



3rd Grade Reading, Child Poverty, and Economic Mobility in Tennessee

April 5, 2023

Key Takeaways

- Tennessee counties with higher child poverty rates tend to have lower standardized test scores and higher rates of abuse, neglect, and food-insecurity among youth.
 - About 23% of low-income 3rd graders met or exceeded expectations on state reading tests in 2017-2019. In some counties, those kids scored as much as 30 points lower than their higher-income peers.
 - A child's reading skills by the end of 3rd grade influence their odds of success in school and beyond — which means these gaps are important for understanding lifelong success.
 - Of the factors we explored, three helped explain differences in low-income 3rd graders' test scores across counties: other students' scores, socioeconomic comingling, and concentration of low-income students.
 - Our findings raise many important questions that warrant more exploration about the role of communities in supporting achievement and economic mobility for low-income Tennessee children.
 - Finding ways to encourage relationship-building across class lines and focused attention on areas of high poverty concentration could help promote better outcomes for all children.
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Background

When families don't have the resources to meet basic needs, children's health, education, and well-being suffer. (1) In [a prior report](#), we provided a picture of the children, families, and communities in Tennessee with the highest rates of child poverty — one measure of economic-well-being.

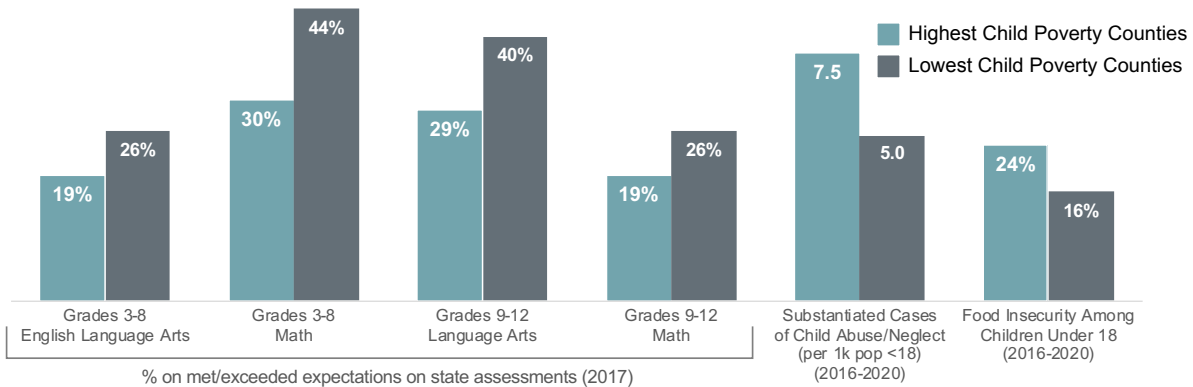
Here, we examine the connections between economic disadvantage and educational outcomes. By focusing on gaps in 3rd grade reading achievement, we explore the effects of community-level programs, policies, norms, and assets in Tennessee.

Child Poverty and Outcomes Across Tennessee

Tennessee counties with higher child poverty rates tend to have lower standardized test scores and higher rates of abuse, neglect, and food-insecure youth.¹ We explored several county-level measures to understand how youth outcomes differ between counties with high and low rates of child poverty.² Test scores, rates of abuse, neglect, and youth food insecurity all had meaningful and statistically significant relationships with county child poverty rates (**Figure 1**). Overall, these trends show that counties with high child poverty rates may face multiple challenges that impact child well-being. See the **Methods Appendix** of the prior report for more information about each measure and the full statistical results of our analyses.

Figure 1. Counties with the Highest and Lowest Child Poverty Rates Have Very Different Outcomes for Education and Well-Being

Averages for Lowest and Highest Child Poverty Counties



Note: Highest child poverty counties were the 20 counties with the highest 2016-2020 child poverty rates. Lowest were the 20 with the lowest rates. All metrics shown had a statistically significant linear relationship with county child poverty rates.

Sources: The Sycamore Institute's analysis of data from the U.S. Census Bureau and Kids Count (2) (3)

Academic Achievement of Low-Income Students

State data also show persistent gaps in academic performance between students who are economically disadvantaged and those who are not.³ In 2022, for example, only about 20% of economically disadvantaged 3rd graders in Tennessee had met or exceeded expectations for English language arts (ELA), according to the state's TNReady test — compared with 43% of their peers who were not economically disadvantaged. Similar disparities have persisted over time across grade level and subject matter (**Figure 2**). (4)

¹ We caution readers [not to mistake correlation with cause-and-effect](#). Correlation means that two factors move in the same or opposite directions at the same time. Causality means that changes in one factor led to changes in another. Establishing cause-and-effect requires more sophisticated research design — like statistical controls, experimental designs with random assignments or matching techniques, or longitudinal designs. Sometimes two data points may be correlated, but there is another factor at play.

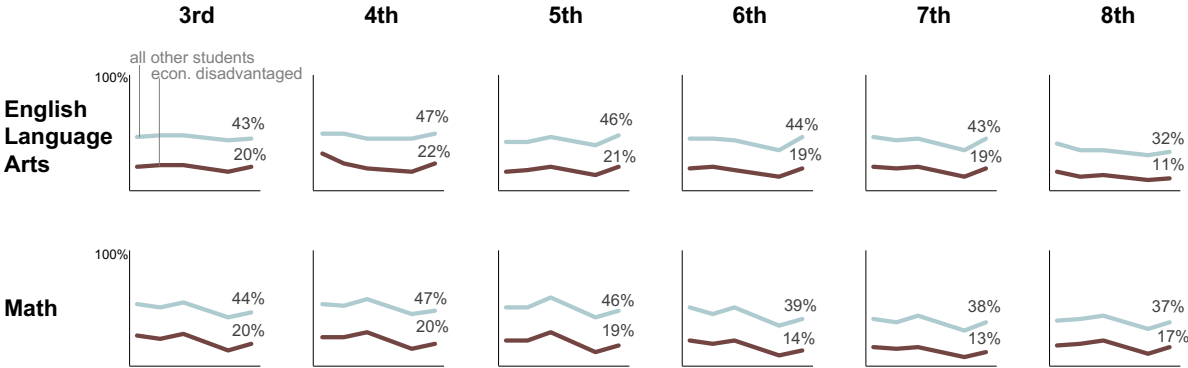
² Highest child poverty counties were the 20 counties with the highest 2016-2020 child poverty rates. Lowest were the 20 with the lowest rates.

³ Economically disadvantaged students are defined as those eligible to receive free or reduced-price school meals, as well as students who are migrants, experiencing homelessness, or in the foster care system. (38)

Gaps in test achievement also exist at the county level, but some counties have smaller disparities and higher achievement among economically disadvantaged students. Focusing on ELA, about 23% of economically disadvantaged 3rd graders across the state had met or exceeded expectations each year between 2017-2019, on average. This ranged from a low of 13% in Madison County to a high of 39% in Williamson County (Figure 3). The difference in achievement levels among economically disadvantaged students and their peers was as small as six percentage points in Lewis County (35% vs. 41%) to as big as 30 points in Trousdale County (27% vs. 57%) (Figure 4). (5)

Figure 2. Tennessee’s Economically Disadvantaged Students Have Lower Achievement on State Education Testing Than Their Peers

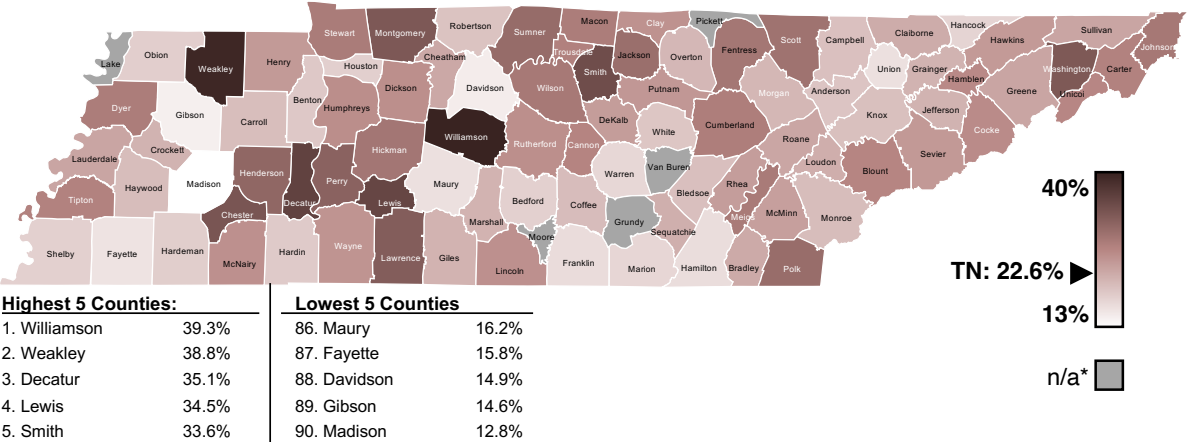
% of Students Meeting/Exceeding Subject Expectations on the TNReady Test by Grade (2017-2022*)



*Scores are not available for 2020 due to pandemic-related testing disruptions. Source: Tennessee Department of Education (4)

Figure 3. About 23% of Low-Income 3rd Graders Met or Exceeded Reading Expectations in 2017-2019

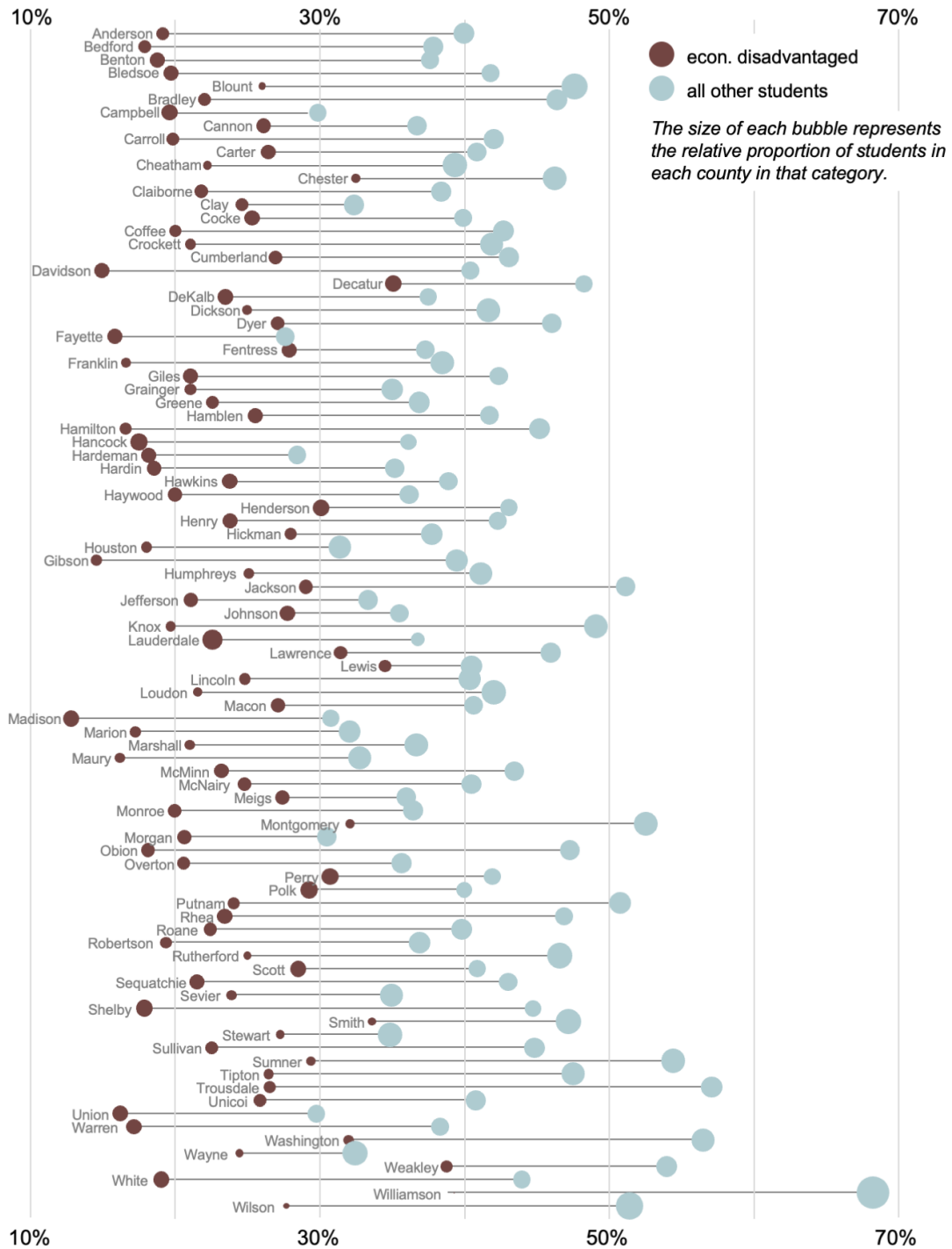
% of Economically Disadvantaged 3rd Graders Meeting/Exceeding English Language Arts Expectations on TNReady Test by County (2017-2019)



Averages of annual percentages for 2017-2019 (for the years where data were available) based on a sum of the relevant totals within all districts in each county. *Excludes 5 counties for which data were missing for all years. Source: The Sycamore Institute’s analysis of data from the Tennessee Department of Education (5)

Figure 4. Disparities in 3rd Grade Reading Achievement by Economic Status Vary Widely Across Tennessee Counties

% of 3rd Graders Meeting/Exceeding Expectations on English Language Arts TNReady Test by County* (2017-2019)



*Averages of annual percentages for 2017-2019 (for the years where data were available) based on a sum of the relevant totals within all districts in each county. Excludes 5 counties for which data were missing for all years. Source: The Sycamore Institute's analysis of data from the Tennessee Department of Education (5)

Why Academic Achievement Matters

A child's reading skills by the end of 3rd grade impact their odds of success in school and beyond — which means these gaps are important for understanding lifelong success. (6) Efforts to promote success among low-income children often look to their 3rd grade reading scores as a way to boost their chances of having more resources (economic mobility) and better life outcomes by raising the likelihood of graduation and college attendance rates. (7)(8)

Explaining County Variation in Achievement for Low-Income Students

We explored multiple community assets and characteristics to better understand why some counties have higher test scores and smaller achievement gaps for low-income students. Prior research suggests that household characteristics may play the largest role in a child's educational achievement but that community-level characteristics also shape outcomes. (9) (10) (11) These include things like school funding, access to supports in and outside the school system, concentrated poverty, adult educational attainment, and classroom size. (6) (12) (13) (14) We analyzed these and other characteristics (**Table 1**) in an attempt to explain the range of outcomes shown in **Figure 4**.

What We Found

Of the factors we explored, three helped explain differences in low-income 3rd graders' test scores: other students' scores, socioeconomic comingling, and concentration of low-income students. Counties with higher ELA test scores for economically disadvantaged 3rd graders tended to have lower concentrations of low-income students, better scores among other students, and more social connection across economic lines (**Figure 5**). These relationships were both meaningful and statistically significant in regression analyses (see Tables A5-A6 in the **Appendix**). Of the three, the most important in understanding county differences was scores among non-economically disadvantaged students. Many of the other factors explored in **Table 1** were correlated with better test scores among non-economically disadvantaged 3rd graders but not economically disadvantaged ones (see Table A3 in the **Appendix**).

Prior research supports the idea that more social connection across economic lines may foster better outcomes and more social and economic mobility among low-income children. (15) (16) (17) Economic connectedness — or socioeconomic comingling — is one type of social capital, which describes the value people gain from connections and resources available in their community and personal network. Here, economic connectedness includes friendships between individuals of high- and low-socioeconomic status — as measured by social media interactions. (15) Similar to our findings, the original research found that economic connectedness was more important than other measures in predicting economic mobility (i.e. how many low- and middle-income children would move to the top 20th income percentile in adulthood). (15) (16)

We also found economic connectedness to be strongly and significantly correlated with lower poverty rates and higher median household income and adult education levels. However, these economic indicators did not predict better test scores among economically disadvantaged students (see Table A5 in the **Appendix**).

See the **Appendix** for more information about each measure and the full statistical results of our analyses.

Table 1. What Community Characteristics Help Explain County Differences in Test Scores Among Low-Income 3rd Graders?

Key		*	Statistically significant association.
		x	No statistically significant association.
Community Demographics	1	2	
	x	x	% of population that is a race/ethnicity other than white, non-Hispanic
	x	x	% of children living in single-parent households
	x	x	% rural
Educational Achievement	*	*	higher test achievement among non-economically disadvantaged students
	x	x	% of adults age 25+ with some college but no degree
	x	x	% of adults age 25+ with at least an associate's degree
	x	x	% of adults age 25+ with at least a bachelor's degree
	x	x	% of adults age 25+ with a graduate degree
Economic Well-Being	*	*	more economic connectedness
	x	*	lower % of all test-takers who were economically disadvantaged
	x	x	overall poverty rate
	x	x	child poverty rate
	x	x	income difference between high- and low-income households
	x	x	unemployment rate
Education Investments	x	x	per-pupil spending
	x	x	student-teacher ratio
	x	x	student-provider* ratio
Access to/ Uptake of Resources	x	x	% of children under 18 who were food insecure
	x	x	% of households in poverty receiving SNAP

¹ Bivariate analyses (see Table A3 of Appendix). Statistically significant associations are those relationships with a p-value less than 0.05.

² Regression analyses (see Tables A5-A6 of Appendix). Statistically significant associations are those that explained differences in test scores on their own or when controlling for other county-level factors in regression analyses.

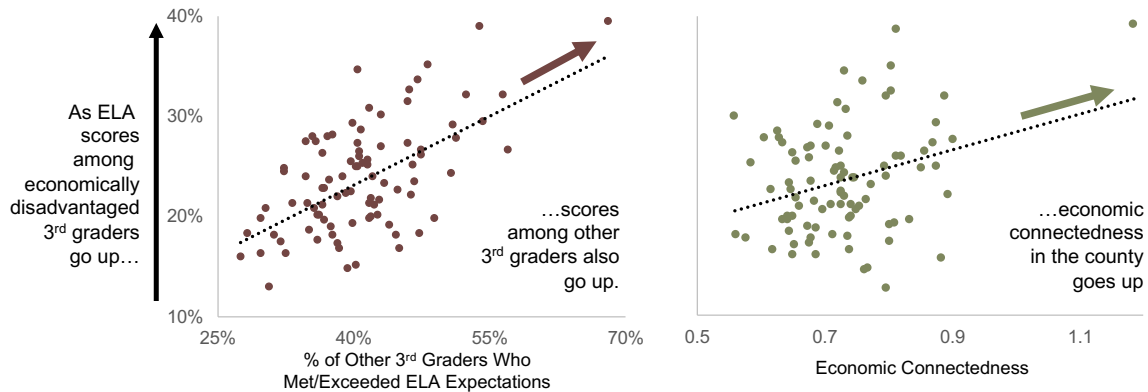
* Providers include the counselors, psychologists, nurses, social workers, and other health providers reported by school districts to the Tennessee Department of Education.

See our Appendix for full definitions of each measure and the full results of the analyses.

Source: The Sycamore Institute's analysis of data from the Tennessee Department of Education, Kids Count, Opportunity Atlas, U.S. Census Bureau, and U.S. Bureau of Labor Statistics (16) (3) (2) (18) (19)

Figure 5. Counties Where Low-Income 3rd Graders Scored Better Had More Social Capital and Better Scores Among Other Students

% of Economically Disadvantaged 3rd Graders Meeting/Exceeding TNReady English Language Arts Expectations by County* vs. Other County Characteristics



*Averages of 2017-2019 annual percentages (for the years where data were available) based on a sum of the relevant totals within all districts in each county. Excludes 5 counties for which data were missing for all years. Each relationship was meaningful and statistically significant in both bivariate and regression analyses. Not shown is the relationship with the concentration of economically-disadvantaged students, which was only statistically significant in regression analyses when controlling for other county factors.

Source: The Sycamore Institute's analysis of data from the Tennessee Department of Education and Opportunity Insights (5) (18)

Limitations

Our findings raise many important questions that warrant more study about the role of communities in supporting economic mobility among low-income children in Tennessee. For example, existing research shows that community-level factors influence test performance and economic outcomes for low-income students. (12) (13) (6) (14) We attempted to explore some of these relationships in Tennessee, but our county-level analyses did not account for other factors on the school or district level that may affect the learning environment and student performance — such as school-level resources (e.g. funding, support staff), years of teacher experience, and teacher diversity, among others. These and other potential drivers deserve more thorough analysis in the future.

Why It Matters

Research like this seeks to better understand how new and existing policy and community levers could help achieve better outcomes for low-income children. Our state and federal governments already fund dozens of programs aimed at helping kids and their families not only survive but thrive. For example:

- **TennCare** — As of February 2023, TennCare — Tennessee's state-operated [Medicaid](#) program — provides health coverage to over 900,000 children in low-income households. (20) In FY 2020, TennCare spent over \$3 billion on child enrollees — which were jointly covered by state and federal dollars. (21) The governor's FY 2024 budget also [proposes](#) providing eligible children with 12 months of continuous coverage regardless of changes in income or family size. TennCare seeks to improve lives towards a "vision of a healthier Tennessee." (22)

- **SNAP** — As of September 2022, Tennessee’s [Supplemental Nutrition Assistance Program](#) (SNAP) provided grocery stipends to over 800,000 low-income children and their parents. (23) These benefits are administered by the state but federally-funded and totaled over \$3 billion in federal fiscal year (FY) 2021. (24)
- **Earned-Income Tax Credit** — In 2021, over 600,000 low- and moderate-income working families with children were credited \$1.5 billion. (25) The EITC reduces eligible families’ federal income tax burden and is fully refundable for households that do not owe taxes.
- **Head Start** — In federal FY 2021, the U.S. government spent over \$182 million to provide Head Start early learning services to about 16,500 low-income children in Tennessee. (26) Head Start is federally-funded and -administered.
- **Child Care Assistance** — Tennessee spent about \$195 million in federal funds to provide childcare assistance to over 22,000 low-income children each month, on average, in federal FY 2020. (27) (28)
- **WIC** — In federal FY 2022, Tennessee received \$134 million in federal funding to support nearly 114,000 low-income mothers and infants under the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). (29) (30) WIC is aimed at “improving the health of pregnant women, new mothers, and their infants.” (31)
- **Families First** — As of September 2022, the Families First program aided nearly 30,000 low-income children and their parents. (32) In federal FY 2020, Tennessee spent about \$74 million in federal funds and \$90 million in state money on these activities. (33) Families First is Tennessee’s [Temporary Assistance for Needy Families](#) (TANF) program, which provides temporary cash assistance, transportation, child care assistance, job training, and employment activities meant to develop self-sufficiency among participants. (34)

Money spent through these programs lifts people out of poverty, but the ability of each program to produce better outcomes is not always clear. The U.S. Census Bureau’s supplemental poverty measure accounts for 17 different federal benefits (e.g. SNAP, WIC, Social Security) and certain household expenses not counted in the [official poverty measure](#). Between 2019 and 2021, about 12.2% of all Tennesseans had incomes under the official poverty measure. After considering the value of these benefits, Tennessee’s supplemental poverty measure rate fell to 9.1%. In other words, these programs lifted about 214,000 Tennesseans out of poverty during that period. (3)

Considerations and Parting Words

Although our findings leave much to be studied, they support the idea of exploring and monitoring two key levers to improve outcomes for low-income children.

1. **Finding ways to encourage relationship-building across class lines may help promote better outcomes for low-income children.** Existing research on the topic has had mixed

results. (35) Observational studies similar to this report have found strong associations between social capital and student test performance, but interventions to increase social capital among students have found limited evidence of impact on student test performance. (36) Nevertheless, fostering connections between high- and low-socioeconomic status individuals may generate opportunities, resources, and knowledge that help economically disadvantaged students succeed. Ideas to explore include more student collaboration in schools, mentor and networking opportunities among individuals with diverse backgrounds, and ways to foster more economically integrated communities. (37)

- 2. Focused attention on places with higher concentrations of low-income students could produce better outcomes for all local students.** Given the role that concentrated poverty appears to play in test performance — both for students who are economically disadvantaged and those who are not — policies focused on these areas might benefit all student groups in counties with high proportions of economically disadvantaged students. For example, Tennessee’s new school funding formula allocates additional money for economically disadvantaged students and counties with concentrated poverty. (38)

**This paper was updated on April 13, 2023 to add supplementary references and greater clarity to the discussion of our findings.*

***The paper was updated on April 17, 2023 to correct a mistake in the key in Figure 1.*

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Appendix

This Appendix provides additional information on our methods and results of our search for connections between economic disadvantage/child outcomes and the effects of community-level programs, policies, norms, and assets in Tennessee.

Table A1. Metrics and Data Sources

Community Characteristic	Definition	Years	Source
Community Demographics			
Non-white population	% of population that is a race/ethnicity other than white, non-Hispanic	2016-2020 5-year estimate	American Community Survey (3)
Rurality	% of population that lives in an area considered rural	2010	U.S. Census Bureau (3)
Children in single-parent households	% of children living in households headed by an unmarried parent	2016-2020 5-year estimate	American Community Survey (3)
Educational Achievement			
Some college, no degree	% of residents 25+ finishing some college	2016-2020 5-year estimate	American Community Survey (3)
Associate's degree or more	% of residents 25+ with at least an associate's degree	2016-2020 5-year estimate	American Community Survey (3)
Bachelor's degree or more	% of residents 25+ with at least a bachelor's degree	2016-2020 5-year estimate	American Community Survey (3)
Graduate degree	% of residents 25+ with a graduate or professional degree	2016-2020 5-year estimate	American Community Survey (3)
Economic Well-Being			
Economic connectedness	Average share of above-median SES friends among below-median SES members in a community divided by 50%	Indicator published 2022	Opportunity Insights, Chetty et al. 2022 (19)
Unemployment rate	% of population 16 and older who were unemployed but seeking work	2018-2020 average	Bureau of Labor Statistics (<i>as reported by County Health Rankings</i>) (39)
Income ratio	Ratio of high income (80th percentile) to low income (20th percentile)	2016-2020 5-year estimate	American Community Survey (<i>as reported by County Health Rankings</i>) (39)
Median household income	Median household income	2016-2020 5-year estimate	American Community Survey (3)
Child poverty rate	% of children under 18 living in poverty	2016-2020 5-year estimate	American Community Survey (3)
Poverty rate (all ages)	% of residents living in poverty	2016-2020 5-year estimate	American Community Survey (3)

(continued)

Community Characteristic	Definition	Years	Source
Economic mobility – middle to high income	Probability of moving from middle income status in childhood to top 20% in adulthood	Adults born between 1978-1983 in homes at 50th percentile of incomes nationwide who are now in top 20% of household incomes for their cohort	Opportunity Atlas (19)
Economic mobility – low to high income	Probability of moving from low-income status in childhood to top 20% in adulthood	Adults born between 1978-1983 in homes at 25th percentile of incomes nationwide who are now in top 20% of household incomes for their cohort	Opportunity Atlas (19)
Child Outcomes			
Youth unemployment	% of those 16-19 who are unemployed but seeking work	2016-2020 5-year average	TCCY analysis of Tennessee Department of Labor and Workforce Development data and U.S. Census Bureau data (2)
Food insecurity	% of children under 18 who lack access at times for enough food for an active healthy life	2016-2020 5-year average	TCCY analysis of Feeding America, Map the Meal Gap *2020 is projected (2)
TNReady 3-8 math	% of students in grades 3-8 who scored on track or mastered on the math TNReady test	2017	TCCY analysis of TN Department of Education (2)
TNReady 3-8 ELA	% of students in grades 3-8 who scored on track or mastered on the English language arts TNReady test	2017	TCCY analysis of TN Department of Education (2)
Substantiated child abuse/neglect rate	Unduplicated count of substantiated child abuse and neglect cases per 1k population under 18	2016-2020	TCCY analysis of TN Department of Children's Services case data and TN Department of Health population data (2)
3rd Grade ELA score met/exceeded expectations for economically disadvantaged students	% of 3rd graders who are economically disadvantaged that met or exceeded expectation/were on track or mastered on the English Language Arts TNReady test	average of available data for 2017-2019*	Tennessee Department of Education (5)
3rd Grade ELA score met/exceeded expectations for non-economically disadvantaged students	% of 3rd graders who do not meet criteria for economically disadvantaged that met or exceeded expectation/were on track or mastered on the English Language Arts TNReady test	average of available data for 2017-2019*	Tennessee Department of Education (5)

(continued)

Community Characteristic	Definition	Years	Source
% of students who are economically disadvantaged	% of 3rd grade ELA test takers who met criteria for economically disadvantaged out of all students	average of available data for 2017-2019*	Tennessee Department of Education (5)
Measures of Access to Resources and Support			
SNAP receipt out of households in poverty	% of households below poverty level who received SNAP benefits	2016-2020 5-year estimates	American Community Survey (3)
Educational Investments			
Per pupil spending	The dollar amount spent per pupil in a county	2016-2020 average	Tennessee Department of Education (18)
Student-teacher ratio	County-level ratio of teachers to students (average daily membership) in a classroom	2016-2019 average	Tennessee Department of Education (18)
Student-provider ratio	Ratio of providers (counselors, psychologists, nurses, social workers, and other health providers) to students (average daily membership) in a county	2016-2020 average	Tennessee Department of Education (18)

Source: The Sycamore Institute's analysis of data from the TN Dept. of Education, U.S. Department of Education, Kids Count, Opportunity Atlas, and U.S. Bureau of Labor Statistics (16) (3) (2) (18)

*Includes counties that may have been missing 1-2 years of data. In these cases, we used the average of the available years. Excludes the following 5 counties for which data were unavailable for all 3 years: Greene, Lake, Moore, Pickett, and Van Buren.

Table A2. Bivariate Associations Between County 5-Year Child Poverty Rates and Child Outcomes across Tennessee’s 95 Counties

Child Outcomes	Correlation Coefficient *	P Value
Youth unemployment	0.0860	0.4075
TNReady 3-8 math	-0.5347*	P<0.0001
TNReady 3-8 ELA	-0.5454*	P<0.0001
Substantiated child abuse/neglect rate	0.4870*	P<0.0001
Food insecurity	0.7683*	P<0.0001

*Statistically significant associations are those with a p-value of 0.05 or less. Correlation coefficients range from -1.0 to + 1.0.

Source: Sycamore’s analysis of ACS 5-Year Estimates 2016-2020, Tennessee Department of Education data, and Tennessee Commission on Children & Youth’s analysis of Tennessee Department of Labor and Workforce Development data. (3) (18) (2)

We conducted bivariate analyses by county to see which community characteristics trended up or down with student test scores (Table A3). We also conducted bivariate analyses for economic indicators to see how much they correlated with each other (Table A4).

As a next step, we estimated Ordinary Least Squares (OLS) regressions for county characteristics to see how they were associated with test scores among economically disadvantaged (ED) students (Table A4).

We regressed ED student test scores on economic indicators and general community characteristics (Tables A5-A6). This allows us to discern how much these factors are related to student test scores and how much they may relate to each other.

We find that higher levels of economic connectedness predict better test scores among economically disadvantaged students (Table A5). However, even with all economic indicators included, the model only accounts for 7% of variance of ED student test scores. We expect that additional factors not included in this report drive differences in ED student test scores.

In Table A6, we find that the strongest predictors of higher ED student test scores are non-ED student test scores and a lower percentage of students who are economically disadvantaged out of all test takers. Notably, the latter was not significant until rurality was accounted for in the model, as rural counties in Tennessee are more likely to have higher proportions of economically disadvantaged students. The percentage of non-white residents in a county had no effect on ED student test scores. With all factors combined, the model accounts for about 45% of the variance in ED student test scores.

Note: Additional regression analyses were conducted on factors included in Table 1 with nonsignificant results. The results of those analyses are not included in the Appendix.

Table A3. Bivariate Associations Between County Test Scores and Community Characteristics

Community Characteristics	% 3rd Grade Met/Exceeded ELA Expectations for ED Students	% 3rd Grade Met/Exceeded ELA Expectations for non-ED Students
Poverty rate (all ages)	-0.1206 p=0.2574	-0.4200* P<0.0001
Child poverty rate	-0.1302 P=0.2212	-0.4209* P<0.0001
% of students who are ED	-0.1048 P=0.3201	-0.2810* P=0.0070
Food insecurity	-0.1052 P=0.3238	-0.4301* P<0.0001
% SNAP receipt out of households in poverty	-0.1153 P=0.2794	-0.3612* P=0.0005
Income ratio	-0.1458 P=0.1703	-0.2366* P=0.0248
Unemployment rate	-0.1657 P=0.1185	-0.2538* P=0.0158
Economic connectedness	0.3077* P=0.0032	0.4679* P=0.0001
Children in single-parent households	-0.1126 P=0.2908	-0.0698 P=0.5134
Rurality	0.0176 P=0.8695	-0.4287* P<0.0001
Non-white population	-0.1038 P=0.33	0.1229 P=0.2485
Per pupil spending	-0.1719 P=0.11	-0.1091 P=0.31
Student-teacher ratio	-0.0713 P=0.500	.2842* P=0.01
Student-provider ratio	0.0485 P=0.650	.0239 P=0.82
Some college, no degree	0.0285 P=0.7894	0.1191 P=0.2636
Associate’s degree or more	0.1298 P=0.2228	0.5329* P<0.0001
Bachelor’s degree or more	0.1260 P=0.2367	0.5365* P<0.0001
Graduate degree	0.0878 P=0.4104	0.5005* P<0.0001

Note: Statistically significant associations* are those with a p-value of 0.05 or less. Correlation coefficients range from -1.0 to + 1.0.

Source: The Sycamore Institute’s analysis of data from the TN Dept. of Education, U.S. Department of Education, Kids Count, Opportunity Atlas, and U.S. Bureau of Labor Statistics (16) (3) (2) (18)

Table A4. Bivariate Associations Between Economic Connectedness and Other Measures of Economic Well-Being

Measures of Economic Well-Being	Correlation Coefficient
Poverty rate (all ages)	-0.06885* P<0.0001
Economic mobility - low income to high income	0.5280* P<0.0001
Economic mobility - middle income to high income	0.4237* P<0.0001
Median household income	0.7848* P<0.0001
% of students who are ED	-0.6253* P<0.0001

*Statistically significant associations are those with a p-value of 0.05 or less. Correlation coefficients range from -1.0 to + 1.0.

Source: The Sycamore Institute’s analysis of data from the U.S. Census Bureau, Tennessee Department of Education, and Opportunity Insights. (18) (3) (19)

Table A5. OLS Regression: Associations Between Indicators of Economic Well-Being and Economically Disadvantaged Student Test Scores

Measures of Economic Well-Being	% 3rd Grade Met/Exceeded ELA for ED Students			
	1	2	3	4
Economic connectedness	0.1782* (0.07)		0.2438* (0.12)	0.2484* (0.09)
Income ratio		-0.0148 (0.01)		-0.0093 (0.01)
Median household income			-7.08e^07 (1.02e^06)	-9.65e^07 (8.54e^07)
Observations	90	90	90	90
R-squared	0.0947	0.0213	0.1031	0.0782

Note: Robust standard errors are reported in parentheses.

*Statistically significant associations are those with a p-value of 0.05 or less.

Source: The Sycamore Institute’s analysis of data from the U.S. Census Bureau, Tennessee Department of Education, and Opportunity Insights. (18) (3) (19)

Table A6. OLS Regression: Associations Between County Characteristics and Economically Disadvantaged Student Test Scores

County Characteristics	3rd Grade ELA Score on Track for ED Students			
	1	2	3	4
% of students who are ED	-0.065 (0.11)	-0.2257* (0.07)	-0.0670 (0.05)	-0.0627 (0.05)
3rd Grade met/exceeded ELA expectations for non-ED students			0.0054* (0.00)	0.0054* (0.00)
Rurality		0.0001 (0.00)	0.0007* (0.00)	0.0006* (0.00)
Non-white population				-0.0148 (0.05)
Observations	92	90	90	90
R-squared	0.0110	0.1087	0.4487	0.4494

Note: Robust standard errors are reported in parentheses. *Statistically significant associations are those with a p-value of 0.05 or less.

Source: The Sycamore Institute’s analysis of data from the U.S. Census Bureau, Tennessee Department of Education, and Opportunity Insights. (18) (3) (19)