2016

Consumer Financial Education and Financial Capability

Jing Jian Xiao
University of Rhode Island, jjxiao@uri.edu

Barbara O'Neill

Citation/Publisher Attribution
Xiao, J. J. and O'Neill, B. (2016), Consumer financial education and financial capability. International Journal of Consumer Studies, 40: 712-721. doi: 10.1111/ijcs.12285
Available at: http://dx.doi.org/10.1111/ijcs.12285

Consumer Financial Education and Financial Capability

Jing Jian Xiao[1], Barbara O'Neill[2]

Abstract

The purpose of this study was to explore potential effects of financial education on the financial capability of American consumers. Data from the 2012 National Financial Capability Study were used to test the hypothesis that financial education is positively associated with financial capability. Four financial literacy and behavior variables were used to form a financial capability index. Multivariate linear regression results showed that, after controlling for demographic and financial variables, respondents who ever received financial education had higher scores in all financial capability indicators (objective financial literacy, subjective financial literacy, desirable financial behavior, perceived financial capability, and the financial capability index). In addition, high school, college, and workplace financial education variables showed positive associations with these financial capability indicators. Additional state comparison analyses provided evidence suggesting high school financial education may have direct impacts and spillover effects on consumer financial capability.

Key Words: financial behavior, financial capability, financial education, financial literacy,

U. S. National Financial Capability Study

[1] Department of Human Development and Family Studies, University of Rhode Island, Kingston, RI 02881, USA; xiao@uri.edu.

[2] CFCS Extension, Rugters University, Cook Office Building Room 107, 55 Dudley Road, New Brunswick, NJ 08901, USA; oneill@aesop.rutgers.edu.

Introduction

Consumer financial literacy education is an increasingly prevalent topic in the literature of consumer studies in recent years. Researchers have studied this topic from diverse perspectives such as conceptually arguing for and against financial education (Alsemgeest, 2015), positioning education as the foundational discipline in financial education (Baumann and Hall, 2012), designing a financial literacy course for a liberal arts curriculum (Crain and Ragan 2012), emphasizing sustainable financial behavior in financial education (Hira, 2012), and tailoring financial education material to meet individual consumer needs (West, 2012). However, little previous research on financial education has directly examined the association between financial education exposure and financial capability indicators using a large scale, national data set. This study attempts to address this research gap.

The purpose of this study was to examine the association between financial education and financial capability using a large national U.S. dataset. In the research literature of financial education, the terms“financial literacy” and “financial capability” are often used. Compared to financial literacy, financial capability is a broader concept that includes financial literacy, financial behavior, and financial self-efficacy (Taylor, 2011; Shim *et al.*, 2013). Specifically, financial capability refers to the ability to apply appropriate financial knowledge and perform desirable financial behaviors to achieve financial well-being (Xiao *et al.*, 2014b).

For convenience of communication, in this study we refer to financial capability as financial literacy, behavior, or a combination of the two. In recent years, programs to improve consumer financial capability have been developed in many countries due to recent socioeconomic trends including the 2008 global financial crisis that demonstated the need for

consumers to take more responsibility for their current and future economic security. Financial education is crucial for improving consumer financial literacy, encouraging desirable financial behavior, and enhancing financial capability (PACFC, 2013). The goal of financial education is to help improve financial well-being (CFPB, 2015). However, effects of financial education are controversial (Alsemgeest, 2015). Some research suggests that financial education has positive impacts on consumer financial outcomes (e.g. Danes *et al.*, 1999; Bernheim *et al.*, 2001; Brown, *et al.*, 2014) and other studies imply that financial education has limited effects on financial outcomes (e.g. Mandell and Klein, 2009; Fernandes et al., 2014). This study used data collected from the U.S. 2012 National Financial Capability Study to examine relationships between financial education exposures and financial capability indicators and found positive associations. The results suggest that financial education may have multiple positive impacts on consumer financial capability by improving financial knowledge, encouraging positive financial behaviors, and enhancing confidence in financial capability.

Compared to previous research, this study contributes to financial literacy and capability literature in four aspects. First, this study used multiple measures of financial capability that include four individual literacy/behavior variables and one index. The four individual variables are objective financial literacy, subjective financial literacy, desirable financial behavior, and perceived financial capability. The index was calculated by summing Z scores of these individual variables. In previous research, financial capability was measured either by behavior related variables (Atkinson *et al.*, 2006; Lusardi, 2011), a mix of behavior and outcome variables (Taylor, 2011), and a comprehensive set of literacy/behavior variables (Xiao *et al.*, 2014b). The financial capability index was first used by Xiao *et al.* (2015) to examine age differences in financial capability. This study followed a similar approach but focused on the association

between financial education and financial capability indicators. Second, compared to previous studies on financial literacy and behavior that used smaller state or local datasets, this study used a large scale, national dataset with over 25,000 observations. Third, compared to previous studies using the same dataset, the FINRA National Financial Capability Study, this is the first to focus on the association between financial education and financial capability. Lastly, this study not only examined potential effects of any financial education, but also those of specific financial education sources such as high school, college, and workplace financial education on financial capability regarding their potential individual and combined impacts, which is unique compared to previous research.

Literature Review

The Concept and Measurements of Financial Capability

As described in the introduction, the term "financial capability" was first used in a national survey in the UK (Atkinson *et al.*, 2006). Later, many developed and developing countries conducted similar surveys using "financial capability" as the label. Before the 2006 UK financial capability survey, many countries, including the UK, conducted national surveys with the label "financial literacy." In the research literature, researchers emphasized the importance of financial literacy in financial capability. Financial literacy, not only implies a certain level of financial knowledge, but also an ability to apply the knowledge in action (Huston, 2010). In recent years, researchers have referred to financial capability as an ability to manage money well by performing desirable behaviors (Atkinson *et al.*, 2006; Taylor, 2011). Both financial literacy and behavior are important components of financial capability (Xiao *et al.*, 2014b; Xiao *et al.*,

2015). In summary, financial capability should imply a certain level of financial knowledge and the performance of desirable financial behaviors for achieving financial well-being.

When financial capability is measured, several approaches are used. One approach is to focus on several desirable behaviors (Atkinson *et al.*, 2006). A second approach is to use an index that includes both behavior and outcome measures (Taylor, 2011). A third is to use multiple measures that include objective and subjective financial literacy, desirable and undesirable financial behaviors, and perceived financial capability variables (Xiao *et al.*, 2014b). A fourth approach is to use an index integrating both objective and subjective measures of financial literacy and financial behavior (Xiao *et al.*, 2015). The advantage of using the fourth approach is that the index is the most comprehensive measure of the theoretical construct of financial capability, integrating financial literacy and behavior components, which is used in this study.

Impact of Financial Education on Financial Capability

Previous research indicates that financial education may improve consumer financial literacy, financial behavior, and financial capability overall, as documented by several review papers. Braunstein and Welch (2002) concluded that financial literacy training yields some benefits. Martin (2007) found that financial education is necessary and that many existing approaches are effective. Hilgert and colleagues (2003) documented a strong relationship between financial knowledge and the likelihood of engaging in recommended financial practices such as maintaining an emergency fund. Hastings, Madrian, and Skimmyhorn (2012) noted that a sizeable and growing body of literature has established a correlation between financial literacy and several different financial behaviors and outcomes.

Research indicates high school financial education may improve youth financial capability. McCormick (2009) reviewed studies of the effectiveness of youth financial education efforts and noted that some indicators point to the efficacy of financial education efforts. For example, Danes *et al.* (1999) evaluated the NEFE High School Financial Planning Program® and found student increases in knowledge, self-efficacy, and savings rates. Bernheim *et al.* (2001) found positive effects of state mandates on savings rates and net worth in subsequent adulthood years. Tennyson and Nguyen (2001) found that students in states that required specific financial education course work scored significantly higher than those in states with either a general mandate or with no mandate. Based on panel data, Brown et al. (2014) found that young people who were in school after the implementation of a financial education requirement had higher relative credit scores and lower relative delinquency rates than those in control states. Walstad *et al.* (2010) investigated the effects of a financial education program on high school students' knowledge of personal finance and found that scores increased regardless of which course the curriculum was used in and across student characteristics.

Financial education received in college may also increase financial capability. Research showed that college students taking financial education courses were less likely to engage in risky credit behaviors (Lyons, 2004). A longitudinal study based on a panel of college students found that that high school and college personal finance courses correlated with subjective financial knowledge (Xiao *et al.*, 2012) and earlier financial knowledge improved later financial behavior (Xiao *et al.*, 2014a).

Previous studies also documented that workplace financial education may have positive effects on consumer financial capability. For example, Joo and Grable (2005) found that persons exposed to workplace financial education were more likely to have a retirement savings program

and having retirement savings was related positively to retirement confidence. Similarly, Kim *et al.* (2005) found that attending financial education workshops was positively related to both employees' and their spouses' contributions to retirement savings plans. Clark *et al.* (2014) explored associations between financial knowledge and retirement savings plan performance and found that risk-adjusted annual expected returns were 130 basis points higher for the most financially knowledgeable employees.

Some researchers found financial education has little or limited effect on financial literacy and financial behavior. Willis (2008) reviewed the financial literacy literature and concluded that government should pay more attention to consumer protection instead of consumer financial literacy education since consumers are less likely to be their own financial experts. Mandell and Klein (2009) studied the effects that taking a personal finance course had on students one to four years later and found that those who took a course were no more financially literate than those who had not. Gale and Levine (2011) reviewed the effectiveness of previous efforts to promote financial literacy and concluded that none of the four traditional approaches to financial literacy- employer-based, school-based, credit counseling, or community-based- has generated strong evidence that financial education has had positive and substantial impacts.

A meta-analysis conducted by Fernandes and colleagues (2014) found that interventions to improve financial literacy explained only 0.1% of the variance in financial behavior while correlational studies that measured financial literacy had larger effects on financial behaviors. Collins and O'Rourke (2010) conducted a financial education evaluation literature review and concluded that positive impacts are often small when compared to valid comparison groups. These researchers noted the limited impact of financial education on financial literacy, financial

behavior and financial capability, but also believe financial education is necessary and can be improved to make it more effective.

The Conceptual Model and Hypotheses

To our knowledge, no formal theory of financial capability is found in the research literature so far. Lusardi and Mitchell (2014) developed a life-cycle saving model that addresses the role of financial literacy, which is closely relevant to this study. Under the traditional utility framework, they incorporated several factors such as borrowing constraints, mortality risk, demographic factors, stock market returns, and earnings and health shocks in the theoretical model and made simulations using plausible parameters. This model predicts that financial literacy is endogenously determined over the life cycle. Consumers invest in financial knowledge to the point where their marginal time and money costs of doing so are equated to their marginal benefits. These predictions suggest that consumers who receive financial education would increase their ability to manage their money and perform financially better than their counterparts who do not receive financial education. Previous research also shows that financial education in high school, college, and a workplace increases financial literacy and encourages desirable financial behaviors among consumers (see the literature review in the previous section).

Based on the above conceptual model and discussion of financial capability in the literature review section, we propose the following hypotheses:

H1: Consumers who have received financial education score higher in financial capability indicators than those who have not.

H2: Specifically, consumers who have received financial education from a specific location such as a high school (H2a), college (H2b), or workplace (H2c), or any combination of these locations score higher in financial capability indicators.

Method

Data

Data used in this study were from the 2012 National Financial Capability Study (NFCS). In consultation with the U.S. Department of the Treasury and the President's Advisory Council on Financial Literacy, the FINRA Investor Education Foundation commissioned the first national study of the financial capability of American adults in 2009. The 2012 NFCS is a replicated study that included 25,509 American adults (roughly 500 per state, plus the District of Columbia) and 1,000 military service members through online surveys (FINRAIEF, 2013). Compared to the 2009 survey, the 2012 survey included many new variables such as several financial education variables that were used in this study. The data set was retrieved from the website of the FINRA Investor Education Foundation. For this study, observations were removed for respondents who reported "don't know" or "prefer not to say" for three perception variables, subjective financial literacy, perceived financial capability, and financial satisfaction, which resulted in a sample size of 24,242 used for this study.

Variables

The dependent variables were four individual financial capability variables and one index variable. The four individual variables were objective financial literacy, subjective financial literacy, desirable financial behavior, and perceived financial capability. Objective financial literacy was measured by respondents' score on a financial quiz with five multiple

choice questions. Subjective financial literacy was a self-assessment of financial knowledge with a 7-point scale. Desirable financial behavior was the number of desirable financial behaviors performed from a list of 20 behaviors including spending within one's income, saving for emergencies, etc. The perceived financial capability variable was a self-assessment of money management ability with a 7-point scale. The financial capability index was calculated by summing Z scores of objective financial literacy, subjective financial literacy, desirable financial behavior, and perceived financial capability. These measures were used in previous research (e.g., Lusardi, 2011; Robb and Woodyard, 2011; Xiao *et al.*, 2014b; Xiao *et al.*, 2015).

As discussed in the previous section "The Concept and Measurements of Financial Capability," financial capability includes two components, financial literacy and financial behavior. Both components can be measured objectively and subjectively. If we consider perceived financial capability as a self-assessment of financial behavior, then four individual measures refer to objective and subjective measures of financial literacy and financial behavior, respectively. The index was used to capture financial literacy and behavior as indicated by both objective and subjective measures. By doing so, the index is a measure closely related to the theoretical construct of financial capability.

The focal independent variable included two sets of financial education variables. One set had only one binary variable: ever received any financial education. The other set included three variables indicating specific sources of financial education, from high school, college, and a workplace. Other independent variables included a set of demographic and financial variables. See Table 1 for variable specifications.

Data Analyses

For preliminary analyses, one-way ANOVA were conducted to examine financial education differences in financial capability variables. Then, multiple OLS regressions were used to examine potential effects of financial education on financial capability variables after adding control variables to test the hypotheses. Both weighted and unweighted samples were used to produce descriptive statistics. Only the unweighted sample was used for bivariate and multivariate statistical analyses. Using an unweighted sample for advanced statistical analyses is appropriate when the focus of the research question is to examine associations between variables of interest (see discussions in Lindamood *et al*., 2007; Nielson and Seay, 2014).

Results

Descriptive Statistics of the Sample

Descriptive statistics are presented in Table 2. Results based on the weighted sample are reported below. For the financial capability variables, the mean score of objective financial literacy was 2.95 out of 5. On a 1-7 scale, the mean score of subjective financial literacy was 5.15 and that of perceived financial capability was 5.68. Of 20 desirable financial behaviors, the mean number performed by respondents was 7.56. The mean score of financial capability index was 0 with a range of -10.25 to 6.36, which is expected since the index is the sum of Z scores of the four individual financial capability variables.

Of respondents in the weighted sample, 20% received any financial education, 11% received financial education in high school, 11% in college, and 8% in a workplace. Mean scores of demographic and financial variables that served as control variables are also presented in

Table 2. Note that, for binary variables (1=yes, 0=no), mean scores represent percentages. For example, 49% of respondents are males based on the weighted sample.

One Way ANOVA Results

Table 3 presents the results of one-way ANOVA when financial education differences in financial capability variables were examined. Specific financial education variables showed more potential impacts than the general financial education variable. The general financial education variable "ever received financial education" showed a potential positive impact on only one capability variable, perceived financial capability. However, two specific financial education variables, "received financial education in college" and "received financial education in workplace," showed potential positive impacts on all five financial capability variables, suggesting that respondents who received financial education in college and/or a workplace scored higher in objective financial literacy, subjective financial literacy, desirable financial behavior, perceived financial capability, and financial capability index. The variable "received financial education in high school" showed potential positive impacts on two capability variables, subjective financial literacy and perceived financial capability.

Multiple Regression Results

Table 4 presents results of multiple regressions when the general financial education variable and control variables were included in the models. After controlling for demographic and financial variables, the general financial education variable "ever received financial education" showed potential positive effects on all five financial capability variables. The results are different from those of one way ANOVA. The explaining powers of these models varied by the R^2 values, that were, from the highest to the lowest, perceived financial capability, financial

capability index, objective financial literacy, subjective financial literacy, and desirable financial behavior.

In addition, a series of regression analyses were conducted. In these analyses, the dependent variables (financial capabililty variables) and the control variables (demographic and financial variables) were the same as those in Table 4. Only different variations of financial education variables were used in the different models. To save space, only coefficient estimates and R^2 changes are presented in Table 5. The notable findings are summarized below. Receiving any financial education contributed to the five financial capability variables. The R^2 changes ranged from 0.3% (desirable financial behavior) to 1.8% (subjective financial literacy). The change magnitudes seem small but they imply unique contributions after controlling for 16 demographic and financial variables.

The results also show important contributions of financial education from specific sources. For example, for objective financial literacy, when high school education, college education and workplace education were entered the model, each of them made unique contributions. When both high school and college education variables were entered into the model, the potential effects were almost doubled. When three specific education source variables were entered the model, the R^2 change was the largest compared to one source or two source variables. Similar patterns were also found in the other four financial capability variables. These findings suggest that financial education at different life cycle stages may have cumulative effects on enhancing financial capability.

People may ask which specific type of financial education is more important to improve consumer financial capability. Findings from Table 5 suggest that it depends on specific financial

capability variables. For example, based on findings when the specific education variables were entered to the model separately or simultaneously, college education seems more important for improving objective financial literacy, subjective financial literacy, and financial capability index; high school education seems more important for perceived financial capability, and workplace education seems more important for desirable financial behavior.

State Comparison Analyses

Previous research showed that state mandates on personal finance courses may affect financial outcomes (Bernheim *et al.*, 2001; Tennyson and Nguyen, 2011; Brown *et al.*, 2014). To explore whether potential effects of financial education in states requiring personal finance courses are greater than those in states without such mandates, we conducted additional state comparison analyses. In 2011, based on a Council for Economic Education (CEE) report (2012), 46 states included personal finance in their grade K-12 standards, 36 states required the standards to be implemented by school districts, 14 states required high school personal finance courses to be offered, 13 states required high school personal finance courses to be taken, and 5 states required testing of personal finance concepts. We divided these states by groups with and without these requirements and repeated the regression analyses regarding the financial capability index. We used the 2012 CEE report because the data used in this study were collected in 2012 .

Table 6 presents regression results where several interesting patterns emerge. First, state personal finance education mandates may increase the effects of high school financial education on financial capability. Results show that the coefficient estimates of states with these requirements are greater than those of states without these mandates. For example, in the

category of “Included in K-12 standard,” the coefficient estimate for states with this requirement is .520 and statistically significant, while that in states without this mandate is only .181 and not significant. Among the other four pairs, the coefficient estimates are greater in states with financial education requirements than those in states without the requirements.

Second, state mandates may have spillover effects on financial education in college and workplace because knowledge is cumulative. Among three categories, “Course required to be offered,” “Course required to be taken,” and “Required student testing,” the coefficient estimates of states with these mandates are greater than those of states without these mandates. For workplace financial education, this pattern is shown in three categories, “Included in K-12 standard,” “Standard required to be implemented,” and “Required student testing.”

Discussion

This study used data from the U.S. 2012 National Financial Capability Study to examine associations between financial education and financial capability. Financial education is measured by two sets of variables, one set has a single variable, receiving any financial education, and the other set has three variables, receiving financial education from high school, college, and a workplace. Financial capability is measured by four individual variables (objective financial literacy, subjective financial literacy, desirable financial behavior, and perceived financial capability) and a financial capability index.

Multiple regression analyses showed that, after controlling for 16 demographic and financial variables, all financial education variables, both general financial education and financial education from a specific source, showed positive associations with all five financial capability variables, supporting H1, H2a, H2b, and H2c. Results from additional state

comparison analyses suggest that a state personal finance education mandate may enhance effects of high school financial education on financial capability. These high school financial education mandates may also have spillover effects on college and workplace financial education.

These findings provide statistically significant evidence of the potential effects of financial education exposure on financial capability variables. First, the findings are based on a large scale, national data set. Second, in the case of the financial capability index, the unique contributions of .8% to 1.5% from financial education variables, after controlling for 16 demographic and financial variables, are comparable with findings of a recent meta-analysis of financial literacy/education on downstream financial behavior (Fernandes *et al.*, 2014).

The findings of this study indicate that receiving any financial education and receiving financial education from high school, college, and a workplace (either from one source or from any combination of the three sources) are positively associated with objective financial literacy and subjective literacy, which are consistent with previous research (Martin, 2007; McCormick, 2009; Hastings *et al.*, 2012). This evidence shows multiple benefits of financial education. Financial education not only increases consumers' knowledge level but also increases confidence in their financial knowledge. Both objective and subjective knowledge variables are associated with positive financial behavior as indicated in previous research (Robb and Woodyard, 2011).

Findings of this study suggest that any financial education or financial education from a specific source is associated with the number of positive financial behaviors, which is consistent with previous research (Braunstein and Welch, 2002; Hilgert *et al.*, 2003). Financial education may not only teach consumers financial subject matter content, but also provide a social network

setting for consumers to learn from each other. Research shows that social networks such as neighbors may have effects on consumer financial literacy (Lachance, 2014).

Study results also demonstrate that both general financial education and financial education from a specific source are positively associated with perceived financial capability. Perceived financial capability can be considered as financial self-efficacy based on a major psychological concept, self-efficacy. Self-efficacy is an important psychological state that gives people confidence to achieve their desirable goals (Bandura, 1982). Financial self-efficacy is associated with financial well-being (Lown, 2011). Since real financial capability is difficult to measure directly, this variable can be a good proxy. Research indicates that perceived financial capability is positively associated with financial satisfaction (Xiao *et al.*, 2014b).

Finally, both general financial education and financial education from a specific source are positively associated with financial capability index. Financial capability index was calculated in this study by summing Z scores of objective financial literacy, subjective financial literacy, desirable financial behavior, and perceived financial capability. Compared to previous research (Atkinson et al. 2006; Taylor 2011), this index includes more dimensions (e.g., quiz scores and respondent self-assessments and financial behaviors) that may better capture the construct of financial capability.

Limitations and Future Research

Due to limitations of the data set that was used to conduct this study, the measures of financial education are only respondents' exposure to financial education from several specific sources such as high school, college, and a workplace. Details about the timing, content, and length of financial courses are not available from the data set, which precludes the opportunity to

conduct more detailed analyses. Another limitation is that the data are cross sectional and, thus, the results only show associations between dependent and independent variables that only imply potential effects of financial education on financial capability. Longitudinal or well controlled field or lab studies are needed to confirm causality.

Even though this study has the limitations noted above, it still indicates significant associations between financial education and financial capability using a large scale data set, which is encouraging news for consumer educators, policy makers, and researchers. Using this nationally representative sample with comprehensive financial literacy and behavior measures, additional research can be conducted to explore associations between financial capability and financial well-being. For example, similar research to this study can be replicated among different demographic groups to generate useful information for financial educators working with diverse populations. Similar research could also be conducted using data from different countries to make international comparisons.

Future research could support one of the Financial Literacy and Education Commission (FLEC) 2012 research priorities to identify and evaluate "key metrics" for financial capability, including measures of knowledge and well-being (FLEC, 2012). The methodology could be replicated with a different sample such as employees of a large company or university students. Many of the questions that were asked could be placed online for ease of administration. The questions could also be used as pre- and post-tests before and after a financial education program or in a study with a control group. Attention should also be paid by researchers to assessing the return on investment (ROI) from financial education programs in economic terms as well as in terms of participants' financial capability. The higher the ROI multiple (e.g., a 30:1program cost

versus benefit versus 3:1), the better a financial education program from an economic standpoint, which increases its attractiveness to potential funders and stakeholders.

Implications For Educators and Policy Makers

The goal of most financial education programs is to translate financial education into knowledge gains and behavior change on the part of participants for improved financial well-being. This study employed two different measures of financial education (any education and school or workplace specific education) and five variables including an index comprised of the first four, to measure financial capability. Positive associations were found between both measures of financial education and all five financial capability variables: objective financial literacy, subjective financial literacy, financial behavior, perceived financial capability, and financial capability index.

Taken together, these findings suggest that financial education may enhance financial capability whether it is measured on an objective or subjective basis. Thus, this study lends support to efforts to enhance financial education for both youth and adults. Financial education, whether through formal classes, workplace seminars, or other means appears to have beneficial results. Consumers may be motivated to seek financial education because responsibility for financial security (e.g., retirement savings) has been transferred, for the most part, from government and employers to individual Americans. For consumer educators, this study provides evidence that their hard work to build the financial knowledge and skills of consumers is not in vain. With that said, there is always room for improvement such as more rigorous evaluation methods and providing "just in time" information at "teachable moments" when people are motivated by life circumstances to want to learn to better manage their finances.

Other ways to enhance financial education programs and outcomes include increased training for personal finance instructors, tailoring programs for specific audiences, addressing underlying behaviors that shape people's financial decisions, using case studies to foster critical thinking and financial decision-making skills, making it easy for people to take positive action (e.g., enrolling in a defined contribution retirement savings plan or electing auto-escalation of savings immediately following a workplace seminar), and helping simplify financial decision-making with step-by-step instructions and/or good choice architecture. It is also important to increase the public's awareness of the need for financial education and to make it accessible.

For policy makers, the most obvious implication of this study is that, given the positive association between financial education and financial capability, financial education programs in schools and in the community should be supported and funded. These research findings, based on a large scale national data set, suggest that any financial education exposure and any financial education from a specific source (high school, college and a workplace) may increase consumer financial capability. Also, compared to financial education from a single source, financial education from multiple sources has greater potential impacts on consumer financial capability. In states that do not mandate financial education courses, some might take this suggestion even further and recommend required financial education classes in public schools. As a caveat to these recommendations, program funders should require financial education programs to have clear objectives and an evaluation methodology that assesses both knowledge gains and behavior change. Financial education is not an option- it is a necessity. The financial security of families and, by extension, communities and nations, is at stake.

References

Alsemgeest, L. (2015). Arguments for and against financial literacy education: where to go from here? *International Journal of Consumer Studies*, *39*(2), 155-161.

Atkinson, A., McKay, S., Kempson, E., & Collard, S. (2006). Levels of Financial Capability in the UK: results of a baseline survey. UK: financial Services Authority.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American psychologist*, *37*(2), 122-147.

Baumann, C., & Hall, T. (2012). Getting Cinderella to the ball: putting education at the heart of financial education. *International Journal of Consumer Studies*, *36*(5), 508-514.

Bernheim, B. D., Garrett, D. M., & Maki, D. M. (2001). Education and saving:: The long-term effects of high school financial curriculum mandates. *Journal of Public Economics*, *80*(3), 435-465.

Braunstein, S., & Welch, C. (2002). Financial literacy: An overview of practice, research, and policy. *Federal Reserve Bulletin.* 88: 445-457.

Brown, A. M., Collins, J. M., Schmeiser, M. D., & Urban, C. (2014). State Mandated Financial Education and the Credit Behavior of Young Adults. *Divisions of Research & Statistics and Monetary Affairs Federal Reserve Board, Washington, DC, Finance and Economics Discussion Series*, (2014-68).

CFPB. (2015). *Financial well-being: The goal of financial education.* Washington, DC: Consumer Financial Protection Bureau. http://files.consumerfinance.gov/f/201501_cfpb_report_financial-well-being.pdf

Clark, R. L., Lusardi, A., & Mitchell, O. S. (2014). *Financial knowledge and 401 (k) investment performance* (No. w20137). Cambridge, MA: National Bureau of Economic Research.

Collins, J. M., & O'Rourke, C. M. (2010). Financial education and counseling—Still holding promise. *Journal of Consumer Affairs*, *44*(3), 483-498.

Council For Economic Education. (2012). *Survey of the states: Economic and personal finance education in our nation's schools 2011*. New York: Author. Retrieved from http://www.councilforeconed.org/wp/wp-content/uploads/2011/11/2011-Survey-of-the-States.pdf.

Crain, S. J., & Ragan, K. P. (2012). Designing a financial literacy course for a liberal arts curriculum. *International Journal of Consumer Studies*, *36*(5), 515-522.

Danes, S. M., Huddleston-Casas, C., & Boyce, L. (1999). Financial planning curriculum for teens: Impact evaluation. *Financial Counseling and Planning*, *10*(1), 25-37.

Fernandes, D., Lynch Jr, J. G., & Netemeyer, R. G. (2014). Financial literacy, financial education, and downstream financial behaviors. *Management Science*, *60*(8), 1861-1883.

FINRAIEF. (2013). *Financial capability in the United States: Report of findings from the 2012 National Financial Capability Study*. Washington, DC: FINRA Investor Education Foundation.

FLEC. (2012). 2012 Research Priorities and research questions. Financial Literacy and Education Commission Research & Evaluation Working Group. http://www.treasury.gov/resource-center/financial-education/Documents/2012%20Research%20Priorities%20-%20May%2012.pdf).

Gale, W. G., & Levine, R. (2011). Financial Literacy: What Works? How Could It Be More Effective? How could It be More Effective? Chestnut Hill, MA. Center for Financial Security at Boston College. http://crr.bc.edu/wp-content/uploads/2011/03/FSP-2011-1.pdf.

Hastings, J. S., Madrian, B. C., & Skimmyhorn, W. L. (2012). *Financial literacy, financial education and economic outcomes* (No. w18412). National Bureau of Economic Research. Available at http://www.nber.org/papers/w18412.pdf?new_window=1

Hilgert, M. A., Hogarth, J. M., & Beverly, S. G. (2003). Household financial management: The connection between knowledge and behavior. *Federal Reserve Bulletin*, 89(7), 309-322.

Hira, T. K. (2012). Promoting sustainable financial behaviour: Implications for education and research. *International Journal of Consumer Studies*, *36*(5), 502-507.

Huston, S. J. (2010). Measuring financial literacy. *Journal of Consumer Affairs*, *44*(2), 296-316.

Joo, S. H., & Grable, J. E. (2005). Employee education and the likelihood of having a retirement savings program. *Journal of Financial Counseling and Planning*, *16*(1), 37-49.

Kim, J., Garman, E. T., & Quach, A. (2005). Workplace financial education participation and retirement savings by employees and their spouses. *Journal of Personal Finance*, *4*(3), 92-108.

Lachance, M. E. (2014). Financial literacy and neighborhood effects. *Journal of Consumer Affairs*, *48*(2), 251-273.

Lindamood, S., Hanna, S. D., & Bi, L. (2007). Using the Survey of Consumer Finances: Some methodological considerations and issues. *Journal of Consumer Affairs*, *41*(2), 195-222.

Lown, J. M. (2011). Development and Validation of a Financial Self-Efficacy Scale. *Journal of Financial Counseling and Planning*, *22*(2), 54-63.

Lusardi, A., & Mitchell, O. S. (2014). The Economic Importance of Financial Literacy: Theory and Evidence. *Journal of Economic Literature*, *52*(1), 5-44.

Lusardi, A. (2011). *Americans' Financial Capability*. No. w17103. Cambridge, MA: National Bureau of Economic Research.

Lyons, A. C. (2004). A profile of financially at-risk college students. *The Journal of Consumer Affairs*, 56-80.

Mandell, L., & Klein, L. S. (2009). The impact of financial literacy education on subsequent financial behavior. *Journal of Financial Counseling and Planning*, *20*(1), 15-24.

Martin, M. (2007). A Literature Review on the Effectiveness of Financial Education. Richmond, VA: Federal Reserve Bank of Richmond. http://finalist-project.eu/Portals/0/A%20Literature%20Review%20on%20the%20Effectiveness%20of%20Financial%20Education.pdf.

McCormick, M. H. (2009). The effectiveness of youth financial education: A review of the literature. *Journal of Financial Counseling and Planning*, *20*(1), 70-81.

Nielsen, R. B., & Seay, M. C. (2014). Complex Samples and Regression-Based Inference: Considerations for Consumer Researchers. *Journal of Consumer Affairs*, *48*(3), 603-619.

PACFC. (2013). *Final Report: President's Advisory Council on Financial Capability*. Washington, DC: President's Advisory Council on Financial Capability. Retrieved from http://www.treasury.gov/resource-center/financial-education/Documents/PACFC%20final%20report%20revised%2022513%20(8)_R.pdf.

Robb, C. A., & Woodyard, A. (2011). Financial knowledge and best practice behavior. *Journal of Financial Counseling and Planning*, *22*(1), 60-70.

Shim, S., Serido, J., Bosch, L., & Tang, C. (2013). Financial Identity-Processing Styles Among Young Adults: A Longitudinal Study of Socialization Factors and Consequences for Financial Capabilities. *Journal of Consumer Affairs*, *47*(1), 128-152.

Taylor, M. (2011). Measuring financial capability and its determinants using survey data. *Social Indicators Research*, *102*(2), 297-314.

Tennyson, S., & Nguyen, C. (2001). State curriculum mandates and student knowledge of personal finance. *Journal of Consumer Affairs*, *35*(2), 241-262.

Walstad, W. B., Rebeck, K., & MacDonald, R. A. (2010). The effects of financial education on the financial knowledge of high school students. *Journal of Consumer Affairs*, *44*(2), 336-357.

West, J. (2012). Financial literacy education and behaviour unhinged: combating bias and poor product design. *International Journal of Consumer Studies*, *36*(5), 523-530.

Willis, L. E. (2008). Against financial literacy education. *Iowa Law Review*, *94*(08-10), 197-285.

Xiao, J. J., Ahn, S. Y., Serido, J., & Shim, S. (2014a). Earlier financial literacy and later financial behaviour of college students. *International Journal of Consumer Studies*, *38*(6), 593-601.

Xiao, J. J., Chen, C., & Chen, F. (2014b). Consumer financial capability and financial satisfaction. *Social indicators research*, *118*(1), 415-432.

Xiao, J. J., Chen, C., & Sun, L. (2015). Age Differences in Consumer Financial Capability. *International Journal of Consumer Studies*, *39*(4), 387-395.

Xiao, J. J., Serido, J., & Shim, S. (2012). Financial education, financial knowledge, and risky credit behavior of college students. In *Consumer Knowledge and Financial Decisions* (pp. 113-128). New York: Springer.

Table 1
Variable Specifications

Variable name	Variable label	Attribute
	Financial capability	
Sum(m6x, m7x, m8x, m9x, m10x)	Objective financial literacy	0-5, the sum of correct numbers for financial literacy questions. The original financial literacy variables (m6-m10) were recoded to binary variables in which 1=correct answer, 0=otherwise and then the new variables were summed to form the score. The five questions are about interest rate, inflation, bond, mortgage, and stock. More details of these questions can be found in FINRAIEF (2013).
M4	Subjective financial literacy	"On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you assess your overall financial knowledge?" 1-very low, 7-very high
See note	Desirable financial behavior	The sum of desirable financial behaviors
M1_1	Perceived financial capability	"I am good at dealing with day-to-day financial matters, such as checking accounts, credit and debit cards, and tracking expenses" 1-strongly disagree, 7-strongly agree
	Financial capability index	A sum of Z scores of objective financial literacy, subjective financial literacy, desirable financial behavior, and perceived financial capability variables.
	Financial education	
m20_fin_edu	Received financial education	1=yes, 0=no
m21_1_highsch	Received fin. ed. in high school	1=yes, 0=no
m21_2_coll	Received fin. ed. in college	1=yes, 0=no
m21_3_work	Received fin. ed. in workplace	1=yes, 0=no
	Control variables	
a3a_age	Age	Year
a3_male	Being male (vs. female)	1=male, 0=female
a5_some_coll	Education level	1-some college or higher, 0=other
a6_married	Being married	1=married, 0=not married
a11_dep_child	Having dependent children	1=yes, 0=no
a8_under25k	Income under $25,000	1=yes, 0=no
a8_over75k	Income $75,000 or higher	1=yes, 0=no
a9_working	Working	1=yes, 0=no
j1_fin_sat	Financial satisfaction	1-not at all satisfied, 10-extremely satisfied
j10_inc_drop	Experiencing income drop	1=yes, 0=no
b1_have_check	Having checking account	1=yes, 0=no
b2_have_cd	Having savings, MMA and CD.	1=yes, 0=no
b14_have_invest	Having other investments	1=yes, 0=no
c1_have_401k	Having a 401k plan	1=yes, 0=no
ea_1_own_home	Owning a home	1=yes, 0=no
e7_have_mort	Having a mortgage	1=yes, 0=no
f1_have_cc	Having credit card	1=yes, 0=no

Note: 20 desirable financial behaviors are spending within income, saving for children's college education, saving for emergency, checking credit reports, checking credit scores, using advice on financial services (debt counseling, investment, mortgage, insurance, and taxes), contributing to 401k plans, comparison shopping for credit card, calculating retirement needs, making mortgage payment on time, and desirable credit card behaviors (making full payment, not keeping balance, not making minimum payment, not paying late fees, not being over the limit, and not using cash advance) . All of these variables are binary variables that are appropriately recoded from corresponding

variables from the original data set using following variable names: j3_no_overspend, j6_child_coll, j5_emerg, j11_credit_rep, j12_credit_score, k1_advice_debt, k2_advice_invest, k3_advice_mort, k4_advice_ins, k5_advice_tax, c5_contri_401k, f10_cc_shop, j8j9_cal_retire, e15_mort_ontime, f2_1_cc_fullpay, f2_2_cc_no_balance, f2_3_cc_no_minipay, f2_4_cc_no_latefee, f2_5_cc_no_overlimit, and f2_6_cc_no_cash.

Table 2
Descriptive Statistics of the Sample (Means)

Variable	Unweighted	Weighted
Financial capability		
Objective financial literacy (0-5)	3.06	2.95
Subjective financial literacy (1-7)	5.18	5.15
Perceived financial capability (1-7)	5.74	5.68
Desirable financial behavior (0-20)	7.82	7.56
Financial capability index (-10.25-6.36)	-.19	-0.19
Financial education		
Received financial education	0.21	0.20
Received financial education in high school	0.11	0.11
Received financial education in college	0.13	0.11
Received financial education in workplace	0.09	0.08
Control variables		
Age	47.14	45.88
Male	0.45	0.49
Some college or higher	0.68	0.63
Married	0.57	0.55
Having dependent children	0.39	0.39
Income under $25,000	0.24	0.26
Income $75,000 or higher	0.31	0.29
Working	0.54	0.53
Financial satisfaction (1-10)	5.19	5.19
Experiencing income drop	0.28	0.30
Having checking account	0.91	0.90
Having savings, MMA and CD.	0.76	0.74
Having other investments	0.36	0.34
Having a 401k plan	0.55	0.52
Owning a home	0.62	0.59
Having a mortgage	0.38	0.35
Having credit card	0.75	0.73

Note: For a binary variable (1=yes, 0=no), the mean represents the percentage. For example, based on the unweighted sample, 21% received any financial education.

Table 3
Results of one way ANOVA of Financial Capability Variables by Financial Education Variables

	Objective Knowledge (0-5)	Subjective Knowledge (1-7)	Financial Behavior (0-20)	Perceived Financial Capability (1-7)	Financial Capability Index (-10.01-6.38)
Received financial education					
Yes	3.43	5.62	9.25	5.96	1.17
No	2.93	5.05	7.38	5.65	-.23
p				***	
Received financial education in high school					
Yes	3.38	5.68	9.24	6.03	1.23
No	3.36	5.45	8.89	5.85	.84
p		**		**	
Received financial education in college					
Yes	3.69	5.79	10.15	6.16	1.81
No	3.12	5.36	8.16	5.74	.37
p	***	***	***	***	***
Received financial education in workplace					
Yes	3.66	5.80	10.37	6.17	1.85
No	3.14	5.36	7.99	5.73	.34
p	***	***	***	***	***

Author calculations using data from the 2012 National Financial Capability Study.
*<.05. **<.01. ***<.001.

Table 4
Results of Regression on Financial Capability Variables: Having Ever Received Financial Education

	Objective Financial Literacy		Subjective Financial Literacy		Perceived Financial Capability		Desirable Financial Behavior		Financial Capability Index	
	B	*p*	*B*	*p*	*B*	*p*	*B*	*p*	*B*	*p*
Constant	1.172	***	3.491	***	3.926	***	-.250	**	-5.636	***
Age	.016	***	.007	***	.011	***	.000	***	.024	***
Male	.463	***	.135	***	-.051	**	.099	**	.421	***
Some college or higher	.494	***	.109	***	.141	***	.549	***	.648	***
Married	.040	*	.032		-.006		.066		.065	*
Having dependent children	-.093	***	.086	***	-.042		.242	***	.030	
Income under $25,000	-.180	***	.008		-.018		-.079		-.150	***
Income $75,000 or higher	.268	***	.022		.059	*	.806	***	.424	***
Working	.045	**	.033	*	.002		.149	***	.093	***
Financial satisfaction	-.043	***	.125	***	.074	***	.303	***	.184	***
Income drop last year	-.089	***	.099	***	-.117	***	.170	***	-.021	
Having checking	.207	***	.098	***	.528	***	.056		.574	***
Having CD and MMA	.138	***	.072	***	.185	***	.684	***	.427	***
Having investments	.336	***	.164	***	.062	**	1.564	***	.758	***
Having 401k plans	.186	***	-.027		-.008		.744	***	.272	***
Owning home	.050	*	.088	***	.081	***	.382	***	.243	***
Having a mortgage	.080	***	.028		.010		.773	***	.259	***
Having credit card	.185	***	.174	***	.183	***	4.547	***	1.409	***
Any financial education	.308	***	.420	***	.236	***	.647	***	.846	***
R^2	.291		.193		.117		.674		.489	
p	<.0001		<.0001		<.0001		<.0001		<.0001	

Author calculations using data from the 2012 National Financial Capability Study.
*<.05. **<.01. ***<.001.

Table 5
Various Models with Financial Education Variables: Coefficient Estimates and R^2 Changes

	Objective Financial Literacy		Subjective Financial Literacy		Perceived Financial Capability		Desirable Financial Behavior		Financial Capability Index	
	B	ΔR^2	*B*	ΔR^2	*B*	ΔR^2	*B*	ΔR^2	*B*	ΔR^2
Any financial education	.308	.008	.420	.018	.236	.004	.647	.003	.846	.014
High school financial education	.265	.003	.424	.011	.265	.003	.638	.002	.834	.009
College financial education	.293	.004	.450	.013	.259	.002	.705	.003	.886	.010
Workplace financial education	.272	.003	.412	.008	.254	.002	.873	.003	.876	.008
High school financial education	.170	.005	.280	.017	.186	.004	.408	.003	.552	.013
College financial education	.224		.335		.183		.539		.661	
High school financial education	.210	.004	.347	.013	.203	.003	.426	.004	.648	.011
Workplace financial education	.190		.257		.119		.722		.575	
College financial education	.204	.004	.328	.012	.217	.003	.481	.004	.650	.011
Workplace financial education	.185		.254		.106		.683		.552	
High school financial education	.143	.006	.241	.018	.161	.004	.287	.004	.459	.015
College financial education	.188		.284		.149		.380		.538	
Workplace financial education	.132		.191		.125		.590		.456	

Note: Author calculations using data from the 2012 National Financial Capability Study. For all models, the same control variables presented in Table 3 are used. All coefficient estimates are significant at 5% or higher level.

Table 6
Potential Effects of Financial Education on Financial Capability Index by States with Personal Finance Mandates

	Included in K-12 standard		Standard required to be implemented		Course required to be offered		Course required to be taken		Required student testing	
	no	yes	no	yes	no	yes	no	yes	no	yes
High school financial education	.181	.520*	.420*	.528*	.458*	.596*	.465*	.584*	.495*	.632*
College financial education	.954*	.459*	.536*	.470*	.473*	.527*	.474*	.532*	.485*	.562*
Workplace financial education	.150	.438*	.352*	.451*	.448*	.362*	.445*	.368*	.418*	.453*
R^2	.493	.481	.484	.481	.483	.477	.482	.479	.480	.489
p	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

* p<.05 or better.
Author calculations using data from the 2012 National Financial Capability Study. For all models, the same control variables presented in Table 3 are used.