

Insights: Financial Capability

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Math + Money = Smart Decisions

Integrating Math and Personal Finance into the Classroom

Introduction

As an educator, you are invested in your students' success – not just academically, but across all elements of their lives. One crucial area of concern is their financial well-being. Financial decision-making skills are key to people's prosperity across their lifespan, and financial choices made in youth and young adulthood can have long-term implications. Since young people today are more likely to struggle to meet their monthly expenses, less likely to have a savings plan and tend to have lower levels of financial knowledge than older generations, this is a pressing problem.¹ In addition, many students are also encountering new financial experiences, like beginning to invest, and financing higher education, often by taking on large debt obligations. How can we, as educators of young people, tackle these issues?

Education has been shown to be an important avenue for developing the knowledge required for effective financial decision-making and, consequently, financial wellness. However, we need to make sure we are introducing the right type of education in order to develop the right type of knowledge.

Our latest research shows that improving financial behavior may involve expanding both math and financial education efforts in order to develop both math and financial knowledge.

Common Approaches

There are two approaches that are commonly used by educators to improve financial decision making—teaching personal finance and teaching math.

- ▶ **Improve personal finance knowledge:** This is often seen as the natural way to increase students' understanding of positive financial behavior.
 - **Educational strategy:** Provide a course in personal finance education.²
- ▶ **Improve math knowledge:** Math is also relevant—not just because math-intensive career paths are among those with the highest financial returns, but because numeracy is key to understanding and making crucial financial decisions.
 - **Educational strategy:** Provide additional math coursework.³

Focus on Math or Personal Finance? It Is Unclear.

Research is inconclusive on whether it is best to increase math or financial knowledge to bolster financial capability, and experts are starkly divided. Therefore, it's no surprise that educators can feel unsure about how to effectively to equip students to make better-informed financial decisions. Math teachers may believe that personal finance topics are outside the scope of their curriculum, while personal finance teachers may believe that they should stick to the fundamentals of personal finance.

Further, principals and other administrators trying to decide on the overall curriculum for their school may be unsure how best to integrate personal finance subject matter—as a stand-alone course, or as part of math education—in ways that fulfill core educational standards.

Our Research

Our latest research provides insights on strategies that may bolster financial outcomes and how educators can leverage these techniques. We look at how respondents' math and financial education and knowledge relate to financial behaviors.

We examine two questions:

1. Does participating in high levels of both math and financial education have benefits over financial or math education alone?
2. Does having both high math and financial knowledge have benefits over knowledge in only one domain?

We identified a series of financial behaviors that tend to promote financial wellness (having a plan for saving, having a savings account, owning a taxable investment account and owning a retirement account) and created a positive financial behavior score, ranging from 0-4, that corresponds to the total number of positive behaviors taken by the respondent. Higher scores indicate *better* financial decision making. We also identified financial behaviors that can undermine financial wellness (using payday loans, using check cashing services, lacking a bank account) and created a score for total negative actions taken (out of 4). In this case, higher scores indicate *poorer* financial decision making.

We examined whether the number of positive or negative behaviors respondents reported varied by their knowledge or education group classification. See the [issue brief](#) for the complete methodology.

In short, our results show that boosting both financial and math knowledge may be most effective for fostering positive financial outcomes. In terms of education, those who had financial education and took more intensive math have the greatest benefits. In terms of knowledge, those with high levels of both math and financial knowledge fared best.

The Role of Education: Math or Personal Finance?

What we did: We grouped people according to their experiences with math and financial education. Those who reported having taken a course that covered personal finance topics were classified as having received financial education. Those who had taken high school or college calculus, or another college math course were classified as having received “intensive” math education, whereas respondents who had only taken high school algebra or precalculus or indicated not having taken any of the prior-mentioned math courses were classified as having “foundational” math education.

Four groups were determined based on these classifications:

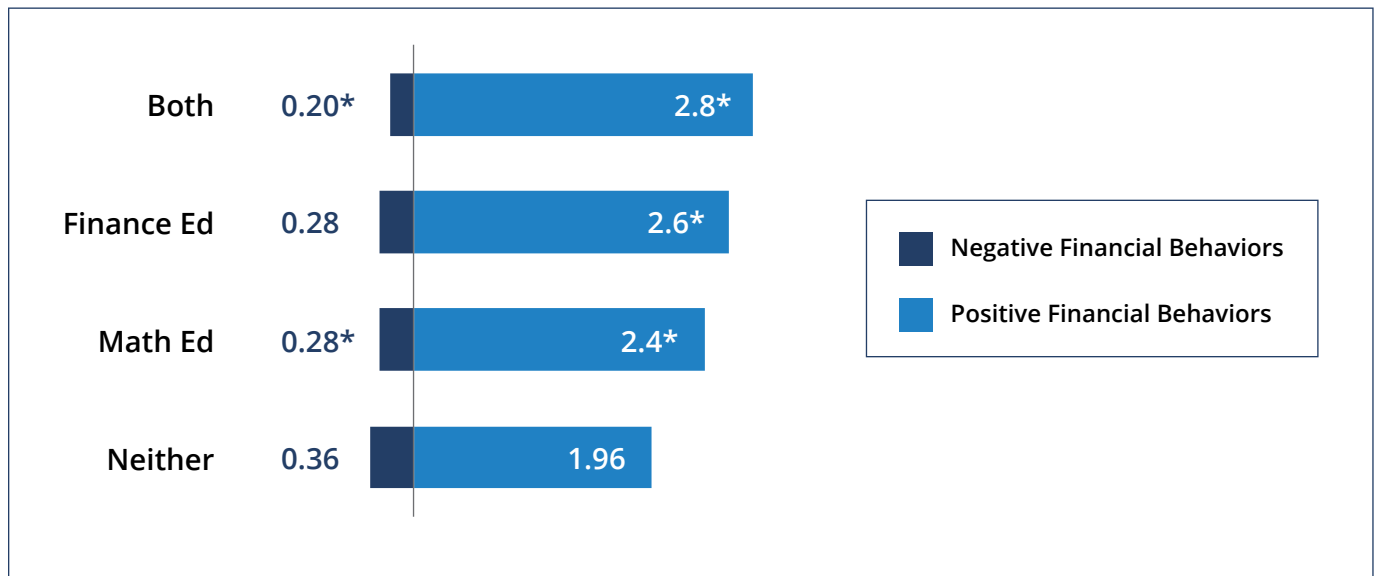
1. **Neither** (no financial education, foundational math education).
2. **Financial Ed** (financial education, foundational math education).
3. **Math Ed** (no financial education, intensive math education).
4. **Both** (financial education, intensive math education).

Figure 1. Financial Education Groups

| | | Math Education | |
|---------------------|-----|----------------|-----------|
| | | Foundational | Intensive |
| Financial Education | No | Neither | Math Ed |
| | Yes | Finance Ed | Both |

What we found: Financial and intensive math education combined are associated with better financial behaviors than either form of education alone. On average, those with both financial and intensive math education reported taking the most positive actions (2.8 out of four), relative to those with neither form of education (1.96), those with only financial education (2.6), and those with only intensive math education (2.4). For negative behaviors, those with both forms of education reported taking 0.2 negative behaviors on average, whereas those with neither reported 0.36, and those with only financial education or only intensive math education reported 0.28, respectively.

Figure 2. Association Between Education and Total Financial Actions Taken (out of 4)



Note: Asterisk indicates that result significantly differed from that of the “Neither” group at the p<.05 level ⁴

The Role of Knowledge: Math or Personal Finance?

What we did: We also grouped respondents according to their performance on a math and financial knowledge quiz to examine the relationship between each type of knowledge (math or financial) and financial behaviors. See the Appendix for the math and financial knowledge questions used.

Four groups were determined based on these classifications:

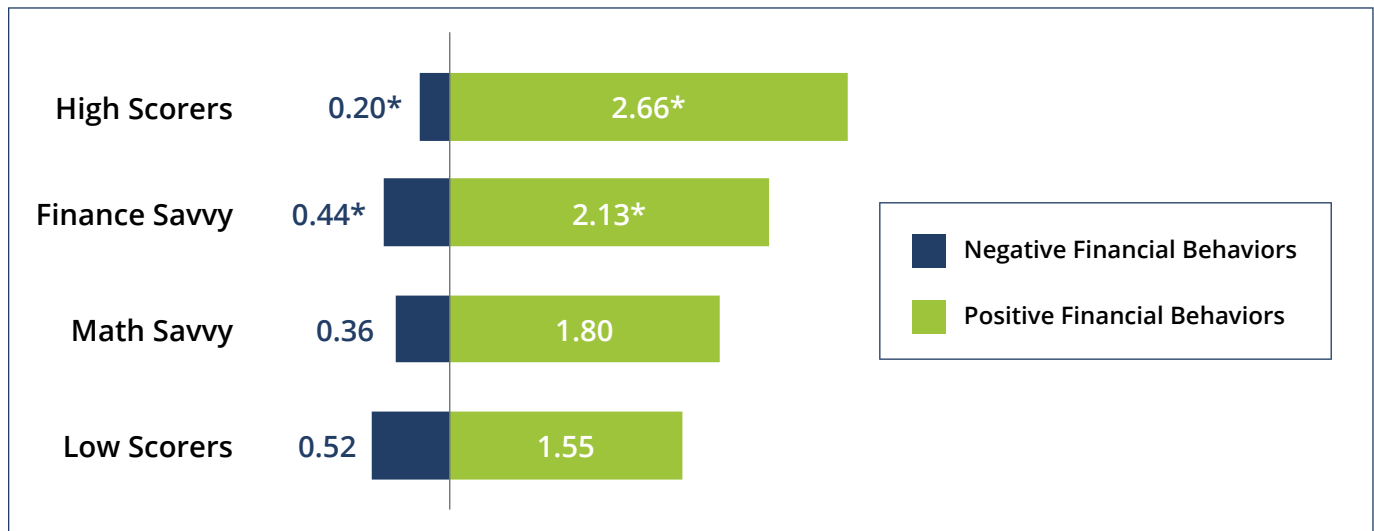
1. **Low Scorers** have low math and financial knowledge.
2. **Math Savvy** have high math and low financial knowledge.
3. **Finance Savvy** have high financial knowledge and low math knowledge.
4. **High Scorers** have high math and financial knowledge.

Figure 3. Four Knowledge Groups

| | | Math Knowledge | |
|---------------------|------|----------------|--------------|
| | | Low | High |
| Financial Knowledge | Low | Low Scorers | Math Savvy |
| | High | Finance Savvy | High Scorers |

What we found: Similar to our findings on financial and math education, our findings here suggest that financial and advanced math knowledge should be thought of as complements rather than competitors. Having high levels of both types of knowledge is associated with greater financial behaviors than either math or financial knowledge alone. On average, High Scorers reported engaging in more positive behaviors (2.66 of the four) than Low Scorers (1.55 of four), Financially Savvy respondents (2.13), and Math Savvy respondents (1.80). For negative behaviors, we see a similar pattern. In this case, lower values indicate that fewer negative actions were taken. Thus, a lower score suggests better behaviors. Here, High Scorers reported taking an average of 0.20 out of four possible negative behaviors, the fewest of the groups studied. In comparison, Low Scorers 0.52, Finance Savvy 0.44, and Math Savvy 0.36.

Figure 4. Association Between Knowledge and Total Financial Actions Taken (out of 4)



Note: Asterisk indicates that result significantly differed from that of the “Neither” group at the p<.05 level

Takeaways

1. **Math teachers:** Consider including financial applications within your math coursework, bolstering students' financial knowledge in addition to their math skills. For example, use lessons on probability to model financial risk.
2. **Personal Finance teachers:** Consider delving into the math and numeracy skills involved in the financial topics covered in class, for example, teaching the math behind exponents to calculate compound interest. See <https://fifecycle.org/compound-interest-and-your-financial-life-cycle/>.
3. **School administrators:** Consider emphasizing both math and personal finance within curricula.

Resources

- ▶ For free lessons that teach fundamental financial concepts alongside the math necessary to critically evaluate financial decisions, see: <https://fifecycle.org/free-fifecycle-lessons-for-teachers/>
- ▶ To explore FINRA Foundation's resources to help teens and young adults make wise decisions about earning, spending, credit, budgeting, saving and investing, see: <https://finrafoundation.org/people-we-help/resources-for-educators>

Endnotes

- 1 See, Mottola, G. (2015). The Financial Capability of Young Adults: A Generational View. 10.13140/RG.2.1.3800.5281.
- 2 See, for example, Urban, C., Schmeiser, M., Collins, J. M., & Brown, A. (2020). The effects of high school personal financial education policies on financial behavior. *Economics of Education Review*, 78, 101786.
- 3 See, Goodman, J. (2019). The labor of division: Returns to compulsory high school math coursework. *Journal of Labor Economics*, 37(4), 1141-1182.
- 4 Dunnett's tests were used to examine determine whether group differences in positive and negative financial behaviors differed significantly from the "Neither" group.

Appendix

Financial Knowledge Questions (Correct answers in **bold**)

| |
|--|
| Q1 - Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? |
| More than \$102 |
| Exactly \$102 |
| Less than \$102 |
| Q2 - Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, with the money in this account would you be able to buy: |
| More than today |
| Exactly the same as today |
| Less than today |
| Q3 - Do you think that the following statement is true or false? "Buying a single company stock usually provides a safer return than a stock mutual fund." |
| True |
| False |

Math Knowledge Questions (Correct answers in **bold**)

| |
|--|
| Q1 - What is the value of $6x + y$, if $x=3$ and $y=6$? |
| 9 |
| 18 |
| 24 |
| 63 |
| Q2 - What number is 7% more than 50? |
| 3.5 |
| 53.5 |
| 57 |
| 107 |
| Q3 - There are six marbles in a bag. Two of them are blue, and the other four are red. If you pick one marble, what is the chance that it is blue? |
| one in two |
| one in three |
| one in five |
| one in six |