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Better Data • Informed Choices • Improved Results

Making the Most of FARMS Data to Explore Effects of Student and School Poverty

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MD Connections Summit

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Introductions and Acknowledgements

- About the presenters:
  - ***Bess A. Rose***, Ed.D., is a member of the Research Branch at the MLDS Center and statistician at the University of Maryland School of Social Work (SSW).
  - ***Dawnsha R. Mushonga***, Ph.D., LCPC, ACS, NCC, is a member of the Research Branch at the MLDS Center and post-doctoral researcher at the University of Maryland SSW.
  - ***Angela K. Henneberger***, Ph.D., is director of the Research Branch at the MLDS Center and Research Assistant Professor at the University of Maryland SSW.
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Overview

- Introduction to the MLDS Center
- Importance of student and school poverty
- What is FARMS?
- Using FARMS data to measure student poverty
- Using FARMS data to measure school poverty
- Using FARMS data to estimate the effects of student and school poverty: An example
- Recommendations and discussion

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Introduction to the MLDS Center

mldscenter.maryland.gov

What is the MLDS Center?

- The Maryland Longitudinal Data System (MLDS) was established by state law in 2010 and began operations as an independent unit of state government in 2013
- We generate timely and accurate information about student performance to improve Maryland's education system and guide decision makers at all levels
- MLDS partners with the University of Maryland to conduct advanced statistical analyses and policy evaluation to provide actionable information for policy and practice
- MLDS data includes K12 and postsecondary educational data from MSDE and MHEC, and workforce wages data from DLLR

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Cohort and outcomes

- Cohort: All 6th graders in 2007-08 in all Maryland public schools who did not transfer out of Maryland public schools (N = 54,465)
- Outcomes for today:
  - On-time high school graduation
  - Ever graduating from high school
  - Dropping out of school
  - HSA Algebra score
  - SAT Math score
  - Enrolling in postsecondary within 1 year of on-time HS graduation
- Outcomes for future presentation:
  - Wages earned

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Importance of student and school poverty

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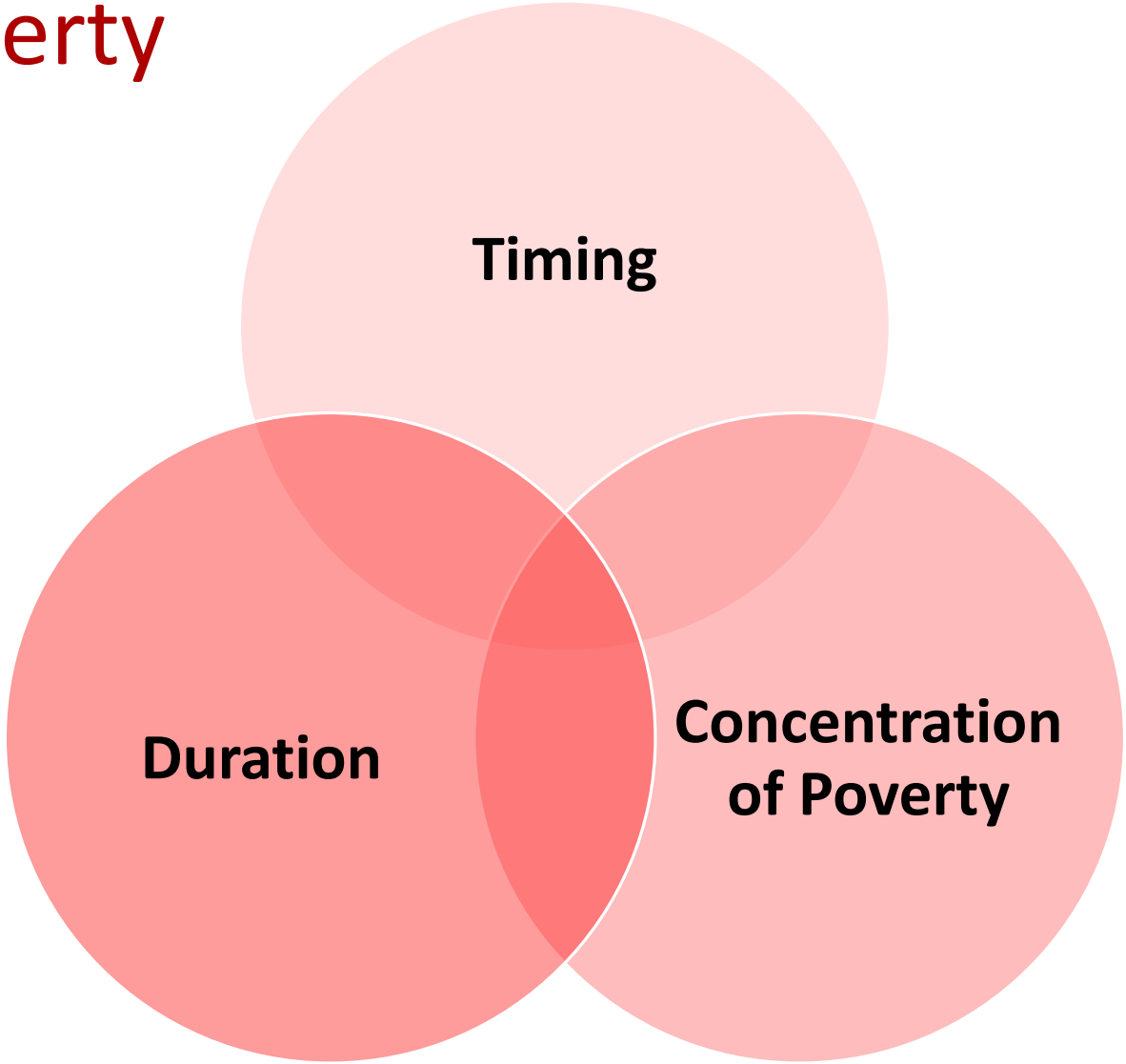
Poverty

- *Definition*: Residing in a household with a total income below the poverty threshold.
- In 2017, the poverty threshold for a family of four, including two children, was $24,858.
- According to the National Center for Children in Poverty, 21% of children (15 million) live below the poverty threshold.

Sources: U.S. Census Bureau, 2018; Jiang, Granja, & Koball, 2017; U.S. Census Bureau, 2017.

Impact of Poverty



Source: Chaudry & Wimer, 2016.

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Characteristics associated with living in poverty

- Reside in poor neighborhoods
- High exposure to crime and violence
- High levels of food insecurity
- Multiple transitions (school and family)
- High rates of incarceration
- High rates of teen pregnancy
- Remain in poverty in adulthood
- Poor developmental outcomes (cognitive, emotional, physical)
- Poor academic achievement
- Less likely to graduate
- Earn lower wages
- Unemployment

Sources: Chaudry & Wimer, 2016; Crosnoe, 2009; Wagmiller & Adelman, 2009.

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Why both student and school poverty?

- For many outcomes, a lot of the variation in outcomes is due to differences between schools, not just differences between students
- Regression analyses attribute variation to students that is actually due to differences between schools, so we use multilevel modeling (HLM)

Outcome	Level	Proportion of variation in outcome
HSA Algebra	School	0.56
	Student	0.44
SAT Math	School	0.57
	Student	0.43

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What is FARMS?

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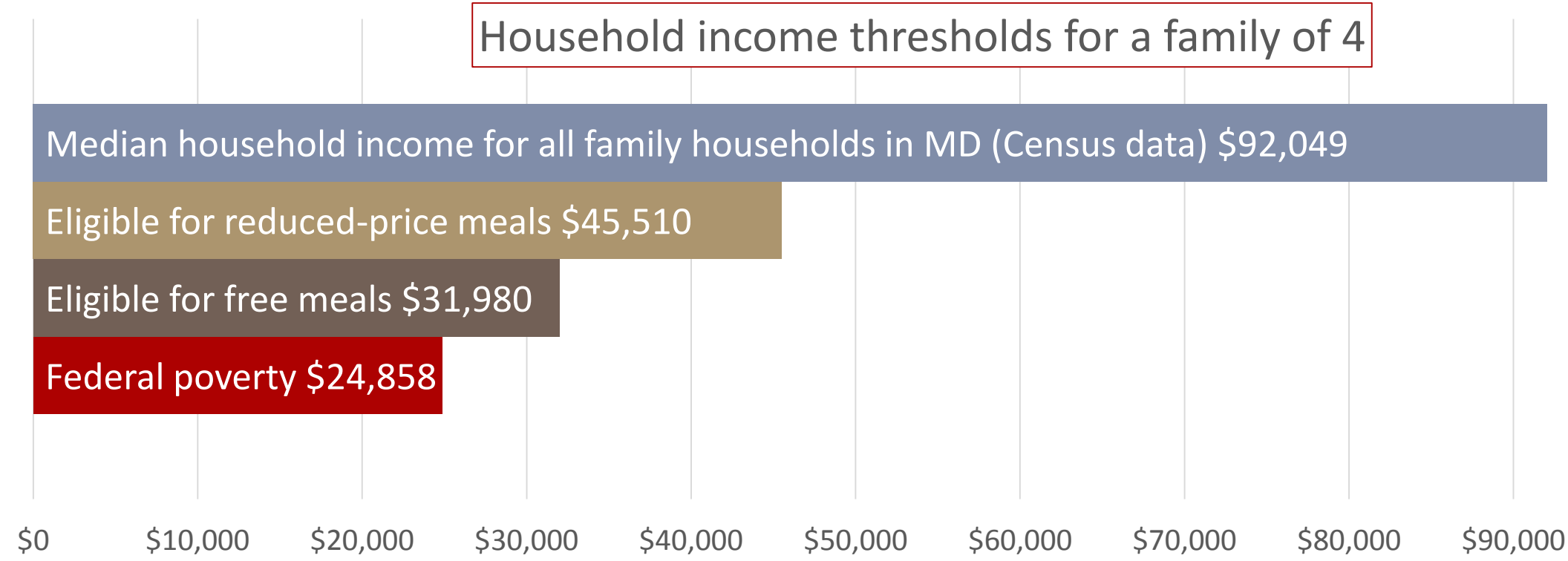
What is FARMS?

- FARMS = *free* and *reduced-price* meals = eligibility for National School Lunch Program
  - Free: household income up to 130% of federal poverty level
  - Reduced-price: household income 130%-185% of federal poverty level



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Caveats about FARMS data

- Prior to direct certification, families had to apply
  - Some students with FARMS=N may actually be in poverty
- After 2012, entire schools can be deemed eligible under Community Eligibility Provision
  - Some students with FARMS=Y may actually not be in poverty
- High school students tend not to apply
  - High school FARMS rates underreport poverty
- A student's FARMS status and true poverty status can change over time

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Using FARMS data to measure student poverty

Measuring student poverty

- **Traditional way:** FARMS status as of one point in time
- **Our way:** FARMS history: proportion of time student was FARMS in grades 6 through 12

Acad Year	Student	School	Start Date	End Date	Grade	FARMS Status	FARMS History
2008	Example Student	MLDS Academy	1 Sep 2007	5 June 2008	6	N	= 0/1 = 0
2009	Example Student	MLDS Academy	30 Aug 2008	1 June 2009	7	Y	= 1/2 = 0.5
2010	Example Student	Maryland MS	28 Aug 2009	4 June 2010	8	Y	= 2/3 = 0.66
2011	Example Student	Maryland HS	6 Sep 2010	5 June 2011	9	Y	= 3/4 = 0.75
2012	Example Student	Maryland HS	1 Sep 2011	7 June 2012	10	N	= 3/5 = 0.60
2013	Example Student	Maryland HS	1 Sep 2011	7 June 2012	11	N	= 3/6 = 0.50
2014	Example Student	Maryland HS	1 Sep 2011	7 June 2012	12	N	= 3/7 = 0.43

$$\text{Final FARMS History} = \frac{\#\ of\ records\ where\ FARMS{=}Y}{Total\ \#\ of\ records} = \frac{3}{7} = 0.43$$

- Final FARMS history was used as student poverty variable (mean = 0.36)

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Student's last FARMS status vs. FARMS history

	FARMS status at last enrollment					
FARMS history	**Missing**		**Not eligible**		**Eligible**	
	N	**%**	**N**	**%**	**N**	**%**
Never	46	<1%	27,820	51%	0	0%
Sometimes, <50%	28	<1%	3,985	7%	1,986	4%
Sometimes, >=50%	153	<1%	3,653	7%	6,408	12%
Always	0	0	0	0	10,386	19%

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Using FARMS data to measure school poverty

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Measuring school poverty

- **Traditional way:** Percent FARMS
- **Our way:** Mean proportion of time FARMS
  - Using the student FARMS history data, calculate mean for all students enrolled at end of each year

Measuring school poverty

School	AcadYear	Student	FARMS History (as of end of year)
MLDS Academy	2009	Student A	0.0
MLDS Academy	2009	Student B	1.0
MLDS Academy	2009	Student C	0.0
MLDS Academy	2009	Student D	0.5
MLDS Academy	2009	Student E	0.66
MLDS Academy	2009	Student F	0.33
MLDS Academy	2009	Student G	0

$$\text{Mean} = \frac{Sum\ of\ all\ students'\ proportion\ of\ time\ FARMS\ up\ to\ end\ of\ this\ year}{Total\ \#\ of\ students\ enrolled\ at\ end\ of\ this\ year}$$

- Annual mean was used as school poverty variable (mean = 0.37)

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Using FARMS data to estimate the effects of student and school poverty: An example

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Background

- State Senator Bill Ferguson asked the MLDS Center to research the role of student and school poverty
- Currently, Maryland's formula for education funding provides additional funds for *each student* in poverty
- The Kirwan Commission is drafting recommendations for giving additional state funding for *schools with high concentrations* of poverty

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Research questions

- What is the effect of *individual student poverty* on student outcomes (on-time high school graduation, ever graduating from high school, dropping out of school, HSA Algebra score, SAT Math score, enrolling in postsecondary within 1 year of on-time HS graduation)?
- Does *school poverty context* have an effect on outcomes even after controlling for individual student poverty?

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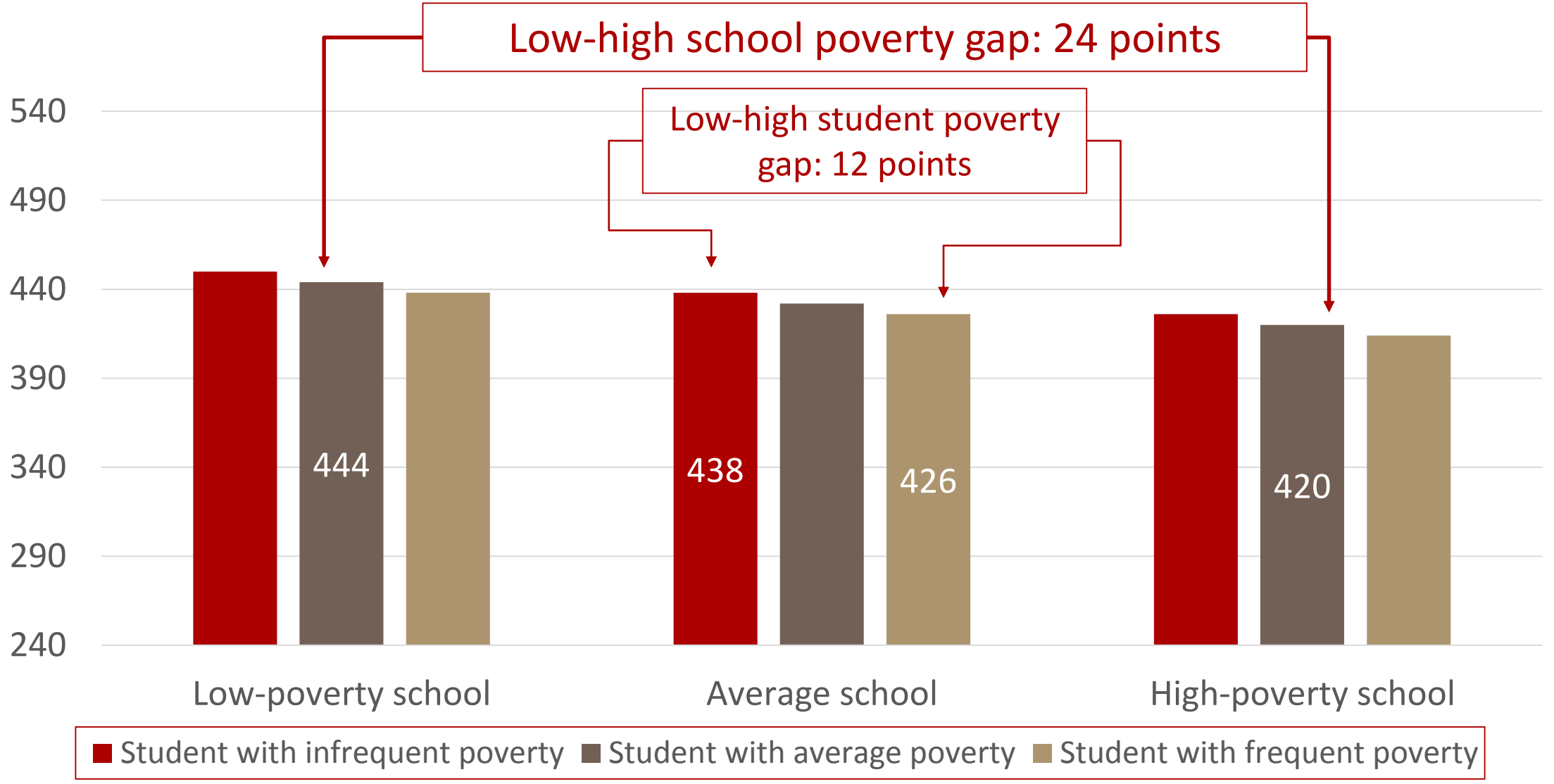
Results summary

- Overall, the effects of individual student poverty on student outcomes are *negative* and *substantial*
- There is an independent negative effect of *school* poverty context even controlling for student poverty

HSA Algebra score



N=52,261. Scale ranges from 240 to 650. Cut scores: Proficient = 412; Advanced = 450.

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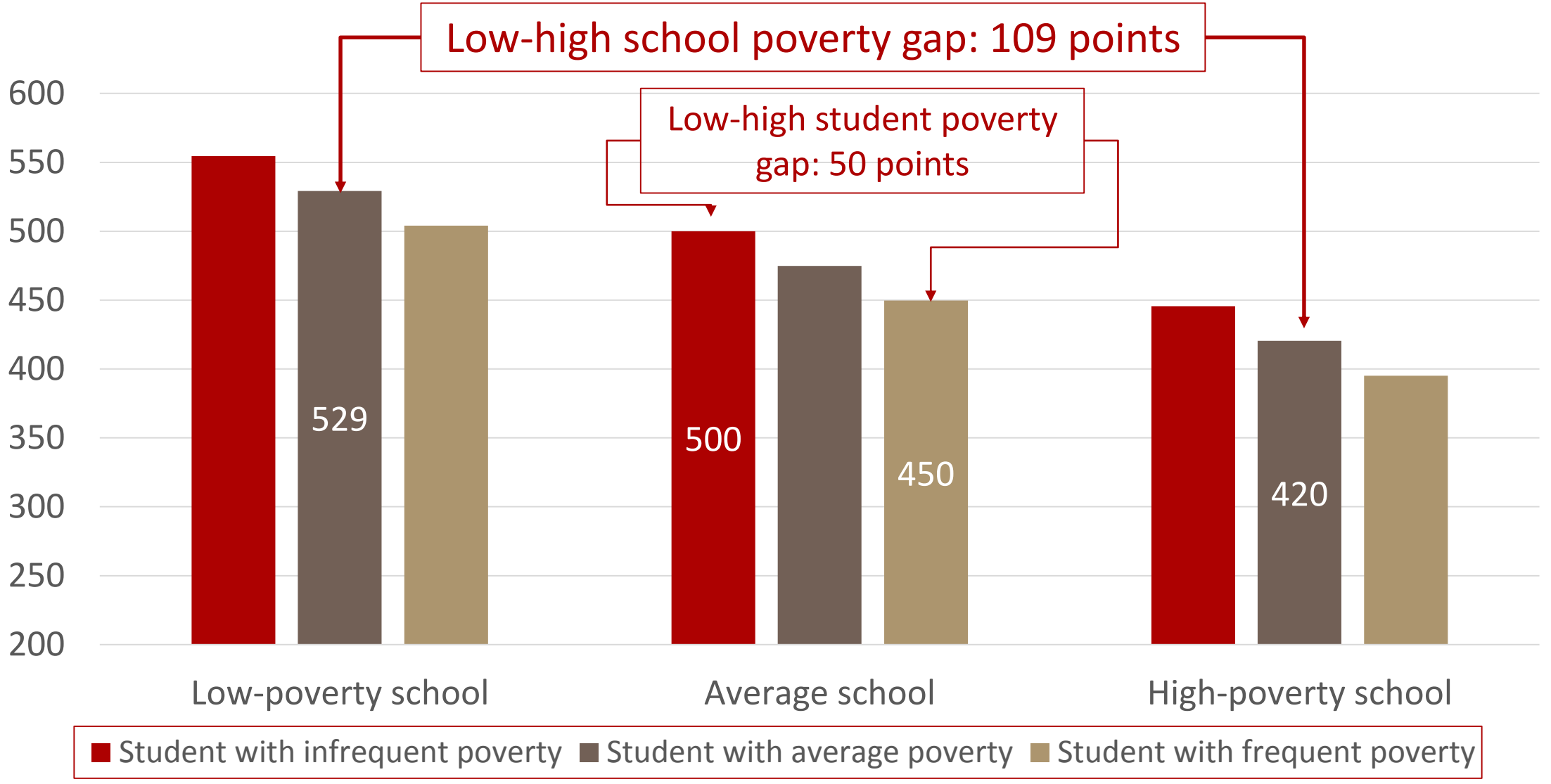
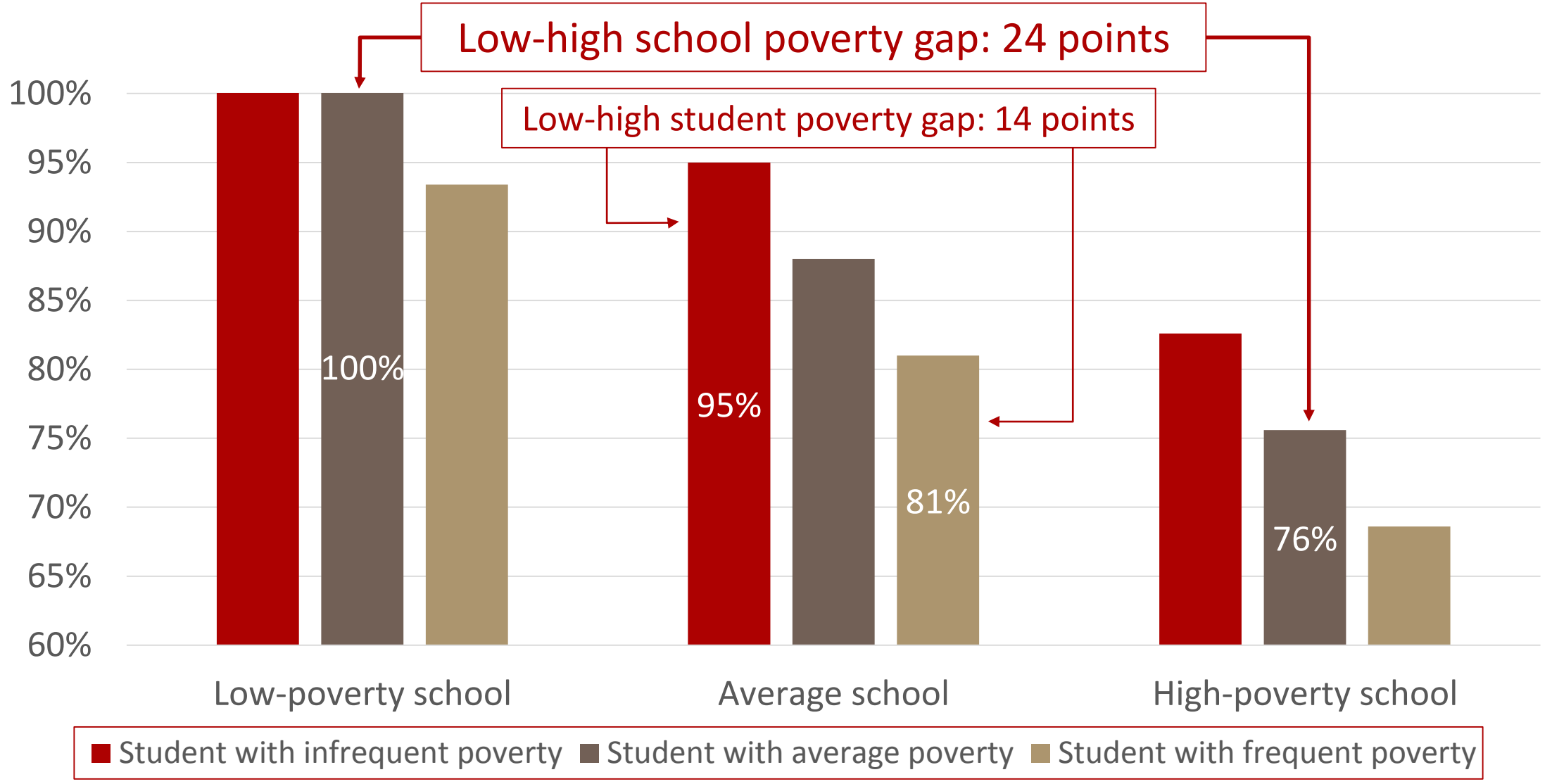
SAT Math score



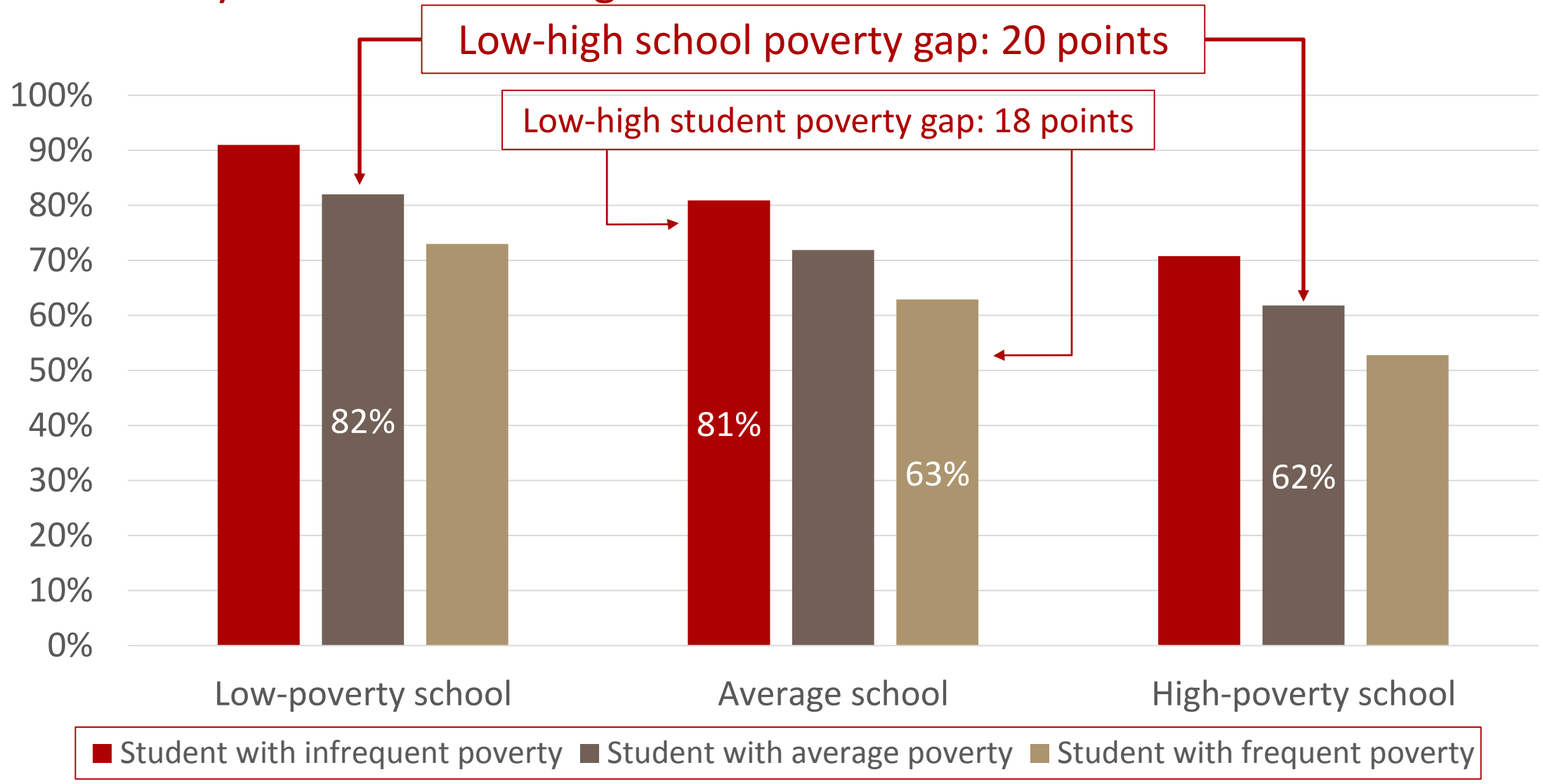
N = 33,534. Scale ranges from 200 to 800.

Likelihood of on-time HS graduation



N = 54,465. Likelihood scale ranges from 0 to 1.

Likelihood of enrolling in postsecondary within one year of on-time HS graduation



N = 46,581. On-time HS graduates only. Likelihood scale ranges from 0 to 1.

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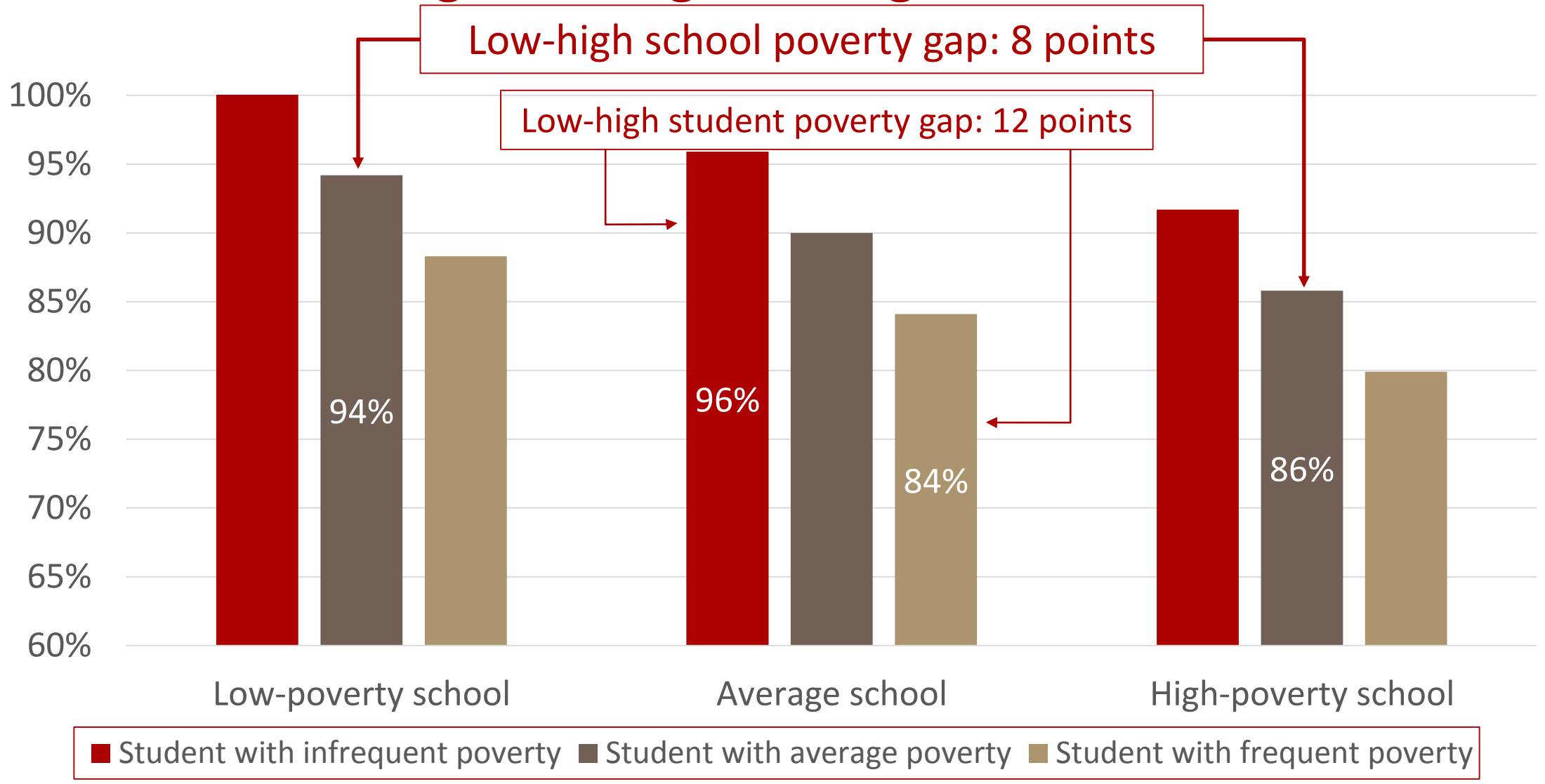
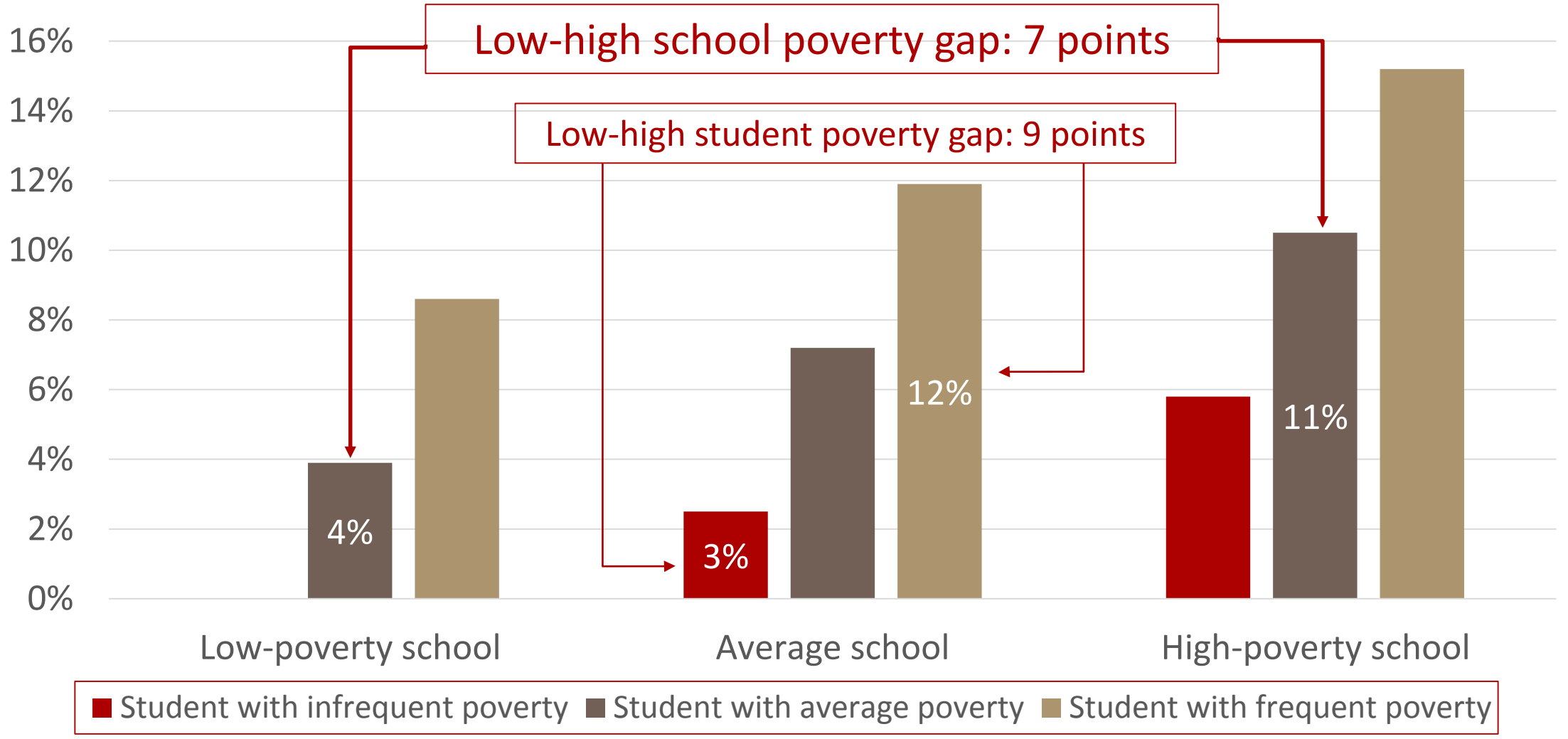
Likelihood of ever graduating from high school



N = 54,465. Likelihood scale ranges from 0 to 1.

Likelihood of dropping out of school



N = 54,465. Likelihood scale ranges from 0 to 1.

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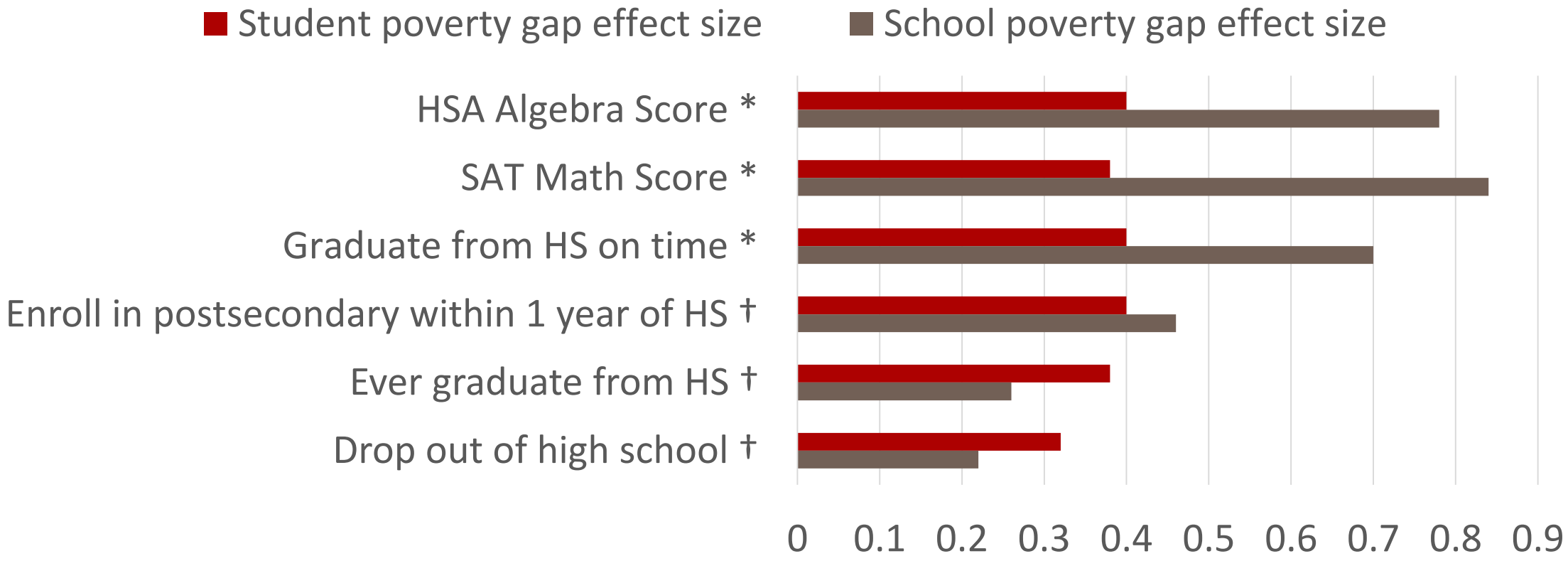
Student and school poverty gap effect sizes

- **Effect size** is a standardized way of expressing the size of the gap relative to 1 standard deviation in the outcome, allowing comparison across all outcomes.



*The student and school poverty gaps are statistically significantly different from one another. †The student and school poverty gaps are not statistically different from one another. All student and school poverty gaps are statistically significant.

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Recommendations and discussion

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Recommendations

- Make the most of your data
  - Distinguish between free and reduced-price students if possible – there is a meaningful distinction in household income
  - Use student's FARMS history if available
  - Use both student and school data
- Identify key questions by talking to decision makers and stakeholders
- Conduct appropriate statistical analyses to answer questions
- Explore other ways to measure poverty or socioeconomic status
  - Parental education, household income, neighborhood median income
  - Next presentation: poverty measurement transition in Baltimore City Public Schools

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Discussion

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Thank you!

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