

## **Effectiveness and Outcomes of Missouri's A+ Scholarship, 2008-2013**

### **July 10, 2015**

#### Introduction

Missouri's A+ Scholarship, which was established in the Outstanding Schools Act of 1993, initially combined a school improvement component with a scholarship for participating students. Participating high schools were required to eliminate any "general" track to a high school diploma, to establish "knowledge, skills and competencies, in measurable terms, that students must demonstrate to successfully complete any individual course offered by the school", and to develop advisory partnerships "developed in cooperation and with the advice of local business persons, labor leaders, parents, and representatives of college and postsecondary vocational and technical school representatives". Schools that completed these and several other steps specified in the legislation would receive additional funding.

Students who graduated from an A+ designated school and met several requirements, including maintaining a 2.5 grade point average, maintaining 95 percent attendance, abstaining from unlawful use of drugs and alcohol, and accruing a minimum of 50 volunteer tutoring/mentoring hours, would be eligible to receive a scholarship for full tuition and fees to any public two-year or vocational school in Missouri. Initially, the program also included an allowance of up to 50 percent of the cost of books. More information on current program requirements is available at <http://dhe.mo.gov/ppc/grants/aplusscholarship.php>.

Since its inception, the program has grown steadily. While in the beginning, significant costs to schools, including curricular changes and a requirement in the legislation for dedicated (and at least half-time) program staff limited the program's growth, in recent years, program changes have ensured that graduates of effectively all of the state's public high schools are eligible to participate. In FY 2014, disbursements totaled over \$32.1 million to 13,006 participating students from approximately 450 different high schools.

While the program was initially administered by the Department of Elementary and Secondary Education (DESE), it was eventually transferred to the Department of Higher Education (DHE). DHE administered the A+ program cooperatively with DESE beginning in FY 2011, and fully in FY 2012. DHE was not assigned the school improvement components of the program; although it has been argued that DESE's Missouri School Improvement Program (MSIP) now imposes equal or more stringent requirements for review and accreditation on participating schools. Beginning with the high school graduating class of 2015, students must also have achieved a score of proficient or advanced on the Algebra I or higher-level state end-of-course exam, or have achieved a qualifying ACT Math or COMPASS score. Beginning in October of 2015, A+ recipients are also required to be U.S. citizens or permanent residents. Finally, because A+ awards are reduced by the amount of federal non-loan aid, students must with limited exceptions complete the Free Application for Federal Student Aid (FAFSA) in order to be eligible.

Meanwhile, the growth of the A+ program has strained its finances. For Spring 2015, participating postsecondary institutions were advised that financial projections required that reimbursement for students might be reduced, for the first time, by one credit hour or its 37.5 clock hour equivalent. This reduction was ultimately determined to be unnecessary, but fiscal pressures are certainly expected to continue to mount as participation grows among schools and students.

Particularly over the past 18-24 months, there has been increased interest from legislators in studying the effectiveness and outcomes of the state's major student aid programs. DHE staff has worked in recent months with the General Assembly's Joint Committee on Education to develop studies which will update our collective understanding of the programs' impacts. While this study was not a direct result of the A+ program's recent financial constraints, they certainly spotlight the growing need to better understand its utility in order to target resources efficiently.

## Methods

Enhanced Missouri Student Achievement Study (EMSAS) fall enrollment data collected from public Missouri two-year colleges and universities from 2008 to 2013 were filtered for first-time full-time degree-seeking undergraduates (A+ students must be full-time and degree-seeking) whom had graduated from high school the spring prior to their college enrollment. We chose to study only same-year high school graduates to eliminate any confounding effects on performance by students who did not immediately re-enroll in college coursework. EMSAS fall enrollment data provided information on student demographics and enrollment in remedial coursework during the student's first fall term.

Fall enrollment data were then joined to A+ disbursement records and to a DESE-maintained table of ACT school codes for public high schools. Students were maintained in the study only if they had received an A+ disbursement their first semester in college *or* were non-recipient same-year Missouri public high school graduates; these students would provide a comparison group. Records were then joined to ACT data to include the student's highest ACT score and accompanying self-reported high school GPA at time of test, and to the FAFSA record maintained by DHE for the student's first year enrolled in college, which provided dependency status, Pell eligibility, and the student's expected family contribution (EFC). Reported parents' educational attainments were also used to flag first generation students.

Student records were then submitted to the National Student Clearinghouse to determine whether students had graduated within three years or transferred to a four-year institution. EMSAS completions records were also used for this purpose, since not all Missouri institutions report completion records to NSC. Clearinghouse data were also used to flag whether students had transferred to a four-year institution within four years of their first fall term (i.e. within one year of standard 150 percent time-to-degree). Graduation rates could then be calculated for 2008-2011 entering students, and transfer rates for 2008-2010 entering students.

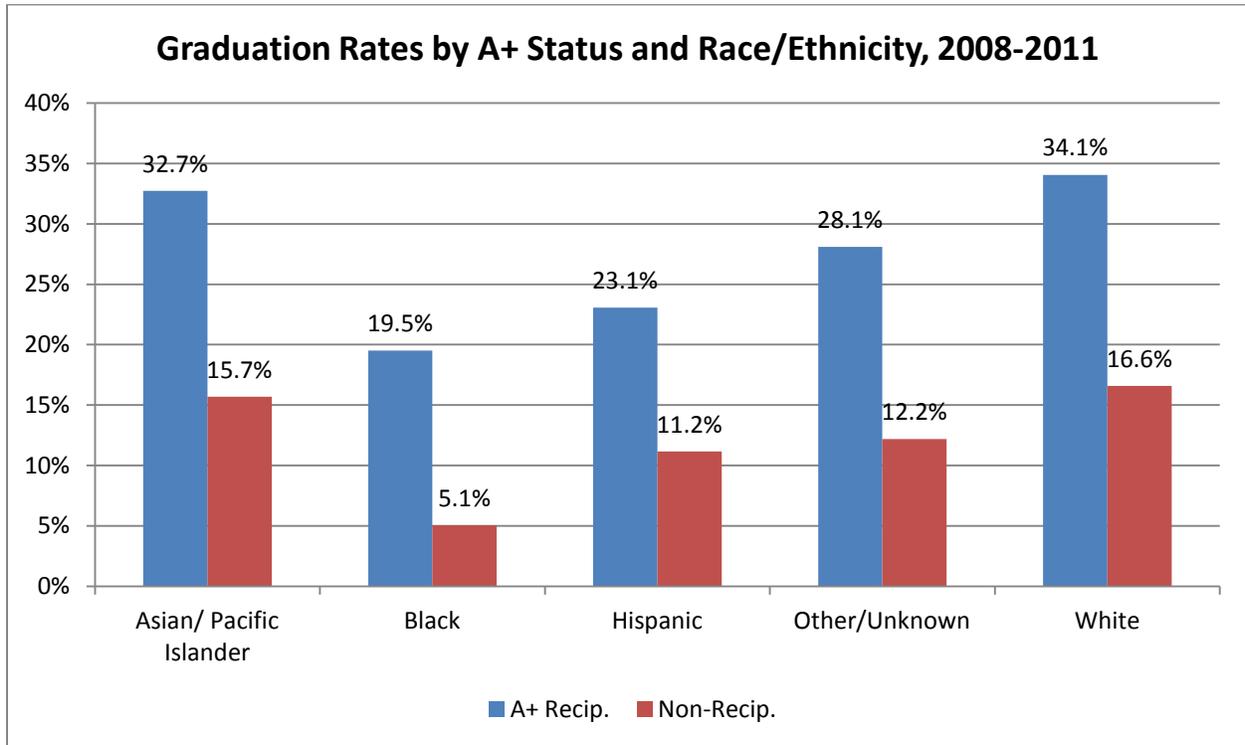
Last, student records were joined again to EMSAS fall enrollment data to determine whether students had persisted at the same institution the following year. Fall-to-fall persistence rates could be calculated for all years (2008-2013). After all joins, a dataset had been created which could be used to calculate simple percentages for persistence, graduation within three years, or transfer to a four-year institution within four years of initial enrollment for same-year public Missouri high school graduate A+ recipients and a non-recipient comparison group. Percentages could also be calculated for selected demographic groups within both populations.

In addition, logistic regression models were constructed to calculate the adjusted odds that A+ recipients would persist, graduate, or transfer compared to non-recipients. Each model included students' gender, race/ethnicity, remedial math credit hours enrolled in first fall term, total remedial hours, A+ status, highest ACT score, self-reported high school GPA, first generation status, primary EFC amount, high school code (included to further control for differences in student preparation), Pell eligibility, and dependency status as independent variables, with a binary variable for persistence, graduation, or transfer as the outcome/dependent variable.

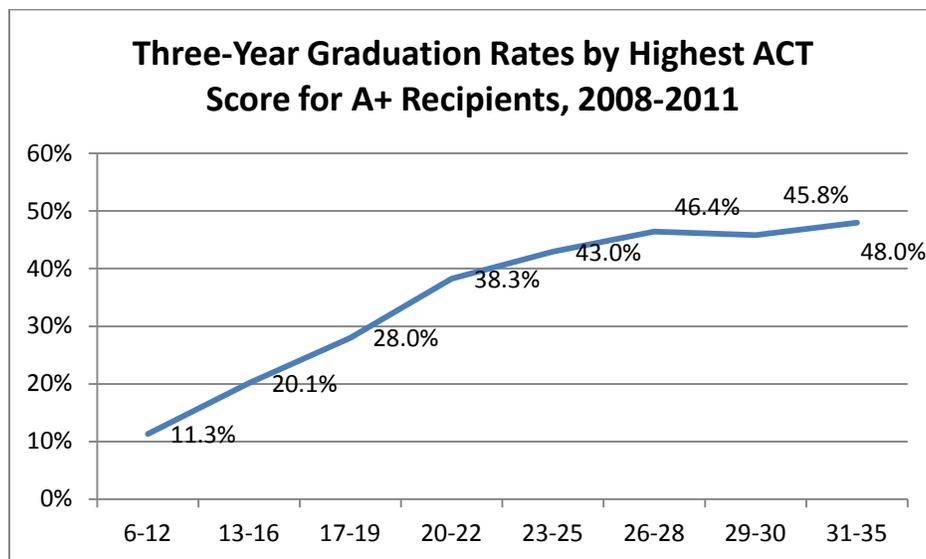
## Results

### Graduation

In simple percentage terms, A+ recipients are more likely to graduate within three years than non-recipients. From fall 2008 to fall 2011, 33.1 percent of A+ recipients completed a degree or certificate, compared to 14.5 percent of non-recipient same-year public Missouri high school graduates. This differential persisted across all major racial/ethnic groups:

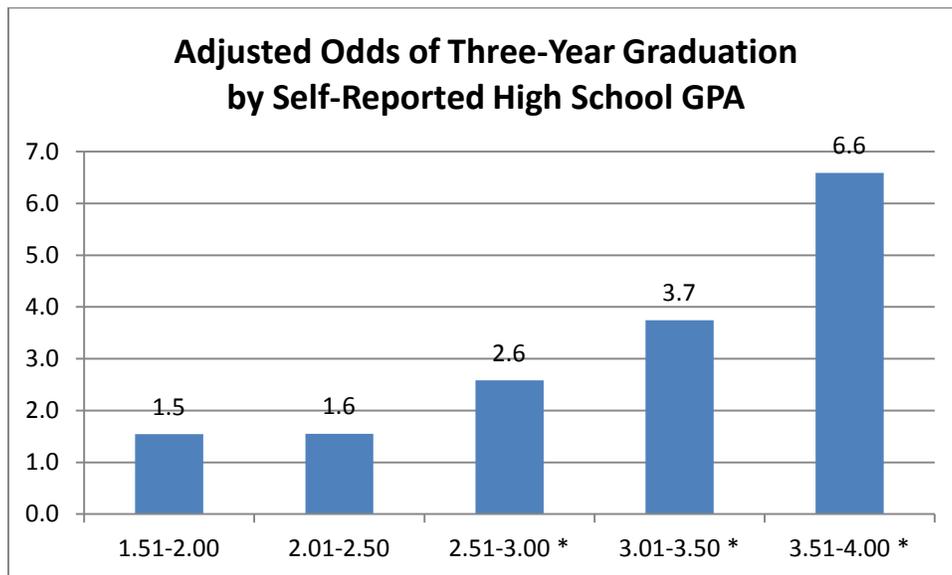


Not surprisingly of course, even among A+ recipients, high school preparation has a strong impact on graduation rates. Students' highest ACT scores have a strong linear relationship with completion:



As noted previously, a multiple regression model was also constructed with three-year graduation as a binary dependent variable and A+ recipient status and a number of other student and family characteristics as independent variables. This model provides the adjusted odds of a student's graduation for each subcategory of each independent variable in relation to a chosen comparison group, called the reference cell, when all other included variables are held constant. Where calculated odds are statistically significant, this theoretically isolates the impact of any individual student or family characteristic (such as A+ status) on the dependent/outcome variable.

Of most interest to us, A+ recipients are 2.0 times as likely to graduate within three years as non-recipients when controlling for all other included variables. A table of other selected odds is provided as an appendix. Perhaps not surprisingly, the strongest predictor of three-year graduation, when controlling for all other included variables (including A+ status) is reported high school GPA:



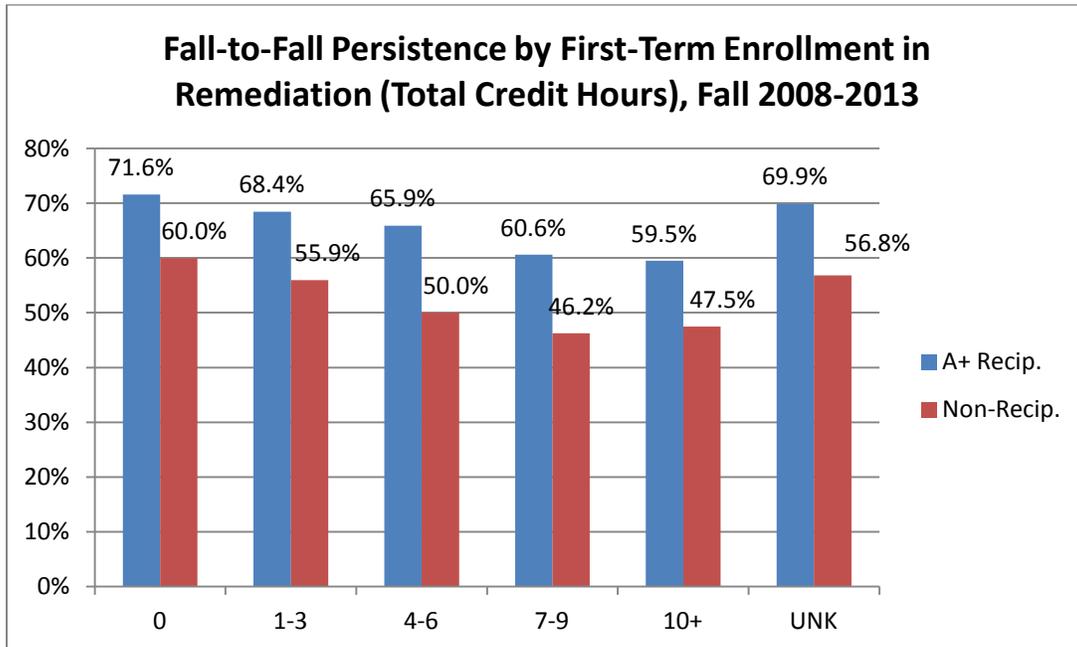
Note: reference (comparison) cell is GPA 0.00 - 1.50

\* Statistically significant at  $p < .05$

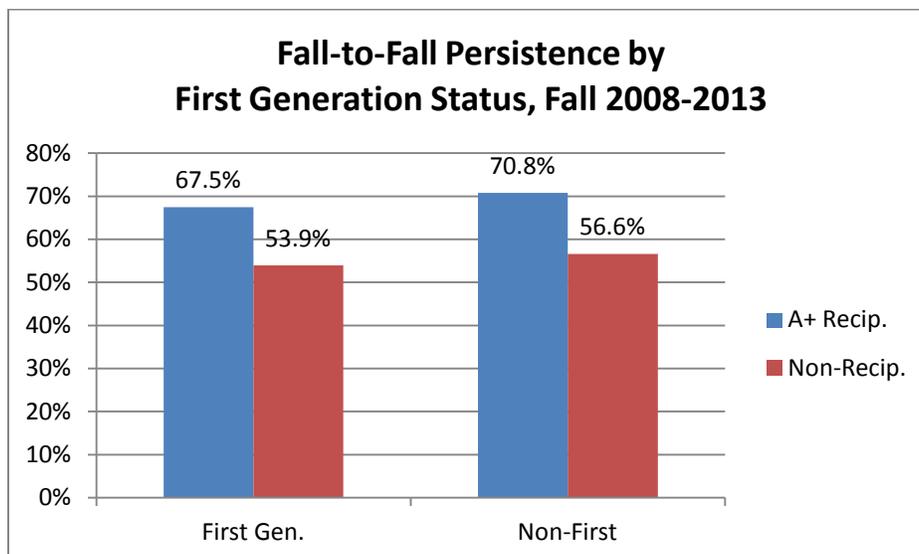
It bears repeating here that high school grade point average was self-reported by students in ACT survey data at the time of the student's highest ACT composite score. Of course, A+ eligibility requires a 2.5 GPA at graduation from high school, but these GPAs were not final as of graduation and were not reported by the schools. They were the best available data at the time of the study.

### Persistence

In simple percentage terms, A+ recipients are also more likely to persist to the following fall than non-recipient same-year public Missouri high school graduates. From fall 2008 to fall 2013, 69.5 percent of A+ recipients re-enrolled at the same institution the following fall, compared to 55.4 percent of non-recipients. Interestingly, while remediation of A+ recipients has been a topic of discussion in recent years, students requiring similar amounts of remedial coursework during their first fall term were still more likely to persist if A+ eligible:



First generation students, an important demographic for two-year institutions, were also more likely to persist if A+ eligible:

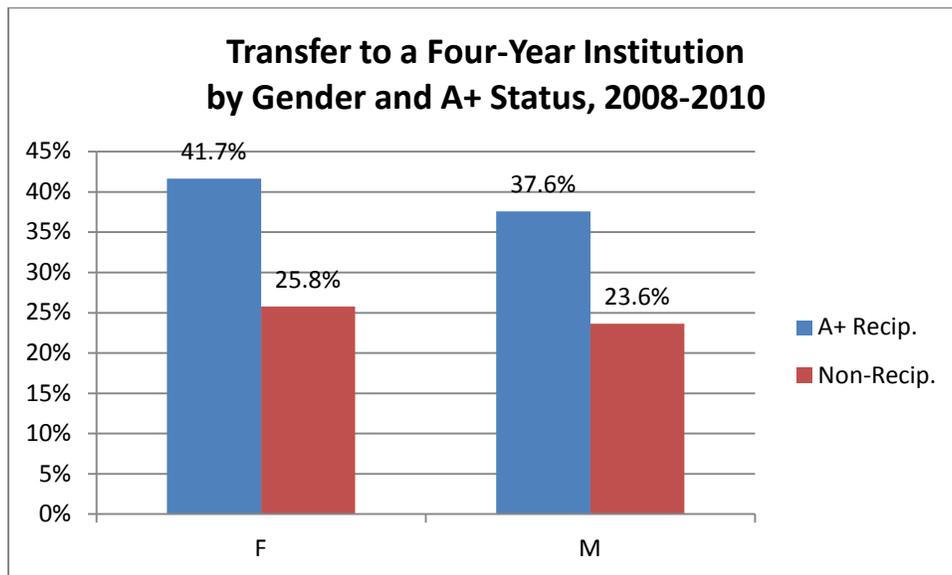


We also ran a logistic regression model for which all independent variables were identical to the model for graduation, and the outcome/dependent variable was fall-to-fall persistence at the same institution. When controlling for all other included variables, A+ recipients were 1.5 times as likely to persist as

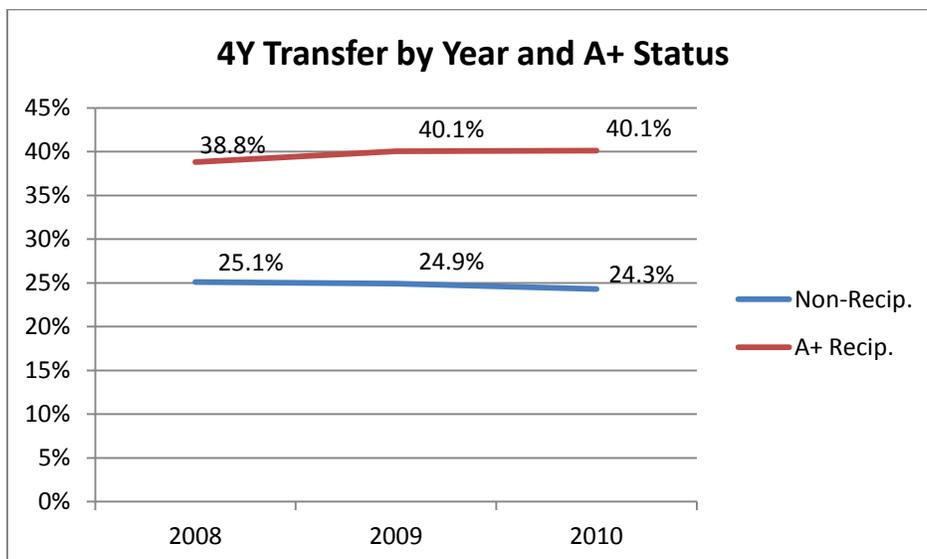
similar non-recipients. Again, high school GPA was the strongest predictor of persistence when controlling for all other variables (including A+ status); students with a self-reported GPA over 3.5 were 2.5 times as likely to persist as students with a GPA of 1.5 or lower (the same caveats apply as above regarding available GPA data). A table of other selected odds is provided as an appendix.

*Transfer*

In simple percentage terms, A+ recipients are also more likely to transfer to a four-year institution within four years than non-recipient same-year public Missouri high school graduates. (Four-years was chosen to allow one additional academic year beyond three-year/150 percent time-to-degree.) From fall 2008 to fall 2010, 39.7 percent of A+ recipients transferred to a four-year institution within this timeframe, compared to 24.7 percent of non-recipients. Female students are slightly more likely to have transferred than male students, among A+ recipients and non-recipients:



Interestingly, data for these cohorts would also suggest that while any changes are fairly gradual and bear future monitoring, transfer rates appear to be increasing for A+ recipients and declining for non-recipients:



We also ran a logistic regression model for which all independent variables were identical to the previous models, and the outcome/dependent variable was transfer to a four-year institution within four years of initial enrollment. When controlling for all other included variables, A+ recipients were 1.4 times as likely to transfer as similar non-recipients. Again, high school GPA was the strongest predictor of transfer when controlling for all other variables (including A+ status); students with a self-reported GPA over 3.5 were 3.1 times as likely to transfer as students with a GPA of 1.5 or lower (the same caveats apply as above). A table of other selected odds is provided as an appendix.

*Outcomes by Income*

A+ eligible students are required to make “a good faith effort” to pursue all available federal financial aid, a stipulation which requires them to file a Free Application for Federal Student Aid (FAFSA), and for all available aid, principally but not limited to a Pell grant, to be applied to the student’s tuition and fees before A+ is charged. Because of this provision and the generally lower tuition and fees at two-year institutions, some A+ eligible students do not actually receive any funds, and the median adjusted gross income for recipients is higher than for all A+ eligible students. In FY14, the median AGI for the families of dependent A+ recipients was approximately \$85,200.

While a natural outgrowth of the program’s eligibility requirements, questions have been raised about the relative effectiveness of A+ assistance for higher income students. Unfortunately, characteristics in the structure of our dataset and relatively small sample sizes in some cases meant we were unable to replicate our regression model within each formatted by-group of estimated family contribution (EFC) and get valid results. We were able, however, to calculate simple percentages for each of our selected outcomes (graduation, persistence, and transfer) by EFC category:

		Expected Family Contribution				
		\$0 - 12,000	\$12,001 - 19,999	\$20,000 - 29,999	\$30,000 - 39,999	\$40,000 +
<b>Graduation</b>	<b>A+ Recip.</b>	32.6%	34.9%	33.6%	29.4%	33.8%
	<b>Non-Recip.</b>	15.1%	15.9%	14.7%	15.4%	18.7%
		\$0 - 12,000	\$12,001 - 19,999	\$20,000 - 29,999	\$30,000 - 39,999	\$40,000 +
<b>Persistence</b>	<b>A+ Recip.</b>	67.5%	71.0%	73.4%	71.3%	70.9%
	<b>Non-Recip.</b>	54.7%	54.9%	55.1%	60.8%	59.0%
		\$0 - 12,000	\$12,001 - 19,999	\$20,000 - 29,999	\$30,000 - 39,999	\$40,000 +
<b>Transfer</b>	<b>A+ Recip.</b>	36.0%	42.2%	45.6%	44.9%	47.8%
	<b>Non-Recip.</b>	24.3%	27.9%	28.2%	33.5%	37.9%

These results would suggest that even where financial need is not a consideration, participation in the A+ program has a positive impact on student outcomes, and that the preparation and behavioral components of the program are in and of themselves beneficial to students.

### Limitations

DHE staff believes this to have been a generally robust, valid, and reliable study of A+ recipients and their outcomes. Because A+ recipients must have been graduates of public Missouri high schools, and will have enrolled, with a few exceptions, in a public two-year Missouri institution, student data are available to track enrollment, persistence, and graduation by program participants. DHE's participation in the National Student Clearinghouse also insures that students who begin at a public Missouri college or university can be tracked elsewhere nationally at institutions enrolling approximately 90 percent of postsecondary students. While these results may not be generalizable to students attending private institutions or less-than-two-year area career centers, those schools enrolled only about 3.7 percent of participating A+ recipients in FY2014.

The study was limited to students who enrolled as first-time students in a public two-year institution for the fall immediately following their spring high school graduation. This was done in order to remove gaps in educational enrollment as a confounding factor in student performance, and did eliminate some students who either did not re-enroll for a full year after graduation, or who may have graduated from high school early, e.g. after the fall semester the previous year, and enrolled in college the following fall. Another approach would have been to include these students and control in the regression models for time elapsed between high school graduation and college enrollment; further research would be needed to determine whether this approach would render meaningfully different results.

### Conclusions

A+ participation has a measurable and statistically significant impact on students' persistence, graduation, and/or eventual transfer to a four-year institution in comparison to non-participating same-year public high school graduates, and when controlling for a set of other selected demographic, family, and academic preparation-related variables. While other variables or student characteristics could be included in the regression models along with A+ participation, we believe the chosen model is well fit and generally parsimonious, i.e. it provides an effective level of explanation or prediction with the fewest number of predictor/independent variables.

It is true that the regression models used here, as currently constructed, do not serve to determine whether recipients' high school preparation and program eligibility requirements are as, or more important to their positive outcomes than the financial support they receive once enrolled in college. While the structure and size of our dataset made it impossible to effectively construct a regression model that would run separately *within* each EFC by-group, simple percentages for students' graduation, persistence, and transfer within by-groups at least suggest that the program has a positive impact even where need is not a consideration. If that is the case, there may well be other ways to construct benefits and incentivize high school students to complete the requirements to gain eligibility.

### Next Steps

While requests for this study predate the financial constraints on the A+ program that became acute during the spring 2015 semester, it is hoped that this and future analyses will continue to support conversations about how to ensure the continuing viability of the program while preserving its incentive for students to exhibit behaviors in high school, such as regular attendance, maintaining a moderately high grade point average, and participating in peer tutoring, that are collectively predictive of student success in postsecondary education. While discussions will continue regarding the most effective ways to use financial assistance to incentivize high school student preparation, the combination of the two has clearly been effective and beneficial for students across racial/ethnic and income demographics.

### Contact

For more information, contact Jeremy Kintzel, director of data and research services, Missouri Department of Higher Education, [jeremy.kintzel@dhe.mo.gov](mailto:jeremy.kintzel@dhe.mo.gov).

**Appendix  
Selected Adjusted Odds Ratios**

*Graduation*

<b>Odds Ratio Estimates</b>			
<b>Effect</b>	<b>Point Estimate</b>	<b>95% Wald</b>	
		<b>Confidence Limits</b>	

**Gender**

<b>Male vs Female</b>	1.00	0.94	1.05
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**Race/Ethnicity**

<b>ASIAN/PACIFIC ISLANDER vs WHITE</b>	0.92	0.76	1.13
<b>AFRICAN/AMER. vs WHITE</b>	0.74	0.63	0.88
<b>HISPANIC vs WHITE</b>	0.85	0.70	1.04
<b>OTHER/UNK vs WHITE</b>	0.87	0.78	0.96

**Remedial Math Hours Enrolled - First Fall Term**

<b>1-3 vs 0</b>	0.63	0.59	0.68
<b>4+ vs 0</b>	0.88	0.70	1.11

**Total Remedial Hours Enrolled - First Fall Term**

<b>1-3 vs 0</b>	0.96	0.87	1.06
<b>4-6 vs 0</b>	0.64	0.56	0.74
<b>7-9 vs 0</b>	0.45	0.37	0.54
<b>10+ vs 0</b>	0.39	0.21	0.72
<b>UNK vs 0</b>	0.89	0.84	0.95

**A+ Participation**

<b>YES vs NO</b>	2.01	1.87	2.16
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**Highest ACT Score**

<b>6-12 vs 13-16</b>	0.49	0.29	0.83
<b>17-19 vs 13-16</b>	1.18	1.07	1.32
<b>20-22 vs 13-16</b>	1.43	1.28	1.59
<b>23-25 vs 13-16</b>	1.39	1.24	1.57
<b>26-28 vs 13-16</b>	1.51	1.30	1.76
<b>29-30 vs 13-16</b>	1.62	1.21	2.18
<b>31-35 vs 13-16</b>	1.57	0.99	2.50
<b>UNK vs 13-16</b>	1.04	0.91	1.18

Odds Ratio Estimates		
Effect	Point Estimate	95% Wald
		Confidence Limits

**High School GPA (Self-Reported)**

1.51-2.00 vs 0.00-1.50	1.54	0.65	3.65
2.01-2.50 vs 0.00-1.50	1.55	0.67	3.58
2.51-3.00 vs 0.00-1.50	2.59	1.13	5.93
3.01-3.50 vs 0.00-1.50	3.75	1.63	8.59
3.51-4.00 vs 0.00-1.50	6.59	2.87	15.13
UNK vs 0.00-1.50	2.75	1.20	6.32

**First Generation**

NO vs YES	0.98	0.93	1.04
UNK vs YES	0.88	0.79	0.98

**Expected Family Contribution**

\$12,001 - 19,999 vs \$0 - 12,000	1.04	0.96	1.14
\$20,000 - 29,999 vs \$0 - 12,000	1.01	0.91	1.12
\$30,000 - 39,999 vs \$0 - 12,000	0.87	0.74	1.02
\$40,000 + vs \$0 - 12,000	1.06	0.91	1.22
UNK vs \$0 - 12,000	1.09	0.88	1.36

**Pell Eligibility**

YES vs NO	0.95	0.88	1.02
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**Dependency Status (FAFSA)**

Dependent vs. UNK	1.44	1.23	1.68
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Persistence

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald	
		Confidence Limits	

**Gender**

Male vs Female	0.85	0.83	0.88
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**Race/Ethnicity**

ASIAN/PACIFIC ISLANDER vs WHITE	1.39	1.21	1.60
AFRICAN/AMER. vs WHITE	0.85	0.79	0.92
HISPANIC vs WHITE	1.27	1.13	1.43
OTHER/UNK vs WHITE	0.97	0.91	1.02

**Remedial Math Hours Enrolled - First Fall Term**

1-3 vs 0	0.97	0.92	1.02
4+ vs 0	1.05	0.94	1.17

**Total Remedial Hours Enrolled - First Fall Term**

1-3 vs 0	1.06	0.99	1.13
4-6 vs 0	0.91	0.85	0.98
7-9 vs 0	0.83	0.76	0.91
10+ vs 0	0.85	0.73	0.99
UNK vs 0	1.06	1.01	1.12

**A+ Participation**

YES vs NO	1.52	1.45	1.60
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**Highest ACT Score**

6-12 vs 13-16	0.83	0.69	1.00
17-19 vs 13-16	1.03	0.97	1.09
20-22 vs 13-16	1.05	0.99	1.12
23-25 vs 13-16	1.03	0.95	1.11
26-28 vs 13-16	1.13	1.01	1.26
29-30 vs 13-16	0.99	0.79	1.24
31-35 vs 13-16	1.00	0.71	1.42
UNK vs 13-16	0.73	0.68	0.79

Odds Ratio Estimates		
Effect	Point Estimate	95% Wald
		Confidence Limits

**High School GPA (Self-Reported)**

1.51-2.00 vs 0.00-1.50	0.95	0.72	1.26
2.01-2.50 vs 0.00-1.50	1.12	0.86	1.47
2.51-3.00 vs 0.00-1.50	1.43	1.09	1.86
3.01-3.50 vs 0.00-1.50	1.79	1.37	2.34
3.51-4.00 vs 0.00-1.50	2.49	1.91	3.26
UNK vs 0.00-1.50	1.34	1.03	1.76

**First Generation**

NO vs YES	1.08	1.04	1.12
UNK vs YES	0.98	0.92	1.05

**Expected Family Contribution**

\$12,001 - 19,999 vs \$0 - 12,000	1.01	0.94	1.08
\$20,000 - 29,999 vs \$0 - 12,000	1.08	0.99	1.17
\$30,000 - 39,999 vs \$0 - 12,000	1.05	0.93	1.18
\$40,000 + vs \$0 - 12,000	1.02	0.92	1.14
UNK vs \$0 - 12,000	1.59	1.41	1.79

**Pell Eligibility**

YES vs NO	1.01	0.95	1.06
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**Dependency Status (FAFSA)**

Dependent vs. UNK	1.39	1.29	1.51
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*Transfer*

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald	
		Confidence Limits	

**Gender**

<b>Male vs Female</b>	0.89	0.84	0.94
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**Race/Ethnicity**

<b>ASIAN/PACIFIC ISLANDER vs WHITE</b>	1.11	0.92	1.35
<b>AFRICAN/AMER. vs WHITE</b>	1.23	1.08	1.39
<b>HISPANIC vs WHITE</b>	1.09	0.91	1.30
<b>OTHER/UNK vs WHITE</b>	1.01	0.92	1.12

**Remedial Math Hours Enrolled - First Fall Term**

<b>1-3 vs 0</b>	0.83	0.77	0.88
<b>4+ vs 0</b>	0.79	0.60	1.06

**Total Remedial Hours Enrolled - First Fall Term**

<b>1-3 vs 0</b>	0.86	0.77	0.97
<b>4-6 vs 0</b>	0.77	0.67	0.89
<b>7-9 vs 0</b>	0.65	0.54	0.78
<b>10+ vs 0</b>	0.86	0.53	1.39
<b>UNK vs 0</b>	0.88	0.81	0.95

**A+ Participation**

<b>YES vs NO</b>	1.36	1.26	1.46
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**Highest ACT Score**

<b>6-12 vs 13-16</b>	0.43	0.28	0.67
<b>17-19 vs 13-16</b>	1.35	1.23	1.48
<b>20-22 vs 13-16</b>	1.60	1.45	1.77
<b>23-25 vs 13-16</b>	1.90	1.69	2.13
<b>26-28 vs 13-16</b>	2.08	1.78	2.43
<b>29-30 vs 13-16</b>	2.22	1.61	3.07
<b>31-35 vs 13-16</b>	2.78	1.68	4.57
<b>UNK vs 13-16</b>	0.64	0.57	0.72

Odds Ratio Estimates		
Effect	Point Estimate	95% Wald
		Confidence Limits

**High School GPA (Self-Reported)**

1.51-2.00 vs 0.00-1.50	1.04	0.61	1.79
2.01-2.50 vs 0.00-1.50	1.30	0.77	2.17
2.51-3.00 vs 0.00-1.50	1.56	0.93	2.60
3.01-3.50 vs 0.00-1.50	2.10	1.26	3.51
3.51-4.00 vs 0.00-1.50	3.13	1.87	5.24
UNK vs 0.00-1.50	1.55	0.93	2.59

**First Generation**

NO vs YES	1.34	1.27	1.43
UNK vs YES	1.02	0.91	1.13

**Expected Family Contribution**

\$12,001 - 19,999 vs \$0 - 12,000	1.07	0.98	1.18
\$20,000 - 29,999 vs \$0 - 12,000	1.15	1.03	1.28
\$30,000 - 39,999 vs \$0 - 12,000	1.19	1.01	1.40
\$40,000 + vs \$0 - 12,000	1.43	1.23	1.67
UNK vs \$0 - 12,000	1.41	1.14	1.74

**Pell Eligibility**

YES vs NO	1.009	0.93	1.095
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**Dependency Status (FAFSA)**

Dependent vs. UNK	1.42	1.22	1.66
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