	10%
2014-2015	10%
2015-2016	9%
2016-2017	8%

APPENDIX B

Probability of MMSD Kindergarteners Attending MMSD 4K: Results by Cohort

Results by cohort reveal trends that were masked in the pooled linear probability models. Table B1 presents cohort results for the probability of kindergartners attending MMSD 4K. The 2012-2013 cohort accounts for much of the increased likelihood of African American students attending MMSD 4K and the 2013-2014 cohort accounts for much of the decreased likelihood of Asian students attending. The 2016-2017 cohort is mostly responsible for differences based on low-income students in the pooled model. The 2013-2014 through 2015-2016 cohorts account for the decreased probability of attending among students whose parents do not report their educational attainment. Students with limited English proficiency were more likely to attend MMSD 4K in 2012-2013, 2013-2014, and 2016-2017 than in the remaining cohorts. Special education designation became a stronger predictor of MMSD 4K attendance over time, where students with disabilities were nine percentage points more likely to attend than other students in 2012-2013, and 13 percentage points more likely to attend in 2016-2017.

Table B1. Probability of Kindergarten Student Having Been Enrolled in MMSD 4K Site, by Year of Kindergarten Entry

	2012-13		2013-14		2014-15		2015-16		2016-17	
Race/Ethnicity (Ref = White)	*Co-eff.*	*S.E.*	*Co-eff.*	*S.E.*	*Co-eff.*	*S.E.*	*Co-eff.*	*S.E.*	*Co-eff.*	*S.E.*
Black/African American	0.10***	(0.03)	0.01	(0.03)	0.02	(0.03)	0.03	(0.03)	0.02	(0.03)
Hispanic or Latino	0.03	(0.04)	-0.02	(0.04)	0.08*	(0.03)	0.02	(0.04)	0.01	(0.04)
Asian	-0.07	(0.04)	-0.10*	(0.04)	-0.03	(0.04)	-0.04	(0.04)	-0.03	(0.04)
Multiracial or Other	0.00	(0.03)	-0.01	(0.03)	0.03	(0.03)	0.03	(0.03)	0.03	(0.03)
Low Income	0.03	(0.03)	0.02	(0.03)	0.05	(0.03)	0.05	(0.03)	0.12***	(0.03)
Parent Education (Ref = HS)										
<HS	0.08	(0.05)	-0.09	(0.05)	-0.00	(0.05)	0.07	(0.05)	-0.09	(0.03)
Some College	0.05	(0.03)	0.02	(0.03)	0.00	(0.03)	0.03	(0.03)	-0.00	(0.03)
BA	0.05	(0.04)	-0.02	(0.04)	0.03	(0.04)	0.02	(0.04)	0.02	(0.04)
MA+	-0.04	(0.04)	-0.08*	(0.04)	-0.00	(0.04)	-0.02	(0.04)	0.02	(0.04)
Not Reported	-0.03	(0.04)	-0.08*	(0.04)	-0.09*	(0.04)	-0.08*	(0.04)	-0.04	(0.04)
Limited English Proficiency	0.13***	(0.03)	0.09**	(0.03)	0.04	(0.03)	0.05	(0.03)	0.08*	(0.03)
Student with Disabilities	0.09**	(0.04)	0.08*	(0.03)	0.09**	(0.03)	0.11**	(0.03)	0.13***	(0.04)
Age (in years)	0.03	(0.03)	0.01	(0.03)	0.04	(0.03)	0.09**	(0.03)	0.08**	(0.03)

*** p<0.01, ** p<0.05, * p<0.1

Table B2 displays cohort results for the probability of enrolling at an MMSD school 4K site instead of an ECE site. The lower overall school-based 4K enrollment of African American and Hispanic students compared to white students appears to be driven more by the first three years of the program's implementation than the three most recent years. While across cohorts Asian students were similarly likely to attend an MMSD school site compared to white students, they were 10 and 11 percentage points more likely to attend than white students in the 2014-2015 and 2016-2017 school years, respectively. The higher likelihood of low-income students to attend school sites in the pooled results is driven by the 2012-2013, 2013-2014, and 2015-2016 school years. While the decreased likelihood of attending 4K MMSD school sites was consistent among students whose parents had some college education or a master's degree, results among those with bachelor's degree parents appeared to be driven almost entirely by the 2013-2014 and 2015-2016 cohorts. Limited English proficiency was not a large factor for the first and last cohort of students. Students with disabilities were more likely to attend school sites over ECE sites across cohorts, with modest fluctuations in the likelihood of attending school 4K compared to those without disabilities.

Table B2. Probability of Enrolling at MMSD School Based Site by Year of 4K Attendance

	2011-12		2012-13		2013-14		2014-15		2015-16		2016-17	
Race/Ethnicity (Ref = White)	*Co-eff.*	*S.E.*	*Co-eff.*	*S.E.*	*Co-eff.*	*S.E.*	*Co-eff.*	*S.E.*	*Co-eff.*	*S.E.*	*Co-eff.*	*S.E.*
Black /African American	-0.08*	(0.04)	-0.10**	(0.04)	-0.11**	(0.04)	-0.02	(0.04)	-0.03	(0.04)	0.04	(0.04)
Hispanic/Latino	-0.12**	(0.04)	-0.19***	(0.04)	-0.15***	(0.04)	-0.02	(0.04)	-0.07	(0.04)	0.01	(0.04)
Asian	-0.03	(0.05)	-0.03	(0.04)	0.00	(0.04)	0.10*	(0.05)	0.01	(0.05)	0.11*	(0.05)
Multiracial or Other	-0.03	(0.04)	-0.04	(0.04)	0.03	(0.04)	0.03	(0.04)	-0.01	(0.04)	0.05	(0.04)
Low Income	-0.01	(0.03)	0.15***	(0.03)	0.19***	(0.03)	0.02	(0.03)	0.08*	(0.03)	-0.04	(0.03)
Parent Education (Ref = HS)												
<HS	-0.08	(0.05)	-0.10	(0.06)	0.01	(0.05)	-0.10*	(0.05)	-0.00	(0.06)	0.02	(0.06)
Some College	0.01	(0.04)	0.04	(0.04)	0.10**	(0.04)	0.08*	(0.04)	0.14***	(0.04)	0.09*	(0.04)
BA	0.02	(0.04)	0.03	(0.04)	0.17***	(0.04)	0.01	(0.04)	0.12**	(0.04)	-0.02	(0.05)
MA+	-0.07	(0.04)	-0.11**	(0.04)	-0.02	(0.04)	-0.16***	(0.04)	-0.04	(0.04)	-0.17***	(0.04)
Not Reported	0.03	(0.04)	-0.11**	(0.04)	-0.14***	(0.04)	-0.13**	(0.04)	-0.07	(0.04)	-0.14**	(0.05)
Limited English Proficiency	-0.00	(0.04)	0.14***	(0.03)	0.18***	(0.03)	0.02	(0.03)	0.07*	(0.03)	0.01	(0.03)
Student with Disabilities	-0.02	(0.04)	0.15***	(0.04)	0.10*	(0.04)	0.20***	(0.04)	0.17***	(0.04)	0.12**	(0.05)
Age (in years)	0.02	(0.04)	-0.01	(0.04)	0.00	(0.04)	-0.02	(0.04)	-0.01	(0.04)	-0.06	(0.04)
Constant	0.52**	(0.18)	0.61***	(0.16)	0.47**	(0.16)	0.70***	(0.17)	0.57***	(0.17)	0.91***	(0.18)
Observations	1,846		2,052		2,091		1,995		1,907		1,745	
R-squared	0.015		0.058		0.083		0.050		0.045		0.049	

*** p<0.01, ** p<0.05, * p<0.1

Table B3 shows cohort results for the probability of enrolling in afternoon classes at any MMSD 4K site instead of morning classes. Hispanic students' higher probability of attending afternoon classes compared to white students appears to be driven mostly by the 2012-2013 and 2015-2016 cohorts of 4K students. Student's living in a low-income household was a stronger predictor of lower probability of afternoon 4K enrollment in the first three years of the program than in the most recent three cohorts of 4K students. The increased likelihood of students whose parents had master's degrees to attend afternoon classes compared to those with high school educated parents was stronger for the first four cohorts of 4K students than the last two cohorts. After the first year of the program, higher age consistently predicted lower probability of enrollment in afternoon 4K classes.

Table B3. Probability of Enrolling in Afternoon Classes at MMSD 4K Site, by Cohort

	2011-12		2012-13		2013-14		2014-15		2015-16		2016-17	
Race/Ethnicity (Ref=White)	*Co-eff.*	*S.E.*	*Co-eff.*	*S.E.*	*Co-eff.*	*S.E.*	*Co-eff.*	*S.E.*	*Co-eff.*	*S.E.*	*Co-eff.*	*S.E.*
Black /African American	0.06	(0.04)	0.03	(0.04)	0.05	(0.04)	-0.05	(0.04)	0.04	(0.04)	0.00	(0.04)
Hispanic or Latino	0.05	(0.04)	0.06	(0.04)	0.06	(0.04)	-0.06	(0.04)	0.09*	(0.04)	-0.03	(0.04)
Asian	0.02	(0.05)	-0.02	(0.04)	-0.05	(0.04)	-0.07	(0.05)	-0.03	(0.05)	-0.06	(0.05)
Multiracial or Other	0.03	(0.04)	0.06	(0.04)	-0.00	(0.04)	-0.01	(0.04)	0.07	(0.04)	-0.01	(0.04)
Low Income	-0.09**	(0.03)	-0.16***	(0.03)	-0.19***	(0.03)	-0.08**	(0.03)	-0.10**	(0.03)	-0.05	(0.03)
Parental Education												
<HS	0.03	(0.05)	-0.06	(0.05)	0.09	(0.05)	-0.03	(0.05)	0.09	(0.06)	-0.01	(0.06)
Some College	0.09*	(0.04)	-0.01	(0.04)	0.11**	(0.04)	0.04	(0.04)	0.02	(0.04)	0.06	(0.04)
BA	0.08	(0.04)	0.02	(0.04)	0.06	(0.04)	0.09*	(0.04)	0.02	(0.04)	0.01	(0.05)
MA+	0.15***	(0.04)	0.09*	(0.04)	0.14***	(0.04)	0.12**	(0.04)	0.06	(0.04)	0.09	(0.04)
Not Reported	0.10*	(0.04)	0.06	(0.04)	0.06	(0.04)	0.04	(0.04)	-0.01	(0.04)	0.06	(0.05)
Limited English Proficiency	-0.04	(0.03)	-0.02	(0.03)	-0.04	(0.03)	0.04	(0.03)	-0.01	(0.03)	0.04	(0.03)
Student with Disabilities	-0.01	(0.04)	-0.03	(0.04)	-0.02	(0.04)	0.00	(0.04)	-0.02	(0.04)	0.01	(0.05)
Age (in years)	0.02	(0.04)	-0.07*	(0.04)	-0.07	(0.04)	-0.05	(0.04)	-0.11**	(0.04)	-0.09*	(0.04)
Constant	0.45**	(0.17)	0.96***	(0.16)	0.90***	(0.16)	0.84***	(0.17)	1.10***	(0.17)	0.98***	(0.18)
Observations	1,897		2,048		2,088		1,983		1,903		1,735	
R-squared	0.024		0.043		0.058		0.036		0.019		0.014	

*** p<0.01, ** p<0.05, * p<0.1

Appendix C

Time of Attendance and Site Type: Results by Group

Main results describing trends in morning and afternoon 4K attendance might overlook differences in attendance patterns by time of day between school and ECE sites. Table C1 displays model results differentiated by 4K site type. Results indicate that African American and multiracial or other non-white students attending ECE sites are more likely to attend afternoon classes than white students attending ECE sites.

There are no substantial racial/ethnic differences in the time of day students attended within school sites. Low-income students were less likely to attend afternoon classes regardless of site type, but that likelihood was lower in ECE sites compared to school sites. In ECE sites, children who had a parent with some college education were more likely to attend afternoon classes compared to children who had a parent with a high school diploma. Parents with a Bachelor's degree were equally more likely to enroll their children in afternoon classes than parents with a high school diploma, regardless of whether they chose to enroll in a school or ECE site. Parents with a Master's degree were also more likely to enroll their children in afternoon classes than parents with a high school diploma, but the likelihood was higher among those who enrolled in ECE sites than school sites. Additionally, parents who enrolled their children at ECE sites but did not report their education level were less likely to enroll in afternoon classes.

Table C1. Probability of a 4K Student Attending Afternoon Classes, by 4K Site Type

	School Sites		ECE Sites	
	Co-eff.	*S.E*	*Co-eff.*	*S.E.*
Race/Ethnicity (Ref = White)				
Black or African American	-0.01	(0.02)	0.07**	(0.02)
Hispanic or Latino	0.03	(0.02)	0.02	(0.02)
Asian	-0.03	(0.02)	-0.02	(0.03)
Multiracial or Other	0.01	(0.02)	0.06*	(0.02)
Low Income	-0.09***	(0.02)	-0.13***	(0.02)
Parent Education (Ref = HS)				
<HS	0.02	(0.03)	0.00	(0.03)
Some College	0.03	(0.02)	0.11***	(0.02)
BA	0.06*	(0.02)	0.06*	(0.03)
MA+	0.07**	(0.02)	0.13***	(0.03)
Not Reported	0.02	(0.02)	0.06**	(0.02)
Limited English Proficiency	0.01	(0.02)	-0.01	(0.02)
Student with Disabilities	0.00	(0.02)	0.02	(0.03)
Age (in years)	-0.06**	(0.02)	-0.06**	(0.02)
Year of 4K Entry (Ref=2011-2012)				
2012-2013	-0.05*	(0.02)	0.13***	(0.02)
2013-2014	-0.05*	(0.02)	0.10***	(0.02)
2014-2015	-0.02	(0.02)	0.15***	(0.02)
2015-2016	-0.02	(0.02)	0.06*	(0.02)
2016-2017	-0.02	(0.02)	0.06*	(0.02)
Constant	0.85***	(0.10)	0.82***	(0.10)
Observations	6,736		4,859	
R-squared	0.017		0.052	

*** p<0.01, ** p<0.05, * p<0.1