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Poverty and Student Outcomes:

Disentangling the Effects of Student and School Poverty

Bess A. Rose, Dawnsha R. Mushonga, and
Angela K. Henneberger

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University of Maryland, School of Social Work

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

- Background and policy relevance
- Measuring student and school ~~SES~~ poverty
- Cohort and outcomes
- Effects of student and school poverty

Background and policy relevance

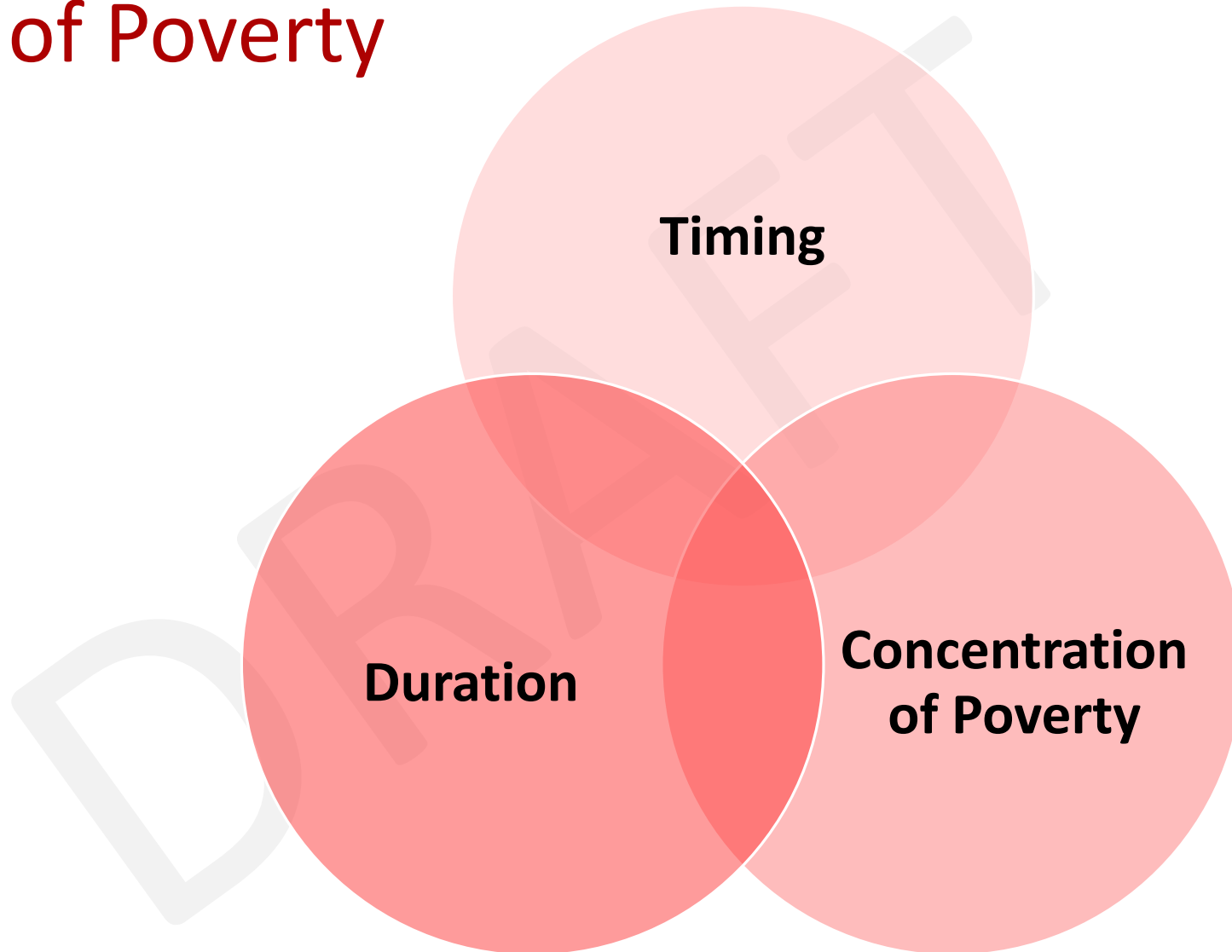
Background and policy relevance

- Request from State Senator Bill Ferguson: How does the socio-economic status (SES) of a school's student population impact student outcomes? Do student outcomes change as the SES of the student population at a school changes?
- Current state education funding formula provides additional funds for students in poverty
- Under consideration is giving additional state funding for schools with high concentrations of poverty (Kirwan Commission is drafting recommendations)
- Recent study recommended no changes to current linear formula, but advocacy groups and stakeholders pushing for additional resources

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.

Impact of Poverty



Characteristics associated with living in poverty

- Reside in poor neighborhoods
- High exposure to crime and violence
- High levels of food insecurity
- Attend low-quality schools
- 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

Federal funding to counteract effects of poverty in schools: Title I

- All schools with 40% or higher poverty rates are *eligible* for schoolwide Title I programs; schools with 35% or higher are *eligible* for targeted assistance Title I programs
- **But there are not enough Title I funds to serve all eligible schools**
 - School districts allocate funding to eligible schools using strict guidelines
 - Poorest schools must be served first
 - Some districts group by grade span and serve elementary and/or middle schools first
- In 2015-16, 26% of all schools in MD had Schoolwide Title I programs.

Example of Title I schools in one district (2016)

| LEA | School | Pct FARMS | Title I Status |
|-----|----------------------------------|-----------|----------------|
| 05 | Federalsburg Elementary School | 0.77 | Schoolwide |
| 05 | Greensboro Elementary School | 0.71 | Schoolwide |
| 05 | Colonel Richardson Middle School | 0.57 | Not Title I |
| 05 | Colonel Richardson High School | 0.53 | Not Title I |
| 05 | Denton Elementary School | 0.51 | Schoolwide |
| 05 | Lockerman Middle School | 0.50 | Not Title I |
| 05 | North Caroline High School | 0.49 | Not Title I |
| 05 | Ridgely Elementary School | 0.48 | Schoolwide |
| 05 | Preston Elementary School | 0.48 | Schoolwide |

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?
- How do student and school poverty interact? Does individual poverty have a larger impact as school poverty increases?
- How do the effects of student and school poverty vary based on school Title I status?



Measuring student and school ~~SES~~ poverty

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Measuring student ~~SES~~ poverty

- We only have eligibility for National School Lunch Program (*free and reduced-price* meals = FARMS)
 - *Free*: household income at or below 130% of federal poverty level (family of 4: current max \$31,980)
 - *Reduced-price*: 130%-185% of federal poverty level (family of 4: current max \$45,510)
 - Original data have 3 categories (*Free, Reduced, and Not eligible*) but we only have *Eligible* (includes *free and reduced*) or *Not eligible*

Measuring student ~~SES~~ poverty, cont'd

- Only families that chose to apply (false negatives)
- Community eligibility since 2012 means entire schools get FARMS (false positives)
- **Eligible** means household income was below 185% of the federal poverty level
 - Unless (after 2012) whole school = Y
- **Not eligible** means either household income was above 185% of poverty, OR income was below 185% of poverty but they didn't apply
 - High school students tend not to apply
- Time-varying – associated with each school enrollment

Measuring student and school poverty

- Student:
 - **FARMS status:** as of last school enrollment (point in time)
 - **FARMS history:** proportion of time student was FARMS across all school enrollment records
- School:
 - **Percent FARMS** (usual measure)
 - **Mean proportion of time FARMS**

Last FARMS status vs. FARMS history

| FARMS history | FARMS status at last enrollment | | | | | |
|------------------|---------------------------------|-----|--------------|-----|----------|----|
| | 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 |



Cohort and outcomes

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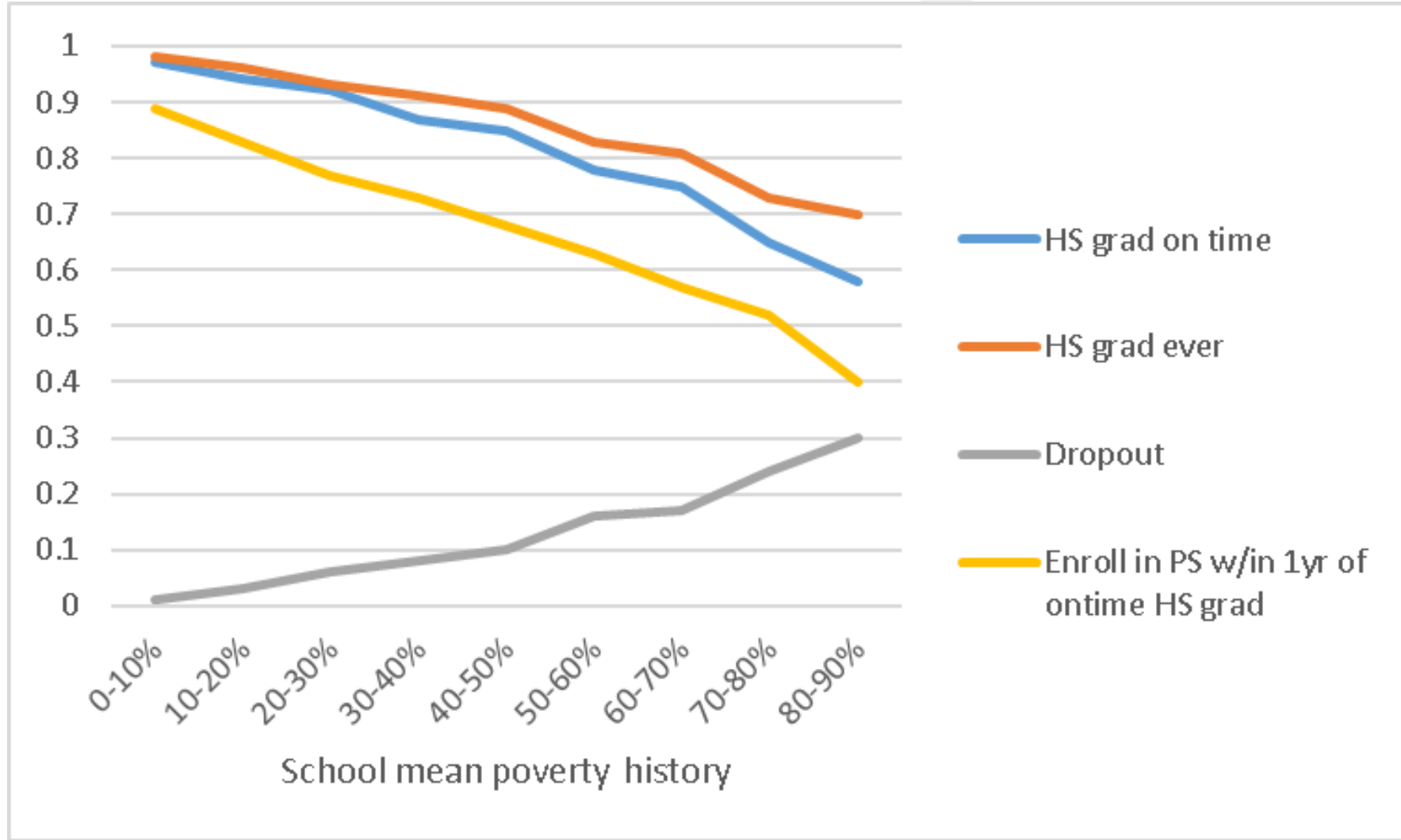
Cohort and outcomes

- 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

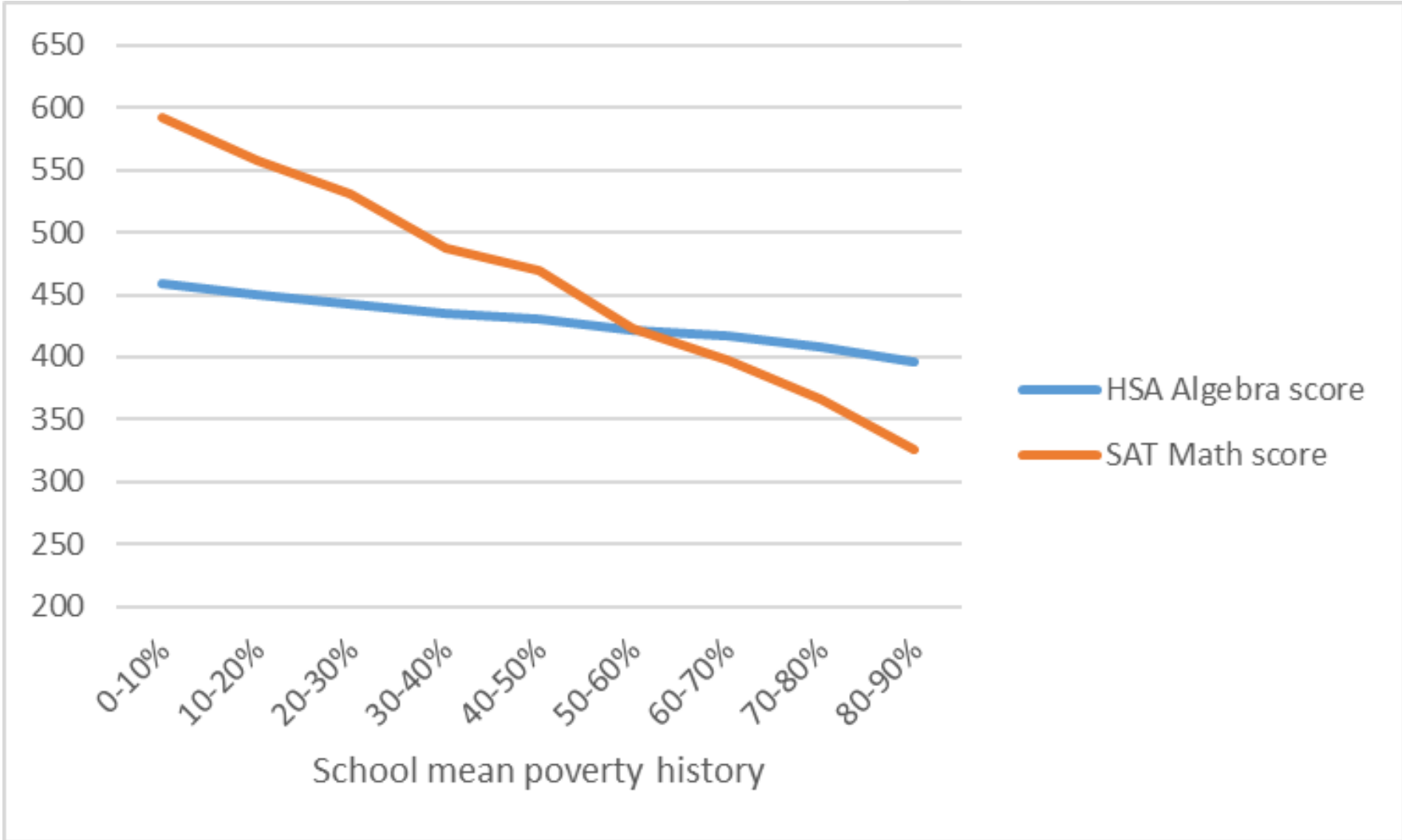
Mean outcomes by student's FARMS history

| FARMS history | HS grad on time (n = 54,465) | HS grad ever (n = 54,465) | Dropout (n = 54,465) | HSA Algebra score (n = 52,261) | SAT Math score (n = 33,534) | Enroll in PS w/in 1yr of on-time HS grad (n = 46,581) |
|----------------------|-----------------------------------------|--------------------------------------|---------------------------------|-------------------------------------------|----------------------------------------|------------------------------------------------------------------|
| Never | 0.95 | 0.97 | 0.03 | 448 | 543 | 0.83 |
| <50% | 0.83 | 0.88 | 0.11 | 429 | 449 | 0.64 |
| >=50% | 0.69 | 0.77 | 0.21 | 419 | 414 | 0.59 |
| Always | 0.76 | 0.82 | 0.17 | 418 | 406 | 0.56 |
| All | 0.86 | 0.89 | 0.10 | 435 | 496 | 0.73 |

Event outcomes by school mean poverty history



Score outcomes by school mean poverty history



Mean poverty history by Schoolwide Title I status

| | Schoolwide Title I status | | | |
|--------------------------------------|---------------------------|-------------------------------|----------------------------------------------|--------------------------------------------|
| | All | Not eligible (FARMS < 40%) | Eligible (FARMS >= 40%) but no funding | Eligible (FARMS >= 40%) with funding |
| Student proportion of time FARMS | 0.36 (0.42) | 0.19 (0.34) | 0.51 (0.42) | 0.78 (0.29) |
| School mean proportion of time FARMS | 0.37 (0.22) | 0.21 (0.11) | 0.52 (0.09) | 0.72 (0.12) |

Note. Standard deviations are in parentheses.

Mean outcomes by Schoolwide Title I status

| Outcome | Schoolwide Title I status | | |
|---------------------------------------------------------------------------|-------------------------------|----------------------------------------------|--------------------------------------------|
| | Not eligible (FARMS < 40%) | Eligible (FARMS >= 40%) but no funding | Eligible (FARMS >= 40%) with funding |
| Graduate from HS on time | 0.92 | 0.82 | 0.64 |
| Ever graduate from HS | 0.94 | 0.87 | 0.73 |
| Drop out of high school | 0.05 | 0.12 | 0.25 |
| HSA Algebra Score | 446 | 426 | 408 |
| SAT Math Score | 540 | 443 | 372 |
| Enroll in postsecondary within 1 year of graduating from HS on time | 0.80 | 0.65 | 0.50 |



Effects of student and school poverty

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General analytic approach

- Used multilevel models to account for clustering of students within schools, using multiple membership to account for all schools attended grades 6-12
- Estimated independent main effects of student and school poverty on each outcome (student poverty was grand-mean centered)
- Calculated effect size (Cohen's d) to standardize size of coefficient relative to distribution of outcome variable to allow for comparison across outcomes
- Estimated interaction in separate analyses (student poverty was group-mean centered)
- Estimated student and school poverty main effects for each Title I group separately

A note about regression vs. multilevel analysis

- About a third of the variation in outcomes is due to differences between schools, with two-thirds due to differences between students
- Regression analyses attribute variation to students that is actually due to differences between schools

| Outcome | Level | Proportion of variation in outcome |
|-------------|---------|------------------------------------|
| HSA Algebra | School | 0.33 |
| | Student | 0.67 |
| SAT Math | School | 0.32 |
| | Student | 0.68 |



Student vs. school 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 one year of on-time HS graduation)?
- Does school poverty context have an effect on outcomes even after controlling for individual student poverty?

Results summary

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

Models for continuous outcomes (e.g. HSA score)

Level one: individuals

$$Y_{i\{j\}} = \beta_{0\{j\}} + \beta_{1\{j\}} \text{Poverty}_{i\{j\}} + e_{i\{j\}}$$

Level two: school(s) {j}

$$\beta_{0\{j\}} = \gamma_{00} + \gamma_{01} \text{MeanPoverty}_{\{j\}} + \sum_{h \in \{j\}} w_{ih} u_{0h0}$$

$$\beta_{1\{j\}} = \gamma_{10}$$

$$\beta_{2\{j\}} = \gamma_{20}$$

Models for binary outcomes (e.g. graduation)

Level one: individuals

$$\text{Log odds } Y_{i\{j\}} = \beta_{0\{j\}} + \beta_{1\{j\}} \text{Poverty}_{i\{j\}} e_{i\{j\}}$$

Level two: school(s) {j}

$$\beta_{0\{j\}} = \gamma_{00} + \gamma_{01} \text{MeanPoverty}_{\{j\}} + \sum_{h \in \{j\}} w_{ih} u_{0h0}$$

$$\beta_{1\{j\}} = \gamma_{10}$$

$$\beta_{2\{j\}} = \gamma_{20}$$

Effects of student and school poverty: HSA Algebra score

| (Mean: 435.30 SD: 31.67 n: 52,261) | β | SE | Sig | Predicted | ES |
|------------------------------------|---------------|------|-----|-----------|-------------|
| Intercept | 432.07 | 0.70 | *** | 432 | |
| Student poverty main effect | -6.40 | 0.14 | *** | 426 | 0.20 |
| School poverty main effect | -12.31 | 0.58 | *** | 420 | 0.39 |

Notes. *Intercept* is the predicted outcome for an average student in an average school. *Student poverty main effect* is the predicted difference in outcome for a student whose poverty history is 1 standard deviation (SD) above average (FARMS 78% of the time). A student with high poverty history is predicted to score 6 points (one-fifth of a SD) lower than a student with average poverty history at the same school. *School poverty main effect* is the predicted difference in outcome for a student at a school whose mean poverty history is 1 SD above average (where the average student is FARMS 59% of the time). A student at a high-poverty school is predicted to score 12 points (two-fifths of a SD) lower than a similar student at an average poverty school. **Bold** indicates that the student and school poverty main effects are statistically significantly different from one another. *** $p < .001$. β : Unstandardized coefficient. SE: Standard error. Sig: Statistical significance. Predicted: Predicted outcome. ES: Effect size.

Effects of student and school poverty: SAT Math score

| (Mean: 495.80 SD: 129.70 n: 33,534) | β | SE | Sig | Predicted | ES |
|-------------------------------------|---------------|------|-----|-----------|-------------|
| Intercept | 474.79 | 2.76 | *** | 475 | |
| Student poverty main effect | -25.21 | 0.69 | *** | 450 | 0.19 |
| School poverty main effect | -54.43 | 2.49 | *** | 420 | 0.42 |

Notes. *Intercept* is the predicted outcome for an average student in an average school. *Student poverty main effect* is the predicted difference in outcome for a student whose poverty history is 1 standard deviation (SD) above average (FARMS 78% of the time). A student with high poverty history is predicted to score 25 points (one-fifth of a SD) lower than a student with average poverty history at the same school. *School poverty main effect* is the predicted difference in outcome for a student who attends a school whose mean poverty history is 1 SD above average (where the average student is FARMS 59% of the time). A student at a high-poverty school is predicted to score 54 points (two-fifths of a SD) lower than a similar student at an average poverty school. **Bold** indicates that the student and school poverty main effects are statistically significantly different from one another. *** $p < .001$. β : Unstandardized coefficient. SE: Standard error. Sig: Statistical significance. Predicted: Predicted outcome. ES: Effect size.

Effects of student and school poverty: On-time HS graduation

| (Mean: 0.86 Std. Dev.: 0.35 n: 54,465) | β | SE | Sig | OR | Predicted | ES |
|----------------------------------------|--------------|------|-----|------|-----------|-------------|
| Intercept | 1.99 | 0.13 | *** | 7.32 | 88.0% | |
| Student poverty main effect | -0.54 | 0.02 | *** | 0.58 | 81.0% | 0.20 |
| School poverty main effect | -0.86 | 0.10 | *** | 0.42 | 75.6% | 0.35 |

Notes. *Intercept* is the predicted outcome for an average student in an average school. *Student poverty main effect* is the predicted difference in outcome for a student whose poverty history is 1 standard deviation (SD) above average (FARMS 78% of the time). The likelihood of a student with high poverty history is predicted to be 7 percentage points (one-fifth of a SD) lower than a student with average poverty history at the same school. *School poverty main effect* is the predicted difference in outcome for a student who attends a school whose mean poverty history is 1 SD above average (where the average student is FARMS 59% of the time). The likelihood of a student at a high-poverty school is predicted to be 12 percentage points (one-third of a SD) lower than a similar student at an average poverty school. **Bold** indicates that the student and school poverty main effects are statistically significantly different from one another. *** $p < .001$. β : Unstandardized coefficient. SE: Standard error. Sig: Statistical significance. OR: Odds ratio. Predicted: Predicted outcome. ES: Effect size.

Effects of student and school poverty: Enrolling in postsecondary within one year of on-time HS graduation

| (Mean: 0.73 Std. Dev.: 0.44 n: 46,581) | β | SE | Sig | OR | Predicted | ES |
|----------------------------------------|--------------|------|-----|------|-----------|-------------|
| Intercept | 0.94 | 0.04 | *** | 2.56 | 71.9% | |
| Student poverty main effect | <i>-0.41</i> | 0.01 | *** | 0.66 | 62.9% | <i>0.20</i> |
| School poverty main effect | <i>-0.46</i> | 0.04 | *** | 0.63 | 61.8% | <i>0.23</i> |

Notes. *Intercept* is the predicted outcome for an average student in an average school. *Student poverty main effect* is the predicted difference in outcome for a student whose poverty history is 1 standard deviation (SD) above average (FARMS 78% of the time). The likelihood of a student with high poverty history is predicted to be 9 percentage points (one-fifth of a SD) lower than a student with average poverty history at the same school. *School poverty main effect* is the predicted difference in outcome for a student who attends a school whose mean poverty history is 1 SD above average (where the average student is FARMS 59% of the time). The likelihood of a student at a high-poverty school is predicted to be 10 percentage points (one-fifth of a SD) lower than a similar student at an average poverty school. *Italics* indicate that the student and school poverty main effects are not statistically different from one another. *** $p < .001$. β : Unstandardized coefficient. SE: Standard error. Sig: Statistical significance. OR: Odds ratio. Predicted: Predicted outcome. ES: Effect size.

Effects of student and school poverty: Ever graduating from high school

| (Mean: 0.89 Std. Dev.: 0.31 n: 54,465) | β | SE | Sig | OR | Predicted | ES |
|----------------------------------------|---------|------|-----|------|-----------|-------------|
| Intercept | 2.19 | 0.09 | *** | 8.95 | 90.0% | |
| Student poverty main effect | -0.53 | 0.02 | *** | 0.59 | 84.1% | <i>0.19</i> |
| School poverty main effect | -0.39 | 0.08 | *** | 0.68 | 85.8% | <i>0.13</i> |

Notes. *Intercept* is the predicted outcome for an average student in an average school. *Student poverty main effect* is the predicted difference in outcome for a student whose poverty history is 1 standard deviation (SD) above average (FARMS 78% of the time). The likelihood of a student with high poverty history is predicted to be 6 percentage points (one-fifth of a SD) lower than a student with average poverty history at the same school. *School poverty main effect* is the predicted difference in outcome for a student who attends a school whose mean poverty history is 1 SD above average (where the average student is FARMS 59% of the time). The likelihood of a student at a high-poverty school is predicted to be 4 percentage points (one-tenth of a SD) lower than a similar student at an average poverty school. *Italics* indicate that the student and school poverty main effects are not statistically different from one another. *** $p < .001$. β : Unstandardized coefficient. SE: Standard error. Sig: Statistical significance. OR: Odds ratio. Predicted: Predicted outcome. ES: Effect size.

Effects of student and school poverty: Dropping out of school

| (Mean: 0.10 Std. Dev.: 0.30 n: 54,465) | β | SE | Sig | OR | Predicted | ES |
|----------------------------------------|-------------|------|-----|------|-----------|-------------|
| Intercept | -2.55 | 0.10 | *** | 0.08 | 7.2% | |
| Student poverty main effect | <i>0.55</i> | 0.02 | *** | 1.74 | 11.9% | <i>0.16</i> |
| School poverty main effect | <i>0.41</i> | 0.07 | *** | 1.51 | 10.5% | <i>0.11</i> |

Notes. *Intercept* is the predicted outcome for an average student in an average school. *Student poverty main effect* is the predicted difference in outcome for a student whose poverty history is 1 standard deviation (SD) above average (FARMS 78% of the time). The likelihood of a student with high poverty history is predicted to be 5 percentage points (one-sixth of a SD) higher than a student with average poverty history at the same school. *School poverty main effect* is the predicted difference in outcome for a student who attends a school whose mean poverty history is 1 SD above average (where the average student is FARMS 59% of the time). The likelihood of a student at a high-poverty school is predicted to be 4 percentage points (one-tenth of a SD) higher than a similar student at an average poverty school. *Italics* indicate that the student and school poverty main effects are not statistically different from one another. *** $p < .001$. β : Unstandardized coefficient. SE: Standard error. Sig: Statistical significance. OR: Odds ratio. Predicted: Predicted outcome. ES: Effect size.

Summary of effect sizes of student and school poverty

| Outcome | Student poverty ES | School contextual ES |
|---------------------------------------------------------------------|--------------------|----------------------|
| HSA Algebra Score | 0.20 (-) | 0.39 (-) |
| SAT Math Score | 0.19 (-) | 0.42 (-) |
| Graduate from HS on time | 0.20 (-) | 0.35 (-) |
| Enroll in postsecondary within 1 year of graduating from HS on time | <i>0.20 (-)</i> | <i>0.23 (-)</i> |
| Ever graduate from HS | <i>0.19 (-)</i> | <i>0.13 (-)</i> |
| Drop out of high school | <i>0.16 (+)</i> | <i>0.11 (+)</i> |

Notes. ES: Effect size. (-): Direction of effect is negative. (+): Direction of effect is positive. **Bold** indicates that the student and school poverty main effects are statistically significantly different from one another. *Italics* indicate that the student and school poverty main effects are not statistically different from one another.



Interactions

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Research questions, continued

- How do student and school poverty interact? Does individual poverty have a larger impact as school poverty increases?

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Results summary, continued

- Interaction results indicated that some effects of student poverty appear to be *lessened* at higher levels of school poverty

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Models for continuous outcomes (e.g. HSA score) with interactions

Level one: individuals

$$Y_{i\{j\}} = \beta_{0\{j\}} + \beta_{1\{j\}} \text{Poverty}_{i\{j\}} + \beta_{2\{j\}} \text{Poverty} \times \text{MeanPoverty}_{i\{j\}} + e_{i\{j\}}$$

Level two: school(s) {j}

$$\beta_{0\{j\}} = \gamma_{00} + \gamma_{01} \text{MeanPoverty}_{\{j\}} + \sum_{h \in \{j\}} w_{ih} u_{0h0}$$

$$\beta_{1\{j\}} = \gamma_{10}$$

$$\beta_{2\{j\}} = \gamma_{20}$$

Models for binary outcomes (e.g. graduation) with interactions

Level one: individuals

$$\text{Log odds } Y_{i\{j\}} = \beta_{0\{j\}} + \beta_{1\{j\}} \text{Poverty}_{i\{j\}} + \beta_{2\{j\}} \text{Poverty} \times \text{MeanPoverty}_{i\{j\}} + e_{i\{j\}}$$

Level two: school(s) {j}

$$\beta_{0\{j\}} = \gamma_{00} + \gamma_{01} \text{MeanPoverty}_{\{j\}} + \sum_{h \in \{j\}} w_{ih} u_{0h0}$$

$$\beta_{1\{j\}} = \gamma_{10}$$

$$\beta_{2\{j\}} = \gamma_{20}$$

Interaction of student and school poverty: HSA Algebra score

| (Mean: 435.30 Std. Dev.: 31.67 n: 52,261) | β | SE | Sig |
|--------------------------------------------------|-------------|-------------|------------|
| Intercept | 432.01 | 0.81 | *** |
| Coefficient for student poverty | -5.71 | 0.12 | *** |
| Coefficient for school poverty | -15.88 | 0.62 | *** |
| Interaction of student and school poverty | 2.32 | 0.15 | *** |

Notes. The coefficients for student and school poverty should not be interpreted as main effects. Because the interaction models used group-mean centering, the coefficient for school poverty reflects both the school poverty effect and the student poverty effect. *** $p < .001$. β : Unstandardized coefficient. SE: Standard error. Sig: Statistical significance.

Interaction of student and school poverty: SAT Math score

| (Mean: 495.80 Std. Dev.: 129.70 n: 33,534) | β | SE | Sig |
|--------------------------------------------------|--------------|-------------|------------|
| Intercept | 473.73 | 2.70 | *** |
| Coefficient for student poverty | -23.95 | 0.61 | *** |
| Coefficient for school poverty | -67.74 | 2.30 | *** |
| Interaction of student and school poverty | 11.58 | 0.75 | *** |

Notes. The coefficients for student and school poverty should not be interpreted as main effects. Because the interaction models used group-mean centering, the coefficient for school poverty reflects both the school poverty effect and the student poverty effect. *** $p < .001$. β : Unstandardized coefficient. SE: Standard error. Sig: Statistical significance.

Interaction of student and school poverty: On-time HS graduation

| (Mean: 0.86 Std. Dev.: 0.35 n: 54,465) | β | SE | Sig |
|--------------------------------------------------|--------------|-------------|------------|
| Intercept | 1.99 | 0.11 | *** |
| Coefficient for student poverty | -0.51 | 0.01 | *** |
| Coefficient for school poverty | -1.23 | 0.07 | *** |
| Interaction of student and school poverty | 0.24 | 0.02 | *** |

Notes. The coefficients for student and school poverty should not be interpreted as main effects. Because the interaction models used group-mean centering, the coefficient for school poverty reflects both the school poverty effect and the student poverty effect. *** $p < .001$. β : Unstandardized coefficient. SE: Standard error. Sig: Statistical significance.

Interaction of student and school poverty:

Enrolling in postsecondary within one year of on-time HS graduation

| (Mean: 0.73 Std. Dev.: 0.44 n: 46,581) | β | SE | Sig |
|--------------------------------------------------|-------------|-------------|------------|
| Intercept | 0.96 | 0.04 | *** |
| Coefficient for student poverty | -0.37 | 0.01 | *** |
| Coefficient for school poverty | -0.70 | 0.04 | *** |
| Interaction of student and school poverty | 0.18 | 0.01 | *** |

Notes. The coefficients for student and school poverty should not be interpreted as main effects. Because the interaction models used group-mean centering, the coefficient for school poverty reflects both the school poverty effect and the student poverty effect. *** $p < .001$. β : Unstandardized coefficient. SE: Standard error. Sig: Statistical significance.

Interaction of student and school poverty: Ever graduating from high school

| (Mean: 0.89 Std. Dev.: 0.31 n: 54,465) | β | SE | Sig |
|--------------------------------------------------|-------------|-------------|------------|
| Intercept | 2.22 | 0.10 | *** |
| Coefficient for student poverty | -0.50 | 0.02 | *** |
| Coefficient for school poverty | -0.73 | 0.06 | *** |
| Interaction of student and school poverty | 0.24 | 0.02 | *** |

Notes. The coefficients for student and school poverty should not be interpreted as main effects. Because the interaction models used group-mean centering, the coefficient for school poverty reflects both the school poverty effect and the student poverty effect. *** $p < .001$. β : Unstandardized coefficient. SE: Standard error. Sig: Statistical significance.

Interaction of student and school poverty: Dropping out of school

| (Mean: 0.10 Std. Dev.: 0.30 n: 54,465) | β | SE | Sig |
|--------------------------------------------------|--------------|-------------|------------|
| Intercept | -2.56 | 0.08 | *** |
| Coefficient for student poverty | 0.53 | 0.02 | *** |
| Coefficient for school poverty | 0.76 | 0.07 | *** |
| Interaction of student and school poverty | -0.24 | 0.02 | *** |

Notes. The coefficients for student and school poverty should not be interpreted as main effects. Because the interaction models used group-mean centering, the coefficient for school poverty reflects both the school poverty effect and the student poverty effect. *** $p < .001$. β : Unstandardized coefficient. SE: Standard error. Sig: Statistical significance.



Title I results

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Research questions, continued

- How do the effects of student and school poverty vary based on school Title I eligibility and funding?

Results summary, continued

- Title I funding appears to significantly compensate for student poverty when it comes to academic outcomes
- Student poverty has the largest (detrimental) effect in schools that are *not eligible for Title I*

Effect sizes of **student** poverty by Schoolwide Title I status

| Outcome | All schools | Schoolwide Title I Status | | |
|---------------------------------------------------------------------|-------------|----------------------------|----------------------------------------|--------------------------------------|
| | | Not eligible (FARMS < 40%) | Eligible (FARMS >= 40%) but no funding | Eligible (FARMS >= 40%) with funding |
| HSA Algebra Score | 0.20 (-) | 0.28 (-) | 0.18 (-) | 0.06 (-) |
| SAT Math Score | 0.19 (-) | 0.28 (-) | 0.17 (-) | 0.07 (-) |
| Graduate from HS on time | 0.20 (-) | 0.53 (-) | 0.21 (-) | 0.03 (-) |
| Enroll in postsecondary within 1 year of graduating from HS on time | 0.20 (-) | 0.31 (-) | 0.15 (-) | 0.07 (-) |
| Ever graduate from HS | 0.19 (-) | 0.42 (-) | 0.22 (-) | 0.01 (-) |
| Drop out of high school | 0.16 (+) | 0.36 (+) | 0.22 (+) | 0.02 (+) |

Notes. (-): Direction of effect is negative. (+): Direction of effect is positive. Grey indicates not statistically significantly different from zero.

Effect sizes of **school** poverty by Schoolwide Title I status

| Outcome | All schools | Schoolwide Title I Status | | |
|---------------------------------------------------------------------|-------------|----------------------------|----------------------------------------|--------------------------------------|
| | | Not eligible (FARMS < 40%) | Eligible (FARMS >= 40%) but no funding | Eligible (FARMS >= 40%) with funding |
| HSA Algebra Score | 0.39 (-) | 0.57 (-) | 0.39 (-) | 0.35 (-) |
| SAT Math Score | 0.42 (-) | 0.60 (-) | 0.47 (-) | 0.38 (-) |
| Graduate from HS on time | 0.35 (-) | 1.41 (-) | 0.27 (-) | 0.31 (-) |
| Enroll in postsecondary within 1 year of graduating from HS on time | 0.23 (-) | 0.14 (-) | 0.07 (-) | 0.09 (-) |
| Ever graduate from HS | 0.13 (-) | 0.47 (-) | 0.05 (+) | 0.15 (-) |
| Drop out of high school | 0.11 (+) | 0.37 (+) | 0.11 (-) | 0.11 (+) |

Notes. (-): Direction of effect is negative .(+): Direction of effect is positive. Grey indicates not statistically significantly different from zero.

Next Steps

- Examine the associations between student and school poverty and workforce outcomes
- Examine additional protective effects that mitigate the negative role of poverty
- Publish research report to website



Questions and Suggestions?

DRAFT