



NJSO CHAMPS

A Retrospective

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Executive Summary

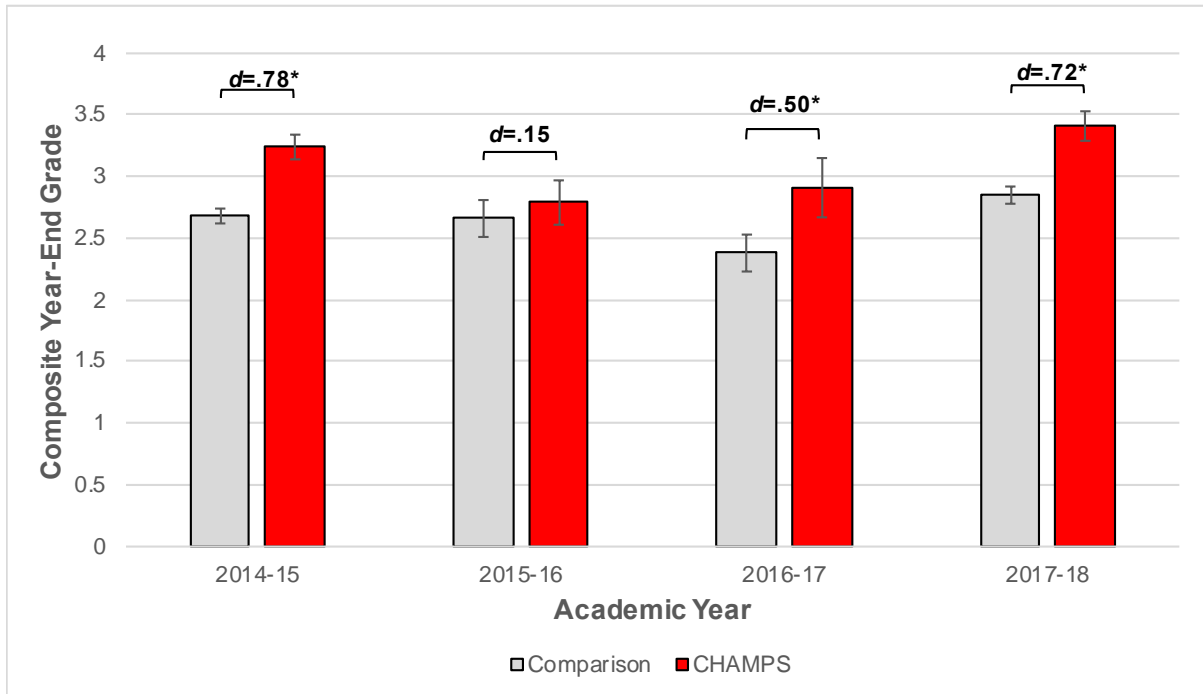
Since its inception at University Heights Charter School in the 2012-13 academic year, WolfBrown has worked with the New Jersey Symphony Orchestra (NJSO) to evaluate its Character, Achievement, and Music Project (CHAMPS). Since the 2013-14 academic year we have conducted an annual evaluation of CHAMPS, each of which has been focused on three guiding questions:

- Do students enrolled in CHAMPS exhibit higher levels of academic achievement?
- Do students enrolled in CHAMPS exhibit higher levels of character?
- Do students enrolled in CHAMPS exhibit musical growth?

The answer to each of these questions is “yes.” As we discuss in detail below, across multiple academic years students enrolled in CHAMPS earned higher grades than their peers who were not enrolled in the program. Students in CHAMPS exhibited higher levels of character than their peers, and in a number of instances displayed higher levels of growth in their character over the course of the school year. Finally, students in CHAMPS experienced growth as young musicians, and in a number of years the magnitude of this growth was substantial. In the remainder of this summary we delve deeper into the evidence of the impact of CHAMPS on the students it served.

As can be seen in Figure S1, students in CHAMPS earned higher composite year-end grades in every year except 2013-14. In the 2014-15, 2016-17, and 2017-18 academic years the difference between CHAMPS students and their peers was statistically and practically significant.

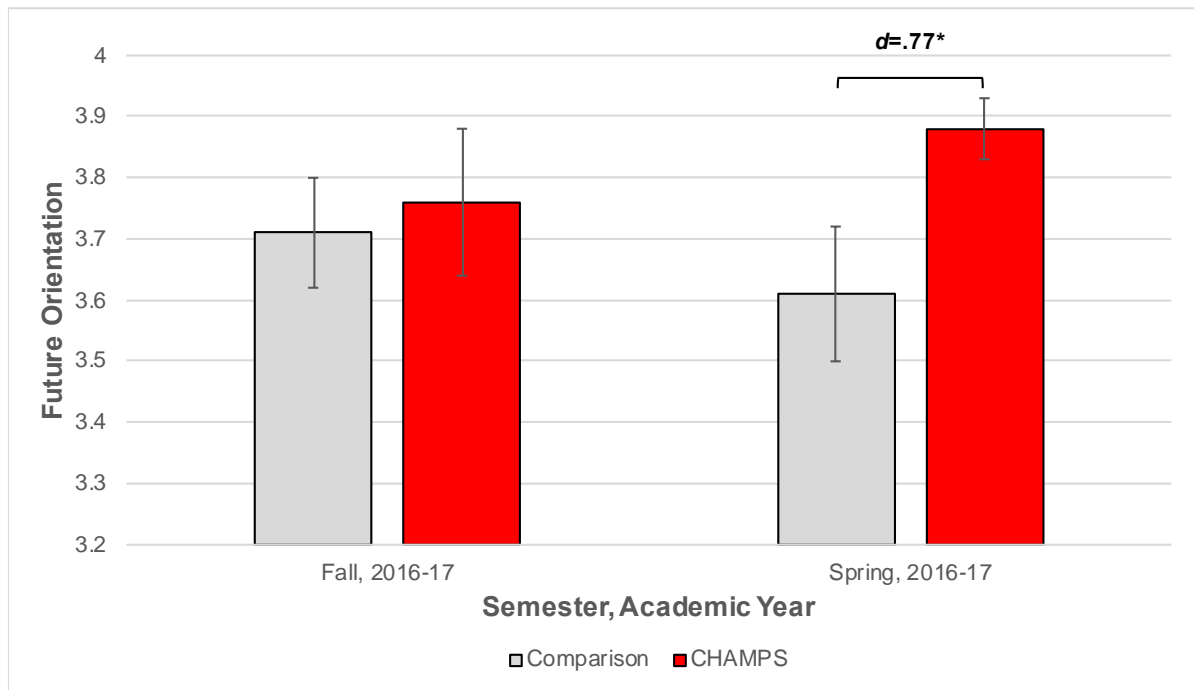
Figure S1¹



Among the domains of character collected in each year of the study, students enrolled in CHAMPS exhibited larger increases in intrapersonal skills and future orientation than their unenrolled peers in multiple academic years. This pattern of results was observed in 2013-14 (though it was statistically significant only for girls), in 2016-17 for future orientation (see Figure S2), and for intrapersonal skills in 2017-18. As can be seen in Figure S2, in the fall of 2016-17 students in CHAMPS reported levels of future orientation that were similar to those exhibited by their unenrolled peers. However, by the spring students in CHAMPS reported future orientation scores that were significantly higher than those reported by their peers. The magnitude of the difference in spring scores was three times the threshold for an effect to be practically significant.

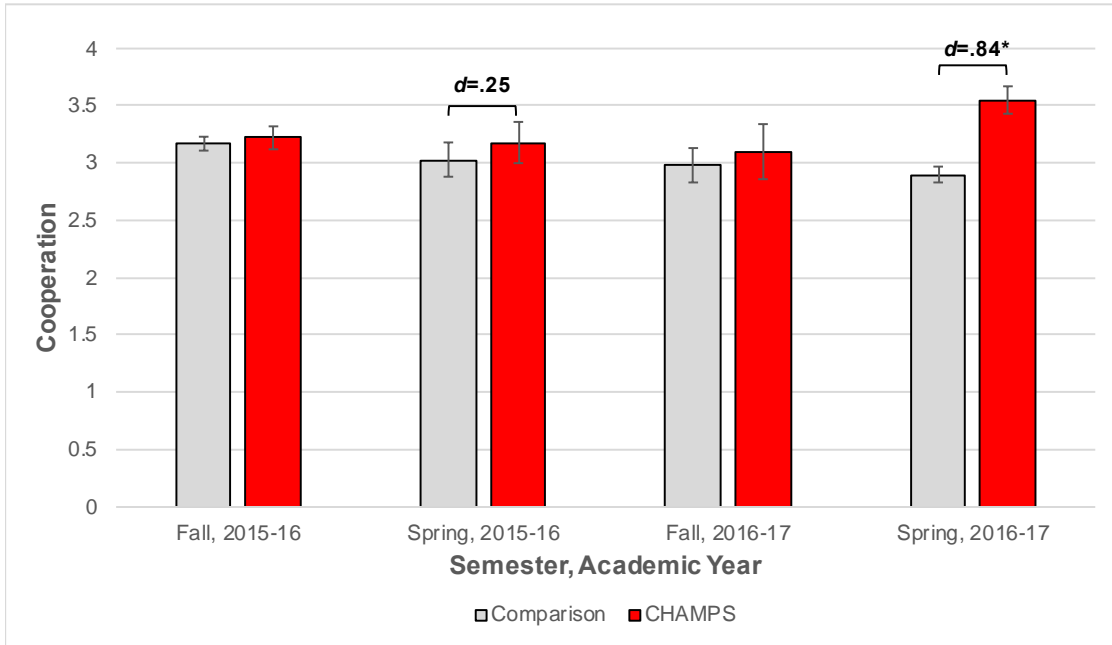
¹ Here and throughout error bars (or whiskers) accompanying each column correspond to two times the standard error of the mean (another measure of dispersion about the mean). The *d* statistic refers to the effect size, and statistically significant differences are indicated by an asterisk.

Figure S2



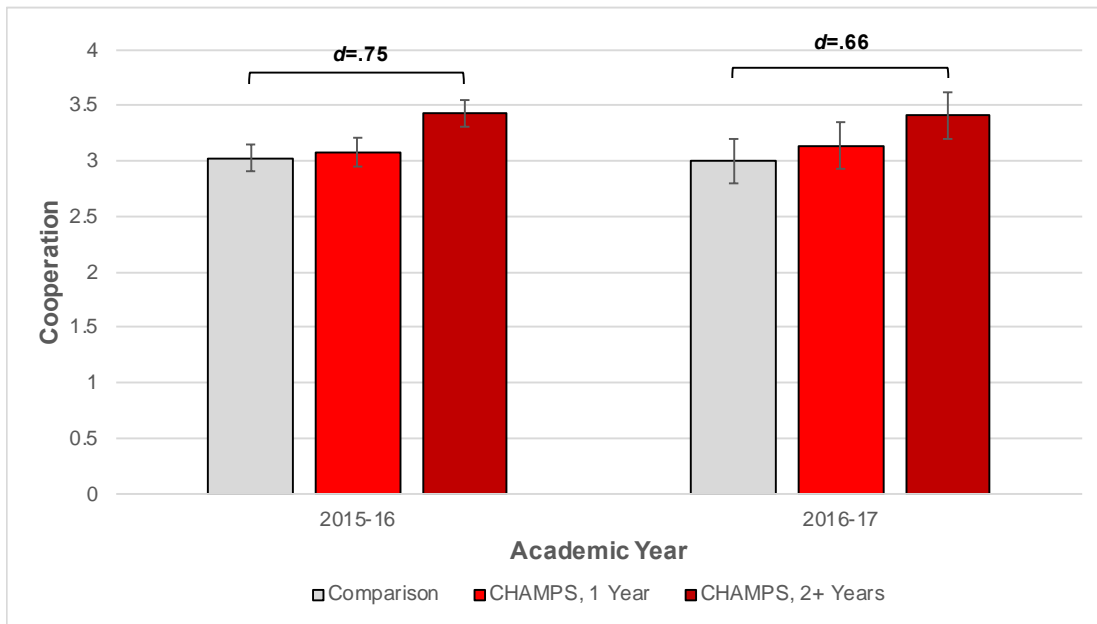
A similar pattern of results was observed for cooperation in the 2015-16 and 2016-17 academic years. As can be seen in Figure S3, in the fall of 2015-16 and 2016-17, students in CHAMPS and their peers reported similar levels of cooperation. However, by the spring of those years students in CHAMPS reported higher levels of cooperation.

Figure S3



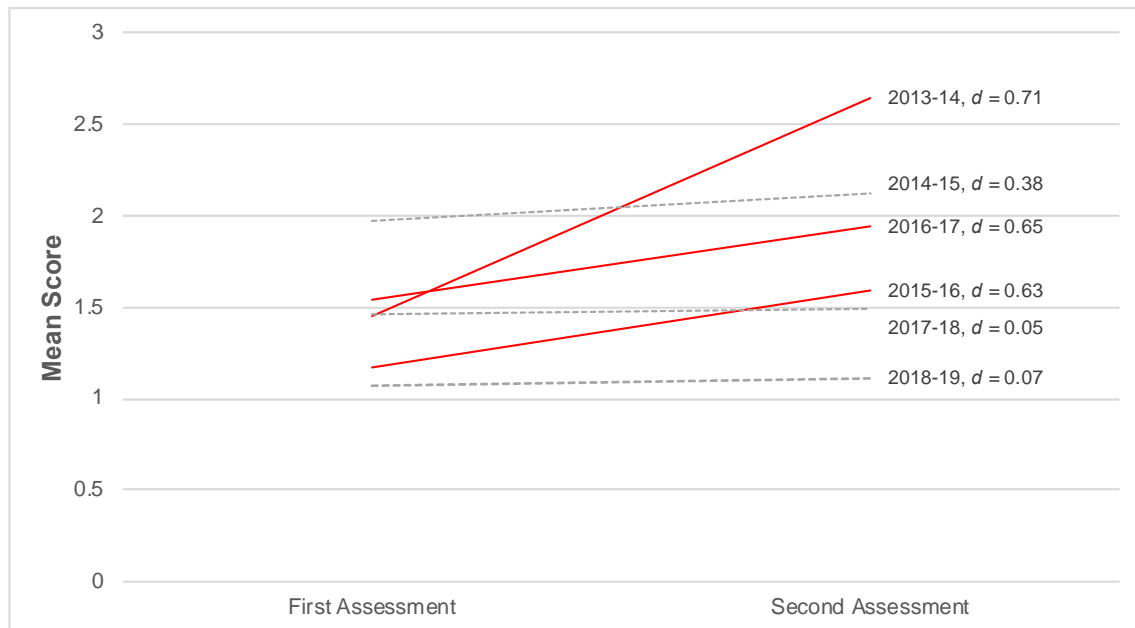
For multiple aspects of character, students enrolled in CHAMPS for longer periods of time exhibited substantially higher scores on measures of character than students enrolled for shorter periods of time. This pattern of results was most pronounced for cooperation (see Figure S4).

Figure S4



Since its inception, the musical growth of students enrolled in CHAMPS has been assessed through juries, which have typically occurred in December or January and then again in April or May. As can be seen in Figure S5, the increase in jury scores was statistically significant in three years (as indicated by the solid red lines) and the magnitude of the increase corresponded to an effect of practical importance (such that $d > 0.25$) in every year except 2017-18 and 2018-19.

Figure S5



In sum, students in CHAMPS exhibited higher levels of academic achievement in four of the six years of the evaluation, and displayed greater degrees of positive change in select aspects of character over the course of the academic year. However, as we explain in greater detail below, we cannot conclude that CHAMPS *caused* students to exhibit higher levels of achievement or accelerated character development. It is possible that students who would have exhibited these outcomes absent CHAMPS chose to enroll in the program (or were chosen to enroll in the program by their families). In contrast, we can conclude that CHAMPS caused students' musical growth, because the counterfactual – that without being enrolled in CHAMPS students would have exhibited this growth – is so implausible.

The robust effects we observed for CHAMPS on students' musical growth, as well as our capacity to claim that CHAMPS caused these effects, strongly suggests musical growth as a key goal for the Orchestra's expanded Saturday program. But equally important is understanding the factors that might contribute to that growth. Chief among these is students' persistence or longevity in the program. That the Orchestra is creating an opportunity for students from under-served and under-represented backgrounds to engage in sustained musical study is laudable, but in order for students to benefit from this opportunity, they must choose to come to the program. Therefore, every effort must be made to encourage them to do so.

The insights and understanding gained from these efforts would have implications for the development of the program, but also for the broader field. If the expanded Saturday program can be shown to retain students from under-served and under-represented backgrounds in the study of classical music, it would have wide-ranging implications from the diversity of the orchestral workforce to the creation of audiences that can sustain orchestras through the 21st century. And if the Orchestra can learn which program elements are more effective in retaining students, and which elements foster students' musical and socioemotional development, this understanding would have implications for programs working with students from under-served and under-represented communities throughout the country.

Introduction

Since its inception at University Heights Charter School in the 2012-13 academic year, WolfBrown has worked with the New Jersey Symphony Orchestra (NJSO) to evaluate its Character, Achievement, and Music Project (CHAMPS). Since the 2013-14 academic year we have conducted an annual evaluation of CHAMPS, each of which has been focused on three guiding questions:

- Do students enrolled in CHAMPS exhibit higher levels of academic achievement?
- Do students enrolled in CHAMPS exhibit higher levels of character?
- Do students enrolled in CHAMPS exhibit musical growth?

Over the six evaluations we conducted, many things about CHAMPS have changed, including program leadership and staff and the school that hosted the program. However, the ways in which we have sought to address the guiding questions outlined above have been fairly consistent. Therefore, it is possible to look across years of our evaluation and reflect on the extent to which CHAMPS achieved the goals encompassed by these questions.

As we note below, this is a particularly opportune time to engage in this reflection. The Orchestra is preparing to revise the structure of its youth ensembles in order to expand access to high-quality, intensive musical instruction to students who otherwise would not receive it – students who were in CHAMPS, and new students drawn from the same communities. This raises a set of questions to consider, including the extent to which the goals of this expanded Saturday program overlap with those of CHAMPS, which areas of students' development appear most open to positive change through program participation, and the degree to which program leadership feel the need to be able to claim that the program *caused* those changes.

In the remainder of this report we review the results from the evaluations of CHAMPS that were conducted each year. Rather than organize the review by year, we have organized it according to guiding question, and have sought to extract cross-year themes, rather than reiterating the details of each report. We then discuss the implications of these results for the Orchestra's expanded Saturday program.

Do Students Exhibit Higher Levels of Academic Achievement?

To address this question we obtained students' grades in each year of our evaluation. In every year CHAMPS' host school provided grades for students who were in CHAMPS and for their peers who were in the same grades and classrooms, and in each year these grades were on a four-point scale ranging from A to F. In two years (2014-15 and 2017-18) the host school provided academic data for all students, including all those who were *not* in CHAMPS. As such, our comparison groups were quite large in those years. Table 1² presents composite³ year-end grades for students in CHAMPS and their comparison-group peers.

Table 1

Academic Year	Comparison			CHAMPS		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
2013-14	35	3.01	0.71	23	3.02	0.73
2014-15	208	2.68	0.82	37	3.24	0.61
2015-16	28	2.66	0.82	24	2.79	0.86
2016-17	46	2.38	1.01	22	2.91	1.12
2017-18	134	2.85	0.86	33	3.41	0.68

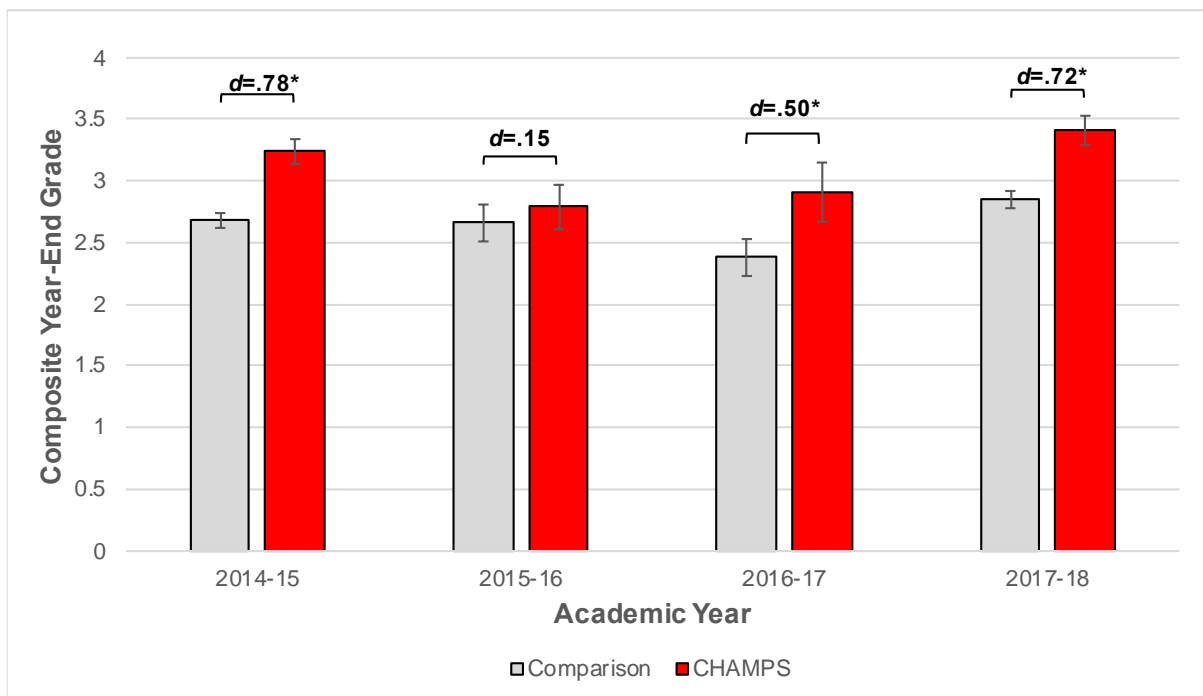
As is evident in the table, students in CHAMPS earned higher composite year-end grades in every year except 2013-14. Moreover, in three of the years in which CHAMPS students earned higher grades (all but 2015-16) the difference between CHAMPS students and their peers was statistically and practically significant.⁴ These findings are summarized in Figure 1.

² Here and throughout, *N* = number of individuals, *M* = mean or arithmetic average, and *SD* = standard deviation, a measure of dispersion about the mean.

³ Composite grades were calculated using data provided for all academic subjects. In 2013-14, 2015-16, and 2016-17 composite grades were therefore calculated using grades for math and English Language Arts (ELA). In 2014-15 and 2017-18 composite grades were calculated using grades for math, ELA, science, and social studies.

⁴ A difference is said to be statistically significant when the likelihood of it being due to chance is below an acceptable threshold (by the convention followed here, 5%, or $p < .05$). A difference is said to be practically significant its size exceeds a quarter of a standard deviation (or $d > .25$).

Figure 1⁵



As impressive as these results are in their magnitude and consistency, it is important to note that we cannot conclude that CHAMPS *caused* students to earn higher grades. It is possible that students who selected to participate in CHAMPS (or whose parents selected for them to participate) would have earned higher grades even if they had not been in the program. This possibility recommends alternative examinations of the academic data to allow firmer conclusions as to the potential effects of CHAMPS.

One alternative way of examining the data is to look at differences in how students' grades change over the course of the academic year. When examined in this way, there was no clear association between CHAMPS enrollment and change in composite grades, an indicator of academic achievement (see Table A1). There was, however, a consistent association between enrollment in CHAMPS and higher rates of positive change in English Language Arts (ELA) grades in the 2013-14, 2014-15, 2015-16, and 2016-17 academic years (see Table 2).

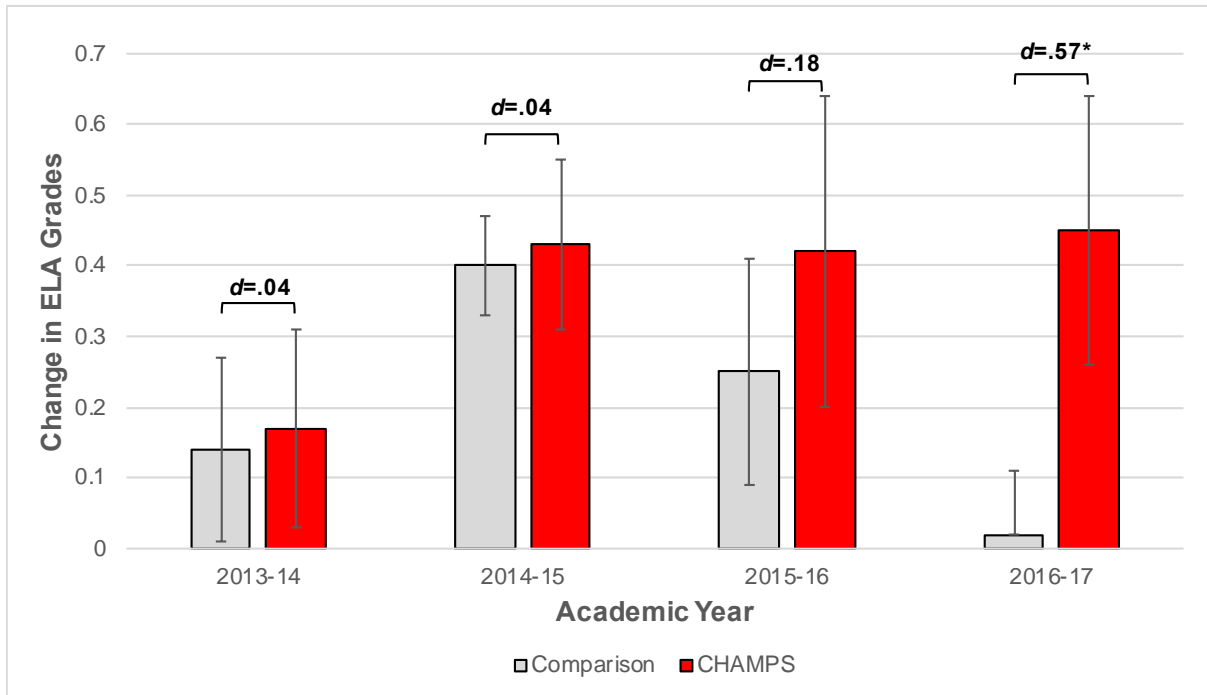
⁵ Here and throughout error bars (or whiskers) accompanying each column correspond to two times the standard error of the mean (another measure of dispersion about the mean). The *d* statistic refers to the effect size, and statistically significant differences are indicated by an asterisk.

Table 2

Academic Year	Comparison			CHAMPS		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
2013-14	23	0.14	0.77	35	0.17	0.65
2014-15	205	0.40	0.94	37	0.43	0.73
2015-16	28	0.25	0.84	24	0.42	1.06
2016-17	46	0.02	0.63	22	0.45	0.88
2017-18	134	-0.12	0.60	36	-0.11	0.46

While the size of this association was negligible in 2013-14 and 2014-15, in the 2015-16 academic year it approached statistical and practical significance; in 2016-17 achieved it (see Figure 2).

Figure 2



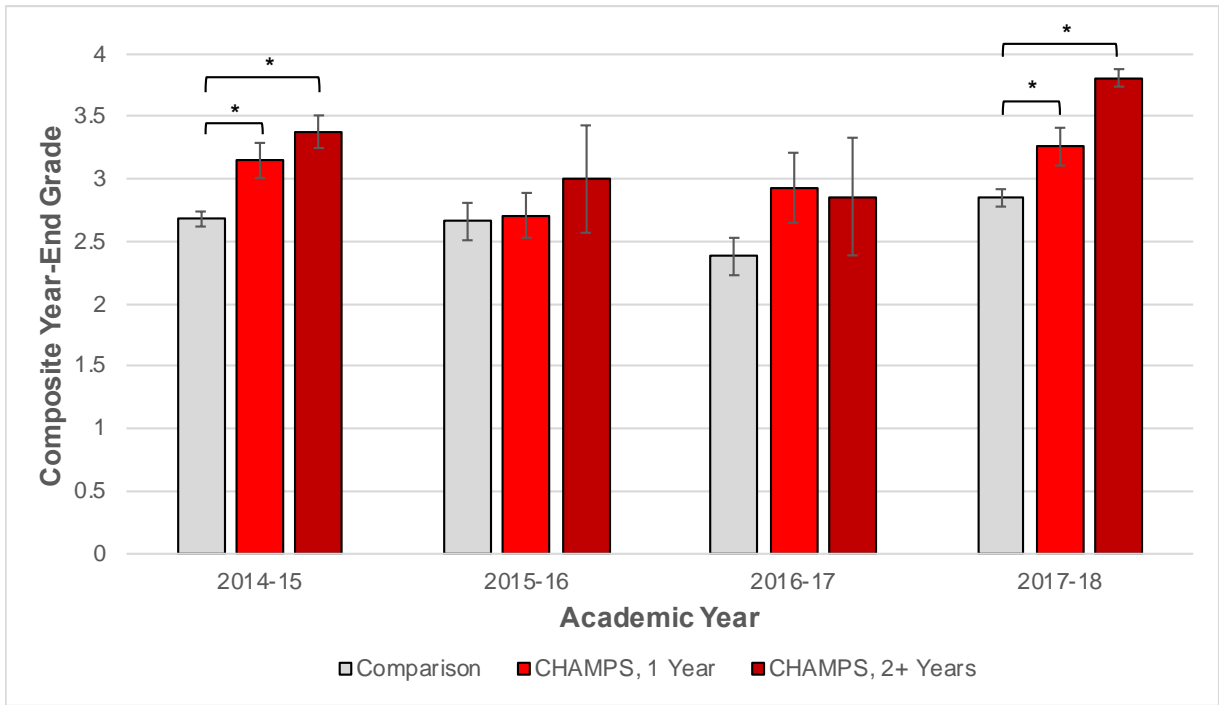
A second alternative way to examine the academic data is to check for dosage effects – whether students who are enrolled in CHAMPS for longer periods of time exhibit higher grades than their peers. These analyses were only possible beginning in the 2014-15 academic year, given that this was the first year in which students could have been in CHAMPS for multiple years. Table 3 displays composite grades for students who were not in CHAMPS and for students who were in the program for one year or two or more years.

Table 3

Academic Year	Comparison			CHAMPS					
				One Year			Two or More Years		
	N	M	SD	N	M	SD	N	M	SD
2014-15	208	2.68	0.82	22	3.15	0.67	15	3.38	0.52
2015-16	28	2.66	0.82	17	2.71	0.75	7	3.00	1.12
2016-17	46	2.38	1.01	15	2.93	1.10	7	2.86	1.25
2017-18	134	2.85	0.86	24	3.26	0.85	9	3.81	0.21

As can be seen in Figure 3, year-end composite grades were higher for students enrolled in CHAMPS for one year than among students who were not enrolled. However, with the exception of 2016-17, year-end grades were higher still among students enrolled in CHAMPS for two or more years. Although these differences were not always statistically significant, this may be due, in part, to the larger standard errors associated with the small number of students enrolled in CHAMPS for two or more years in any single academic year.

Figure 3

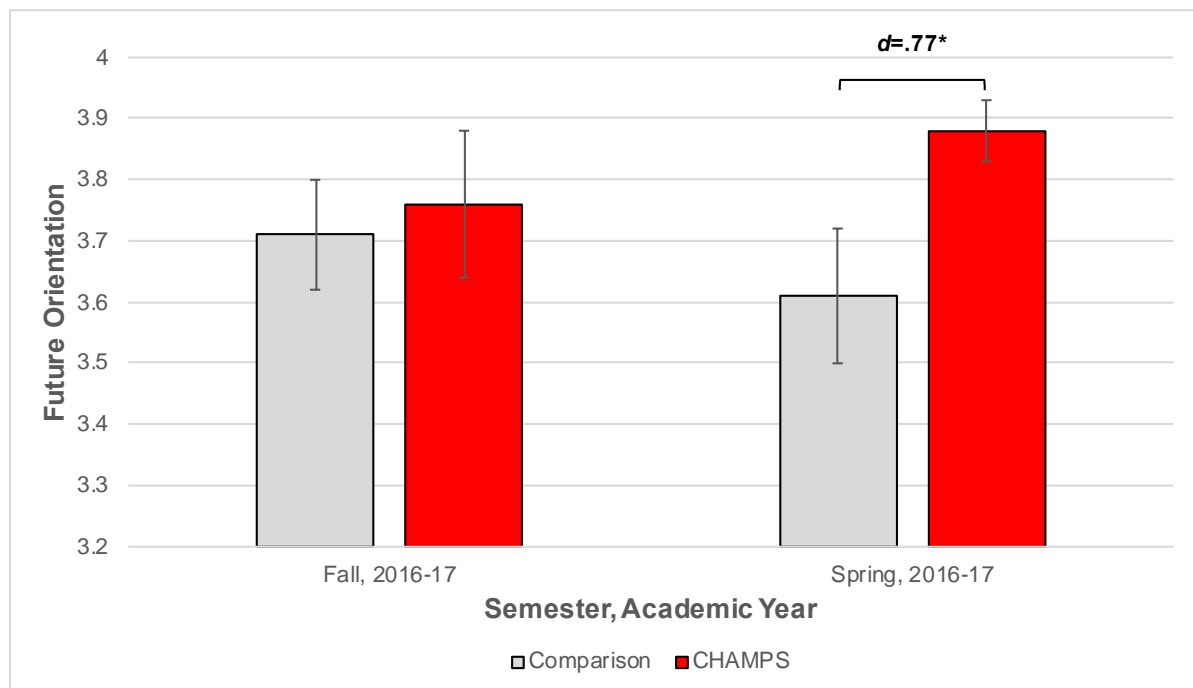


Do Students Exhibit Higher Levels of Character?

Like academic achievement, students' character was assessed in each academic year between 2013-14 and 2017-18. However, the ways in which character was assessed was more variable than was the case for academic achievement for two reasons. First, in the 2015-16 and 2016-17 academic years CHAMPS participated in the National Study of *Sistema*-inspired Programs funded by the Buck Family and Andrew W. Mellon Foundations. As a result, students completed measures of socioemotional development (or character) that were included as part of that study, in addition to the measures that they completed as part of our evaluation. Second, the capacity and willingness of the schools that hosted CHAMPS to facilitate survey administration varied from year to year. For example, measures of socioemotional development were not available for students in 2014-15.

Nevertheless, the data that were available tell a story that is fairly consistent with the data that were collected regarding students' academic achievement. For example, among the domains of character collected in each year of the study⁶, students enrolled in CHAMPS exhibited larger increases in intrapersonal skills and future orientation than their unenrolled peers in multiple academic years. This pattern of results was observed in 2013-14 (though it was statistically significant only for girls), in 2016-17 for future orientation (see Figure 4), and for intrapersonal skills in 2017-18.

Figure 4

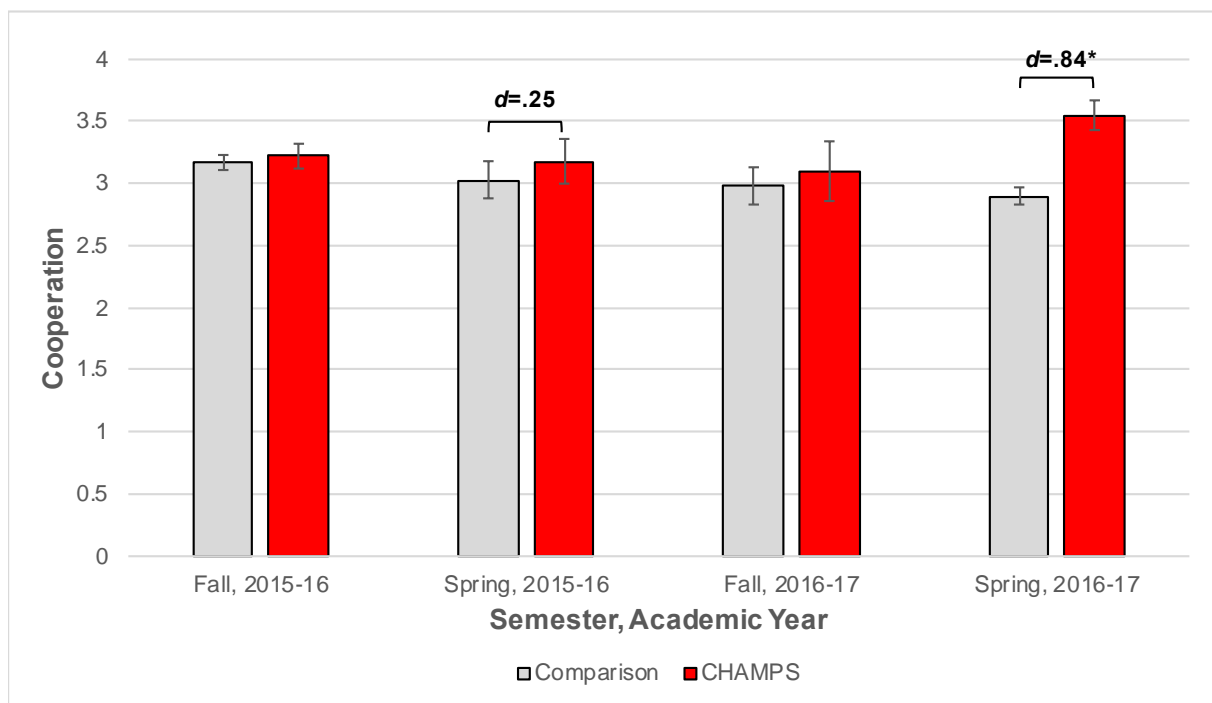


⁶ These were intrapersonal skills (as indexed by students' responses on the Behavioral and Emotional Rating Scale; BERS-2), future orientation (Longscan, 1998), and prosocial behavior (Goodman, 2006).

As can be seen in Figure 4, in the fall of 2016-17 students in CHAMPS reported levels of future orientation that were similar to those exhibited by their unenrolled peers. However, by the spring students in CHAMPS reported future orientation scores that were significantly higher than those reported by their peers. The magnitude of the difference in spring scores was three times the threshold for an effect to be practically significant.

In the two years that CHAMPS participated in the National Study, these patterns of differential growth were observed for multiple domains of character that were assessed⁷. In 2015-16 (the first year of CHAMPS' participation), this pattern was observed for cooperation, academic self-concept, and perseverance. In 2016-17 it was observed for cooperation, school engagement, and self-efficacy. Figure 5 displays these differential rates of growth in cooperation for the 2015-16 and 2016-17 academic years.

Figure 5

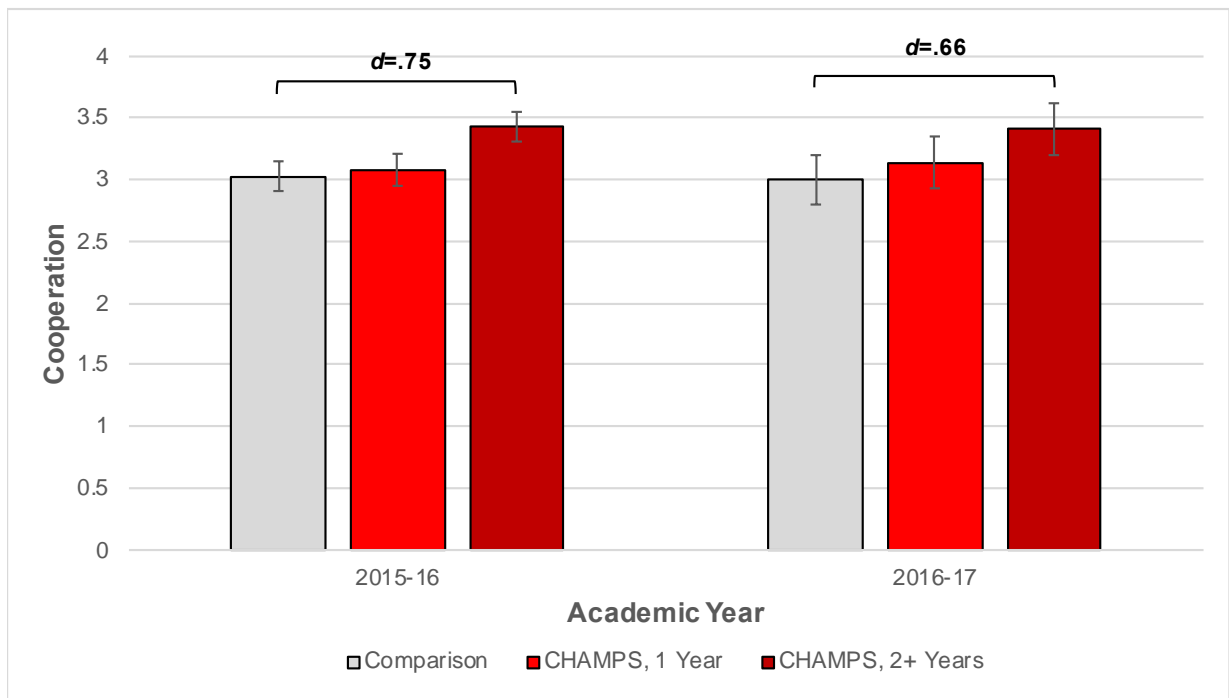


In the fall of 2015-16 and 2016-17, students in CHAMPS and their peers reported similar levels of cooperation. However, by the spring of those years students in CHAMPS reported higher levels of cooperation. In the spring of 2015-16, the magnitude of the difference between CHAMPS students and their peers reached the threshold of practical significance, but was not statistically significant. In the spring of 2016-17, however, students in CHAMPS reported significantly higher levels of cooperation than their peers.

⁷ These were cooperation and empathy, as indexed by the students' responses on the Social Skills Improvement System (SSIS; Gresham & Elliott, 2008), peer relations (Marsh, 1990), academic self-concept (Marsh, 1992), growth mindset (Blackwell et al., 2007), school engagement (Voelkl, 1996), academic self-efficacy (Farrington, 2012), and perseverance (Duckworth et al., 2007).

Like academic achievement, there were also dosage effects for multiple aspects of character, such that students enrolled in CHAMPS for longer periods of time exhibited substantially higher scores on measures of character than students enrolled for shorter periods of time. Among the measures of character included in the National Study, this pattern of results was most pronounced for cooperation (see Figure 6).

Figure 6



Although the differences between students enrolled in CHAMPS for two or more years and their unenrolled peers are not statistically significant, this is due, in part, to the limitations imposed by the small number of students enrolled in CHAMPS for two or more years on our ability to detect significant results. Nevertheless, the size of the difference, expressed in terms of effect size, well exceeds the threshold of practical significance.

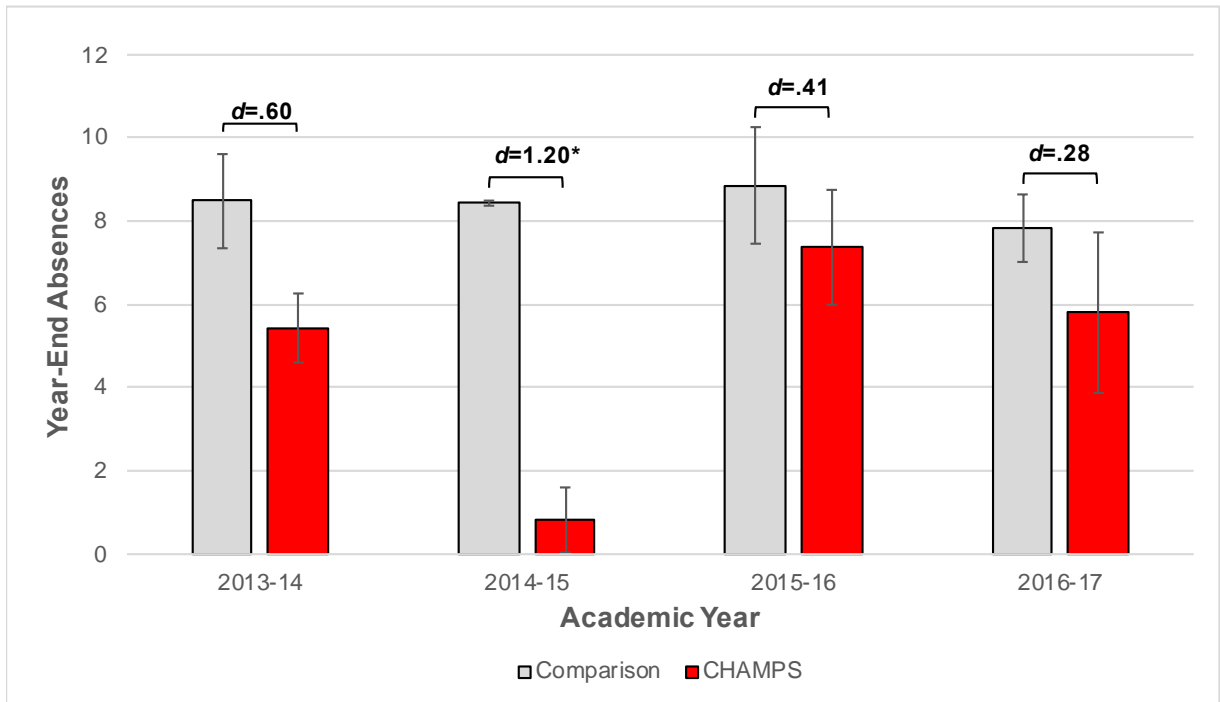
One proxy measure of character that was available for each year of the study with the exception of 2017-18 was students' attendance in school. As can be seen in Table 4, in each year for which these data were available, students enrolled in CHAMPS missed fewer days in school than their unenrolled peers.

Table 4

Academic Year	Comparison			CHAMPS		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
2013-14	23	8.48	5.43	35	5.37	4.89
2014-15	208	8.43	0.82	37	5.08	4.77
2015-16	28	8.86	7.37	24	5.96	6.77
2016-17	46	7.83	9.05	22	5.47	9.05

Only in 2014-15 was the association between CHAMPS enrollment and a reduced number of absences statistically significant. Nevertheless, as can be seen in Figure 7 in each year the magnitude of the difference between CHAMPS students and their peers was practically significant, as judged by the effect size.

Figure 7



Do Students Exhibit Musical Growth?

Since its inception, the musical growth of students enrolled in CHAMPS has been assessed through juries, though the procedures for doing so have varied somewhat from year to year. In the 2014-15 and 2015-16 academic years students were rated by three jurors along 16 dimensions of performance, from bow placement to musicality. Since 2015-16 students have been rated by two jurors while they play two selections, which in 2015-16 and 2016-17 consisted of a pair of excerpts and in 2017-18 and 2018-19 comprised a scale and a piece. Generally, the first jury assessment occurred between December and January, while the second assessment occurred in late April or early May. The notable exception was 2018-19, when the first assessment did not occur until March 2019.

Table 5 presents scores for all students who completed both assessments in a given year. The mean scores for both assessments are the averages calculated across jurors and excerpts. Because scores for 2013-14 were assigned on a scale from 1 to 64 and scores for 2014-15 on a scale from 1 to 100 and scores thereafter on a scale from 1 to 4 earlier scores were adjusted so that all scores were on a common, four-point scale.

Table 5

Academic Year	<i>N</i>	First Assessment		Second Assessment	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
2013-14	30	1.45	1.68	2.64	1.80
2014-15	30	1.97	0.39	2.12	0.31
2015-16	21	1.17	0.67	1.59	0.62
2016-17 ^a	14	1.54	0.62	1.94	0.67
2017-18	30	1.46	0.63	1.49	0.40
2018-19 ^b	20	1.07	0.56	1.11	0.63

^a Cross-rater reliability for excerpt 2 was too low for cross-excerpt scores to be used. Therefore only scores for excerpt 1 are reported.

^b Cross-rater reliability for excerpt 1 was too low for cross-excerpt scores to be used. Therefore only scores for excerpt 2 are reported.

As can be seen in Figure 8, the increase in jury scores was statistically significant in three years (as indicated by the solid red lines) and the magnitude of the increase corresponded to an effect of practical importance (such that $d > 0.25$) in every year except 2017-18 and 2018-19.

Figure 8



Discussion

Returning to the first guiding question for the annual evaluations of CHAMPS – do students in CHAMPS exhibit higher levels of academic achievement? – we may now answer that question with a firm “yes.” With the exception of the 2013-14 academic year, students in CHAMPS exhibited higher levels of academic achievement than their peers. Moreover, in three years the difference in achievement between CHAMPS students and their peers was statistically and practically significant: that is, the difference was unlikely to be due to chance and was substantial in size.

However, as we observed in our previous reports, we cannot claim that CHAMPS *caused* students to exhibit higher levels of achievement. It is possible that students who would have exhibited higher levels of academic achievement absent CHAMPS chose to enroll in the program (or were chosen to enroll in the program by their families). It is also possible that the decision to enroll in CHAMPS is a proxy indicator of any number of factors that are associated with higher levels of academic achievement, including increased familial involvement in their child’s education or more stable household circumstances that would allow a family to commit to a program like CHAMPS.

To some extent, these possibilities are rendered less likely by the fact that we observed differential rates of *growth* in academic achievement between CHAMPS students and their peers, and that we also observed dosage effects. Students enrolled in CHAMPS exhibited a greater degree of improvement in their academic achievement from the beginning to the end of the academic year in four of the five years for which academic data were available. In two years this difference approached or exceeded the threshold of practical significance, and in one year it reached statistical significance. In three of these five years students enrolled in CHAMPS for two or more years exhibited higher levels of academic achievement than students who were enrolled for one year. This may suggest that as a student receives a higher “dosage” of CHAMPS, the benefits of the program to their academic achievement accrue.

We observed similar differential growth and dosage effects for certain aspects of students’ character, and for two areas in particular: future orientation and cooperation. In the 2016-17 academic year students in CHAMPS ended the year with significantly- and practically-higher levels of future orientation than their peers, despite the fact that they began the year with comparable levels of future orientation. Parallel results were observed for cooperation in the 2015-16 and 2016-17 academic years. In those same years a dosage effect was observed for cooperation as well.

So can we conclude, based on these differential rates of growth and dosage effects, that CHAMPS causes higher levels of academic achievement and character? Unfortunately, no. It may be the case that students who enroll in CHAMPS are more diligent than their peers, and that this explains the differential rates of growth we observe for academic achievement. Similarly, students who stay in CHAMPS for longer periods of time may be more persistent than their peers. This persistence might explain why students who are enrolled in CHAMPS for two or more years exhibit higher levels of academic achievement than their peers.

Indeed, the only area for which we can conclude that CHAMPS caused a change in students is in their musical growth, because the counterfactual – that without being enrolled in CHAMPS students would have exhibited this growth – is so implausible. Fortunately, this is the area of students’ development in which our results are most compelling. In all but two academic years, students exhibited growth in their playing abilities that was practically significant, and in all but three years the degree of growth was statistically significant. This is made all the more impressive by the fact that these assessments were not truly a year apart, but rather occurred first in December or January and then again in April or May. Therefore the growth we observed was typically occurring over the span of five or six months. The notable exception was 2018-19, in which assessments were ten weeks apart. Any concern about the fact that negligible growth was observed in this year must be tempered by the very modest period of time that elapsed between the two assessments.

Implications for Program Design & Development

The robust effects we observed for CHAMPS on students' musical growth, as well as our capacity to claim that CHAMPS caused these effects, strongly suggests musical growth as a key goal for the Orchestra's expanded Saturday program, and as a focus for our evaluation of it. But equally important is understanding the factors that might contribute to that growth. Chief among these is students' persistence or longevity in the program. That the Orchestra is creating an opportunity for students from under-served and under-represented backgrounds to engage in sustained musical study is laudable, but in order for students to benefit from this opportunity, they must choose to come to the program. Therefore, every effort must be made to encourage them to do so.

Some of the factors that would lead students to make this choice may be fixed. For example, we may find that girls are more likely to persist in their studies than boys. Other factors may be malleable. Uncovering the combination of fixed and malleable factors that predict persistence in musical study is possible using the proper analytic techniques (i.e., event history analysis), and knowing these factors would have direct impact on program design. Knowing that being a male (a fixed factor) is associated with lower levels of persistence might prompt the program to reflect on what it could do to maximize the retention of boys in the program. Knowing that a malleable factor such as growth mindset predicted persistence might lead the program to examine how it could foster these mindsets and thereby enhance students' commitment to the program.

These possibilities underscore the need for the Orchestra to approach the development and refinement of its expanded Saturday program from the perspective of design thinking. Many outcomes are possible for this program, just as many outcomes were possible for the original version of CHAMPS. With that version, the Orchestra cast the net wide, specifying academic, character/socioemotional, and musical outcomes for the program. Where character was concerned, we learned that the program may have a particular capacity to foster intrapersonal skills, future orientation, and cooperation among participating students. This returns us to the questions we outlined at the beginning of the report, which include whether these aspects of character should be explicit goals of instruction in the expanded Saturday program, and, if so, what elements of teacher-student interaction and student experience in the program might drive growth among these outcomes. In this way the program can serve as a laboratory for developing best practices to fostering desired outcomes among under-served and under-represented students.

The insights and understanding gained from these efforts would have implications for the development of the program, but also for the broader field. If the expanded Saturday program can be shown to retain students from under-served and under-represented backgrounds in the study of classical music, it would have wide-ranging implications from the diversity of the orchestral workforce to the creation of audiences that can sustain orchestras through the 21st century. And if the Orchestra can learn which program elements are more effective in retaining students, and which elements foster students' musical and socioemotional development, this understanding would have implications for programs working with under-served and under-represented populations of students throughout the country.

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Appendix

Table A1. Change in Composite Grades

Academic Year	Comparison			CHAMPS		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
2013-14	35	0.19	0.60	23	0.19	0.60
2014-15	208	0.15	0.67	37	0.33	0.55
2015-16	28	0.32	0.63	24	0.27	0.91
2016-17	46	0.09	0.86	22	-0.02	0.81
2017-18	134	-0.23	0.36	33	-0.06	0.39