



The Middle Class Is Key to a Better-Educated Nation

A Stronger Middle Class Is Associated
with Better Educational Outcomes

David Madland and Nick Bunker November 2011



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Introduction and summary

Education is key to America's economic success as technological change and global competition increase exponentially. Unfortunately, where once our nation was atop the world academically, today American students rank in the middle of the pack. Fifteen countries now have higher college graduation rates than us, and our average test scores are lower than those of not just peer countries but also less-wealthy places such as Slovenia and Poland.¹

Not surprisingly, business leaders and the American public are concerned about the quality of American education.² There are myriad proposals about how to improve the U.S. education system. Yet a critical but often overlooked reason for our poor educational achievement is the decline of the American middle class over the past four decades.

America today is less of a middle-class society as the wealthy capture most of the economy's gains. The top 1 percent's share of income reached 23.5 percent in 2007, the last year before the Great Recession, up from 9.12 percent in 1974. Over this same time period, the share of income going to the middle class, defined as the middle 60 percent of the population, fell to 46.9 percent from 52.2 percent, and the share of income going to the bottom 20 percent stayed at roughly 3 percent, declining by less than 1 percentage point.³

When poor and lower-income Americans can't work their way into the middle class, and when the middle class sees its share of income shrinking, that harms our nation's educational achievement in several ways. Societies with a strong middle class make greater investments in education—as described in detail and quantified in our companion report, ["Middle Class Societies Invest More in Public Education"](#)—and all else being equal, higher levels of spending tend to boost educational performance.⁴

At the family level, people living in strong middle-class societies are more likely to get involved in making their children's schools better, pushing to raise educational

standards, and putting pressure on school administrators to fire or transfer bad teachers.⁵ And some of the culture and behaviors that middle-class parents pass on to their children about education, such as valuing school achievement and attending school, are thought to come from their middle position in society with a level of income and security that makes them neither rich nor poor.⁶ All of this helps boost educational achievement. What's more, in more middle-class societies, citizens—rich, poor, and middle class alike—tend to be healthier and healthier students do better academically.⁷

Finally, expectations for educational performance can have a significant impact on educational outcomes. Societies sometimes have lower expectations for those at the bottom of the economic spectrum—an effect that may be more pronounced in societies with a weaker middle class.⁸ In contrast, societies that expect everyone to excel in school if given the opportunity boast more students doing better and going onto college.⁹

To quantify the impact of the middle class on educational achievement, we examined math scores in all 50 states between 2003, the first year data on all states are available, and 2009, the most recent year complete data are available. We found that a weaker middle class is associated with significantly lower levels of math performance. Our results held even when controlling for a host of other factors that affect outcomes, such as the state's income level, childhood poverty rates, and the percentage of students who are English language learners.

Our results indicate that a stronger middle class is associated with higher test scores, separate and above any effects of poverty, overall income levels, and the percentage of non-English speakers. In short, the “middle-classness” of a state directly influences its educational achievement.

Specifically, we found that each percentage point increase in the share of income going to the middle class is associated with an increase of 0.69 points on the National Assessment of Educational Progress composite scale for math.

Our study suggests that if the middle class received the same share of income as it did in the 1960s—approximately 7 percentage points more—then the median state, which had a math score of 284 in 2009, would have a score 4.83 points higher today. If just a single state—for example, Florida, which currently ranks 16th from the bottom on standardized tests—boosted its middle-class income share by 7 percentage

In more middle-class societies, citizens—rich, poor, and middle class alike—tend to be healthier and healthier students do better academically.

points, the results suggest that its scores would rise to the level of the states with the median score—Delaware, Iowa, and North Carolina in 2009.

To put this in context, a \$20,000 increase in a state's gross domestic product per capita—the commonly used measure of a state's income level—results in about an eight-point increase in math scores. Such an increase in per capita GDP would be about the same increase the United States experienced between 1967 and 2009.

In the pages that follow, we will present the array of academic research on this topic that supports the premise of our paper, and then detail the school and nonschool functions that a strong middle class supports in our education system and our society. We turn next in the paper to the specific results of our analysis, which find that a stronger American middle class is associated with higher levels of academic achievement.

The academic research

Linking a strong middle class to better education

A significant body of academic research finds that countries with lower levels of economic inequality do better academically than countries with greater levels of economic inequality.¹⁰ This research tends to examine reading, math, or science scores on standardized tests, finding that on average students in more equal countries have higher test scores.

Importantly, this research finds that a more equal income distribution boosts the performance of all students, not just those at the bottom. The poor may benefit most from being in a more egalitarian society, but those at the top also benefit. Dennis Condron, an Emory University sociologist, finds that more economically equal countries actually have higher percentages of very highly skilled students than do less egalitarian countries.¹¹ Similarly, Richard Wilkinson, a University of Nottingham professor, and Kate Pickett of the University of York argue in *The Spirit Level* that lower levels of economic inequality increase academic performance, even for students with high socioeconomic status.¹²

The literature linking inequality and academic performance generally controls for a country's income level as well as for a host of other factors that also influence test scores. Some of these studies also control for the poverty level in a country.¹³ By controlling for total income and poverty levels, as well as other factors, the academic literature on country-level educational achievement makes a compelling case that the relative distribution of income in a society affects educational performance.

Research at the student and school level has also come to similar conclusions, finding that middle-class students and schools tend to have, for example, higher test scores, lower dropout rates, and better academic and career achievements in the future.¹⁴ Many of these studies also control for income and poverty levels.

In short, the empirical literature strongly suggests that the “middle-classness” of a society affects educational outcomes, though the research does not often directly examine the impact of the middle class, instead focusing on other measures of inequality. Similarly, many of the theoretical arguments made by researchers about

unequal societies are also likely to be relevant to the effects on the middle class, though they are not always made directly about the middle class.

This is especially true because over the past few decades in the United States and other advanced countries, changes in inequality are largely about the rich pulling away from not just the poor but also (and especially) the middle class. The middle class and the poor both experienced relative income decreases that are significant compared to the top, but the decline in the relative share of income going to the middle class is especially stark.

In the United States from 1979 to 2007, as the share of national income going to the top 1 percent increased by more than 14 percentage points, the share of income going to the middle 60 percent declined by 4.7 percentage points, compared to a decline of just 0.7 percentage points for the bottom 20 percent.¹⁵ The same trend is also apparent internationally. The share of income going to the rich rose dramatically in a number of developed countries, including the United Kingdom, Australia, and Canada, largely at the expense of their middle class.¹⁶

In short, the trends driving inequality are largely because of runaway incomes at the top, which distanced the rich from the rest of society and weakened the middle class.

This study builds on existing research to argue that a strong middle class boosts educational achievement in U.S. states. We are aware of only one other study that examines state-level inequality and its effect on educational achievement. This study finds that inequality reduces test scores, though the analysis does not control for other factors that are commonly found to impact test scores, such as income.¹⁷

Because the economic literature on this topic finds income distribution effects academic achievement at the country, school, and individual levels, we have strong expectations that a stronger middle class is very likely to also boost educational performance in U.S. states.¹⁸

Why a strong middle class boosts achievement

The reasons why middle-class societies have better educational outcomes tend to fall into two broad categories: school-funding explanations and nonschool-funding explanations. Researchers sometimes emphasize one account over the other but generally find that both are at play. Let's look at each in turn.

School-funding connections

Countries and states with strong middle classes tend to spend more on education and, all else being equal, higher levels of spending tend to lead to higher levels of achievement.¹⁹ As described at length in our companion report, "[Middle Class Societies Invest More in Public Education](#)," middle-class societies invest more in public goods such as education because the economic future of the middle class is more closely tied to the quality of public education than is the economic future of the rich. And a strong middle class boasts the political power to push for their desired level of funding. Furthermore, middle-class societies are more trusting of people they don't know—and trust increases all people's support for spending on public education that they may not directly benefit from.

To be sure, there is much room to improve the efficiency of current levels of education spending.²⁰ But all else being equal, higher levels of spending lead to improved outcomes.²¹

Importantly, there is good reason to expect that increased spending from a stronger middle class would be spent in ways that boost achievement. Middle-class societies tend to spend government money more efficiently than unequal societies, with less waste, fraud, and abuse.²² And researchers also find that more equal countries spend their education resources more equitably, ensuring most students have sufficient resources, not just the privileged.²³

Nonschool-funding connections

There are numerous nonschool-funding explanations for why middle-class societies have higher levels of academic achievement. The reasons range from more engaged parents to increased levels of public health to higher expectations.

Consider first, the efforts of middle-class parents in pushing for higher academic standards and putting pressure on administrators to fire or transfer bad teachers boosts educational achievement.²⁴

Because paying for private school imposes a much greater, and sometimes impossible, hardship on middle-class families than it does on the wealthy, the middle class has an especially strong incentive to invest their time and energy to make public schools work. In addition, in more equal societies, people are more likely to think their actions can make a difference and thus are more likely to participate in political activities such as volunteering to improve a school.²⁵

As a result, people living in middle-class societies are more likely to get involved to make their children's schools better, while people living in unequal societies are more likely to remain on the sidelines. As America became less of a middle-class society, political participation significantly decreased.²⁶ Indeed, membership in Parent Teacher Associations, a predominantly middle-class organization, declined dramatically as the middle class declined in the United States.²⁷

Then there's the question of time. As incomes for the rich rise rapidly and wages stagnate for the middle class, many middle-class Americans have had to significantly increase their hours of work—in large part by women moving into the paid workforce—which reduces the time and energy Americans have for volunteering to improve their children's schools.²⁸

More equal societies also tend to be healthier. The rich, poor, and middle class all tend to be healthier in more middle-class societies.²⁹ In contrast, inequality can harm public health in several ways, specifically by:

- Reducing investment in public health efforts³⁰
- Undermining social cohesion and networks³¹
- Causing frustration and work stress that leads to reduced health³²

This is a major problem because healthier students score better on standardized tests. Research by Phillip B. Levine and Diane Schanzenbach, economists at Wellesley

In more equal societies, people are more likely to think their actions can make a difference and thus volunteer to improve a school.

College and Northwestern University respectively, find that children who are healthier score higher on the National Assessment of Educational Progress tests.³³

Cultural expectations may also be defined by the size of a nation's middle class. Societies sometimes have lower educational expectations for those at the bottom of the economic spectrum.³⁴ And society's expectations for educational performance can have a significant impact on achievement.³⁵ As the rich pulled away from the poor and especially the middle class over the past several decades, the social distances are now greater, which could make elite expectations especially low for the poor and middle class.³⁶

Finally, some of the culture and behaviors that middle-class parents pass on to their children about education are thought to come from the unique economic position of the middle class. Unlike the rich, the middle class has more of an economic need to work for a living and thus values education for its potential economic returns. Yet unlike the poor, the middle class has greater economic resources to delay gratification and make investments in human capital.³⁷ These middle-class values and behaviors, such as valuing school achievement and attending school, promote educational achievement.³⁸ In especially unequal societies, people on the bottom end may be more likely to reject these values and develop an oppositional culture or lose their sense of control over their destiny if they don't see a clear path to success.³⁹

In sum, there are a number of ways in which a strong middle class might be expected to increase educational outcomes. Figure 1 demonstrates how this dynamic plays out in a state-by-state evaluation of a strong middle class and better educational outcomes.

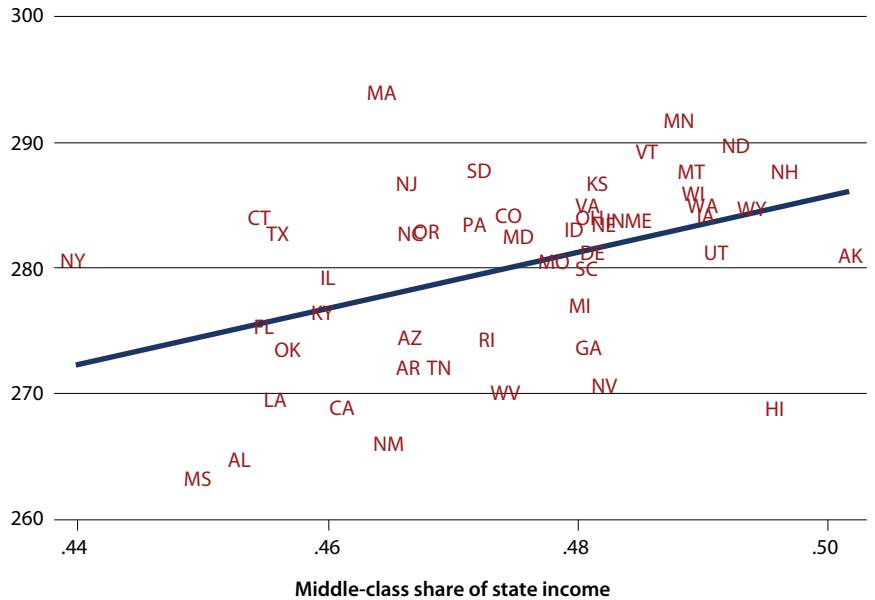
We turn now to an analysis of the data that underpins this chart.

FIGURE 1

States with stronger middle classes have better education outcomes

Scores on standardized tests are correlated with the share of income going to the middle class

NAEP math scores



Sources: Data are the averages of the data for 2009, 2007, 2005 and 2003.

The math scores are the composite score index for 8th grade students and are from the National Assessment of Education Progress.

The middle class share is the share of income going to the middle 60 percent of the income distribution and the data are from the Current Population Survey and the American Community Survey.

Results

To examine the relationship between the middle class and educational achievement, we analyze state standardized math test scores for eighth-grade students in all 50 states from 2003 to 2009, the first year data are available on all states to the most recent year complete data are available. We control for a range of variables that have been found to affect educational achievement, including state income levels, state childhood poverty rates, and the share of students who are English language learners. By controlling for state wealth and poverty, as well as other factors, we attempt to measure the effect of the “middle-classness” of a state.

We find a strong and statistically significant relationship between the strength of the middle class and math scores. Additional details on our analysis are available in the appendix. Our results are similar even when using different econometric techniques, indicating that our results are quite robust.

In our main model, we find that a 1 percentage point increase in the share of income received by the middle class is associated with an increase of 0.69 points on the National Assessment of Educational Progress composite scale for math. The median score on the math test in 2009 was 284. The relationship is statistically significant at beyond the 5 percent level, meaning the results are unlikely to occur by chance. (More detailed analysis of the data is in the appendix.)

Our study suggests that if the middle class received the same share of income as it did in the 1960s—approximately 7 percentage points more—then the score for math would be 4.83 points higher. If just a single state—for example, Florida, which currently ranks 16th from the bottom on standardized tests—boosted its middle-class income share by 7 percentage points, the results suggest that its scores would rise to the level of the states with the median score—currently Delaware, Iowa, and North Carolina. To put this in context, a \$20,000 increase in a state’s gross domestic product per capita—a commonly used measure of a state’s income level—results in about an eight-point increase in math scores. Such an increase in per capita GDP would be about the same increase in the United States experienced between 1967 and 2009.

For our other control variables, results are consistent with other studies and are as expected: We find that both the percent of students who are English language learners and childhood poverty rates are associated with lower test scores.

As a further test of the importance of a strong middle class on educational achievement, we also run a model that controls for education spending. In this way, we are able to test whether the middle class affects educational outcomes through channels outside of increased spending. Our main model accounts for all the ways that the middle class improves outcomes, while our second model shows how the factors outside of spending affect outcomes. In both cases, the strength of the middle class is strongly correlated with educational outcomes.

Specifically, when we control for state educational spending as well as for state income and poverty levels and the share of students who are English language learners, we find that a 1 percentage point increase in the share of income received by the middle class is associated with an increase of 0.55 points on the math scale. This result is significant at the 5 percent level, again indicating that the results are unlikely to occur by chance. This suggests that a stronger middle class boosts achievement through both school-funding and nonschool-funding mechanisms.

Conclusion

Our study uses data from all 50 states and finds that a stronger middle class is associated with concrete improvements in educational outcomes. A stronger middle class is likely to lead to better educational outcomes by not only increasing levels of spending but also through other means including healthier societies, more involvement with the educational system, and strengthening middle-class values. Improving America's educational system is no easy task but strengthening the middle class is likely an important part of that task.

Appendix

Data

Our dependent variable, and our measure of educational attainment, is the composite National Assessment of Educational Progress math scale for eighth-grade students. We also ran our models using data for fourth-grade students and found similar results.⁴⁰

The scale is a composite index that measures a student's ability across several areas within the subject. The math scale covers knowledge of measurement, geometry, data analysis, probability, and algebra, and ranges from 0 to 500.⁴¹ The data are available for 2000, 2003, 2005, 2007, 2009, and 2011, but we only use 2003 through 2009. The 2000 data do not cover all 50 states and our other variables are not updated to 2011. For the 2009 data the scores for math ranged from 265 to 299 with a standard deviation of 7.6 points.

Our independent variable of interest is the share of income going to the middle 60 percent of the income distribution. We adopt this definition of the middle class from work on economic growth and the middle class by William Easterly.⁴² These data are from the Current Population Survey and the American Community Survey. Note that using a similar definition of the middle class—the share of income going to the middle 20 percent—produced very similar results. These definitions of middle class are similar because they are both affected similarly by the rise in income share going to the top. The standard deviation of middle-class share is 2.12 percentage points. A one standard deviation increase in middle-class share would translate into a 1.46 point increase on the NAEP scale.

We control for demographic features of a state that may affect educational attainment: overall income levels, child poverty levels, and the percentage of students who are English language learners.

Wealthier societies tend to have better educational outcomes due to more available resources. Research that compares educational outcomes across countries often controls for income level using national GDP per capita as a control variable.⁴³ Accordingly, we account for state income level in our regressions by using state GDP per capita as a control variable. The data are from the Bureau of Economic Analysis and are available for all the years in our analysis.

In contrast, we expect child poverty levels and the percentage of students who are English language learners to be negatively correlated with educational attainment due to the higher concentration of disadvantaged students.⁴⁴ Studies on educational outcomes commonly control for levels of poverty and other factors that impede academic achievement.⁴⁵ Our measure of childhood poverty is the percent of those ages 17 and under who live in poverty. The data are from the Census Bureau's Small Area Income and Poverty Estimates. The data used to calculate the percent of students who are English language learners is from the National Center for Education Statistics. We used data on the number of students who are learning English and total enrollment to calculate the percentages.

We control for state per-pupil education spending in one set of regressions. While increased spending does not always result in better educational attainment, we would expect that spending is positively correlated with outcomes.⁴⁶ Including spending in the regressions helps us confirm whether the relationship between the middle-class share of income and achievement is not just due to higher spending by middle-class states but also due to their "middle-classness."

The spending data are from the Common Core of Data at the National Center for Education Statistics. We deflated the figures using the Consumer Price Index for All Urban Consumers from the Bureau of Labor Statistics. To confirm our results, we also ran regressions with spending adjusted by the Comparable Wage Index. The index is often used in studies of education spending to adjust for regional differences in labor markets.⁴⁷ The regressions using CWI-adjusted spending were generally similar to our main results but the limited availability of the CWI restricted our sample size.

Models

We use three different econometric models in this study but our preferred model uses panel-corrected standard errors, or PCSE. We also ran regressions using a pooled ordinary least squares, or OLS, method and state and year fixed effects. The results of all three models are included in this report but we use the results of the regressions using PCSE in the body of the paper. We believe PCSE is the best choice because the share of income going to the middle class, the independent variable of interest, is relatively slow moving over time.

PCSE was first described by Nathaniel Beck, a political scientist at New York University, and Jonathan Katz, a professor of social sciences and statistics at the California Institute for Technology, and has since become common in the study of political economy. PCSE is a method to improve the accuracy of estimates when using time-series cross-sectional data.⁴⁸ Time-series cross-sectional data are characterized by repeated observations (often annual) on the same fixed political units (usually states or countries), and thus the data are often correlated over time.

As Nathaniel Beck and Jonathan Katz argue, “The inclusion of fixed effects almost always masks the impact of slowly changing independent variables.”⁴⁹ They argue that using fixed effects with time-series cross-sectional data that have slowly changing variables of interest is not just a minor problem but rather can be “profoundly misleading in assessing the impacts of important independent variables. We stress that we are not simply talking about some minor changes in estimation efficiency, but, rather estimates that are so far off as to be completely useless.”⁵⁰

While we prefer PCSE, we show all of our specifications. The majority of the studies we examined that studied similar questions use pooled OLS or similar linear models that adjust standard errors.⁵¹ Using pooled OLS and PCSE models, we find a relationship between the strength of the middle class and math scores that is significant at the 5 percent level. When we use fixed effects, the relationship between the strength of the middle class and math scores is significant at the 10 percent level. That the middle class is associated with higher test scores across a variety of models provides strong support for our arguments. (see Figure 2 for the tabled results of our analysis)

FIGURE 2
Regression results indicate middle-class income share associated with educational outcomes

Three different models produce similar results

Variable	Description
Strength of the middle class	The share of income going to the middle 60 percent of the income distribution
Eighth-grade math score	NAEP composite score for eighth-grade math
Child poverty rate	Percent of those 17 and under who are in poverty
English language learners	Percent of students who are English language learners
Spending per student	K-12 education spending per student
Per capita GDP (\$2009)	Real gross domestic product per capita, in 2009 dollars

Summary statistics

Variable	Observations	Mean	Min	Max
Strength of the middle class	200	0.4772	0.4200	0.5228
Eighth-grade math score	200	280.04	261	299
Child poverty rate	200	17.6	7.8	30.7
English language learners	181	0.061137	0.004535	0.251751
Spending per student	150	11,570.28	7,338.67	19,212.40
Per capita GDP (\$2009)	200	37,909.52	27,972.60	57,559.40

Regression results

Panel-corrected standard errors

<i>Independent variable</i>	<i>Coefficient</i>	<i>p-value</i>
Strength of the middle class	68.64	0.030
Child poverty rate	-0.578	0.015
English language learners	-35.51	0.000
Per capita GDP (\$2009)	0.0004	0.034

R-squared: 0.4173

N: 181

Fixed effects

<i>Independent variable</i>	<i>Coefficient</i>	<i>p-value</i>
Strength of the middle class	19.26	0.087
Child poverty rate	0.1165	0.551
English language learners	-6.92	0.617
Per capita GDP (\$2009)	0.0002	0.409

R-squared: 0.9706

N: 181

Pooled OLS

<i>Independent variable</i>	<i>Coefficient</i>	<i>p-value</i>
Strength of the middle class	68.64	0.032
Child poverty rate	-0.578	0.000
English language learners	-35.51	0.000
Per capita GDP (\$2009)	0.0004	0.005

R-squared: 0.4173

N: 181

With spending controls

Panel-corrected standard errors

<i>Independent variable</i>	<i>Coefficient</i>	<i>p-value</i>
Strength of the middle class	54.98	0.015
Child poverty rate	-0.752	0.000
English language learners	-32.43	0.000
Spending per student	0.00005	0.760
Per capita GDP (\$2009)	0.0002	0.179

R-squared: 0.4748

N: 136

Fixed effects

<i>Independent variable</i>	<i>Coefficient</i>	<i>p-value</i>
Strength of the middle class	19.31	0.091
Child poverty rate	0.1803	0.460
English language learners	-13.28	0.453
Spending per student	0.0004	0.315
Per capita GDP (\$2009)	0.00005	0.842

R-squared: 0.9771

N: 136

Pooled OLS

<i>Independent variable</i>	<i>Coefficient</i>	<i>p-value</i>
Strength of the middle class	54.98	0.087
Child poverty rate	-0.752	0.000
English language learners	-32.43	0.002
Spending per student	0.0001	0.872
Per capita GDP (\$2009)	0.0002	0.273

R-squared: 0.4748

N: 136

About the authors

David Madland is the Director of the American Worker Project at the Center for American Progress Action Fund. He has a Ph.D. in government from Georgetown University and received his B.S. from the University of California at Berkeley. His dissertation about the political reaction to the decline of the defined-benefit retirement system was awarded the Best Dissertation Award by the Labor and Employment Relations Association. Previously, he worked for Congressman George Miller (D-CA) on the House Committee on Education and the Workforce as well as the Resources Committee.

Nick Bunker is a Special Assistant with the Economic Policy team at the Center for American Progress Action Fund. He works on issues related to economic security and working conditions of the American worker. Nick graduated from Georgetown University with a B.S. in international economics. During his undergraduate career, he was involved with student government and helped found a magazine on international affairs. Nick was an intern at CAP during the 2009-10 academic year. He was born and raised in Norwood, Massachusetts.

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