The Effect of Extracurricular Participation on Student Outcomes for the Classes of 2012-2014

Key Findings

1. Across MMSD, approximately 79% of all students in the 2012, 2013, and 2014 graduating cohorts participated in at least one district-sponsored extracurricular activity. Thirty-eight percent participated for four years.
2. Overall, students who participated in extracurriculars at any point in their high school careers demonstrate better academic, behavior, and graduation/postsecondary outcomes than those who did not, with outcomes improving with additional years of participation.
3. Students who participate in extracurriculars during high school have better academic and behavioral outcomes than similar, non-participating students.
4. Positive outcomes associated with extracurricular participation are consistent across extracurricular type, suggesting that the type of participation is less important than participation in general.

Background

Extracurricular participation ties directly into MMSD's Strategic Framework Goal #2: Every student has access to a challenging and well-rounded education. In October 2015, the Research & Program Evaluation Office produced two reports about interscholastic athletics, arguing that athletics participants illustrated noticeably better outcomes than their non-participant peers, and that the benefits of athletics still appear when using more rigorous statistical methods designed to isolate impacts. In this report, we adopt a similar research design to that used in our report about the effects of athletics participation on student outcomes, broadening our focus to all district-sponsored extracurricular activities (including both school-based and MSCR programs). We investigate the following questions of interest:

1. For the 2012-2014 graduating cohorts, who participated in district-sponsored extracurricular activities?
2. What are the academic and behavioral outcomes for extracurricular participants?
3. How do academic and behavioral outcomes for extracurricular participants compare to similar non-participants?
4. Do different types of extracurricular activities have different impacts on student outcomes?

Data and Methods

For all three questions, our dataset includes all students included in the official DPI graduating cohorts of 2012, 2013, and 2014 (three cohorts total), whether or not they actually graduated. These are the three most recent cohorts for which we have official high school completion data available. We determined extracurricular participation through students' schedules, which have district-sponsored extracurricular activities listed, including those run through Madison School and Community Recreation (MSCR). We acknowledge that this may not be a comprehensive list, as some clubs or activities at the school level may be relatively informal and not keep consistent records. We also cannot account for any outside extracurricular activities, such as club sports or community groups, as those activities are not captured in MMSD systems.

For **Question #1**, we report counts and percentages for extracurricular participants, including breakouts by student demographics (e.g., race/ethnicity, gender, special education, low-income, ELL) and school. We identify students as extracurricular participants if they ever participated in a school-sponsored extracurricular activity during high school and had that activity appear on their schedule. Our analysis focuses on years of extracurricular participation, regardless of the number of activities in which the student participated.

For **Question #2**, we look at a variety of outcomes for extracurricular participants, including academics (9th grade course failures, high school GPA, and AP/Honors credits earned), assessment (best composite ACT score, ACT college readiness benchmarks in Reading and Math), behavior (behavior events, out-of-school suspensions, attendance rate), and graduation/postsecondary (four-year graduation status, postsecondary enrollment). We show these outcomes for students by years of participation as well as by high school.

For **Question #3**, we start from the definition of an MMSD extracurricular participant, which is any student who participated in extracurriculars during their high school career, regardless of the amount of participation. We then create a comparison group of similar students who never participated in extracurriculars during high school. To do so, we use a technique called Propensity Score Matching (PSM) to pair extracurricular participants with the most similar non-participants and assess the impact of extracurricular participation on student outcomes. For additional details on this process, see the Appendix. Although this process cannot account for all differences between student groups, we have accounted for a robust set of demographic and academic variables, as well as middle school extracurricular participation, allowing confidence that the differences between groups are as close to causal as possible, given the data available, and as rigorous as any published quantitative research on the topic.

For **Question #4,** we create a binary (yes/no) participation variable for each of the codes used to organize extracurricular participation in MMSD: Academic, Arts, Athletics, Civic, Club, Program, and Service. Because of significant overlap between these areas, we combined Academic/Arts/Club/Program and Civic/Service. Then, using the population of matched extracurricular participants and non-participants created in Question #3, we conduct a series of linear and logistic regression models to look for a statistically significant relationship between participation in each of the extracurricular areas indicated in our data and select outcome variables reflecting a student's high school career: attendance, behavior events, AP/Honors credits earned with a C or better, cumulative GPA, four-year high school completion, and postsecondary enrollment.

Findings

Question #1: For the 2012-2014 graduating cohorts, who participated in district-sponsored high school extracurricular activities?

Table 1 lists the school graduated from and demographics of students in these three cohorts, broken down by extracurricular participation overall as well as years of participation.

Table 1: Extracurricular Participation Rates by School and Demographic Group

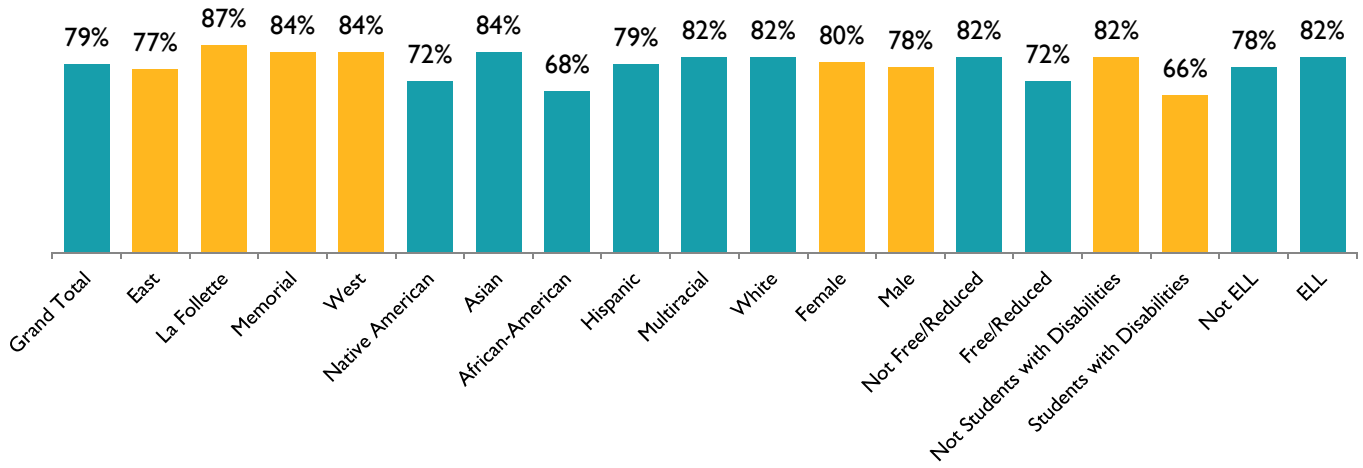
Grouping Category	Group	Total Students	No Extracirrulars	Any Extracurriculars	1 Year	2 Years	3 Years	4 Years
Total	**Grand Total**	**5583**	**21%**	**79%**	**14%**	**12%**	**14%**	**38%**
School of Graduation	East	1217	23%	77%	15%	12%	14%	36%
	La Follette	1131	13%	87%	12%	14%	16%	46%
	Memorial	1340	16%	84%	12%	12%	15%	44%
	West	1578	16%	84%	12%	12%	15%	44%
Race/Ethnicity	Native American	25	28%	72%	16%	8%	12%	36%
	Asian	516	16%	84%	14%	11%	16%	43%
	African-American	1130	32%	68%	19%	13%	11%	24%
	Hispanic	796	21%	79%	18%	13%	13%	35%
	Multiracial	357	18%	82%	11%	15%	15%	42%
	White	2754	18%	82%	12%	12%	14%	44%
Gender	Female	2770	20%	80%	13%	13%	15%	39%
	Male	2813	22%	78%	15%	12%	13%	37%
Income	Not Free/Reduced	3749	18%	82%	14%	12%	14%	42%
	Free/Reduced	1834	28%	72%	15%	13%	13%	30%
Special Education Status	Not Students with Disabilities	4594	18%	82%	14%	12%	14%	42%
	Students with Disabilities	989	34%	66%	18%	13%	11%	23%
ELL Status	Not ELL	4522	22%	78%	14%	12%	13%	39%
	ELL	1061	18%	82%	18%	13%	15%	37%

Note: We do not show data from Shabazz or innovative & alternative programs separately in the table above because of the small student counts, but these students are included in all demographic breakouts.

Across MMSD, approximately 79% of all students in the 2012-2014 graduating cohorts participated in an extracurricular activity at some point during their high school careers. About 38% participated for all four years. Recorded participation

rates were lowest at East among the four conventional high schools. Participation varied by race/ethnicity, was similar by gender, varied by income and disability, and was similar by ELL status.

Figure 1: Extracurricular Participation Rates by Demographic Group, Classes of 2012-2014



From 2008-09 to 2013-14 (senior year for the Class of 2014), MMSD offered extracurricular activities coded under seven different activity types. Because of significant overlap between these areas, as well as data issues like the same club being recorded in different categories during different years, we combined Academic/Arts/Club/Program and Civic/Service. Table 2 lists participant totals and demographics for each of these types across the three included cohorts. **For examples of the most common activities reflected under each category, as well as the number of offerings see Appendix B.**

Table 2: Extracurricular Participant Totals by Type, School, and Demographic Group

Grouping Category	Group	Total Students	Academic/Arts/ Club/Program	Athletics	Civic/Service
Total	**Grand Total**	**5583**	**54%**	**51%**	**45%**
School of Graduation	East	1217	58%	50%	44%
	La Follette	1340	77%	54%	58%
	Memorial	1131	51%	56%	66%
	West	1340	39%	54%	25%
Race/Ethnicity	Native American	25	56%	32%	36%
	Asian	516	70%	46%	56%
	African-American	1130	53%	36%	37%
	Hispanic	796	63%	41%	44%
	Multiracial	357	62%	52%	48%
	White	2754	47%	62%	47%
Gender	Female	2770	57%	48%	50%
	Male	2813	51%	54%	40%
Income	Not Free/Reduced	3749	51%	58%	47%
	Free/Reduced	1834	59%	38%	42%
Special Education Status	Not Students with Disabilities	4594	56%	55%	47%
	Students with Disabilities	989	44%	35%	36%
ELL Status	Not ELL	4522	50%	53%	44%
	ELL	1061	68%	42%	50%

Note: We do not show data from Shabazz or innovative & alternative programs separately in the table above because of the small student counts, but these students are included in all demographic breakouts.

Participation rates were relatively similar across the three categories of extracurricular participation.

Question #2: What are the academic and behavioral outcomes for extracurricular participants?

Table 3 lists outcomes for the 2012, 2013, and 2014 graduating cohorts by years of extracurricular participation.

Table 3: Outcomes for All Students by Extracurricular Participation Status

Category	Outcome	No Extracurriculars	Any Extracurriculars	District Overall
	Students	1183	4400	5583
Academics	Grade 9 two or more Fs	48%	20%	26%
	Average Grade 9 Course Failures	3.25	1.09	1.55
	High School Cumulative GPA	1.90	2.79	2.61
	High School Core GPA	1.75	2.62	2.44
	Grade 11 3.0 GPA	20%	51%	46%
	Average AP/Honors Credits Earned with C or Better	0.48	2.63	2.17
Assessment	Best ACT Composite Score	20.6	23.3	23.1
	ACT Participation	29%	70%	62%
	Met ACT Reading College Readiness Benchmark	44%	63%	61%
	Met ACT Math College Readiness Benchmark	48%	60%	59%
Behavior	Average High School Behavior Events	4.5	2.7	3.1
	Average High School Out-of-School Suspensions	1.1	0.4	0.6
	High School Attendance	84.0%	92.1%	90.4%
Graduation & Postsecondary	Four-Year High School Completion	51.6%	85.1%	78.0%
	Postsecondary Enrollment	29%	70%	61%

Overall, students who participated in district-sponsored extracurricular athletics at any point in their high school careers demonstrate better outcomes than those who did not.

Table 3: Outcomes for Extracurricular Participants by Years of Participation

Category	Outcome	1 Year	2 Years	3 Years	4 Years
	Students	802	693	766	2072
Academics	Grade 9 two or more Fs	38%	28%	21%	9%
	Average Grade 9 Course Failures	2.37	1.55	1.10	0.43
	High School Cumulative GPA	2.24	2.53	2.74	3.13
	High School Core GPA	2.04	2.36	2.56	2.97
	Grade 11 3.0 GPA	29%	40%	49%	64%
	Average AP/Honors Credits Earned with C or Better	0.84	1.52	2.41	3.82
Assessment	Best ACT Composite Score	21.3	22.3	23.0	24.1
	ACT Participation	41%	56%	68%	88%
	Met ACT Reading College Readiness Benchmark	50%	54%	64%	68%
	Met ACT Math College Readiness Benchmark	48%	56%	57%	64%
Behavior	Average High School Behavior Events	4.9	3.8	3.0	1.4
	Average High School Out-of-School Suspensions	1.0	0.7	0.4	0.2
	High School Attendance	88.2%	90.6%	92.0%	94.1%
Graduation & Postsecondary	Four-Year High School Completion	63.0%	79.2%	85.1%	96.0%
	Postsecondary Enrollment	41%	58%	69%	85%

Note: Percent meeting college readiness benchmarks is based only on tested students (e.g., a non-tested student is not included in the calculation).

Outcomes also appear to improve with additional years of participation.

We also chose to take a special look at high school completion, shown in Table 4 below, to see if the positive trend held not just overall, but across student groups. The table illustrates that this trend does in fact hold.

Table 4: High School Completion by Years of Extracurricular Participation and Student Group

Grouping Category	Group	0 Years	1 Year	2 Years	3 Years	4 Years	Total
Total	Grand Total	51.6%	63.0%	79.2%	85.1%	96.0%	78.0%
School of Graduation	East Hi	51.4%	65.0%	82.3%	82.8%	94.6%	77.0%
	LaFollette	53.1%	64.4%	74.5%	85.8%	94.4%	81.2%
	Memorial H	60.5%	69.5%	86.1%	90.3%	97.7%	85.2%
	West Hi	68.1%	76.8%	91.0%	92.2%	98.4%	86.1%
Race/Ethnicity	Asian	73.8%	67.1%	79.3%	86.3%	94.8%	84.1%
	African-American	31.1%	44.9%	64.7%	69.8%	84.6%	55.1%
	Hispanic	44.3%	47.9%	64.4%	73.8%	93.0%	68.2%
	Multiracial	52.3%	61.5%	80.8%	80.8%	97.1%	79.3%
	White	65.4%	81.0%	90.3%	93.7%	99.0%	89.0%
Gender	Female	58.7%	69.3%	85.2%	89.3%	97.4%	82.9%
	Male	45.4%	57.5%	73.1%	80.4%	94.5%	73.2%
Income	Not Free/Reduced	60.1%	67.3%	82.2%	87.3%	96.2%	82.6%
	Free/Reduced	40.8%	55.0%	73.4%	80.6%	95.5%	68.6%
Special Education Status	Not Special Ed.	59.7%	68.8%	83.1%	88.6%	96.4%	83.0%
	Special Ed.	31.5%	42.8%	62.9%	64.2%	92.1%	54.9%
ELL Status	Not ELL	50.6%	64.4%	80.9%	86.3%	96.3%	78.4%
	ELL	57.5%	58.3%	72.3%	80.6%	94.4%	76.3%

To further examine these trends, we broke out the same results for the four conventional high schools and the graduating cohorts of 2012, 2013, and 2014. Table 5 shows those results.

Table 5: Outcomes for Students with 2+ Years of Extracurricular Participation by High School

Category	Outcome	East	La Follette	Memorial	West
	Students	754	853	956	958
Academics	Grade 9 two or more Fs	12%	21%	14%	10%
	Average Grade 9 Course Failures	0.64	1.07	0.69	0.45
	High School Cumulative GPA	2.82	2.82	3.01	3.13
	High School Core GPA	2.66	2.58	2.86	2.99
	Grade 11 3.0 GPA	50%	49%	59%	67%
	Average AP/Honors Credits Earned with C or Better	3.46	2.67	3.41	2.88
Assessment	Best ACT Composite Score	22.0	21.0	24.8	25.7
	ACT Participation	75%	71%	82%	82%
	Met ACT Reading College Readiness Benchmark	55%	46%	76%	75%
	Met ACT Math College Readiness Benchmark	51%	43%	69%	76%
Behavior	Average High School Behavior Events	3.5	2.9	1.0	1.3
	Average High School Out-of-School Suspensions	0.5	0.4	0.1	0.2
	High School Attendance	91.5%	93.2%	94.2%	93.5%
Graduation & Postsecondary	Four-Year High School Completion	89.4%	88.5%	93.6%	95.5%
	Postsecondary Enrollment	72%	71%	83%	85%

Note: Percent meeting college readiness benchmarks is based only on tested students (e.g., a non-tested student is not included in the calculation).

Students who participated in 2+ years of extracurricular activities at each high school show strong academic and behavioral outcomes. Their attendance rates are high, incidences of negative behavior low, and high school completion and postsecondary enrollment rates high as well.

Question #3: How do academic and behavioral outcomes for extracurricular participants compare to similar non-participants?

Question #2 showed us that extracurricular participants had better outcomes than their peers who did not participate. However, these findings do not show that extracurricular participation causes these differences in outcomes, merely that they exist. To go further, we created a comparison group of students who are demographically and academically similar to extracurricular participants (see Appendix for description of the two groups). For this question, extracurricular participants refers to a student who participated in an extracurricular activity at any point in their high school career, whether for one year or four, and whether in one category or more. The matching procedure was highly successful, generating groups of students that were statistically equivalent on every matching variable and distributed similarly across schools. These groups each consist of 729 students.

After completing the matching procedure, we conducted t-tests (for differences in means) and chi-square tests (for differences in proportions) to examine whether the matched extracurricular participants and non-participants had significantly different outcomes across four categories of outcome variables: Academics, Assessment, Behavior, and Graduation & Postsecondary. Table 6 lists the results of these tests. **Note that these are outcomes not for all extracurricular participants and non-participants, but only for those in the treatment and comparison groups matched to be as similar as possible prior to high school. Outcomes for all extracurricular participants and all non-participants appear earlier in this report.**

Table 6: Academic and Behavioral Outcomes for Extracurricular Participants and Non-Participants

Category	Outcome	Extracurricular Participants (Treatment Group)	Non-Extracurricular Participants (Comparison Group)
Academics	Grade 9 two or more Fs	**47%****	53%
	Average Grade 9 Course Failures	**2.9*****	3.6
	High School Cumulative GPA	**2.05****	1.92
	High School Core GPA	**1.86***	1.75
	Grade 11 3.0 GPA	20%	21%
	Average AP/Honors Credits Earned with C or Better	**0.9*****	0.6
Assessment	Best ACT Composite Score	**19.9****	21.3
	ACT Participation	**44%*****	33%
	Met ACT Reading College Readiness Benchmark	**37%*****	50%
	Met ACT Math College Readiness Benchmark	**38%*****	53%
Behavior	Average High School Behavior Events	**7.5*****	5.5
	Average High School Out-of-School Suspensions	1.2	1.3
	High School Attendance	**87.0%*****	84.7%
Graduation & Postsecondary	Four-Year High School Completion	**65.8%*****	48.8%
	Postsecondary Enrollment	**44%*****	29%

Note: statistically significant differences are highlighted by the mean or proportion for extracurricular participants appearing in **bold.** *** = 99% significance, ** = 95% significance, * = 90% significance.

In general, we see favorable outcomes for extracurricular participants relative to non-participants when looking at a group of students that was, on aggregate, substantially similar prior to high school. Extracurricular participants had better academic results and worse ACT results but higher participation rates. They had more recorded behavior events, similar suspensions, and higher attendance as well. Most encouragingly, though, are the substantially higher high school completion and postsecondary enrollment rates among the extracurricular participants in these matched pairs.

Question #4: Does the type of extracurricular activity in which students participate matter?

The final question we chose to investigate is whether the type of extracurricular activity in which students participated leads to different conclusions about the benefits of extracurricular participation on academic and engagement outcomes. To narrow the scope of this question, we focused on six key indicators that were present across all students: attendance, behavior events, AP/Honors credits earned with a C or better, cumulative GPA, four-year high school completion, and postsecondary enrollment.

We used the group of extracurricular participants and comparison group created in question 3 to encourage group similarity. To further account for differences between students even among these matched groups, we conducted a series of 48 logistic and linear regressions, using the seven types of extracurricular activities (plus any extracurriculars) as independent variables and the six outcomes as independent variables, controlling for the same middle school variables used in the matching procedure for question 3.

The table below shows the direction and strength of the association between participating in each type of extracurricular activity and these six outcome variables among the matched groups:

Table 7: Regression Outcomes by Extracurricular Type

	Extracurricular Type			
Outcome	Any extracurriculars	Academic/Arts/Club/Program	Athletic	Civic/Service
Attendance	Positive***	Positive***	Positive***	Positive***
Behavior	Negative***	Negative***	Negative***	Negative*
AP/Honors Credits with C or Better	Positive***	Positive***	Positive***	Positive***
Cumulative GPA	Positive***	Positive***	Positive***	Positive***
High School Completion	Positive***	Positive***	Positive***	Positive***
Postsecondary Enrollment	Positive***	Positive***	Positive***	Positive***

Note: *** = p≤.01, ** = p≤.05, * = p≤.10

Across almost all extracurricular types, we see a pattern of strong positive associations between extracurricular participation and our outcome variables.

For several reasons, we must emphasize that the table above should not be interpreted to mean that, for example, arts extracurriculars impact advanced credit attainment and nothing else. Our outcome variables, although consistent and robust, represent only a subset of the myriad benefits of extracurricular participation pointed to in existing research. In addition, we used the seven categories used by our schools, with activities categorized exactly as our schools categorized them. We wanted to analyze the data in a way that conforms to our current practices rather than designing our own classifications, but we acknowledge that schools may not interpret all of these categories the same way.

With these caveats in mind, we believe it is encouraging that every type of extracurricular activity had a positive relationship with at least one academic variable that we know to be an indicator of college, career, and community readiness.

Conclusion

Extracurricular participation in MMSD is associated with many positive student outcomes. Extracurricular participants demonstrated consistently superior outcomes relative to their peers, and those outcomes appeared to improve with additional years of participation. These positive outcomes also remained when we employed more rigorous statistical methods to estimate the impact of extracurricular participation. Based on this research, we can feel confident that extracurricular participation is beneficial in measurable and observable ways, and that MMSD's extracurricular programs are associated with the benefits described in broader research. These benefits also hold across activity type, suggesting that the type of activity in which a student participates matters less than participation in the first place.

Appendix A: Propensity Score Matching Methods

The logic of propensity score matching involves calculating the predicted probability of participation in a program or activity (in this case, competitive MMSD-sponsored extracurricular activities) for a group of students and then creating matched pairs of students with similar probability of participation, one who participated and one who did not. In theory, the two students in each matched pair will be substantially similar apart from extracurricular participation, which would make it reasonable to assume that any differences in their outcomes is attributable to extracurricular participation.

The variables used in the PSM model to predict extracurricular participation should be expected to affect, but not be affected by, extracurricular participation in high school. To that end, we create our matched pairs using variables taken from students' middle school careers.

We use the following middle school outcome variables:

- Middle school extracurricular participation
- Middle school GPA
- Grade 8 attendance
- Grade 8 out-of-school suspensions
    - We chose to use suspensions as opposed to behavior events because of greater consistency across middle schools in how suspensions are recorded. Including both suspensions and behavior events in the match is unnecessary due to expected collinearity between the two variables.

We also use the following demographic variables:

- Gender
- Grade 8 race/ethnicity (indicator variables for African-American, Hispanic, Asian, Multiracial)
- Grade 8 free/reduced lunch
- Grade 8 special education status
- Grade 8 ELL status
- Grade 8 parent with bachelor's degree or higher
- Grade 8 single adult in home

We acknowledge that using the variables above in this model does not account for every possible difference between extracurricular participants and non-participants, and that we cannot definitively say that all differences between our matched groups are due to extracurriculars. However, we believe our set of matching variables is stronger and more robust than that used in most published academic research on extracurricular participation, and that by controlling for a vector of academic and demographic characteristics, as well as prior extracurricular participation, we come closer to isolating the impact of extracurriculars than work that predates ours.

We conducted the match using the psmatch2 program within Stata. We used a nearest neighbor matching algorithm without replacement, which means each extracurricular participant was matched with a single non-participant, and each non-participant could only serve as the match for one participant. To enhance the precision of our match, we imposed a caliper of one-tenth of a standard deviation of the propensity score, which means that many participants and non-participants were dropped because no student from the other group was similar enough to them for us to be confident attributing the differences between their outcomes to extracurricular participation.

The table below illustrates the success of our matching procedure, which resulted in substantially similar matched groups. The only statistically significant difference was in middle school GPA, indicated in bold and with a *. This difference was only significant with p≤.10 and is, in practical terms, very small (2.58 vs. 2.64).

Table 8: Middle School Outcomes and Demographics for Extracurricular Participant and Non-Participant Groups

		Extracurricular Participants (Treatment Group)	Non-Extracurricular Participants (Comparison Group)
	Number of Students	729	729
Middle School Outcomes	Average Middle School GPA	**2.58***	**2.64***
	Middle School Extracurricular Participation	76%	78%
	Average Grade 8 Attendance	91.2%	91.1%
	Average Grade 8 Out-of-School Suspensions	0.52	0.50
Grade 8 Demographics	Female	48%	47%
	African-American	29%	27%
	Hispanic	17%	17%
	Asian	6%	6%
	Multiracial	6%	7%
	Free/Reduced Lunch	60%	58%
	Special Education	36%	33%
	ELL	21%	20%
	Parent with bachelor's degree or higher	27%	30%
	Single parent	46%	45%

It is important to note that this table reflects nothing about student outcomes, and the numbers presented are shown only to demonstrate the baseline similarity of the groups created to answer Question #3.

Appendix B: Extracurricular Types and Offerings

In this Appendix, we provide examples of common activity types falling into each of the extracurricular categories indicated on student schedules.

Academic/Arts/Club/Program: Homework Club, Forensics, Musical, PEOPLE, Student Council, TOPS

Athletic: Track, football, cross country

Civic/Service: Spartan Youth Service, National Honor Society, Interact, Captains' Club

The table below shows the number of extracurricular offerings by school and type for the 2013-14 school year, senior year for the Class of 2014, as an example of the spectrum of distinct offerings available during a typical year.

Table 9: 2013-14 Extracurricular Offerings by School and Type

School	Activity Type	2013-14 Extracurriculars
East High	Academic/Arts/Club/Program	65
East High	Athletics	59
East High	Civic/Service	4
La Follette High	Academic/Arts/Club/Program	47
La Follette High	Athletics	65
Memorial High	Academic/Arts/Club/Program	65
Memorial High	Athletics	71
Memorial High	Civic/Service	15
West High	Academic/Arts/Club/Program	35
West High	Athletics	61