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Elise Carlson  
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AN ANALYSIS OF THE RELATIONSHIPS  
BETWEEN STATE MANDATES FOR FINANCIAL EDUCATION AND  
YOUNG ADULTS' FINANCIAL LITERACY AND FINANCIAL CAPABILITY

by

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A dissertation submitted in partial fulfillment of the requirements  
for the degree of Doctor of Education  
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at the University of Central Florida  
Orlando, Florida

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## ABSTRACT

The study sought to understand the relationship between the type of state mandate for financial education and 18-24-year-olds' financial literacy and financial capability. Using extant data from national surveys about financial literacy and financial capability in 2015 and 2018, this study determined there was rarely a significant difference in young adults' financial literacy and financial capability as related to the level of financial education they received in high school. For 2015 literacy, the education mandate as a main effect within ethnicity was  $p = .025$ . Within certain demographic main effects, there were significant results. In 2015, ethnicity and educational attainment were each significant for financial literacy  $p = .000$ . In 2018, gender, ethnicity and educational attainment were each significant for financial literacy,  $p = .000$ , while income was significant  $p = .005$ . In 2015, ethnicity was significant for financial capability  $p = .001$ , while educational attainment and income were each  $p = .000$ . In 2018, gender was significant for financial capability  $p = .016$ , while ethnicity, educational attainment, and income were each significant  $p = .000$ . Interaction effects existed in some cases, with 2015 financial literacy at gender by education mandate  $p = .008$  and income by education mandate  $p = .040$ ; for 2015 capability, gender by education mandate  $p = .019$ ; for 2018 capability, educational attainment by education mandate  $p = .024$ . Understanding how demographic factors influence financial literacy and financial capability and can influence how policymakers and educators address these differences to provide effective financial education for all students.

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## TABLE OF CONTENTS

LIST OF FIGURES .....	x
LIST OF TABLES.....	xi
CHAPTER ONE: INTRODUCTION.....	1
Problem Statement .....	2
Purpose Statement.....	2
Research Questions .....	2
Operational Definitions .....	3
Conceptual Framework .....	4
Literature Review.....	5
National Financial Views.....	6
Factors Influencing Financial Behavior.....	7
Policies Concerning Financial Education.....	9
Impact of Financial Education.....	9
Impact of Non-Financial Skills.....	11
Providing Effective Financial Education.....	13
Significance.....	13
Methodology and Research Design.....	14
Participants.....	15
Instrumentation and Data Collection .....	16
Variables .....	17
Measurement of Variables .....	19
Data Analysis .....	20
Delimitations.....	24
Limitations .....	25
Assumptions.....	25
Summary .....	25
CHAPTER TWO: LITERATURE REVIEW.....	27
National Financial Views.....	28
Factors Influencing Financial Behavior .....	29
Policies Concerning Financial Education .....	33
Impact of Financial Education .....	34

Impact of Non-Financial Skills .....	35
Providing Effective Financial Education .....	37
Significance .....	38
Summary .....	38
CHAPTER THREE: METHODOLOGY .....	39
Problem Statement .....	39
Purpose Statement .....	40
Research Questions .....	40
Research Design .....	41
Participants .....	41
Instrumentation and Data Collection.....	42
Variables.....	44
Dependent Variables.....	44
Independent Variables .....	46
Moderator Variables .....	47
Measurement of Variables .....	47
Data Analysis .....	49
Research Question 1 - Financial Literacy.....	49
Research Question 2 - Financial Capability.....	50
Research Question 3 - Changes Over Time.....	51
Research Question 4 - Literacy and Capability .....	52
Delimitations .....	54
Limitations .....	55
Assumptions.....	55
Summary .....	55
CHAPTER FOUR: RESULTS .....	57
Results: Research Question 1 - Financial Literacy .....	57
2015 Financial Literacy Analysis .....	58
Two-Way ANOVA: Gender.....	58
Two-Way ANOVA: Ethnicity .....	65
Two-Way ANOVA: Age .....	72
Two-Way ANOVA: Educational Attainment.....	77
Two-Way ANOVA: Income.....	84

2018 Financial Literacy Analysis .....	91
Two-Way ANOVA: Gender .....	91
Two-Way ANOVA: Ethnicity .....	98
Two-Way ANOVA: Age .....	104
Two-Way ANOVA: Educational Attainment.....	109
Two-Way ANOVA: Income.....	116
Summary of Literacy Findings .....	122
Results: Research Question 2 - Financial Capability .....	123
2015 Financial Capability Analysis .....	123
Two-Way ANOVA: Gender .....	123
Two-Way ANOVA: Ethnicity .....	130
Two-Way ANOVA: Age .....	136
Two-Way ANOVA: Educational Attainment.....	141
Two-Way ANOVA: Income.....	149
2018 Financial Capability Analysis .....	157
Two-Way ANOVA: Gender .....	157
Two-Way ANOVA: Ethnicity .....	163
Two-Way ANOVA: Age .....	169
Two-Way ANOVA: Educational Attainment.....	174
Two-Way ANOVA: Income.....	182
Summary of Capability Findings .....	190
Results: Research Question 3 - Changes Over Time .....	191
Results: Research Question 4 - Literacy and Capability.....	194
2015 One-Way ANOVA.....	194
2018 One-Way ANOVA.....	199
Summary .....	204
CHAPTER FIVE: DISCUSSION.....	207
Summary of the Study.....	207
Discussion of Findings: Research Question 1 - Financial Literacy .....	208
Gender Main Effects and Interaction Effects.....	208
Implications for Policy.....	210
Implications for Practice .....	210
Ethnicity Main Effects .....	211
Implications for Policy.....	211



Implications for Practice.....	212
Education Mandate Main Effects within Ethnicity.....	212
Implications for Policy.....	213
Implications for Practice.....	213
Educational Attainment Main Effects.....	214
Implications for Policy.....	214
Implications for Practice.....	215
Income Main Effects and Interaction Effects .....	215
Implications for Policy.....	216
Implications for Practice.....	217
Discussion of Findings: Research Question 2 - Financial Capability.....	217
Gender Main Effects and Interaction Effects.....	217
Implications for Policy.....	219
Implications for Practice.....	220
Ethnicity Main Effects .....	220
Implications for Policy.....	221
Implications for Practice.....	221
Educational Attainment Main Effects and Interaction Effects .....	221
Implications for Policy.....	222
Implications for Practice.....	223
Income Main Effects.....	223
Implications for Policy.....	224
Implications for Practice.....	224
Discussion of Findings: Research Question 3 - Changes Over Time .....	225
Implications for Policy.....	226
Implications for Practice.....	226
Discussion of Findings: Research Question 4 - Literacy and Capability.....	226
Implications for Policy.....	227
Implications for Practice.....	227
Limitations .....	228
Recommendations for Future Research .....	229
Summary .....	231
Conclusion.....	233
APPENDIX: IRB LETTER.....	235

REFERENCES ..... 237

## LIST OF FIGURES

Figure 1 Graph of two-way ANOVA for financial literacy and gender for 2015 .....	62
Figure 2 Graph of two-way ANOVA for financial literacy and ethnicity for 2015 .....	69
Figure 3 Graph of two-way ANOVA for financial literacy and age for 2015.....	76
Figure 4 Graph of two-way ANOVA for financial literacy and educational attainment for 2015	81
Figure 5 Graph of two-way ANOVA for financial literacy and income for 2015 .....	88
Figure 6 Graph of two-way ANOVA for financial literacy and gender for 2018 .....	95
Figure 7 Graph of two-way ANOVA for financial literacy and ethnicity for 2018 .....	102
Figure 8 Graph of two-way ANOVA for financial literacy and age for 2018.....	108
Figure 9 Graph of two-way ANOVA for financial literacy and educational attainment for 2018 .....	113
Figure 10 Graph of two-way ANOVA for financial literacy and income for 2018 .....	120
Figure 11 Graph of two-way ANOVA for financial capability and gender for 2015.....	127
Figure 12 Graph of two-way ANOVA for financial capability and ethnicity for 2015 .....	134
Figure 13 Graph of two-way ANOVA for financial capability and age for 2015.....	140
Figure 14 Graph of two-way ANOVA for financial capability and educational attainment for 2015.....	145
Figure 15 Graph of two-way ANOVA for financial capability and income for 2015.....	153
Figure 16 Graph of two-way ANOVA for financial capability and gender for 2018.....	161
Figure 17 Graph of two-way ANOVA for financial capability and ethnicity for 2018 .....	167
Figure 18 Graph of two-way ANOVA for financial capability and age for 2018.....	173
Figure 19 Graph of two-way ANOVA for financial capability and educational attainment for 2018.....	178
Figure 20 Graph of two-way ANOVA for financial capability and income for 2018.....	186
Figure 21 Graph of one-way ANOVA for financial literacy for 2015 and 2018 .....	192
Figure 22 Graph of one-way ANOVA for financial capability for 2015 and 2018.....	193
Figure 23 Graph of one-way ANOVA for financial capability for 2015 .....	197
Figure 24 Graph of one-way ANOVA for financial capability for 2018 .....	201
Figure 25 Visual map of relationships among variables.....	232

## LIST OF TABLES

Table 1	State financial education mandates x ethnicity (sample table).....	20
Table 2	Research questions and variables .....	23
Table 3	Factors influencing financial behavior in literature review .....	32
Table 4	Number of states that included each type of mandate in 2011 and 2014 .....	46
Table 5	State financial education mandates x ethnicity (sample table).....	48
Table 6	Variables for research question 1.....	50
Table 7	Variables for research question 2.....	51
Table 8	Research questions and variables .....	53
Table 9	Descriptive statistics for gender and mandate for literacy for 2015 .....	59
Table 10	Tests of between-subject effects for gender and mandate for literacy for 2015.....	60
Table 11	Cross-tabulation of financial literacy marginal mean scores by gender for 2015 .....	61
Table 12	Mean financial literacy scores by education mandate and males and females for 2015 .....	64
Table 13	Descriptive statistics for ethnicity and mandate for literacy for 2015.....	66
Table 14	Tests of between-subject effects for ethnicity and mandate for literacy for 2015.....	67
Table 15	Cross-tabulation of financial literacy marginal mean scores by ethnicity for 2015 ....	68
Table 16	Univariate tests of education mandates within ethnicity for literacy for 2015.....	70
Table 17	Significant mean financial literacy scores by white, black, and Hispanic ethnicities for 2015.....	71
Table 18	Descriptive statistics for age and mandate for literacy for 2015 .....	73
Table 19	Tests of between-subject effects for age and mandate for literacy for 2015 .....	74
Table 20	Cross-tabulation of financial literacy marginal mean scores by age for 2015.....	75
Table 21	Descriptive statistics for educational attainment and mandate for literacy for 2015...	78
Table 22	Tests of between-subject effects for educational attainment and mandate for literacy for 2015.....	79
Table 23	Cross-tabulation of financial literacy marginal mean scores by educational attainment for 2015.....	80
Table 24	Significant mean financial literacy scores by educational attainment for 2015 .....	82
Table 25	Descriptive statistics for income and mandate for literacy for 2015 .....	85
Table 26	Tests of between-subject effects for income and mandate for literacy for 2015.....	86
Table 27	Cross-tabulation of financial literacy marginal mean scores by income for 2015 .....	87
Table 28	Significant mean financial literacy scores by education mandate and income for 2015 .....	90
Table 29	Descriptive statistics for gender and mandate for literacy for 2018.....	92
Table 30	Tests of between-subject effects for gender and mandate for literacy for 2018.....	93
Table 31	Cross-tabulation of financial literacy marginal mean scores by gender for 2018 .....	94
Table 32	Significant mean financial literacy scores by males and females for 2018.....	97
Table 33	Descriptive statistics for ethnicity and mandate for literacy for 2018.....	99
Table 34	Tests of between-subject effects for ethnicity and mandate for literacy for 2018.....	100
Table 35	Cross-tabulation of financial literacy marginal mean scores by ethnicity for 2018..	101
Table 36	Significant mean financial literacy scores by ethnicities for 2018 .....	103
Table 37	Descriptive statistics for age and mandate for literacy for 2018 .....	105
Table 38	Tests of between-subject effects for age and mandate for literacy for 2018 .....	106
Table 39	Cross-tabulation of financial literacy marginal mean scores by age for 2018.....	107

Table 40	Descriptive statistics for educational attainment and mandate for literacy for 2018.	110
Table 41	Tests of between-subject effects for educational attainment and mandate for literacy for 2018.....	111
Table 42	Cross-tabulation of financial literacy marginal mean scores by educational attainment for 2018.....	112
Table 43	Significant mean financial literacy scores by educational attainment for 2018 .....	114
Table 44	Descriptive statistics for income and mandate for literacy for 2018 .....	117
Table 45	Tests of between-subject effects for income and mandate for literacy for 2018.....	118
Table 46	Cross-tabulation of financial literacy marginal mean scores by income for 2018 ....	119
Table 47	Significant mean financial literacy scores by income for 2018.....	121
Table 48	Summary of significant findings about financial literacy.....	122
Table 49	Descriptive statistics for gender and mandate for capability for 2015 .....	124
Table 50	Tests of between-subject effects for gender and mandate for capability for 2015 ....	125
Table 51	Cross-tabulation of financial capability marginal mean scores by gender for 2015 .	126
Table 52	Mean financial capability scores by education mandate and gender for 2015 .....	129
Table 53	Descriptive statistics for ethnicity and mandate for capability for 2015 .....	131
Table 54	Tests of between-subject effects for ethnicity and mandate for capability for 2015.	132
Table 55	Cross-tabulation of financial capability marginal mean scores by ethnicity for 2015 .....	133
Table 56	Significant mean financial capability scores by ethnicities for 2015 .....	135
Table 57	Descriptive statistics for age and mandate for capability for 2015.....	137
Table 58	Tests of between-subject effects for age and mandate for capability for 2015 .....	138
Table 59	Cross-tabulation of financial capability marginal mean scores by age for 2015.....	139
Table 60	Descriptive statistics for educational attainment and mandate for capability for 2015 .....	142
Table 61	Tests of between-subject effects for educational attainment and mandate for capability for 2015.....	143
Table 62	Cross-tabulation of financial capability marginal mean scores by educational attainment for 2015.....	144
Table 63	Significant mean financial capability scores by educational attainment for 2015 ....	147
Table 64	Descriptive statistics for income and mandate for capability for 2015 .....	150
Table 65	Tests of between-subject effects for income and mandate for capability for 2015 ...	151
Table 66	Cross-tabulation of financial capability marginal mean scores by income for 2015.	152
Table 67	Significant mean financial capability scores by income for 2015 .....	155
Table 68	Descriptive statistics for gender and mandate for capability for 2018 .....	158
Table 69	Tests of between-subject effects for gender and education mandate for capability for 2018.....	159
Table 70	Cross-tabulation of financial capability marginal mean scores by gender for 2018 .	160
Table 71	Significant mean financial capability scores by males and females for 2018 .....	162
Table 72	Descriptive statistics for ethnicity and mandate for capability for 2018 .....	164
Table 73	Tests of between-subject effects for ethnicity and mandate for capability for 2018.	165
Table 74	Cross-tabulation of financial capability marginal mean scores by ethnicity for 2018 .....	166
Table 75	Significant mean financial capability scores by ethnicities for 2018 .....	168
Table 76	Descriptive statistics for age and mandate for capability for 2018.....	170
Table 77	Tests of between-subject effects for age and mandate for capability for 2018 .....	171

Table 78	Cross-tabulation of financial capability marginal mean scores by age for 2018.....	172
Table 79	Descriptive statistics for educational attainment and mandate for capability for 2018 .....	175
Table 80	Tests of between-subject effects for educational attainment and mandate for capability for 2018.....	176
Table 81	Cross-tabulation of financial capability marginal mean scores by educational attainment for 2018.....	177
Table 82	Significant mean financial capability scores by educational attainment for 2018 ....	179
Table 83	Mean financial capability scores by education mandate and educational attainment for 2018.....	181
Table 84	Descriptive statistics for income and mandate for capability for 2018 .....	183
Table 85	Tests of between-subject effects for income and mandate for capability for 2018 ...	184
Table 86	Cross-tabulation of financial capability marginal mean scores by income for 2018.	185
Table 87	Significant mean financial capability scores by income for 2018 .....	188
Table 88	Summary of significant findings about financial capability.....	190
Table 89	Descriptive statistics for financial capability main effect 2015.....	195
Table 90	Results of one-way ANOVA for financial capability for 2015 .....	196
Table 91	Significant mean financial literacy scores for financial capability for 2015 .....	198
Table 92	Descriptive statistics for financial capability main effect 2018.....	199
Table 93	Results of one-way ANOVA for financial capability for 2018 .....	200
Table 94	Significant mean financial literacy scores for financial capability for 2018 .....	202
Table 95	Summary of significant findings about financial literacy and financial capability ...	204

## CHAPTER ONE: INTRODUCTION

On a daily basis, people must make decisions that affect their financial wellbeing. Managing income is a key factor in socioeconomic success and is widely recognized as a necessary skill (Brown, 2017; President’s Advisory Council on Financial Capability for Young Americans [PACFCYA], 2015; Consumer Financial Protection Bureau, 2015; Office of Financial Education, 2002; Gonzales & Sen, 2017). Yet, research shows that many parents are not comfortable speaking with their children about financial topics, especially if they feel that they do not have a good grasp on their own finances (T. Rowe Price, 2017).

Organizations such as the U.S. Chamber of Commerce and the Organisation for Economic Co-operation and Development (OECD) believe that public schools should provide financial education for students. However, public schools often do not include financial literacy education in the curriculum or, if schools do include financial education, it is not rigorous (Council for Economic Education [CEE], 2018). Each state addresses financial education in its legislation, and over time, more states have increased the requirements for financial literacy education (CEE, 2018). For example, during the 2019 legislative session, the state of Florida considered a bill, CS/SB 114, which would mandate a half-credit of financial literacy for all high school students but would not require a standardized test except for acceleration. This bill sought to elevate the importance of financial education in Florida by moving the topic from a small portion of the economics course to a standalone semester-long course. The bill moved through the Education Committee and the Rules Committee with unanimous “yeas” (MyFloridaHouse.gov, 2019). Though legislators postponed it indefinitely as the 2019 session ended, this proposed action signifies that the legislature views financial literacy as key knowledge for Florida graduates. Hensley (2019), the President and CEO of the National

Endowment for Financial Education, wrote that politics such as these hinder financial education throughout the nation. Further, Hensley stated that poorly constructed mandates for financial education could actually be harmful.

### Problem Statement

Only 17 states required personal financial education as of 2018; within those states, financial literacy programs varied widely (CEE, 2018). Based on the available research, it was not clear whether there is a relationship between state mandates for financial literacy education and the financial literacy and financial capability of young adults. It is widely recognized that financial decision-making impacts individuals on a daily basis, and current research indicates that financial education can have an impact upon financial decision-making, including use of debt. It is important to understand how formal financial education impacts later financial literacy and financial capability so that policy makers can determine what routes to pursue.

### Purpose Statement

The purpose of this study was to describe the relationships between financial literacy and financial capability rates of 18-24-year-olds and formal financial education in public K-12 schools.

### Research Questions

These questions were the basis for this study and aimed to determine whether formal financial education programs can impact the financial literacy and financial capability of young adults.



- 1) In what ways does the financial literacy of 18-24-year-olds vary according to the requirements for financial education?
- 2) In what ways does the financial capability of 18-24-year-olds vary according to the requirements for financial education?
- 3) What trends in these relationships, between financial education and financial literacy and capability, are observable over time?
- 4) In what ways is the financial literacy of 18-24-year-olds associated with their financial capability?

### Operational Definitions

Financial education, literacy, and capability are frequently referred to in similar contexts. However, there are important distinctions among the terms.

- Financial education is a way to “enhance financial literacy by increasing financial knowledge, skills and attitudes” (The Organisation for Economic Co-operation and Development [OECD], 2015, p. 7)
- Financial literacy (also known as financial knowledge) is “possessing the skills and knowledge on financial matters to take effective action that best fulfills an individual’s personal, family and global community goals” (National Financial Educators Council, 2018, p. 4)
- Financial capability is a “multi-dimensional concept that encompasses a combination of knowledge, resources, access, and habits” (Financial Industry Regulatory Authority [FINRA], 2016, p. 2)

- Financial Industry Regulatory Authority (FINRA) performs the National Financial Capability Study every three years
- The Council for Economic Education (CEE) compiles a report about each of the states' K-12 financial education mandates every three years

### Conceptual Framework

This study used human capital theory as a lens through which to complete a policy analysis of financial education mandates. Human capital theory focuses on the ways that education increases human capability and views formal education as valuable for participants' futures (Olaniyan & Okemakinde, 2008). According to Holden and Biddle (2017), Schultz developed the first modern concept based on ideas from Adam Smith; then, Becker and Mincer popularized the concept.

Holden and Biddle (2017) also described how human capital theory began to influence federal education policy, as promoted by Heller. Prior to the end of the 1950s, education was often viewed as an effect of the economy rather than as an input. As the nation entered the space race, however, policymakers began to see education as supportive of economics and defense, which allowed Heller to highlight the human capital theory of education, showing it as an input to national economic growth (Holden & Biddle, 2017). Given the meaning of the theory and the roots it has in education, it was appropriate to view states' mandates for financial education through this lens because one intent of educational policy is to provide the best possible education for students, with the belief that education can improve their lives. Since financial abilities are recognized as a national concern, financial education falls under the construct of human capital theory.

## Literature Review

The literature review synthesized extant work that collectively addressed the importance of financial literacy and financial capability in national terms. It explored factors that influence financial behaviors and policies about financial education. The review also explored what is currently known about the impacts of financial education, as well as the implementation of financial education.

The literature included articles from peer-reviewed journals, books, dissertations, websites, and information from organizations that are involved in financial education efforts. The following search terms were used in both the ProQuest Education Database and the ERIC databases, as well as in Google Scholar:

- ("financial literacy" OR "financial education") AND (schools OR states OR federal) AND (mandates OR policy) AND la.exact("English") AND stype.exact("Scholarly Journals") AND PEER(yes)
- ("financial literacy" OR "financial education") AND schools AND (mandates OR policy) AND stype.exact("Scholarly Journals") AND la.exact("English") AND PEER(yes)
- ("financial literacy" OR "financial education") AND (schools OR adolescents OR children)
- (("financial education" OR "financial literacy") AND (schools OR adolescents OR children) AND policy) AND stype.exact("Scholarly Journals") AND la.exact("English") AND PEER(yes)
- ("financial literacy" AND (schools OR adolescents OR children) AND policy) AND la.exact("English") AND (stype.exact("Scholarly Journals") AND PEER(yes))

The search results for scholarly articles were limited to 1999-2019 to encompass 20 years of research, which resulted in about 4700 results. However, the focus was primarily on the most recent decade, which revealed an increase in the literature after the economic crisis of 2008. This limitation in time reduced the results to about 3800, many of which were not truly related to the topic this proposal aims to study. Abstracts were scanned of several hundred of the studies and discarded articles were those that did not contain information about 1) efficacy of financial education, 2) public K-12 education, 3) rates of financial literacy among young adults, or 4) financial education policies. Forty articles did relate directly to the topic of study. The following are brief explorations of the literature's content.

### National Financial Views

Financial topics impact everyone, and many governmental and other agencies have studied the effects of financial decision-making among citizens (Brown, 2017; PACFCYA, 2015; Consumer Financial Protection Bureau, 2015; Office of Financial Education, 2002; Gonzales & Sen, 2017). Especially since the economic crisis of 2008, individuals and families have struggled to recover (OECD, 2016; Brown, 2017), which has prompted additional concern about individual financial habits. The PACFCYA (2015) set up a framework for financial education for K-12 public schools, while several other groups have provided curriculum and recommendations (U.S. Chamber of Commerce, 2018). Implementation, however, has been left up to individual states, which has created varied programs and results.

The literature distinguishes multiple aspects of financial knowledge. Financial education is a way to “enhance financial literacy by increasing financial knowledge, skills and attitudes,” which can improve the lives of individuals (OECD, 2015, p. 7). Financial literacy or financial

knowledge, according to the National Financial Educators Council (2018), is “possessing the skills and knowledge on financial matters to take effective action that best fulfills an individual’s personal, family and global community goals” (p. 4). Financial capability is often used as an umbrella term for education, literacy, and behavior, as it is a “multi-dimensional concept that encompasses a combination of knowledge, resources, access, and habits” (FINRA, 2016, p. 2).

According to research by Lusardi and Mitchell (2014), the financial literacy of citizens possibly impacts economic decision-making, though it is difficult to establish a causal link. Yet, these authors discussed the links between higher financial literacy and higher rates of saving and investing; conversely, they discussed the links between lower financial literacy and higher rates of debt (Lusardi & Mitchell, 2014). However, financial literacy is only one element that can influence financial behavior.

### Factors Influencing Financial Behavior

Each person’s financial behavior is influenced by multiple facets of that person’s life. Though the literature surrounding the factors that play into financial capability is sparse, a few studies have found variables that influence young adults’ financial abilities while in college. Shim, Barber, Card, Xiao, and Serido (2009) conducted a cross-sectional study that found that both parental financial socialization and formal education impacted young adults’ attitudes toward finances; this attitude then impacted the subjects’ actions. Shim et al. (2009) defined parental socialization as parental role modeling in an informal fashion, in which the child takes an observational role. Later, Shim, Serido, Tang, and Card (2015) again found that parental financial socialization had a large impact on college students’ financial behaviors. Gudmunson and Danes (2011) conducted a review of the literature and also found that parental financial

socialization is a factor that is often overlooked in the process of analyzing financial ability and recommended that further research focus upon the holistic version of the person.

Sinha, Tan, and Zhan (2018) analyzed data from a national survey to identify characteristics of young adults that correlate to their financial behaviors. The authors self-identified their study as the first one to study latent patterns of financial behaviors of young adults with a national set of data (Sinha et al., 2018). The results also identified financial socialization, or lack thereof, as a contributor to financial behaviors. According to the authors, people must not only learn about finances, but they must also have the opportunity to practice sound financial behaviors (Sinha et al., 2018). While researching relationships among demographics, this study found that young adults with low-income backgrounds or low levels of literacy, or who identified as minorities or females, were less likely to have sound financial footing (Sinha et al., 2018). This aligns with previous research, such as that of Chen and Volpe (2002), Robb & Sharpe (2009), and Robb (2011).

Studies about influences of financial literacy extend beyond the United States. Herawati, Candiasa, Yadnyana, and Suharsono (2018) discovered that social economic status played a large role in the financial behavior of accounting students in Bali. Luksander, Beres, Huzdik, and Nemeth (2014) discovered that, in Hungary, gender, age, and income had a relationship to levels of financial literacy. Researchers in Australia uncovered that self-esteem, gender, and socioeconomic status played a role in financial behavior (Vyvyan, Blue, & Brimble, 2014). Though governments cannot impact most non-educational factors that influence financial behavior, governments have created policies to address formal financial education.

## Policies Concerning Financial Education

Because formal financial education has been found to have an impact on later financial behavior, policies concerning financial education impact the nation's economic well-being. Since each state sets its own curriculum requirements, financial education policies vary widely. Urban, Schmeiser, Collins, and Brown (2018) studied three states' changes in financial education implementation in 2007 and compared the credit scores of 18-21-year-olds to those of the same ages in similar states without financial education implementation in 2007. Their findings suggest that rigorous implementation of financial education mandates can positively impact students' later debt behaviors. The state with the greatest amount of training and support, Georgia, showed stronger effects on young people's financial habits (Urban et al., 2018).

The Council for Economic Education (2014) divides states' policies into five categories: 1) financial education included in standards, 2) required implementation of standards, 3) required offering of high school course, 4) students required to take high school course, and 5) required standardized testing of personal finance knowledge. As of 2018, 43 states included financial education in the standards, while 19 offered a high school course and 17 required students to take that course; only seven states required students to take a standardized test (CEE, 2018). The variation in mandates stems from the differences in understanding about the impact of formal financial education.

## Impact of Financial Education

Though researchers have determined that financial education has an impact, they have not yet pinned down the exact impact that education has. Research on the impact of financial education provides mixed results, which can be, in part, attributed to the variety of methods used

(Urban, Schmeiser, Collins, & Brown, 2015). Reviewing the literature, as found through academic databases and reports from government and other agencies, reveals that most information about the effects of financial education is found in correlational studies. There are few empirical studies. For the studies that do exist, the methods and results vary widely. In 2001, researchers compared students' scores on a financial literacy quiz to their states' mandates for financial education (Tennyson & Nguyen, 2001). The study's results suggested that the type of mandate did matter, with students scoring higher on the test if they had taken a specific course about financial topics; however, the study could not determine causation (Tennyson & Nguyen, 2001). In 2008, Hinojosa et al. (2010) conducted experimental research that showed students' savings and investments improved, with an effect size between 0.27 and 0.51 (depending on grade level and intervention), when they played The Stock Market Game, which simulates investment performance in real time.

Similarly, according to an experimental financial education program conducted in multiple elementary schools in Wisconsin, students who received the financial education treatment scored higher on post-tests about financial knowledge than did students in the control group, with an effect size of 0.77 (Batty, Collins, & Odders-White, 2015). The study comprised of standalone financial lessons, which teachers of record presented during the school day once per week for five weeks. The researchers replicated the study in Texas, which produced results similar to the original Wisconsin study (Batty et al., 2015). These studies found that specific education can improve students' knowledge about financial topics, thus improving their financial literacy.

Most research about financial education only focuses upon students' knowledge of financial topics, as in the Wisconsin and Texas studies—it does not address whether their



behavior, or financial capability, is influenced by this knowledge (Amagir, Groot, Maassen van den Brink, & Wilschut, 2018). Brown, Collins, Schmeiser, and Urban (2014) found that young adults' credit scores were better in states that had more rigorous financial education requirements. Through a related correlational study of the implementation of rigorous personal finance education mandates in three states, Urban et al. (2015) concluded that such education could positively impact financial behavior related to credit scores in early adulthood, if implemented correctly. The study considered populations in similar states—states in which there was not rigorous financial education—to create a comparable control sample (Urban et al., 2015). Though their data indicate that rigorous instruction can impact later behavior, Urban et al. (2015) recognized that this information is limited by both criteria (credit scores) and a selective study sample (three states with rigorous implementation); the authors recommended further study to fully determine the efficacy of such education.

### Impact of Non-Financial Skills

Conversely, Mandell and Klein (2009) surveyed 79 young adults who had graduated from multiple schools within one school district. In their findings, they reported that there was no statistical difference in the financial behaviors of students who took a financial education course and those who did not; rather, they found that full-time college and graduate students had the most responsible financial behaviors, such as paying off credit cards and having savings (Mandell & Klein, 2009). These findings did not consider the demographics of the sample. Due to the small sample size and the nature of their study, the authors were unable to describe which factors may have influenced these outcomes and recommended further study about these topics (Mandell & Klein, 2009).

Fernandes, Lynch, and Netemeyer (2014) conducted empirical studies and determined that financial education interventions resulted in little change in later financial behaviors. The authors suggest that content knowledge may be less crucial than soft skills of control, such as planning and being proactive; they also determined that people with low incomes are less likely to have control of their circumstances and, thus, may not internalize the soft skills as readily (Fernandes et al., 2014). The authors' recommendations for future financial education included just-in-time interventions, in which support is provided as it is needed and, thus, the learner does not have time to forget the information before application (Fernandes et al., 2014). Kaiser and Menkhoff (2018) conducted a meta-analysis of experimental studies related to financial education and found that there was a significant positive effect on financial knowledge and a smaller positive effect on financial behaviors.

Cole, Paulson, and Kartini Shastry (2015) determined that financial education has almost "zero" effect on later financial outcomes. They compared financial data about students who graduated from the same high schools in consecutive years: the first cohorts did not have personal finance courses, while the later cohorts did. The authors observed that, rather than financial education, better math skills related to better financial outcomes; the authors hypothesized that these math skills related to potential increases in patience, better understanding of concepts like compound interest, or career path decisions (Cole et al., 2015). Baron (2015) also discovered that improvements in mathematical skills improved confidence in dealing with financial topics. With such varied research, it is difficult to determine what type of education produces the best results.

## Providing Effective Financial Education

The research about financial education's ability to change financial behaviors is mixed, at best. Other factors beyond the curriculum and programs themselves can hinder implementation of further studies. One issue is educators' concerns about providing financial education. According to Henning and Lucey (2017), 41% of preservice and current elementary-level teachers felt it unnecessary to provide financial education in elementary years; most also lacked confidence in their own ability to provide appropriate instruction in the topic. Baron's (2015) research revealed that parents also often lack the confidence to teach their children about finance, which indicates that factors beyond the school's control may influence the outcomes of financial education.

Though financial education programs aim to improve financial literacy and behaviors, little is known about which facets of education, if any, best provide improved financial situations. According to Hensley (2015), educators must provide financial education in conjunction with changes in other facets, such as regulations, rather than as a standalone element. Financial education must do more than provide presentation of content: it must consider consumers' needs in order to address them effectively (Yoong, 2013).

### Significance

Though much has been studied about financial education, financial literacy, and financial capability, there are few clear answers about the relationships among the three. This study unpacked associations and relationships between financial education in public K-12 schools and young adults' financial literacy and financial capability. Such information is important because it can reveal the differences in outcomes of various levels of formal financial education; this

information can be used to shape policies that will provide the greatest positive impact for individuals and, in turn, the nation.

### Methodology and Research Design

A causal comparative design was used to investigate the relationship between students' participation in financial education and young adults' financial literacy and financial capability. This causal comparative design investigated differences between groups and determined whether the independent variable (type of financial education mandate) could explain the differences in the groups (Fraenkel, Wallen, & Hyun, 2015). The study also accounted for the influence of moderator variables, including gender, ethnicity, age, educational attainment, and income level. To achieve these results, a quantitative method was used. This was appropriate because the extant data were quantitative, which allowed for a quantitative analysis.

The dependent variables focused upon young adults' financial literacy and financial capability by using data from the Financial Industry Regulatory Authority's (FINRA) National Financial Capability Study. The independent variable, level of state mandates, represented the level of financial education required within each state, and is based upon data collected by the Council for Economic Education (CEE). The independent variable, level of state mandates, is not manipulated and is categorical; therefore, a causal comparative design is ideal for this study. Finally, the study considered moderator variables, including gender, ethnicity, age, educational attainment, and income level.

This study utilized data collected by the Financial Industry Regulatory Authority (FINRA) through the National Financial Capability Study. The first study was conducted in 2009 alongside the U.S. Department of the Treasury and President Bush's Advisory Council on

Financial Literacy; FINRA conducted subsequent studies in 2012, 2015, and 2018. By analyzing this data for the indicators of financial literacy and financial capability, it was possible to determine young adults' levels of financial literacy and financial capability by state. The young adults surveyed may or may not have attended high school in these specific states. However, many young adults remain in their home state, so this age group was appropriate to use for state-to-state comparisons (Brown, Grigsby, van der Klaauw, Wen, & Zafar, 2016).

The research also used information about each state's implementation of financial education initiatives in K-12 public schools. The Council for Economic Education (CEE) has compiled a report about each of the states' mandates since 2004, with the most current data reflecting state mandates in 2017 (CEE, 2018). CEE researchers collaborated with each state's Department of Education to discern how and what the state requires to be taught (G. Reichert, personal communication, April 4, 2019). According to Reichert (personal communication, April 4, 2019), if the personal finance segment is set within an economics course, it must encompass "one-quarter or more of a semester" to count as a mandate. This information was used to determine whether there is a relationship between differences in the 18-24-year-old age group's financial literacy and financial capability and the implementation of states' financial education programs.

### Participants

The participants in this study were selected and surveyed in the extant data set that FINRA provided. The 27,564 state-by-state participants in the 2015 FINRA study answered questions to an online survey. Of these, 3049 respondents fall into the 18-24 age group. First, researchers selected participants via quota sampling, using established panels of online survey

respondents (FINRA, 2015). The panels used ensure that the demographic characteristics are valid and current by using industry-standard techniques (Mottola & Kieffer, 2017). To account for populations in large states, the researchers used oversamples in four states. As the survey did not specifically target heads of households, any respondent within the pool was able to complete the survey between June and October of 2015 (FINRA, 2016). Researchers then weighted the responses to match Census data; finally, researchers weighted state numbers according to various demographics, including ethnicity, income, education level, age, and gender (FINRA, 2019).

### Instrumentation and Data Collection

The study relied on extant data obtained from FINRA's Financial Capability survey. The unaggregated data sets were acquired by signing a non-disclosure agreement with FINRA. Applied Research and Consulting conducted FINRA's state-by-state study, which consisted of a questionnaire. This questionnaire collected demographic data, then asked respondents a variety of questions related to financial knowledge and behaviors (Applied Research and Consulting, 2015). The study's questions' reliability and validity have been verified by many stakeholders over the years through use (Applied Research and Consulting, 2018). However, the financial literacy scale has not "been validated, though it is widely used" since its inception in 2009 (G. Mottola, personal communication, November 7, 2019). Many individual questions within the FINRA survey were pulled from existing surveys, including the Consumer Finance Protection Bureau (CFPB) Financial Well-Being Scale (G. Mottola, personal communication, November 7, 2019). The CFPB survey was validated using three sets of surveys, as well as comparing the new questions and results to previous, related results, which found "a statistically significant relationship in an expected direction between those measures" (CFPB, 2017, p.21). Sections in

the FINRA survey included topics like credit cards, homeownership, insurance, and an assessment of self-perception within the realm of financial literacy.

### Variables

The dependent variables focused upon young adults' financial literacy and financial capability. For financial literacy, the study used responses to the five questions that FINRA identifies as indicative of financial literacy (FINRA, 2015):

- 1) 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?
- 2) Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?
- 3) If interest rates rise, what will typically happen to bond prices?
- 4) Suppose you owe \$1,000 on a loan and the interest rate you are charged is 20% per year compounded annually. If you didn't pay anything off, at this interest rate, how many years would it take for the amount you owe to double?
- 5) A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less.

For financial capability, the study used responses to five questions from a cross-section of questions within the FINRA study that encompass young adults' abilities to make ends meet, plan for the future, and manage financial products (FINRA). These variables were chosen to mirror FINRA's financial literacy composite because they span multiple aspects of financial

awareness, including budgeting, saving, and borrowing that apply to the 18-24-year-old age group (FINRA, 2015):

- 1) In a typical month, how difficult is it for you to cover all your expenses and bills?
- 2) Over the past year, would you say your household's spending was less than, more than, or about equal to your income?
- 3) Have you set aside emergency or rain day funds that would cover your expenses for three months in case of sickness, job loss, economic downturn, or other emergencies?
- 4) In the past 12 months, I always paid my credit card in full.
- 5) In the past five years, how many times have you taken out a payday loan?

Influential factors that were considered as moderator variables include demographics such as gender, ethnicity, age, educational attainment, and income (Sinha et al., 2018; FINRA, 2016). Research shows that these factors have a relationship to individuals' levels of financial literacy.

The independent variable, level of state mandates, which were categorical, represented the level of financial education required within each state. It was measured in six levels, which are the five levels created by CEE, plus a level for no mandate (CEE, 2018):

- No mandate
- Included in standards
- Standards required to be implemented by districts
- High school course required to be offered
- High school course required to be taken
- Student testing required



These six levels indicated what type of financial literacy education students should have received in each state.

### Measurement of Variables

The scores of the five financial literacy questions for the respondents were combined to determine the mean score for overall financial literacy. For example, if a respondent answered three of the five questions correctly, that respondent would be coded with a score of 60% correct. The mean scores were compared to the six financial education mandates to determine statistical significance for the main effect. The results of the financial capability questions were treated in a similar manner. If a respondent indicated that she or he had used responsible financial behaviors, that response earned a point. The respondent's points were added together and assigned a percentile. These scores were used to determine statistical significance for the main effect.

Moderator variables including gender, ethnicity, age, educational attainment, and income are connected to respondents' information in the extant data set from FINRA. The study compared the financial literacy scores of each demographic subset to the state education mandates to determine the statistical significance of the interaction effects. An example of how the results are reported in crosstabulation format for analysis is provided in Table 1.

Table 1

*State financial education mandates x ethnicity (sample table)*

Factor	White	Black	Hispanic	Asian	Other
No mandate	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)
Included in standards	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)
Standards required to be implemented	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)
High school course required to be offered	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)
High school course required to be taken	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)
Student testing required	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)

### Data Analysis

The data were analyzed according to each research question to determine whether there was any relationship between the independent and dependent variables and, if so, the strength of

that relationship. The data were also analyzed for the influence of moderator variables, which provided an understanding as to what extent, if any, other variables influence the effectiveness of financial literacy education. The intent was to analyze using a two-way ANOVA to examine two factors simultaneously (state financial education mandates and moderator demographic variables) to measure the interaction of how those two influence the dependent variable (financial literacy or financial capability).

While an ANCOVA uses the demographic variables as controls, the idea was to include the variables for interaction effects, not exclude them as pre-existing differences. Additionally, there were two separate analyses—one for financial literacy as the dependent variable, and one for financial capability as the dependent variable. This was why the two-way ANOVA was the analysis tool of choice.

To answer research question one (*In what ways does the financial literacy of 18-24-year-olds vary according to the requirements for financial education?*), descriptive statistics of mean and standard deviation presented data about the populations and cross-tabulation tables described how financial literacy rates vary by state mandate. A two-way analysis of variance (ANOVA) was conducted to investigate how financial literacy varies according to financial education requirements. This analysis revealed whether there is a statistically significant difference in young adults' financial literacy based on variances in their exposure to financial education in high school. For differences that were statistically significant, the degree to which the variance occurs was evaluated and reported in the findings, including the eta squared and mean values. The two-way ANOVA also accounted for moderator variables, including gender, ethnicity, age, educational attainment, and income, and identified whether the interaction effects were statistically significant.

To answer research question two (*In what ways does the financial capability of 18-24-year-olds vary according to the requirements for financial education?*), descriptive statistics of mean and standard deviation presented data about the populations and cross-tabulation tables described how financial capability rates vary by state mandate. A two-way analysis of variance (ANOVA) was conducted to investigate how financial capability varies according to financial education requirements and also accounted for the interaction effects of moderator variables, while eta squared and mean values were reported for statistically significant relationships. Because financial capability encompasses behaviors rather than knowledge, it was important to analyze it separately from the financial literacy addressed in question one.

To answer research question three (*What trends in these relationships, between financial education and financial literacy and capability, are observable over time?*), descriptive statistics and visual data analysis provided interpretation of any changes in the outcomes of financial literacy and financial capability. The first analysis set used the 2015 FINRA data and the second analysis set used the 2018 FINRA data.

To answer research question number four (*In what ways is the financial literacy of 18-24-year-olds associated with their financial capability?*), an ANOVA was used to determine the relationship between respondents' financial literacy and financial capability. Descriptive statistics showed the number of cases and the means of financial literacy and financial capability for 2015 and 2018 independently.

Table 2 includes the research questions, variables, and statistical tool utilized to analyze each.

Table 2

*Research questions and variables*

Research Question	Independent Variable	Dependent Variable	Moderator Variables	Statistical Tool
In what ways does the financial literacy of 18-24-year-olds vary according to the requirements for financial education?	Financial education policy level (categorical)	Financial literacy score (continuous)	Gender, ethnicity, age, educational attainment, income	Two-way ANOVA
In what ways does the financial capability of 18-24-year-olds vary according to the requirements for financial education?	Financial education policy level (categorical)	Financial capability score (continuous)	Gender, ethnicity, age, educational attainment, income	Two-way ANOVA
What trends in these relationships, between financial education and financial literacy and capability, are observable over time?	Financial education policy level (categorical)	Financial literacy and capability scores (continuous)		Visual comparison
In what ways is the financial literacy of 18-24-year-olds associated with their financial capability?	Financial literacy score (categorical)	Financial capability score (continuous)		ANOVA

## Delimitations

One of the delimitations of this study was that it was delimited to only account for a narrow range of the population, young adults in the age range of 18-24 years old. Analyzing this group's financial literacy and financial capability focused upon the impact financial education may have within a few years of learning the material (Urban et al., 2018). Since many young adults remain in their home state, this age group was appropriate to use for state-to-state comparisons (Brown, Grigsby, van der Klaauw, Wen, & Zafar, 2016). The focus upon this group excluded exploring potential relationships between state mandates and older populations; it also excluded comparisons of differing age groups' financial literacy and financial capability.

This study was concerned with state-level comparisons because each state can create its own mandates about financial literacy education. Drilling into any subcategory, such as school districts, was unfeasible in terms of variables in data and the amount of time required to collect and analyze such data. Additionally, this study did not consider other changes to curriculum requirements in the same time frame, such as those for mathematics or economics.

There are many factors that may influence financial literacy and capability, such as parental financial socialization and geography. However, due to the lack of time and available data for these factors, they were not included.

Finally, this study considered the most recent sets of results about financial literacy and financial capability by analyzing the 2015 and 2018 FINRA data. The data were compared to the CEE's 2011 and 2014 information, respectively, about states' mandates for financial education, which would impact young adults from ages 18-22 in FINRA's data. This gap also considered time for implementation of the mandates. An additional delimitation was that this

study did not consider longitudinal comparisons that could track changes in state mandates and compare those with potential changes in young adults' financial literacy and financial capability.

### Limitations

The lack of detail about implementation of state mandates was a limiting factor. Each school district and school may have various levels of rigor and fidelity with their implementation of the mandated financial education courses, which can create variables that were not explored by this study. Another limitation was whether the data collected were accurate for both 2015 and 2018, as data errors may limit the accuracy of results. Also, because it was a causal comparative study, other factors may have influenced the results, such as lack of randomization of the subjects, the digital location, and subjects' attitudes. Additionally, internal validity may have been limited due to the inability to manipulate an independent variable.

### Assumptions

Several assumptions were made to create the study. First, that the implementation of financial education was relatively similar in schools throughout each state. Second, that the data is representative of the population. Third, that respondents to the survey understood the questions and answered truthfully.

### Summary

This study determined what relationship exists between states' mandates concerning financial education and 18-24-year-olds' financial literacy and financial capability. By analyzing national data from a survey about financial literacy and financial capability, this study

determined causal-comparative relationships between the two factors. Additionally, the study identified interaction effects via demographic moderator variables. Viewed through the lens of human capital theory, this resulted in an analysis of the potential link between states' financial education policies and students' later financial literacy and financial capability. This could help inform future policy creation, deletion, and modification decisions.



## CHAPTER TWO: LITERATURE REVIEW

The literature review synthesized extant work that collectively addressed the importance of financial literacy and financial capability in national terms. It explored factors that influence financial behaviors and policies about financial education. The review examined what is currently known about the impacts of financial education, as well as the implementation of financial education.

The literature included articles from peer-reviewed journals, books, dissertations, websites, and information from organizations that are involved in financial education efforts. The following search terms were used in both the ProQuest Education Database and the ERIC databases, as well as in Google Scholar:

- ("financial literacy" OR "financial education") AND (schools OR states OR federal) AND (mandates OR policy) AND la.exact("English") AND stype.exact("Scholarly Journals") AND PEER(yes)
- ("financial literacy" OR "financial education") AND schools AND (mandates OR policy) AND stype.exact("Scholarly Journals") AND la.exact("English") AND PEER(yes)
- ("financial literacy" OR "financial education") AND (schools OR adolescents OR children)
- ("financial education" OR "financial literacy") AND (schools OR adolescents OR children) AND policy) AND stype.exact("Scholarly Journals") AND la.exact("English") AND PEER(yes)
- ("financial literacy" AND (schools OR adolescents OR children) AND policy) AND la.exact("English") AND (stype.exact("Scholarly Journals") AND PEER(yes)

The search results for scholarly articles were limited to 1999-2019 to encompass 20 years of research, yielding about 4700 results. However, the focus was primarily on the most recent decade, which revealed an increase in the literature after the economic crisis of 2008. This limitation in time reduced the results to about 3800, many of which were not truly related to the topic this proposal aims to study. Abstracts of several hundred of the studies and articles were scanned and discarded if they did not contain information about 1) efficacy of financial education, 2) public K-12 education, 3) rates of financial literacy among young adults, or 4) financial education policies. Forty articles did relate directly to this topic of study. The following section briefly explored the literature's content.

In constructivist theory, students learn by constructing new concepts out of previous and current experiences, such as previous knowledge of finances and new knowledge about financial management. Viewed through the lens of human capital theory, providing effective financial education can enable students to understand and manage their finances well.

### National Financial Views

Financial topics impact everyone, and many governmental and other agencies have studied the effects of financial decision-making among citizens (Brown, 2017; PACFCYA, 2015; Consumer Financial Protection Bureau, 2015; Office of Financial Education, 2002; Gonzales & Sen, 2017). Especially since the economic crisis of 2008, individuals and families have struggled to recover (OECD, 2016; Brown, 2017), which has prompted additional concern about individual financial habits. The PACFCYA (2015) set up a framework for financial education for K-12 public schools, while several other groups have provided curriculum and

recommendations (U.S. Chamber of Commerce, 2018). Implementation, however, has been left up to individual states, which has created varied programs and results.

The literature distinguishes multiple aspects of financial knowledge. Financial education is a way to “enhance financial literacy by increasing financial knowledge, skills and attitudes,” which can improve the lives of individuals (OECD, 2015, p. 7). Financial literacy or financial knowledge, according to the National Financial Educators Council (2018), is “possessing the skills and knowledge on financial matters to take effective action that best fulfills an individual’s personal, family and global community goals” (p. 4). Financial capability is often used as an umbrella term for education, literacy, and behavior, as it is a “multi-dimensional concept that encompasses a combination of knowledge, resources, access, and habits” (FINRA, 2016, p. 2).

According to research by Lusardi and Mitchell (2014), the financial literacy of citizens possibly impacts economic decision-making, though the authors admitted that it is difficult to establish a causal link. Yet, they discussed the links between higher financial literacy and higher rates of saving and investing; conversely, they discussed the links between lower financial literacy and higher rates of debt (Lusardi & Mitchell, 2014). Scheresberg and Lusardi (2014) studied millennials’ financial habits by analyzing data from the Financial Industry Regulatory Authority and determined that the generation, as a whole, was more financially fragile than preceding generations, which will impact the nation’s stability moving forward. However, financial literacy is only one element that can influence financial behavior.

### Factors Influencing Financial Behavior

Each person’s financial behavior is influenced by multiple facets of that person’s life. Though the literature surrounding the factors that play into financial capability is sparse, a few

studies have found variables that influence young adults' financial abilities while in college. Shim, Barber, Card, Xiao, and Serido (2009) conducted a cross-sectional study that found that both parental financial socialization and formal education impacted young adults' attitudes toward finances; this attitude then impacted the subjects' actions. Shim et al. (2009) defined parental socialization as parental role modeling in an informal fashion, in which the child takes an observational role. Later, Shim, Serido, Tang, and Card (2015) again found that parental financial socialization had a large impact on college students' financial behaviors, with a 0.22 beta coefficient in predicting young adults' financial efficacy. Chambers, Asarta, and Farley-Ripple (2019) examined data from OECD's Financial Literacy Assessment to determine whether parental financial socialization played a role in gender-based levels of financial literacy. After controlling for variables in education and other student characteristics, they determined that parents do indeed have an influence on financial literacy, with a preference for ensuring male children have stronger financial capability (Chambers et al., 2019). Gudmunson and Danes (2011) conducted a review of the literature and also found that parental financial socialization is a factor that is often overlooked in the process of analyzing financial ability and recommended that further research focus upon the holistic version of the person. Deenanath, Danes, and Jang (2019) found that, though unintentional parental financial socialization plays a role with  $B = 0.59$ , student behaviors are most strongly influenced by intentional factors, such as student-earned income, which showed a strong relationship to student financial behavior at  $B = 0.74$ .

Sinha, Tan, and Zhan (2018) analyzed data from a national survey to identify characteristics of young adults that correlate to their financial behaviors. The authors self-identified their study as the first one to study latent patterns of financial behaviors of young adults with a national set of data (Sinha et al., 2018). The results of this study also identified

financial socialization, or lack thereof, as a contributor to financial behaviors. According to the authors, people must not only learn about finances, but they must also have the opportunity to practice sound financial behaviors (Sinha et al., 2018). While researching relationships among demographics, one study found that young adults with low-income backgrounds or low levels of literacy, or who identified as minorities or females, were less likely to have sound financial footing (Sinha et al., 2018). For instance, those who had not completed high school showed only a 0.29 correlation to being financially stable while those who had at least some college education showed a 0.50 correlation to being financially stable (Sinha et al., 2018). This aligns with previous research, such as that of Chen and Volpe (2002), Robb and Sharpe (2009), and Robb (2011).

Studies about influences of financial literacy extend beyond the United States. Herawati, Candiasa, Yadnyana, and Suharsono (2018) discovered that social economic status played a large role (at a beta of 0.36) in financial behavior of accounting students in Bali, compared to financial literacy (at a beta of 0.11). Alex Yue (2019) determined that family background played a large role in adolescents' financial literacy in Hong Kong. Luksander, Beres, Huzdik, and Nemeth (2014) discovered that, in Hungary, gender, age, and income had a relationship to levels of financial literacy. Researchers in Australia uncovered that self-esteem, gender, and socioeconomic status played a role in financial behavior (Vyvyan, Blue, & Brimble, 2014). Though governments cannot impact most non-educational factors that influence financial behavior, governments have created policies to address formal financial education.

The information in Table 3 is a summary of the factors that influence financial behavior as found in the literature.

Table 3

*Factors influencing financial behavior in literature review*

Author	Parent Impact	Attitude Toward Finance	Work Experience	Formal Education	Gender	Ethnicity	Income	Age
Alex Yue (2019)	X							
Chambers, Asarta, & Farley-Ripple (2019)	X				X			
Deenanath, Danes, & Jang (2019)	X		X					
Gudmunson & Danes (2011)	X							
Herawati, Candiasa, Yadnyana, & Suharsono (2018)		X		X			X	
Luksander, Beres, Huzdik, & Nemeth (2014)					X		X	X
Shim, Barber, Card, Xiao, & Serido (2009)	X	X	X	X				
Shim, Serido, Tang, & Card (2015)	X			X				
Sinha, Tan, & Zhan (2018)	X			X	X	X	X	
Vyvyan, Blue, & Brimble (2014)		X			X		X	

### Policies Concerning Financial Education

Because formal financial education has been found to have an impact on later financial behavior, policies concerning financial education impact the nation's economic well-being. Since each state sets its own curriculum requirements, financial education policies vary widely. Urban, Schmeiser, Collins, and Brown (2018) studied three states' changes in financial education implementation in 2007 and compared the credit scores of 18-21-year-olds to those of the same age in similar states without financial education implementation in 2007. Their findings suggest that rigorous implementation of financial education mandates can positively impact students' later debt behaviors. The state with the greatest amount of training and support, Georgia, showed stronger effects on young people's financial habits (Urban et al., 2018). Stoddard and Urban (2018) discovered that students who had experienced high school financial education were more likely to incur low-cost financing for college education, while students who had not experienced high school financial education were more likely to incur high-cost financing.

The Council for Economic Education (2014) divides states' policies into five categories: 1) financial education included in standards, 2) required implementation of standards, 3) required offering of high school course, 4) students required to take high school course, and 5) required standardized testing of personal finance knowledge. As of 2018, 43 states included financial education in the standards, while 19 offered a high school course and 17 required students to take that course; only seven states required students to take a standardized test (CEE, 2018). The variation in mandates stems from the differences in understanding about the impact of formal financial education.

## Impact of Financial Education

Though researchers have determined that financial education has an impact, they have not yet pinned down the exact impact that education has. Research on the impact of financial education provides mixed results, which can be, in part, attributed to the variety of methods used (Urban, Schmeiser, Collins, & Brown, 2015). Reviewing the literature, as found through academic databases and reports from government and other agencies, reveals that most information about the effects of financial education is found in correlational studies. There are few empirical studies. For the studies that do exist, the methods and results vary widely. In 2001, researchers compared students' scores on a financial literacy quiz to their states' mandates for financial education (Tennyson & Nguyen, 2001). The study's results suggested that the type of mandate did matter, with students scoring higher on the test if they had taken a specific course about financial topics; however, the study could not determine causation (Tennyson & Nguyen, 2001). In 2008, Hinojosa et al. (2010) conducted experimental research that showed students' savings and investments improved, with an effect size between 0.27 and 0.51 (depending on grade level and intervention), when they played The Stock Market Game, which simulates investment performance in real time.

Similarly, according to an experimental financial education program conducted in multiple elementary schools in Wisconsin, students who received the financial education treatment scored higher on post-tests about financial knowledge than did students in the control group, with an effect size of 0.77 (Batty et al., 2015). The study comprised of standalone financial lessons, which teachers of record presented during the school day once per week for five weeks. The researchers replicated the study in Texas, which produced results similar to the



original Wisconsin study (Batty et al., 2015). These studies found that specific education can improve students' knowledge about financial topics, thus improving their financial literacy.

Most research about financial education only focuses upon students' knowledge of financial topics, as in the Wisconsin and Texas studies—it does not address whether their behavior, or financial capability, is influenced by this knowledge (Amagir, Groot, Maassen van den Brink, & Wilschut, 2018). Brown, Collins, Schmeiser, and Urban (2014) found that young adults' credit scores were better in states that had more rigorous financial education requirements. Through a related correlational study of the implementation of rigorous personal finance education mandates in three states, Urban et al. (2015) concluded that such education could positively impact financial behavior related to credit scores in early adulthood, if implemented correctly. The study considered populations in similar states—states in which there was not rigorous financial education—to create a comparable control sample (Urban et al., 2015). Though their data indicate that rigorous instruction can impact later behavior, Urban et al. (2015) recognized that this information is limited by both criteria (credit scores) and a selective study sample (three states with rigorous implementation); the authors recommended further study to fully determine the efficacy of such education.

#### Impact of Non-Financial Skills

Conversely, Mandell and Klein (2009) surveyed 79 young adults who had graduated from multiple schools within one school district. In their findings, they reported that there was no statistical difference in the financial behaviors of students who took a financial education course and those who did not; rather, they found that full-time college and graduate students had the most responsible financial behaviors, such as paying off credit cards and having savings

(Mandell & Klein, 2009). These findings did not consider the demographics of the sample. Due to the small sample size and the nature of their study, the authors were unable to describe which factors may have influenced these outcomes and recommended further study about these topics (Mandell & Klein, 2009).

Fernandes, Lynch, and Netemeyer (2014) conducted empirical studies and determined that financial education interventions resulted in little change in later financial behaviors. The authors suggest that content knowledge may be less crucial than soft skills of control, such as planning and being proactive; they also determined that people with low incomes are less likely to have control of their circumstances and, thus, may not internalize the soft skills as readily (Fernandes et al., 2014). The authors' recommendations for future financial education included just-in-time interventions, in which support is provided as it is needed and, thus, the learner does not have time to forget the information before application (Fernandes et al., 2014).

In a recent study, Wagner (2019) found associations between young adults' financial education and financial literacy rates. Wagner also determined that financial education had a stronger influence on later literacy for students who had lower educational and socioeconomic backgrounds (Wagner, 2019). Kaiser and Menkhoff (2018) conducted a meta-analysis of experimental studies related to financial education and found that there was a significant positive effect on financial knowledge and a smaller positive effect on financial behaviors.

Cole, Paulson, and Kartini Shastry (2015) determined that financial education has almost *zero* effect on later financial outcomes. They compared financial data about students who graduated from the same high schools in consecutive years: the first cohorts did not have personal finance courses, while the later cohorts did. The authors found that, rather than financial education, better math skills related to better financial outcomes; the authors

hypothesized that these math skills related to potential increases in patience, better understanding of concepts like compound interest, or career path decisions (Cole et al., 2015). Baron (2015) also found that improvements in mathematical skills improved confidence in dealing with financial topics. With such varied research, it is difficult to determine what type of education will produce the best results.

### Providing Effective Financial Education

The research about financial education's ability to change financial behaviors is mixed, at best. Other factors beyond the curriculum and programs themselves can hinder implementation of further studies. One issue is educators' concerns about providing financial education. According to Henning and Lucey (2017), 41% of preservice and current elementary-level teachers felt it unnecessary to provide financial education in elementary years; most also lacked confidence in their own ability to provide appropriate instruction in the topic. Baron's (2015) research revealed that parents also often lack the confidence to teach their children about finance, which indicates that factors beyond the school's control may influence the outcomes of financial education.

Though financial education programs aim to improve financial literacy and behaviors, little is known about which facets of education, if any, best provide improved financial situations. According to Hensley (2015), educators must provide financial education in conjunction with changes in other facets, such as regulations, rather than as a standalone element. Financial education must do more than provide presentation of content: it must consider consumers' needs in order to address them effectively (Yoong, 2013). Similarly, Bapat (2019) found that financial education programs that included access to electronic banking

resulted in stronger positive financial behavior than those without, suggesting courses must address students' real-time needs.

### Significance

As shown in this chapter, there is much research about financial education, financial literacy, and financial capability. However, there are few clear answers about the relationships among the three. The reason this study is important is because it determined whether there are any associations between financial education in public K-12 schools and young adults' financial literacy and financial capability. Though the effects of financial education have been studied for decades, few concrete conclusions have been drawn as to which types of financial education provide the greatest benefit for students. This study fills a gap by determining the relationships between financial education mandates and young adults' financial literacy and financial capability rates.

### Summary

According to the research, there is not a clear understanding about the role that financial education can play in young adults' financial literacy and financial capability (Urban et al., 2015; Tennyson & Nguyen, 2001; Hinojosa et al., 2010; Brown et al., 2014; Mandell & Klein, 2009; Wagner, 2019; Cole et al., 2015). Several studies have found that demographic variables can influence later financial abilities, while several others have determined that financial socialization plays a key role (Luksander et al., 2014; Sinha et al., 2018; Vyvyan et al., 2014; Deenanath et al., 2019; Gudmunson & Danes, 2011; Shim et al., 2009). Additionally, it is clear that policies concerning financial education vary widely.

## CHAPTER THREE: METHODOLOGY

This chapter describes the methodology of the study. It includes the problem, purpose, research questions, design of the research, participants, instrumentation and data collection, variables, data analysis, delimitations, and limitations. This study examined 2015 and 2018 survey data to observe the relationship between mandates for education and the rates of financial literacy and financial capability of 18-24-year-olds. A quantitative method was used and was appropriate because the extant data were quantitative, which allowed for analysis. Data were analyzed with descriptive statistics, two-way ANOVAs, cross-tabulations, and visual comparisons for themes.

### Problem Statement

Only 17 states required personal financial education as of 2018; within those states, financial literacy programs varied widely (CEE, 2018). Based on the available research, it was not clear whether there is a relationship between state mandates for financial literacy education and the financial literacy and financial capability of young adults. It is widely recognized that financial decision-making impacts individuals on a daily basis, and current research indicates that financial education can have an impact upon financial decision-making, including use of debt. It is important to understand how formal financial education impacts later financial literacy and financial capability so that policy makers can determine which routes to pursue.

### Purpose Statement

The purpose of this study was to disclose and describe the relationships between financial literacy and financial capability rates of 18-24-year-olds and formal financial education in public K-12 schools.

### Research Questions

These questions were the basis for this study and aimed to determine whether formal financial education programs can impact the financial literacy and financial capability of young adults. Human capital theory indicates that education and learning can help people have higher-quality lives than if they did not have such an education (Olaniyan & Okemakinde, 2008). Based on this theory, the following questions were developed to determine what impact financial education has upon later financial outcomes for young adults.

- 1) In what ways does the financial literacy of 18-24-year-olds vary according to the requirements for financial education?
- 2) In what ways does the financial capability of 18-24-year-olds vary according to the requirements for financial education?
- 3) What trends in these relationships, between financial education and financial literacy and capability, are observable over time?
- 4) In what ways is the financial literacy of 18-24-year-olds associated with their financial capability?

### Research Design

A causal comparative design was used to investigate the relationship between students' participation in financial education and young adults' financial literacy and financial capability. This causal comparative design investigated differences between groups and determined whether the independent variable (type of financial education mandate) could explain the differences in the groups (Fraenkel, Wallen, & Hyun, 2015). The study also accounted for the influence of moderator variables, including gender, ethnicity, age, educational attainment, and income.

### Participants

The post-hoc participants in this study were selected and surveyed in the extant pre-existing data set that FINRA provided. The total population of 27,564 state-by-state participants in the 2015 FINRA study answered questions to an online survey. From the total population, only 3,049 respondents were in the 18-24 age group. That was the targeted sample utilized in this study. First, researchers selected participants via nonprobability quota sampling, using established panels of online survey respondents (FINRA, 2015). The panels used ensure that the demographic characteristics are valid and current by using industry-standard techniques, which includes quotas based on Census distributions (Mottola & Kieffer, 2017). To account for populations in large states, the researchers used oversamples in four states. As the survey did not specifically target heads of households, any respondent within the pool was able to complete the survey between June and October of 2015 (FINRA, 2016). Researchers then weighted the responses to match Census data; finally, researchers weighted state numbers according to various demographics, including gender, ethnicity, age, educational attainment, and income (FINRA,

2019). Likewise, the data from the 2018 FINRA study included 27,091 adults, with 2,795 respondents in the 18-24 age group (Applied Research and Consulting, 2019).

### Instrumentation and Data Collection

The study relied on post-hoc extant data obtained from FINRA's Financial Capability pre-existing survey. The unaggregated data sets were acquired by signing a non-disclosure agreement with FINRA. Applied Research and Consulting conducted FINRA's state-by-state study, which consisted of a questionnaire. This questionnaire collected demographic data, then asked respondents a variety of questions related to financial knowledge and behaviors (Applied Research and Consulting, 2015). The study's reliability and validity have been verified by many stakeholders over the years through use (Applied Research and Consulting, 2018). Such studies have been published by the National Disability Institute, the Office of Economic and Manpower Analysis, the University of Maryland, the Global Financial Literacy Excellence Center, the Urban Institute, FINRA, and in the *Family and Consumer Sciences Research Journal*. However, the financial literacy scale has not "been validated, though it is widely used" since its inception in 2009 (G. Mottola, personal communication, November 7, 2019). Many individual questions within the FINRA survey were pulled from existing surveys, including the Consumer Finance Protection Bureau (CFPB) Financial Well-Being Scale (G. Mottola, personal communication, November 7, 2019). The CFPB survey was validated using three sets of surveys, as well as comparing the new questions and results to previous, related results, which found "a statistically significant relationship in an expected direction between those measures" (CFPB, 2017, p.21). Other questions were developed by a team that includes experts from the CFPB, the Treasury, and the Federal Reserve (Mottola & Kieffer, 2017). Sections in the FINRA



survey included topics like credit cards, homeownership, insurance, and an assessment of self-perception within the realm of financial literacy.

This study utilized data collected by the Financial Industry Regulatory Authority (FINRA) through the National Financial Capability Study. The first study was conducted in 2009 alongside the U.S. Department of the Treasury and President Bush's Advisory Council on Financial Literacy; FINRA conducted subsequent studies in 2012, 2015, and 2018. By analyzing the most recent data, from 2015 and 2018, for the indicators of financial literacy and financial capability, it was possible to determine young adults' levels of financial literacy and financial capability by level of state financial education mandate. The young adults surveyed may or may not have attended high school in these specific states. However, many young adults remain in their home state, so this age group was appropriate to use for state-to-state comparisons (Brown, Grigsby, van der Klaauw, Wen, & Zafar, 2016).

The current research also used information about each state's implementation of financial education initiatives in K-12 public schools. The Council for Economic Education (CEE) has compiled a report about each of the states' mandates since 2004, with the most current data reflecting state mandates in 2017 (CEE, 2018). CEE researchers collaborated with each state's Department of Education to discern how and what the state requires to be taught (G. Reichert, personal communication, April 4, 2019). According to Reichert (personal communication, April 4, 2019), if the personal finance segment is set within an economics course, it must encompass "one-quarter or more of a semester" to count as a mandate. This information was used to determine whether there is a relationship between differences in the 18-24-year-old age group's financial literacy and financial capability and the implementation of states' financial education programs.

## Variables

The study included dependent variables, independent variables, and moderator variables. This section described the measurement and analyses of the variables.

The dependent variables focused upon young adults' financial literacy and financial capability by using data from the Financial Industry Regulatory Authority's (FINRA) National Financial Capability Study. The independent variable, level of state mandates, represented the level of financial education required within each state, and is based upon data collected by the Council for Economic Education (CEE). The independent variable is not manipulated and is categorical; therefore, a causal comparative design is ideal for this study. Finally, the study considered moderator variables, including gender, ethnicity, age, educational attainment, and income.

### Dependent Variables

The dependent variables, which were continuous, focused upon young adults' financial literacy and financial capability. Each dependent variable was measured against the independent variable, state mandates for financial education, separately to determine what relationship the mandates had to each dependent variable. For financial literacy, the study used responses to the five questions that FINRA identifies as indicative of financial literacy (FINRA, 2015):

- 1) 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?

- 2) Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?
- 3) If interest rates rise, what will typically happen to bond prices?
- 4) Suppose you owe \$1,000 on a loan and the interest rate you are charged is 20% per year compounded annually. If you didn't pay anything off, at this interest rate, how many years would it take for the amount you owe to double?
- 5) A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less.

For financial capability, the study used responses to five questions from a cross-section of questions within the FINRA study that encompass young adults' abilities to make ends meet, plan for the future, and manage financial products (FINRA). These variables were chosen to mirror FINRA's financial literacy composite because they span multiple aspects of financial awareness, including budgeting, saving, and borrowing that apply to 18-24-year-olds (FINRA, 2015):

- 1) In a typical month, how difficult is it for you to cover all your expenses and bills?
- 2) Over the past year, would you say your household's spending was less than, more than, or about equal to your income?
- 3) Have you set aside emergency or rain day funds that would cover your expenses for three months in case of sickness, job loss, economic downturn, or other emergencies?
- 4) In the past 12 months, I always paid my credit card in full.
- 5) In the past five years, how many times have you taken out a payday loan?

## Independent Variables

The independent variable, level of state mandates, which were categorical, represented the level of financial education required within each state. It was measured in six levels, which are the five levels created by CEE, plus a level for no mandate (CEE, 2018):

- No mandate
- Included in standards
- Standards required to be implemented by districts
- High school course required to be offered
- High school course required to be taken
- Student testing required

These six levels indicated what type of financial literacy education students should have received in each state and the District of Columbia. Table 4 shows the number of each mandate.

Table 4

*Number of states that included each type of mandate in 2011 and 2014*

Factor	2011	2014
No mandate	5	7
Included in standards	9	7
Standards required to be implemented	23	16
High school course required to be offered	1	6
High school course required to be taken	9	12
Student testing required	4	3

## Moderator Variables

Influential factors that were considered include the demographics gender, ethnicity, age, educational attainment, and income (Sinha et al., 2018; FINRA, 2016). Research shows that these factors have a relationship to individuals' levels of financial literacy.

## Measurement of Variables

A new variable was added to the FINRA dataset that indicated which type of mandate that student experienced, as based on the CEE report. States with no mandates were coded as 0 through states that required student testing, which were coded as 6. This allowed the analysis to be conducted with the six levels of financial education mandates.

The scores of the five financial literacy questions for respondents were combined to determine their score for overall financial literacy. For example, if a respondent answered three of the five questions correctly, that respondent would be coded with a score of 60% correct, as 3 out of 5 is 60%. The mean scores were compared to each financial education mandate and demographic variable to determine statistical significance for the main effect. The results of the financial capability questions were treated in a similar manner, with the financially responsible behavior earning a point, while irresponsible behaviors did not earn points. The respondent's points were added together and assigned a percentile. These scores ( $n = 3,049$  in 2015 and  $n = 2,975$  in 2018) were used to determine statistical significance for the main effect with education mandate and demographic variables.

Categorical moderator variables, including gender, ethnicity, age, educational attainment, and income, are connected to respondents' information in the extant data set from FINRA. The study compared the financial literacy scores of each demographic subset to the state education

mandates to determine the statistical significance of the interaction effects. An example of how the results are reported in crosstabulation format for analysis can be seen in Table 5.

Table 5

*State financial education mandates x ethnicity (sample table)*

Factor	White	Black	Hispanic	Asian	Other
No mandate	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)
Included in standards	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)
Standards required to be implemented	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)
High school course required to be offered	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)
High school course required to be taken	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)
Student testing required	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)	Financial literacy score (mean)

## Data Analysis

The data were analyzed according to each research question to determine whether there was any relationship between the independent and dependent variables and, if so, the strength of that relationship. The data were also analyzed for the influence of moderator variables, which provided an understanding as to what extent other variables influence the effectiveness of financial literacy education. The intent was to analyze using a two-way ANOVA to examine two factors simultaneously (state financial education mandates and moderator demographic variables) to measure the interaction of how those two influence the dependent variable (financial literacy or financial capability).

While an ANCOVA uses the demographic variables as controls, the idea was to include them for interaction effects, not exclude them as pre-existing differences. Additionally, there were two separate analyses—one for financial literacy as the dependent variable, and one for financial capability as the dependent variable. This was why the two-way ANOVA was the analysis tool of choice.

### Research Question 1 - Financial Literacy

To answer research question one (*In what ways does the financial literacy of 18-24-year-olds vary according to the requirements for financial education?*), descriptive statistics of mean and standard deviation presented data about the populations; cross-tabulation tables described how financial literacy rates vary by state mandate. A two-way analysis of variance (ANOVA) was conducted via SPSS 25 to investigate how financial literacy varies according to financial education requirements. This analysis revealed whether there is a statistically significant difference in young adults' financial literacy based on variances in their exposure to financial

education in high school. For differences that were statistically significant, the degree to which the variance occurred was evaluated and findings were reported, including the partial eta squared and mean values. The two-way ANOVA results also accounted for moderator variables, including gender, ethnicity, age, educational attainment, and income, and indicated whether the interaction effects were statistically significant. These variables are shown within Table 6.

Table 6

*Variables for research question 1*

Dependent Variable (FINRA)	Independent Variable (CEE – Factor)	Independent Variable (FINRA – Moderator)
Financial Literacy Scores	Financial Education Policy Level	Gender  Ethnicity  Age  Educational Attainment  Income

### Research Question 2 - Financial Capability

To answer research question two (*In what ways does the financial capability of 18-24-year-olds vary according to the requirements for financial education?*), descriptive statistics of mean and standard deviation presented data about the populations; cross-tabulation tables described how financial capability rates vary by state. A two-way analysis of variance (ANOVA) was conducted via SPSS 25 to investigate how financial capability varies according to financial education requirements and also accounted for the interaction effects of moderator



variables, while partial eta squared and mean values were reported for statistically significant relationships. Because financial capability encompasses behaviors rather than knowledge, it was important to analyze it separately from the financial literacy addressed in question one. These variables are shown within Table 7.

Table 7

*Variables for research question 2*

Dependent Variable (FINRA)	Independent Variable (CEE – Factor)	Independent Variable (FINRA – Moderator)
Financial Capability Scores	Financial Education Policy Level	Gender Ethnicity Age Educational Attainment Income

### Research Question 3 - Changes Over Time

To answer research question three (*What trends in these relationships, between financial education and financial literacy and capability, are observable over time?*), descriptive statistics and visual data analysis provided interpretation of any changes in the outcomes of financial literacy and financial capability. The first analysis set compared financial literacy from the 2015 FINRA data to the 2018 FINRA data and the second analysis set compared financial capability.

#### Research Question 4 - Literacy and Capability

To answer research question number four (*In what ways is the financial literacy of 18-24-year-olds associated with their financial capability?*), an ANOVA was used to determine the relationship between respondents' financial literacy and financial capability. An ANOVA was appropriate because the independent variable, financial literacy, was presented as categorical scores of 0, 20, 40, 60, 80, and 100, while the dependent variable, financial capability, was a scale score of means. Descriptive statistics showed the number of cases and the means of financial literacy and financial capability for 2015 and 2018 independently.

All research questions, their variables, and the statistical test used in analysis are presented in Table 8.

Table 8

*Research questions and variables*

Research Question	Independent Variable	Dependent Variable	Moderator Variables	Statistical Tool
In what ways does the financial literacy of 18-24-year-olds vary according to the requirements for financial education by each state?	Financial education policy level (categorical)	Financial literacy score (continuous)	Gender, ethnicity, age, educational attainment, income	Two-way ANOVA
In what ways does the financial capability of 18-24-year-olds vary according to the requirements for financial education by each state?	Financial education policy level (categorical)	Financial capability score (continuous)	Gender, ethnicity, age, educational attainment, income	Two-way ANOVA
What trends in these relationships, between financial education and financial literacy and capability, are observable over time?	Financial education policy level (categorical)	Financial literacy and capability scores (continuous)		Visual comparison
In what ways is the financial literacy of 18-24-year-olds associated with their financial capability?	Financial literacy score (categorical)	Financial capability score (continuous)		ANOVA

### Delimitations

One of the delimitations of this study was that it was delimited to only account for a narrow range of the population, young adults in the age range of 18-24 years old. Analyzing this group's financial literacy and financial capability focused upon the impact financial education may have within a few years of learning the material (Urban et al., 2018). Since many young adults remain in their home state, this age group was appropriate to use for state-to-state comparisons (Brown, Grigsby, van der Klaauw, Wen, & Zafar, 2016). The focus upon this group excluded exploring potential relationships between state mandates and older populations; it also excluded comparisons of differing age groups' financial literacy and financial capability.

This study was concerned with state-level comparisons because each state can create its own mandates about financial literacy education. Drilling into any subcategory, such as school districts, was unfeasible in terms of variables in data and the amount of time required to collect and analyze such data. Additionally, this study did not consider other changes to curriculum requirements in the same time frame, such as those for mathematics or economics.

There are many factors that may influence financial literacy and capability, such as parental financial socialization and geography. However, due to the lack of time and available data for these factors, they were not included.

Additionally, this research considered the most recent sets of results about financial literacy and financial capability by analyzing the 2015 and 2018 FINRA data. The data were compared to the CEE's 2011 and 2014 information, respectively, about states' mandates for financial education, which would impact young adults from ages 18-22 in FINRA's data. This gap also considered time for implementation of the mandates. An additional delimitation was that this study did not consider longitudinal comparisons that could track changes in state

mandates and compare those with potential changes in young adults' financial literacy and financial capability.

### Limitations

The lack of detail about implementation of state mandates was a limiting factor. Each school district and school may have various levels of rigor and fidelity with their implementation of the mandated financial education courses, which can create variables that were not explored by this study. Another limitation was whether the data collected were accurate for both 2015 and 2018, as data errors may limit the accuracy of results. Also, because it was a causal comparative study, other factors may have influenced the results, such as lack of randomization of the subjects, the digital location, and subjects' attitudes. Additionally, internal validity may have been limited due to the inability to manipulate an independent variable.

### Assumptions

Several assumptions were made to create the study. First, that the implementation of financial education was relatively similar in schools throughout each state. Second, that the data is representative of the population. Third, that respondents to the survey understood the questions and answered truthfully.

### Summary

This study determined what relationship, exists between states' mandates concerning financial education and 18-24-year-olds' financial literacy and financial capability. By analyzing national data from a survey about financial literacy and financial capability, this study

determined causal-comparative relationships between the two factors. Additionally, the study identified interaction effects caused by demographic moderators. Viewed through the lens of human capital theory, this resulted in an analysis that studied the potential link between states' financial education requirement policy and students' later financial literacy and financial capability, which could help better inform current and future policy decisions regarding requirements for financial education to improve students' outcomes.

## CHAPTER FOUR: RESULTS

This study was designed to examine the relationships between financial education in public K-12 schools and young adults' financial literacy and financial capability. By using data from nationwide studies conducted by FINRA in 2015 and 2018 and comparing the results to varying levels of financial education mandates, the research contained a broad scope. This chapter presents each research question and the results of its statistical tests; for each question, results are presented for both 2015 and 2018.

The following research questions guided the statistical analysis:

- 1) In what ways does the financial literacy of 18-24-year-olds vary according to the requirements for financial education?
- 2) In what ways does the financial capability of 18-24-year-olds vary according to the requirements for financial education?
- 3) What trends in these relationships, between financial education and financial literacy and capability, are observable over time?
- 4) In what ways is the financial literacy of 18-24-year-olds associated with their financial capability?

### Results: Research Question 1 - Financial Literacy

*In what ways does the financial literacy of 18-24-year-olds vary according to the requirements for financial education?*

This question was analyzed first for the data from the 2015 FINRA study and the 2011 CEE Survey of the States, then for the data from the 2018 FINRA study and the 2014 CEE Survey of the States. To answer this question, descriptive statistics provided context for the data,

cross-tabulation tables presented the results in one table, and a series of two-way ANOVAs showed the relationship between education mandate, financial literacy, and the demographic factors of gender, ethnicity, age, educational attainment, and income. For statistically significant effects as measured at  $p < .05$ , partial eta squared was calculated to determine the practical effect size. According to Tabachnick and Fidell (1989), partial eta squared differences are small at .01 to .089, medium at .09 to .249, and large at .25 or more.

### 2015 Financial Literacy Analysis

Two-way ANOVAs were conducted to determine the significance of the main effects between the type of mandate for financial education and various demographic main effects, and 18-24-year-olds' financial literacy.

#### Two-Way ANOVA: Gender

A two-way ANOVA investigated whether young adults' financial literacy varied according to education mandate, gender, and mandate by gender (interaction effect). For the types of mandates, there were 367 lack of mandate, 453 included in standards, 1264 standards required to be implemented, 72 high school courses required to be offered, 653 high school courses required to be taken, and 239 student testing required. There were 1182 males and 1866 females. The financial literacy mean of males was 45.35, with a standard deviation of 27.65, while the financial literacy mean of females was 40.95, with a standard deviation of 25.72. The descriptive statistics are presented in Table 9.



Table 9

*Descriptive statistics for gender and mandate for literacy for 2015*

Gender	Education Mandate	N	Financial Literacy Mean	Standard Deviation
Male		1182	45.35	27.65
Female		1866	40.95	25.72
Education Mandate	None	367	42.51	26.04
	Included in standards	453	41.68	25.95
	Standards required to be implemented	1264	42.17	27.13
	High school course required to be offered	72	40.56	27.26
	High school course required to be taken	653	44.66	26.20
	Student testing required	239	42.51	26.32
Total		3048	42.66	26.57

There was not a statistically significant main effect with gender,  $F(1, 3036) = 2.395, p = .122$ . There was not a statistically significant main effect with mandate,  $F(5, 3036) = .751, p = .586$ . There was a statistically significant interaction between the effects of gender and state financial education mandate on financial literacy,  $F(5, 3036) = 3.156, p = .008$ , partial eta squared = .005. The significance of the interaction effect was measured by a partial eta squared to determine the size of the effect, which suggested that the practical difference was small. The results of the two-way ANOVA are provided in Table 10.

Table 10

*Tests of between-subject effects for gender and mandate for literacy for 2015*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Gender	1,674.89	1	1674.89	2.395	.122	.001
Education Mandate	2,624.39	5	524.88	.751	.586	.001
Gender by Education Mandate	11,034.78	5	2206.95	3.156	** .008	.005
Error	2,122,971.16	3036	699.27			
Corrected Total	2,150,874.41	3047				

\*p < .05, \*\*p < .01

A cross-tabulation is contained in Table 11. The results show each gender’s mean financial literacy scores within each education mandate level, which shows that males generally scored higher than females, except when there was no mandate or when student testing was required.

Table 11

*Cross-tabulation of financial literacy marginal mean scores by gender for 2015*

Factor	Male	Female
No mandate	40.95	43.33
Included in standards	47.08	38.70
Standards required to be implemented	46.56	39.38
High school course required to be offered	41.05	40.38
High school course required to be taken	45.89	43.70
Student testing required	41.41	43.29

The results are presented graphically in Figure 1. The graph shows that males have a higher financial literacy mean score when the education mandate includes financial literacy in standards and when those standards are required to be implemented.

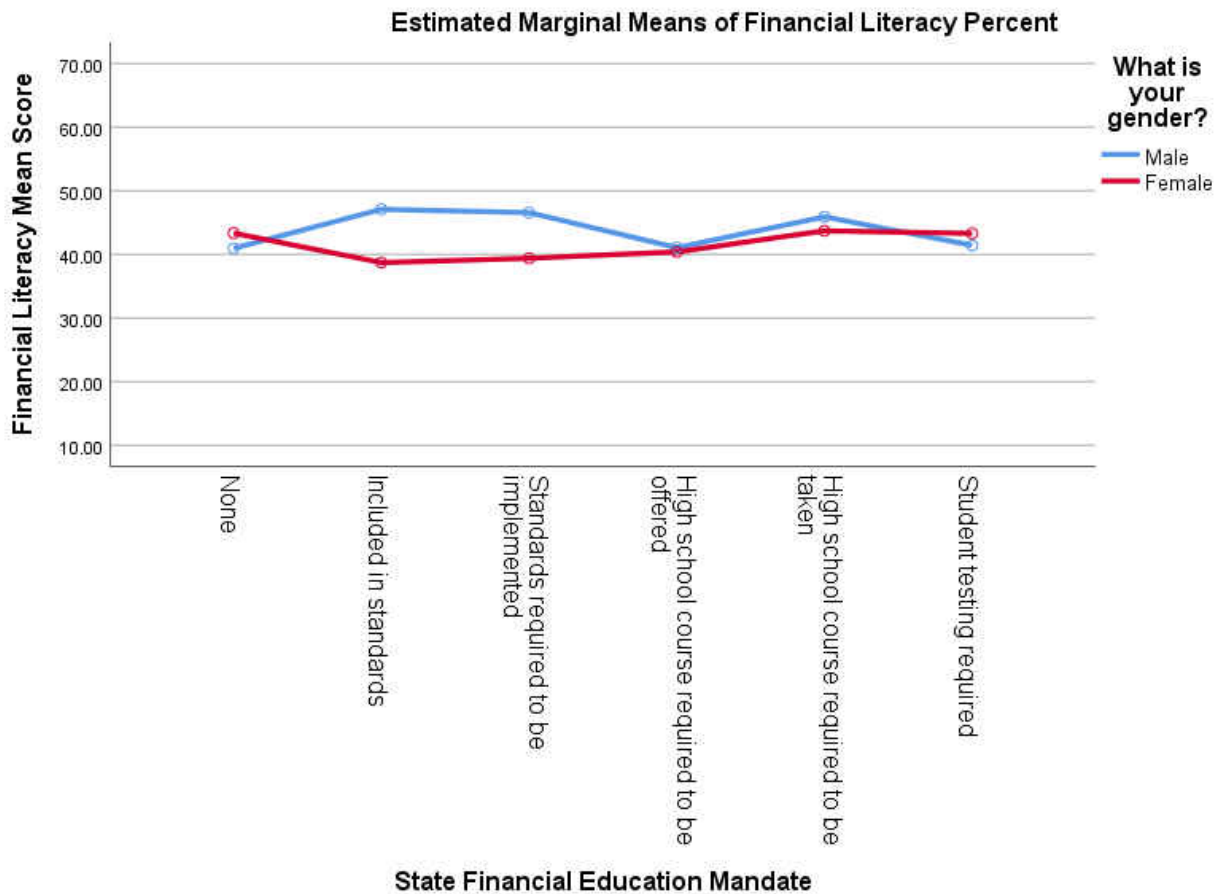


Figure 1 Graph of two-way ANOVA for financial literacy and gender for 2015

Because the two-way ANOVA showed a statistically significant difference in the interaction effect between genders and education mandate, a test for simple main effects was conducted for all categories. For males and females from a state where financial literacy was included in standards, mean financial literacy scores were 8.38 points, 95% CI [3.29, 13.47], higher for males than females,  $F(1, 3036) = 10.43, p = .001, \text{partial eta squared} = .003$ . The

partial eta squared suggests that the practical difference was small. For males and females from a state where standards were required to be implemented, mean financial literacy scores were 7.18 points, 95% CI [4.19, 10.17], higher for males than females,  $F(1, 3036) = 22.13, p = .000$ , partial eta squared = .007. The partial eta squared suggests that the practical difference was small.

These results align with previous research. After controlling for variables in education and other student characteristics, researchers determined that parents have an influence on financial literacy, with a preference for ensuring male children have stronger financial capability (Chambers et al., 2019). Sinha, Tan, and Zhan (2018) analyzed data from a national survey to identify characteristics of young adults that correlate to their financial behaviors. While researching relationships among demographics, one study found that young adults who identified as females were less likely to have sound financial footing (Sinha et al., 2018).

The mean differences in financial literacy mean scores for genders are presented in Table 12.

Table 12

*Mean financial literacy scores by education mandate and males and females for 2015*

Education Mandate	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
None	2.39	2.90	.410	3.30	8.08
Included in Standards	8.38	2.60	** .001	3.29	13.47
Standards required to be implemented	7.18	1.53	** .000	4.19	10.17
High school course required to be offered	.68	7.07	.924	13.19	14.54
High school course required to be taken	2.20	2.09	.292	1.89	6.29
Student testing required	1.87	3.47	.590	4.94	8.68

\*p < .05, \*\*p < .01

### Two-Way ANOVA: Ethnicity

A two-way ANOVA investigated whether young adults' financial literacy varied according to education mandate, ethnicity, and mandate by ethnicity (interaction effect). For the types of mandates, there were 367 lack of mandate, 453 included in standards, 1264 standards required to be implemented, 72 high school courses required to be offered, 653 high school courses required to be taken, and 239 student testing required. There were 1615 white respondents, 426 black respondents, 580 Hispanic respondents, 229 Asian respondents, and 198 other respondents. The financial literacy mean of whites was 45.76, with a standard deviation of 26.28; the financial literacy mean of blacks was 37.14, with a standard deviation of 25.86; the financial literacy mean of Hispanics was 39.17, with a standard deviation of 26.61; the financial literacy mean of Asians was 41.66, with a standard deviation of 27.64; and the financial literacy mean of others was 40.61, with a standard deviation of 25.80. The descriptive statistics are presented in Table 13.

Table 13

*Descriptive statistics for ethnicity and mandate for literacy for 2015*

Ethnicity	Education Mandate	N	Financial Literacy Mean	Standard Deviation
White		1615	45.76	26.28
Black		426	37.14	25.86
Hispanic		580	39.17	26.61
Asian		229	41.66	27.64
Other		198	40.61	25.80
Education Mandate	None	367	42.51	26.04
	Included in standards	453	41.68	25.95
	Standards required to be implemented	1264	42.17	27.13
	High school course required to be offered	72	40.56	27.26
	High school course required to be taken	653	44.66	26.20
	Student testing required	239	42.51	26.32
Total		3048	42.67	26.57



There was a statistically significant main effect with ethnicity,  $F(4, 3018) = 7.343, p = .000$ , partial eta squared = .010. There was a statistically significant main effect with mandate,  $F(5, 3018) = 2.576, p = .025$ , partial eta squared = .004. The significance of each main effect was measured by a partial eta squared to determine the size of the effect, which suggested that the practical difference was small. There was not a statistically significant interaction between the effects of ethnicity and state financial education mandate on financial literacy,  $F(20, 3018) = .722, p = .807$ . The results of a two-way ANOVA are contained in Table 14.

Table 14

*Tests of between-subject effects for ethnicity and mandate for literacy for 2015*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Ethnicity	20,432.05	4	5108.01	7.343	** .000	.010
Education Mandate	8,958.68	5	1791.74	2.576	* .025	.004
Ethnicity by Education Mandate	10,046.05	20	502.30	.722	.807	.005
Error	2,099,538.02	3018	695.67			
Corrected Total	2,150,874.41	3047				

\* $p < .05$ , \*\* $p < .01$

A cross-tabulation is presented in Table 15. The results show each ethnicity’s mean financial literacy scores within each education mandate level and indicate that white respondents generally had higher scores than other ethnicities.

Table 15

*Cross-tabulation of financial literacy marginal mean scores by ethnicity for 2015*

Factor	White	Black	Hispanic	Asian	Other
No mandate	45.04	41.05	39.27	40.00	46.15
Included in standards	44.78	38.31	35.74	41.25	35.88
Standards required to be implemented	45.31	36.00	39.17	39.50	36.71
High school course required to be offered	46.50	32.80	40.00	40.00	0.00
High school course required to be taken	47.45	36.84	40.74	46.96	50.86
Student testing required	46.28	38.44	38.67	42.86	34.00

A graphical representation is provided in Figure 2. The graph shows that white respondents consistently have higher mean financial literacy scores than black and Hispanic respondents, regardless of education mandate. Additionally, the number of other respondents was  $n = 1$  for the mandate that required a high school course to be offered, which makes the score appear significant when it is not.

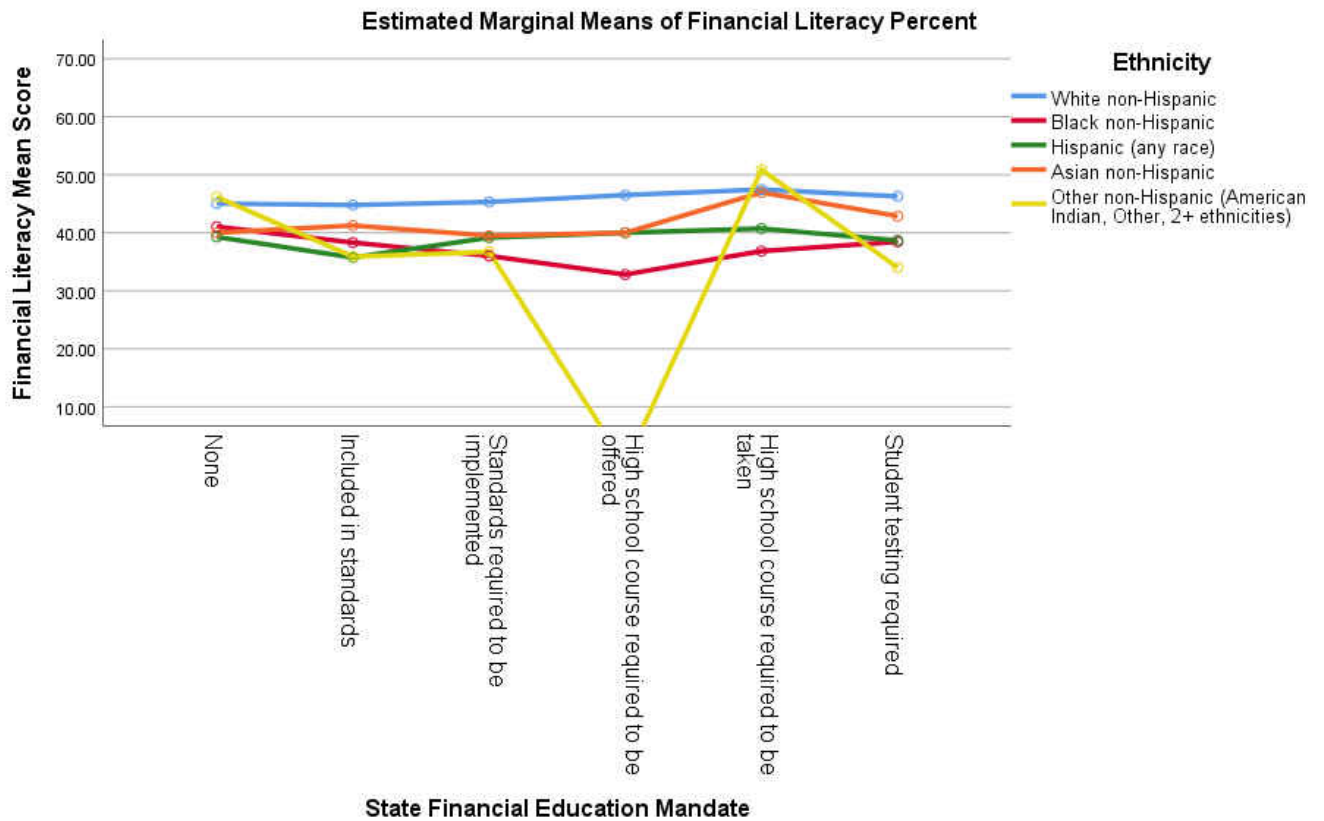


Figure 2 Graph of two-way ANOVA for financial literacy and ethnicity for 2015

Because the two-way ANOVA showed a statistically significant difference between the types of mandates, a test for simple main effects was conducted for all categories. The results indicated that there was a statistically significant difference in mean financial literacy scores from states where financial literacy standards were required to be implemented,  $F(4, 3018) =$

6.37,  $p = .000$ , partial eta squared = .008, which indicates a small practical difference. There was also a statistically significant difference in mean financial literacy scores from states where a high school course was required to be taken,  $F(4, 3018) = 4.36$ ,  $p = .002$ , partial eta squared = .006, which indicates a small practical difference. The results are displayed in Table 16.

Table 16

*Univariate tests of education mandates within ethnicity for literacy for 2015*

	Sum of Squares	df	Mean Square	F	Significance	Partial eta squared
None	2,896.65	4	724.16	1.04	.384	.001
Included in standards	6,391.16	4	1,597.79	2.297	.057	.003
Standards required to be implemented	17,717.53	4	4,429.38	6.367	** .000	.008
High school course required to be offered	4,563.78	4	1,140.94	1.640	.161	.002
High school course required to be taken	12,139.82	4	3,034.96	4.363	** .002	.006
Student testing required	3,951.15	4	987.79	1.420	.225	.002

\* $p < .05$ , \*\* $p < .01$

For whites and blacks, mean financial literacy scores were 8.62 points, 95% CI [4.59, 12.66], higher for whites than blacks. For whites and Hispanics, mean financial literacy scores were 6.59 points, 95% CI [3.00, 10.17], higher for whites than Hispanics.

These results align with previous research. Influential factors that were considered moderator variables include demographics such as ethnicity and socioeconomic status (Sinha et al., 2018). The mean differences in financial literacy mean scores for ethnicity are presented in Table 17.

Table 17

*Significant mean financial literacy scores by white, black, and Hispanic ethnicities for 2015*

Ethnicity	Comparison Ethnicity	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
White	Black	8.62	1.44	** .000	4.59	12.66
	Hispanic	6.59	1.28	** .000	3.00	10.17

\*p < .05, \*\*p < .01

### Two-Way ANOVA: Age

A two-way ANOVA investigated whether young adults' financial literacy varied according to education mandate, age, and mandate by age (interaction effect). For the types of mandates, there were 367 lack of mandate, 453 included in standards, 1264 standards required to be implemented, 72 high school courses required to be offered, 653 high school courses required to be taken, and 239 student testing required. There were 390 18-year-olds, 407 19-year-olds, 423 20-year-olds, 467 21-year-olds, 404 22-year-olds, 460 23-year-olds, and 497 24-year-olds. The financial literacy mean of 18-year-olds was 41.08, with a standard deviation of 26.13; the financial literacy mean of 19-year-olds was 41.13, with a standard deviation of 27.21; the financial literacy mean of 20-year-olds was 42.41, with a standard deviation of 26.89; the financial literacy mean of 21-year-olds was 41.50, with a standard deviation of 27.05; the financial literacy mean of 22-year-olds was 43.17, with a standard deviation of 25.94; the financial literacy mean of 23-year-olds was 43.74, with a standard deviation of 26.30; and the financial literacy mean of 24-year-olds was 45.03, with a standard deviation of 26.33. The descriptive statistics are presented in Table 18.

Table 18

*Descriptive statistics for age and mandate for literacy for 2015*

Age	Education Mandate	N	Financial Literacy Mean	Standard Deviation
18		390	41.08	26.13
19		407	41.13	27.21
20		423	42.41	26.89
21		467	41.50	27.05
22		404	43.17	25.94
23		460	43.74	26.30
24		497	45.03	26.33
Education Mandate	None	367	42.51	26.04
	Included in standards	453	41.68	25.95
	Standards required to be implemented	1264	42.17	27.13
	High school course required to be offered	72	40.56	27.26
	High school course required to be taken	653	44.66	26.20
	Student testing required	239	42.51	26.32
Total		3048	42.67	26.57

There was not a statistically significant main effect with age,  $F(6, 3006) = .554, p = .767$ .  
 There was not a statistically significant main effect with mandate,  $F(5, 3006) = .959, p = .441$ .  
 There was not a statistically significant interaction between the effects of age and state financial education mandate on financial literacy,  $F(30, 3006) = .838, p = .717$ . The results of the two-way ANOVA are provided in Table 19.

Table 19

*Tests of between-subject effects for age and mandate for literacy for 2015*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Age	2,349.89	6	391.65	.554	.767	.001
Education Mandate	3,389.13	5	677.83	.959	.441	.002
Age by Education Mandate	17,766.53	30	592.22	.838	.717	.008
Error	2,123,645.25	3006	706.47			
Corrected Total	2,150,874.41	3047				

\* $p < .05$ , \*\* $p < .01$



A cross-tabulation is contained in Table 20. The results show each age's mean financial literacy scores within each education mandate level and indicate that there was not a consistent difference by age.

Table 20

*Cross-tabulation of financial literacy marginal mean scores by age for 2015*

Factor	18	19	20	21	22	23	24
No mandate	41.22	47.37	42.56	41.85	42.33	40.27	43.71
Included in standards	35.28	39.30	41.14	42.78	44.26	42.90	47.12
Standards required to be implemented	41.45	37.63	42.67	40.00	43.04	45.57	44.87
High school course required to be offered	40.00	40.00	29.23	44.62	42.50	45.00	43.64
High school course required to be taken	47.16	45.58	43.76	41.41	44.04	43.06	47.48
Student testing required	36.67	45.81	45.52	45.88	40.63	44.74	39.11

The results are displayed graphically in Figure 3. The graph shows that there is no significant difference in mean financial literacy scores across age or education mandate.

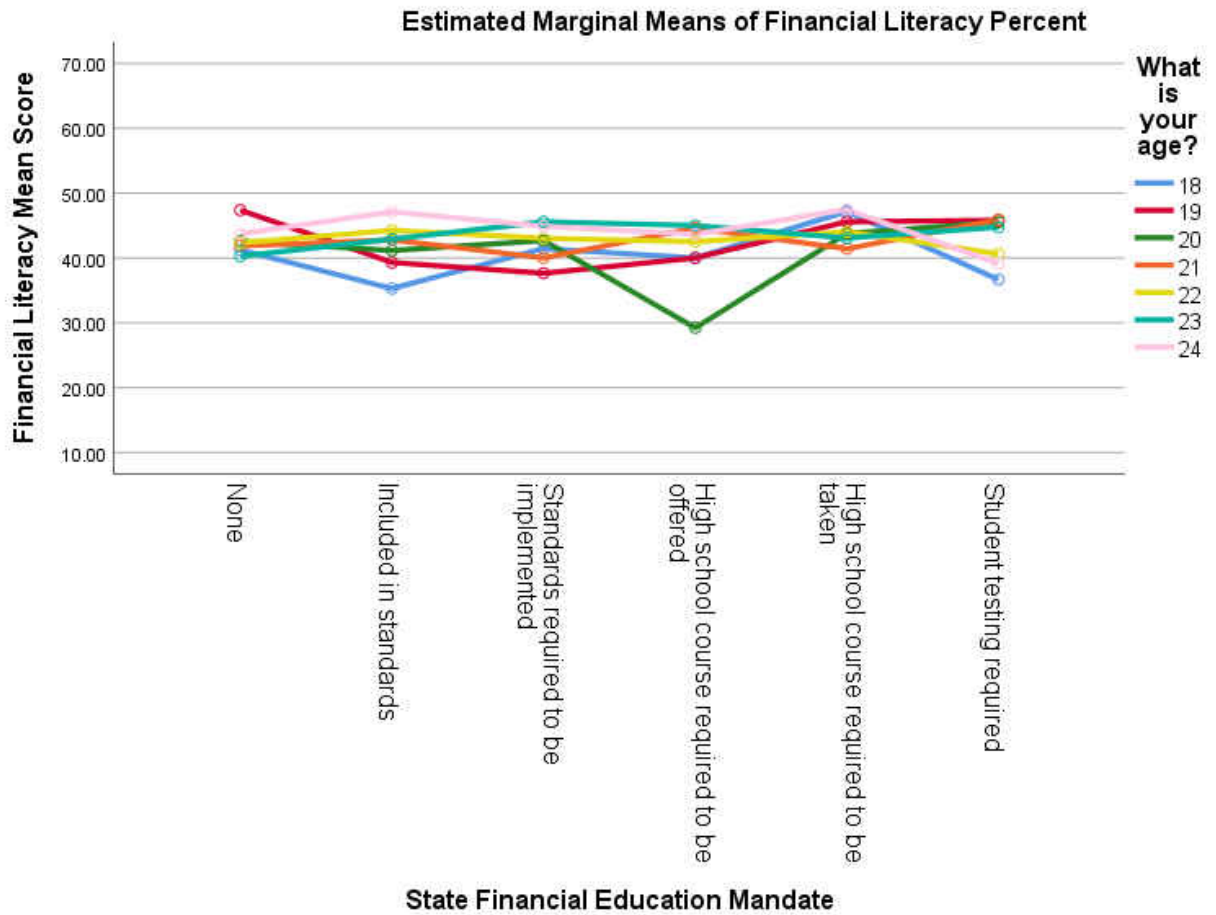


Figure 3 Graph of two-way ANOVA for financial literacy and age for 2015

## Two-Way ANOVA: Educational Attainment

A two-way ANOVA investigated whether young adults' financial literacy varied according to education mandate, educational attainment, and mandate by educational attainment (interaction effect). For the types of mandates, there were 367 lack of mandate, 453 included in standards, 1264 standards required to be implemented, 72 high school courses required to be offered, 653 high school courses required to be taken, and 239 student testing required. There were 132 respondents who did not complete high school, 803 with a regular high school diploma, 225 with a GED, 1137 with some college but no degree, 261 with an associate's degree, 425 with a bachelor's degree, and 65 with a post-graduate degree. The financial literacy mean of those without a high school degree was 30.61, with a standard deviation of 22.44; of those with a regular high school degree was 38.56, with a standard deviation of 25.42; of those with a GED was 37.51, with a standard deviation of 24.59; of those with some college but no degree was 43.66, with a standard deviation of 27.09; of those with an associate's degree was 41.84, with a standard deviation of 25.35; of those with a bachelor's degree was 53.74, with a standard deviation of 26.48; and of those with a post-graduate degree was 48.92, with a standard deviation of 24.50. The descriptive statistics are presented in Table 21.

Table 21

*Descriptive statistics for educational attainment and mandate for literacy for 2015*

Educational Attainment	Education Mandate	N	Financial Literacy Mean	Standard Deviation
Did not complete high school		132	30.61	22.44
High school graduate - regular		803	38.56	25.42
High school graduate - GED		225	37.51	24.59
Some college, no degree		1137	43.66	27.09
Associate's degree		261	41.84	25.35
Bachelor's degree		425	53.74	26.48
Post-graduate degree		65	48.92	24.50
Education Mandate	None	367	42.51	26.04
	Included in standards	453	41.68	25.95
	Standards required to be implemented	1264	42.17	27.13
	High school course required to be offered	72	40.56	27.26
	High school course required to be taken	653	44.66	26.20
	Student testing required	239	42.51	26.32
Total		3048	42.67	26.57

There was a statistically significant main effect with educational attainment,  $F(6, 3008) = 10.827, p = .000$ , partial eta squared = .021. The significance of the effect was measured by a partial eta squared to determine the size of the effect, which suggested that the practical difference was small. There was not a statistically significant main effect with mandate,  $F(5, 3008) = .145, p = .981$ . There was not a statistically significant interaction between the effects of education level and state financial education mandate on financial literacy,  $F(28, 3008) = 1.162, p = .254$ . The results of a two-way ANOVA are provided in Table 22.

Table 22

*Tests of between-subject effects for educational attainment and mandate for literacy for 2015*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Educational Attainment	43,863.14	6	7310.52	10.827	** .000	.021
Education Mandate	490.90	5	98.18	.145	.981	.000
Educational Attainment by Education Mandate	21,977.87	28	784.92	1.162	.254	.011
Error	2,031,085.82	3008	675.23			
Corrected Total	2,150,874.41	3047				

\* $p < .05$ , \*\* $p < .01$

A cross-tabulation is contained in Table 23. The results show each educational attainment level's mean financial literacy scores within each education mandate level and indicate that respondents with college degrees generally scored higher than other respondents.

Table 23

*Cross-tabulation of financial literacy marginal mean scores by educational attainment for 2015*

Factor	Did not complete high school	High school graduate - regular	High school graduate – GED	Some college, no degree	Associate's degree	Bachelor's degree	Post-graduate degree
No mandate	41.25	38.07	37.42	41.89	43.64	51.88	41.54
Included in standards	28.00	36.00	31.25	45.14	34.84	56.84	60.00
Standards required to be implemented	28.33	37.19	37.44	43.34	42.83	54.65	52.00
High school course required to be offered	N/A	23.33	51.43	42.86	50.00	48.89	N/A
High school course required to be taken	32.36	44.34	38.55	45.25	42.57	52.08	47.78
Student testing required	24.00	43.33	40.00	41.04%	37.7	53.33	48.00

The results are displayed graphically in Figure 4. The graph shows that respondents with higher levels of educational attainment generally have a higher financial literacy mean score than those with lower levels of educational attainment. Additionally, the number of respondents was sometimes low in a particular category, which makes the score appear significant when it is not. For example,  $n = 4$  for respondents with a post-graduate degree for the mandate that required a financial education to be included in the standards,  $n = 7$  for respondents with a GED for the mandate that required a high school course to be offered, and  $n = 5$  for respondents who did not complete high school for the mandate that required student testing.

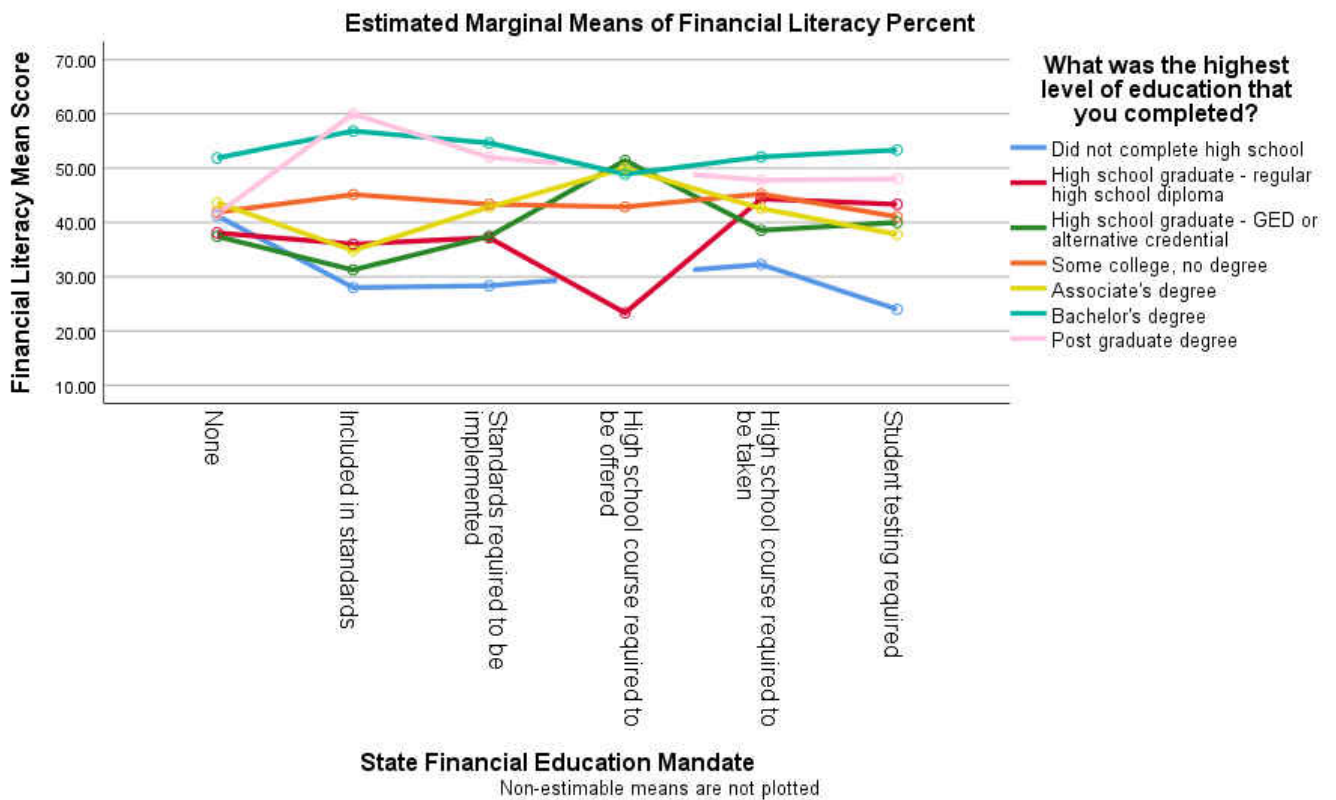


Figure 4 Graph of two-way ANOVA for financial literacy and educational attainment for 2015

Because the two-way ANOVA showed a statistically significant difference in the main effect of educational attainment, a test for simple main effects was conducted for all categories. The results indicated that there was a statistically significant difference in mean financial literacy among many different levels of educational attainment.

These results align with previous research, which reveals that those who had not completed high school showed only a 0.29 correlation to being financially stable while those who had at least some college education showed a 0.50 correlation to being financially stable (Sinha et al., 2018). Others, such as Chen and Volpe (2002), Robb and Sharpe (2009), and Robb (2011), found similar correlations. The results of this study are displayed in Table 24.

Table 24

*Significant mean financial literacy scores by educational attainment for 2015*

Educational Attainment	Comparison Educational Attainment	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Did not complete high school	High school graduate - regular	-7.95	2.44	*.024	.53	15.37
	Some college, no degree	-13.05	2.38	** .000	5.79	20.32
	Associate's degree	-11.23	2.78	** .001	2.79	19.67
	Bachelor's degree	-23.14	2.59	** .000	15.26	31.01



	Post-graduate degree	-18.32	3.94	** .000	6.34	30.29
High school graduate - regular	Some college, no degree	-5.10	1.20	** .000	1.46	8.75
	Bachelor's degree	-15.19	1.56	** .000	10.45	19.93
	Post-graduate degree	-10.37	3.35	* .042	.18	20.56
High school graduate - GED	Some college, no degree	-6.15	1.90	* .025	.38	11.91
	Bachelor's degree	-16.23	2.14	** .000	9.72	22.74
	Post-graduate degree	-11.41	3.66	* .038	.29	22.54
Some college, no degree	Bachelor's degree	-10.08	1.48	** .000	5.59	14.57
Associate's degree	Bachelor's degree	-11.90	2.04	** .000	5.69	18.12

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\*p < .05, \*\*p < .01

### Two-Way ANOVA: Income

A two-way ANOVA investigated whether young adults' financial literacy varied according to education mandate, income, and mandate by income (interaction effect). For the types of mandates, there were 367 lack of mandate, 453 included in standards, 1264 standards required to be implemented, 72 high school courses required to be offered, 653 high school courses required to be taken, and 239 student testing required. There were 963 respondents whose income was less than \$15,000; 516 whose income was \$15,000 to \$25,000; 483 whose income was \$25,000 to \$35,000; 382 whose income was \$35,000 to \$50,000; 356 whose income was \$50,000 to \$75,000; 176 whose income was \$75,000 to \$100,000; 122 whose income was \$100,000 to \$150,000; and 50 whose income was \$150,000 or more. The financial literacy mean of those with less than \$15,000 was 42.20, with a standard deviation of 27.36; of those whose income was \$15,000 to \$25,000 was 40.23, with a standard deviation of 25.39; of those whose income was \$25,000 to \$35,000 was 42.44, with a standard deviation of 26.02; of those whose income was \$35,000 to \$50,000 was 43.14, with a standard deviation of 26.61; of those whose income was \$50,000 to \$75,000 was 43.20, with a standard deviation of 26.26; of those whose income was \$75,000 to \$100,000 was 45.80, with a standard deviation of 26.37; of those whose income was \$100,000 to \$150,000 was 49.34, with a standard deviation of 27.72; and of those whose income was \$150,000 or more was 43.60, with a standard deviation of 25.77. The descriptive statistics are presented in Table 25.

Table 25

*Descriptive statistics for income and mandate for literacy for 2015*

Income		N	Financial Literacy Mean	Standard Deviation
Less than \$15,000		963	42.20	27.36
\$15,000 - \$25,000		516	40.23	25.39
\$25,000 - \$35,000		483	42.44	26.02
\$35,000 - \$50,000		382	43.14	26.61
\$50,000 - \$75,000		356	43.20	26.26
\$75,000 - \$100,000		176	45.80	26.37
\$100,000 - \$150,000		122	49.34	27.72
More than \$150,000		50	43.60	25.77
Education Mandate	None	367	42.51	26.04
	Included in standards	453	41.68	25.95
	Standards required to be implemented	1264	42.17	27.13
	High school course required to be offered	72	40.56	27.26
	High school course required to be taken	653	44.66	26.20
	Student testing required	239	42.51	26.32
Total		3048	42.67	26.57

There was not a statistically significant main effect with income,  $F(1, 3001) = 1.393, p = .204$ . There was not a statistically significant main effect with mandate,  $F(5, 3001) = 1.685, p = .135$ . There was a statistically significant interaction between the effects of income and state financial education mandate on financial literacy,  $F(34, 3001) = 1.467, p = .040$ , partial eta squared = .016. According to the partial eta squared, the practical significance is small. The results of the two-way ANOVA are provided in Table 26.

Table 26

*Tests of between-subject effects for income and mandate for literacy for 2015*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Income	6,827.88	7	975.41	1.393	.204	.003
Education Mandate	5,899.68	5	1179.94	1.685	.135	.003
Income by Education Mandate	34933.97	34	1027.47	1.467	*.040	.016
Error	2,101,421.02	3001	700.24			
Corrected Total	2,150,874.41	3047				

\* $p < .05$ , \*\* $p < .01$

A cross-tabulation is contained in Table 27. The results show each income range's mean financial literacy scores within each education mandate level, which does not show a clear difference in each group's scores.

Table 27

*Cross-tabulation of financial literacy marginal mean scores by income for 2015*

Factor	Less than \$15,000	\$15,000 - \$25,000	\$25,000 - \$35,000	\$35,000 - \$50,000	\$50,000 - \$75,000	\$75,000 - \$100,000	\$100,000 - \$150,000	More than \$150,000
No mandate	45.77	34.85	39.27	45.49	43.91	46.67	44.62	40.00
Included in standards	36.64	38.82	41.37	49.31	45.45	42.61	45.45	58.18
Standards required to be implemented	41.86	40.92	41.17	41.90	41.61	47.25	50.91	32.22
High school course required to be offered	40.00	29.09	48.89	37.50	44.00	0.00	60.00	N/A
High school course required to be taken	42.07	43.60	46.25	45.18	45.51	48.42	51.82	49.23
Student testing required	49.41	41.40	41.08	30.30	38.67	36.92	48.89	40.00

The results are displayed graphically in Figure 5. The graph shows that there is not a consistent difference in financial literacy scores based on income. Additionally, the number of respondents was sometimes low in a particular category, which makes the score appear significant when it is not. For example,  $n = 1$  for respondents with an income of \$75,000-\$100,000 for the mandate that required a high school course to be offered, and  $n = 1$  for respondents with an come of \$100,000-\$150,000 for the mandate that required a high school course to be offered.

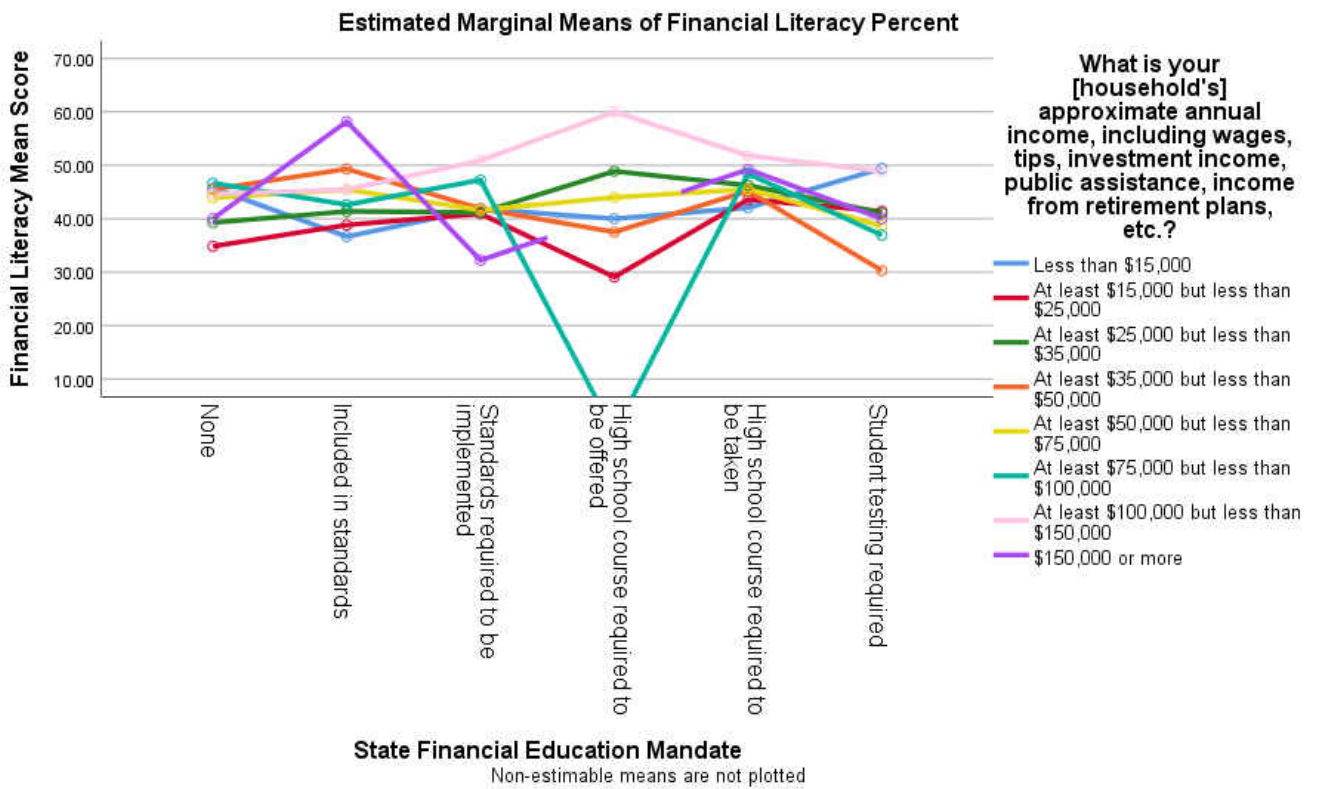


Figure 5 Graph of two-way ANOVA for financial literacy and income for 2015

Because the two-way ANOVA showed a statistically significant difference between the incomes by education mandate, a test for simple main effects was conducted. For respondents

from a state where student testing was required, mean financial literacy scores were 19.11 points, 95% CI [2.14, 36.08], higher for those with an income less than \$15,000 than those with an income between \$35,000 and \$50,000,  $F(1, 3001) = 2.06, p = .044$ , partial eta squared = .005. The partial eta squared suggests that the practical difference was small.

These results agree with previous literature. Deenanath, Danes, and Jang (2019) found that student behaviors are most strongly influenced by intentional factors, such as student-earned income, which showed a strong relationship to student financial behavior at  $B = 0.74$ . Another study found that young adults with low-income backgrounds or low levels of literacy were less likely to have sound financial footing (Sinha et al., 2018). Additionally, Luksander, Beres, Huzdik, and Nemeth (2014) discovered that, in Hungary, gender, age, and income had a relationship to levels of financial literacy.

The mean differences in financial literacy scores for the incomes are presented in Table 28.

Table 28

*Significant mean financial literacy scores by education mandate and income for 2015*

Education Mandate	Income	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Student testing required	Less than \$15,000 and \$35,000 - \$50,000	19.11	5.43	*.012	2.14	36.08

\*p < .05, \*\*p < .01



## 2018 Financial Literacy Analysis

Two-way ANOVAs were conducted to determine the significance of the main effects between the type of mandate for financial education and various demographic main effects, and 18-24-year-olds' financial literacy.

### Two-Way ANOVA: Gender

A two-way ANOVA investigated whether young adults' financial literacy varied according to education mandate, gender, and mandate by gender (interaction effect). For the types of mandates, there were 338 lack of mandate, 435 included in standards, 854 standards required to be implemented, 315 high school courses required to be offered, 667 high school courses required to be taken, and 186 student testing required. There were 1082 males and 1713 females. The financial literacy mean of males was 44.64, with a standard deviation of 28.39, while the financial literacy mean of females was 38.82, with a standard deviation of 26.22. The descriptive statistics are presented in Table 29.

Table 29

*Descriptive statistics for gender and mandate for literacy for 2018*

Gender	Education Mandate	N	Financial Literacy Mean	Standard Deviation
Male		1082	44.64	28.39
Female		1713	38.82	26.22
Education Mandate	None	338	40.53	26.04
	Included in standards	435	42.11	26.88
	Standards required to be implemented	854	41.10	27.78
	High school course required to be offered	315	43.94	27.18
	High school course required to be taken	667	39.73	27.50
	Student testing required	186	39.46	25.76
Total		2795	41.07	27.23

There was a statistically significant main effect with gender,  $F(1, 2783) = 27.52, p = .000$ , partial eta squared = .010. The significance of the effect was measured by a partial eta squared to determine the size of the effect, which suggested that the practical difference was small. There was not a statistically significant main effect with mandate,  $F(5, 2783) = 1.962, p = .052$ . There was not a statistically significant interaction between the effects of gender and state financial education mandate on financial capability,  $F(5, 2783) = 1.962, p = .081$ . The results of the two-way ANOVA are provided in Table 30.

Table 30

*Tests of between-subject effects for gender and mandate for literacy for 2018*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Gender	20,132.61	1	20,132.61	27.52	** .000	.010
Education Mandate	8,025.24	5	1,605.05	2.194	.052	.004
Gender by Education Mandate	7,175.54	5	1,435.11	1.962	.081	.004
Error	2,036,110.49	2783	731.62			
Corrected Total	2,071,179.96	2794				

\*p < .05, \*\*p < .01

A cross-tabulation is contained in Table 31. The results show each gender’s mean financial literacy scores within each education mandate level, which shows that males generally scored higher than females.

Table 31

*Cross-tabulation of financial literacy marginal mean scores by gender for 2018*

Factor	Male	Female
No mandate	44.46	38.34
Included in standards	47.84	38.41
Standards required to be implemented	44.09	39.28
High school course required to be offered	52.00	39.30
High school course required to be taken	41.67	38.46
Student testing required	40.00	38.98

The results are displayed graphically in Figure 6. The graph shows that males have a higher financial literacy mean score.

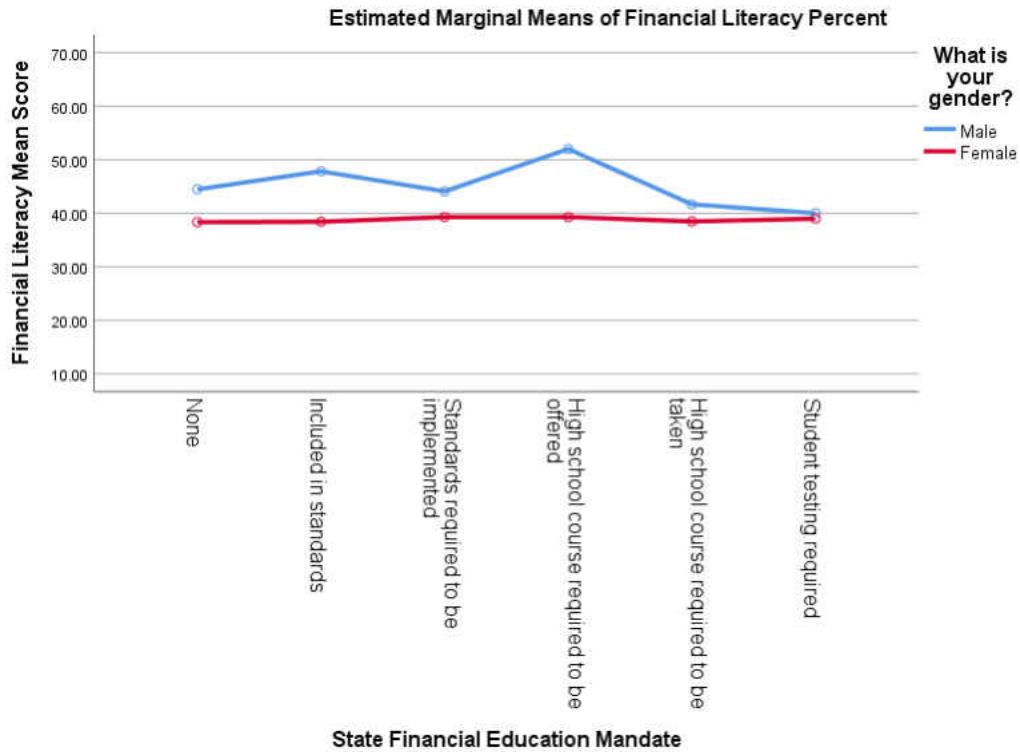


Figure 6 Graph of two-way ANOVA for financial literacy and gender for 2018

Because the two-way ANOVA showed a statistically significant difference in the main effect between genders, a test for simple main effects was conducted. For males and females from a state where there was no mandate, mean financial literacy scores were 6.12 points, 95% CI [.10, 12.14], higher for males than females,  $F(1, 2783) = 3.98, p = .046$ , partial eta squared = .001. For males and females from a state where financial literacy was included in standards, mean financial literacy scores were 9.43 points, 95% CI [4.22, 14.63], higher for males than females,  $F(1, 2783) = 12.61, p = .000$ , partial eta squared = .005. For males and females from a state where standards were required to be implemented, mean financial literacy scores were 4.80

points, 95% CI [1.06, 8.55], higher for males than females,  $F(1, 2783) = 6.33, p = .012$ , partial eta squared = .002. For males and females from a state where a high school course was required to be offered, mean financial literacy scores were 12.70 points, 95% CI [6.49, 18.91], higher for males than females,  $F(1, 2783) = 16.10, p = .000$ , partial eta squared = .006. The partial eta squared results suggest that the practical differences were small.

These results align with previous research. After controlling for variables in education and other student characteristics, researchers determined that parents have an influence on financial literacy, with a preference for ensuring male children have stronger financial capability (Chambers et al., 2019). Sinha, Tan, and Zhan (2018) analyzed data from a national survey to identify characteristics of young adults that correlate to their financial behaviors. While researching relationships among demographics, one study found that young adults who identified as females were less likely to have sound financial footing (Sinha et al., 2018).

The significant mean differences in financial literacy mean scores for genders are presented in Table 32.

Table 32

*Significant mean financial literacy scores by males and females for 2018*

Education Mandate	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
None	6.12	3.07	*.046	.10	12.14
Included in standards	9.43	2.66	** .000	4.22	14.63
Standards required to be implemented	4.80	1.91	*.012	1.06	8.55
High school course required to be offered	12.70	3.17	** .000	6.49	18.91

\*p < .05, \*\*p < .01

### Two-Way ANOVA: Ethnicity

A two-way ANOVA investigated whether young adults' financial literacy varied according to education mandate, ethnicity, and mandate by ethnicity (interaction effect). For the types of mandates, there were 338 lack of mandate, 435 included in standards, 854 standards required to be implemented, 315 high school courses required to be offered, 667 high school courses required to be taken, and 186 student testing required. There were 1685 white respondents, 394 black respondents, 431 Hispanic respondents, 165 Asian respondents, and 120 other respondents. The financial literacy mean of whites was 44.06, with a standard deviation of 27.52; the financial literacy mean of blacks was 32.79, with a standard deviation of 24.69; the financial literacy mean of Hispanics was 36.33, with a standard deviation of 26.00; the financial literacy mean of Asians was 42.30, with a standard deviation of 28.41; and the financial literacy mean of others was 41.67, with a standard deviation of 26.13. The descriptive statistics are presented in Table 33.



Table 33

*Descriptive statistics for ethnicity and mandate for literacy for 2018*

Ethnicity	Education Mandate	N	Financial Literacy Mean	Standard Deviation
White		1685	44.06	27.52
Black		394	32.79	24.69
Hispanic		431	36.33	26.00
Asian		165	42.30	28.41
Other		120	41.67	26.13
Education Mandate	None	338	40.53	26.04
	Included in standards	435	42.11	26.88
	Standards required to be implemented	854	41.10	27.78
	High school course required to be offered	315	43.94	27.18
	High school course required to be taken	667	39.73	27.50
	Student testing required	186	39.46	25.76
Total		2795	41.07	27.23

There was a statistically significant main effect with ethnicity,  $F(4, 2765) = 11.343, p = .000$ , partial eta squared = .016. The significance was measured by a partial eta squared to determine the size of the effect, which suggested that the practical difference was small. There was not a statistically significant main effect with mandate,  $F(5, 2765) = .733, p = .598$ . There

was not a statistically significant interaction between the effects of ethnicity and state financial education mandate on financial literacy,  $F(20, 2765) = .417, p = .989$ . The results of the two-way ANOVA are provided in Table 34.

Table 34

*Tests of between-subject effects for ethnicity and mandate for literacy for 2018*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Ethnicity	32,983.20	4	8,245.80	11.343	** .000	.016
Education Mandate	2,665.03	5	533.01	.733	.598	.001
Ethnicity by Education Mandate	6,067.94	20	303.40	.417	.989	.003
Error	2,009,992.39	2765	726.94			
Corrected Total	2,071,179.96	2794				

\* $p < .05$ , \*\* $p < .01$

A cross-tabulation is contained in Table 35. The results show each ethnicity’s mean financial literacy scores within each education mandate level and indicate that white respondents generally had higher scores than other ethnicities.

Table 35

*Cross-tabulation of financial literacy marginal mean scores by ethnicity for 2018*

Factor	White	Black	Hispanic	Asian	Other
No mandate	42.87	35.92	38.33	41.62	40.00
Included in standards	44.45	32.57	38.49	44.17	42.22
Standards required to be implemented	44.04	31.49	33.82	43.33	42.40
High school course required to be offered	45.87	37.44	39.41	44.62	43.81
High school course required to be taken	43.79	29.51	35.19	36.88	41.43
Student testing required	42.02	36.3	34.67%	49.09	20.00

The results are presented graphically in Figure 7. The graph shows that white respondents consistently have higher mean financial literacy scores than black and Hispanic respondents, regardless of education mandate. Additionally, the number of respondents was sometimes low in a particular category, which makes the score appear significant when it is not. For example,  $n = 1$  for other respondents for the mandate that required student testing.

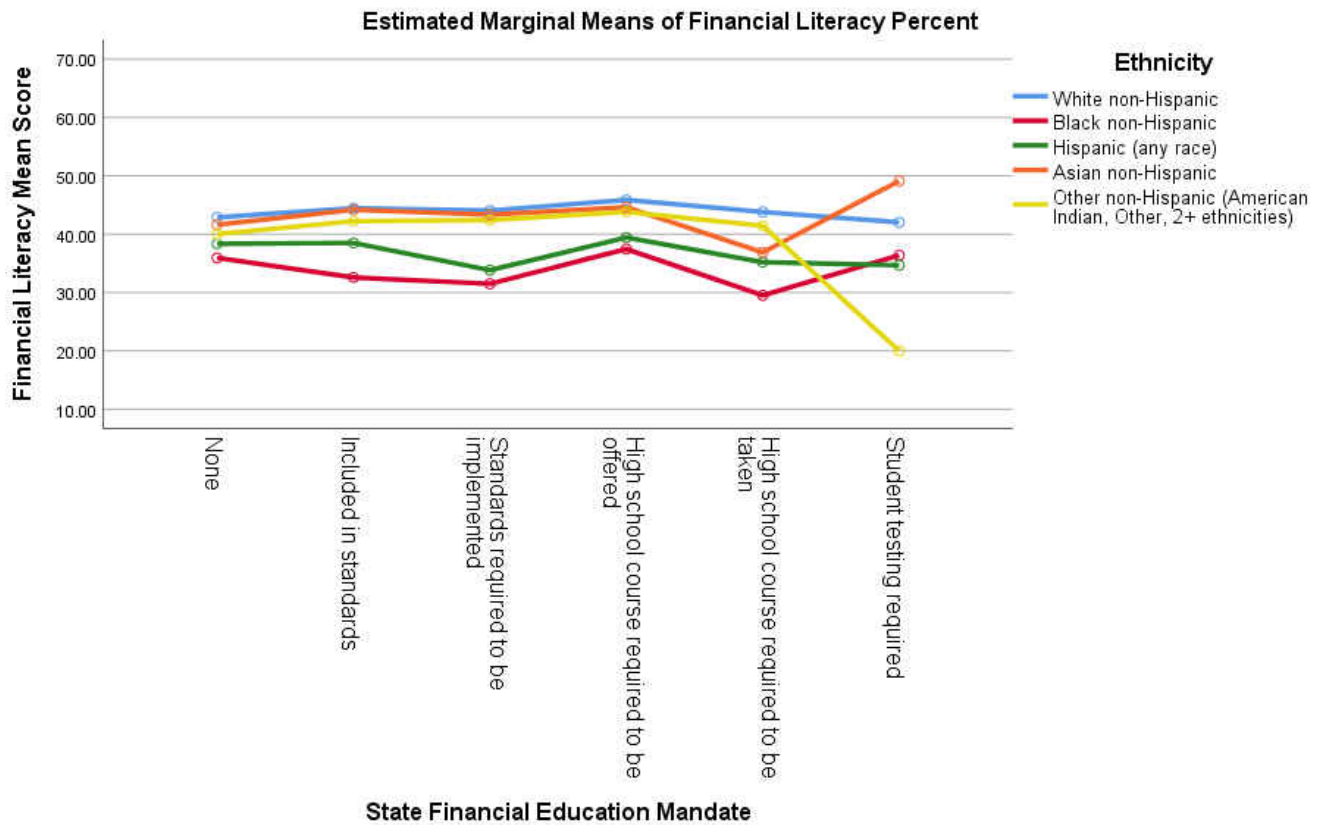


Figure 7 Graph of two-way ANOVA for financial literacy and ethnicity for 2018

Because the two-way ANOVA showed a statistically significant difference between the ethnicities, a test for simple main effects was conducted for all categories. For whites and blacks, mean financial literacy scores were 11.27 points, 95% CI [7.03, 15.51], higher for whites than blacks. For whites and Hispanics, mean financial literacy scores were 7.73 points, 95% CI

[3.64, 11.81], higher for whites than Hispanics. For Asians and blacks, mean financial literacy scores were 9.51 points, 95% CI [2.49, 16.53], higher for whites than blacks. For other ethnicities and blacks, mean financial literacy scores were 8.87 points, 95% CI [.98, 16.77], higher for whites than blacks.

These results align with previous research. Influential factors that were considered moderator variables include demographics such as ethnicity and socioeconomic status (Sinha et al., 2018). The mean differences in financial literacy mean scores for ethnicity are presented in Table 36.

Table 36

*Significant mean financial literacy scores by ethnicities for 2018*

Ethnicity	Comparison Ethnicity	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
White	Black	11.27	1.51	** .000	7.03	15.51
	Hispanic	7.73	1.46	** .000	3.64	11.81
Asian	Black	9.51	2.50	** .001	2.49	16.53
Other	Black	8.87	2.81	* .016	.98	16.77

\*p < .05, \*\*p < .01

### Two-Way ANOVA: Age

A two-way ANOVA investigated whether young adults' financial literacy varied according to education mandate, age, and mandate by age (interaction effect). For the types of mandates, there were 338 lack of mandate, 435 included in standards, 854 standards required to be implemented, 315 high school courses required to be offered, 667 high school courses required to be taken, and 186 student testing required. There were 309 18-year-olds, 337 19-year-olds, 339 20-year-olds, 407 21-year-olds, 424 22-year-olds, 457 23-year-olds, and 522 24-year-olds. The financial literacy mean of 18-year-olds was 38.45, with a standard deviation of 27.45; the financial literacy mean of 19-year-olds was 40.36, with a standard deviation of 27.56; the financial literacy mean of 20-year-olds was 40.18, with a standard deviation of 27.24; the financial literacy mean of 21-year-olds was 39.02, with a standard deviation of 25.94; the financial literacy mean of 22-year-olds was 41.47, with a standard deviation of 27.34; the financial literacy mean of 23-year-olds was 43.37, with a standard deviation of 26.92; and the financial literacy mean of 24-year-olds was 42.95, with a standard deviation of 27.87. The descriptive statistics are presented in Table 37.

Table 37

*Descriptive statistics for age and mandate for literacy for 2018*

Age	Education Mandate	N	Financial Literacy Mean	Standard Deviation
18		309	38.45	27.45
19		337	40.36	27.56
20		339	40.18	27.24
21		407	39.02	25.94
22		424	41.47	27.34
23		457	43.37	26.92
24		522	42.95	27.87
Education Mandate	None	338	40.53	26.04
	Included in standards	435	42.11	26.88
	Standards required to be implemented	854	41.10	27.78
	High school course required to be offered	315	43.94	27.18
	High school course required to be taken	667	39.73	27.50
	Student testing required	186	39.46	25.76
Total		2795	41.07	27.23

There was not a statistically significant main effect with age,  $F(6, 2753) = 1.785, p = .098$ . There was not a statistically significant main effect with mandate,  $F(5, 2753) = 1.430, p = .210$ . There was not a statistically significant interaction between the effects of age and state financial education mandate on financial literacy,  $F(30, 2753) = .481, p = .992$ . The results of the two-way ANOVA are provided in Table 38.

Table 38

*Tests of between-subject effects for age and mandate for literacy for 2018*

	Type III Sum of Squares	df	Mean Square	F	Significance	Partial eta squared
Age	7,964.03	6	1,327.34	1.785	.098	.004
Education Mandate	5,314.47	5	1,062.89	1.430	.210	.003
Age by Education Mandate	10,722.15	30	357.41	.481	.992	.005
Error	2,046,862.43	2753	743.50			
Corrected Total	2,071,179.96	2794				

\* $p < .05$ , \*\* $p < .01$



A cross-tabulation is contained in Table 39. The results show each age's mean financial literacy scores within each education mandate level and indicate that there was not a consistent difference by age.

Table 39

*Cross-tabulation of financial literacy marginal mean scores by age for 2018*

Factor	18	19	20	21	22	23	24
No mandate	37.07	44.32	39.54	37.19	42.79	43.16	40.33
Included in standards	42.93	43.48	42.46	40.00	38.99	44.71	43.29
Standards required to be implemented	37.76	38.99	41.15	42.24	41.98	41.04	43.14
High school course required to be offered	40.00	42.63	40.00	40.42	45.31	51.15	44.83
High school course required to be taken	36.72	40.00	37.60	34.19	40.89	42.15	42.90
Student testing required	39.05	30.00	40.00	38.46	39.38	42.50	42.93

The results are presented graphically in Figure 8. The graph shows that there is no significant difference in mean financial literacy scores across age or education mandate.

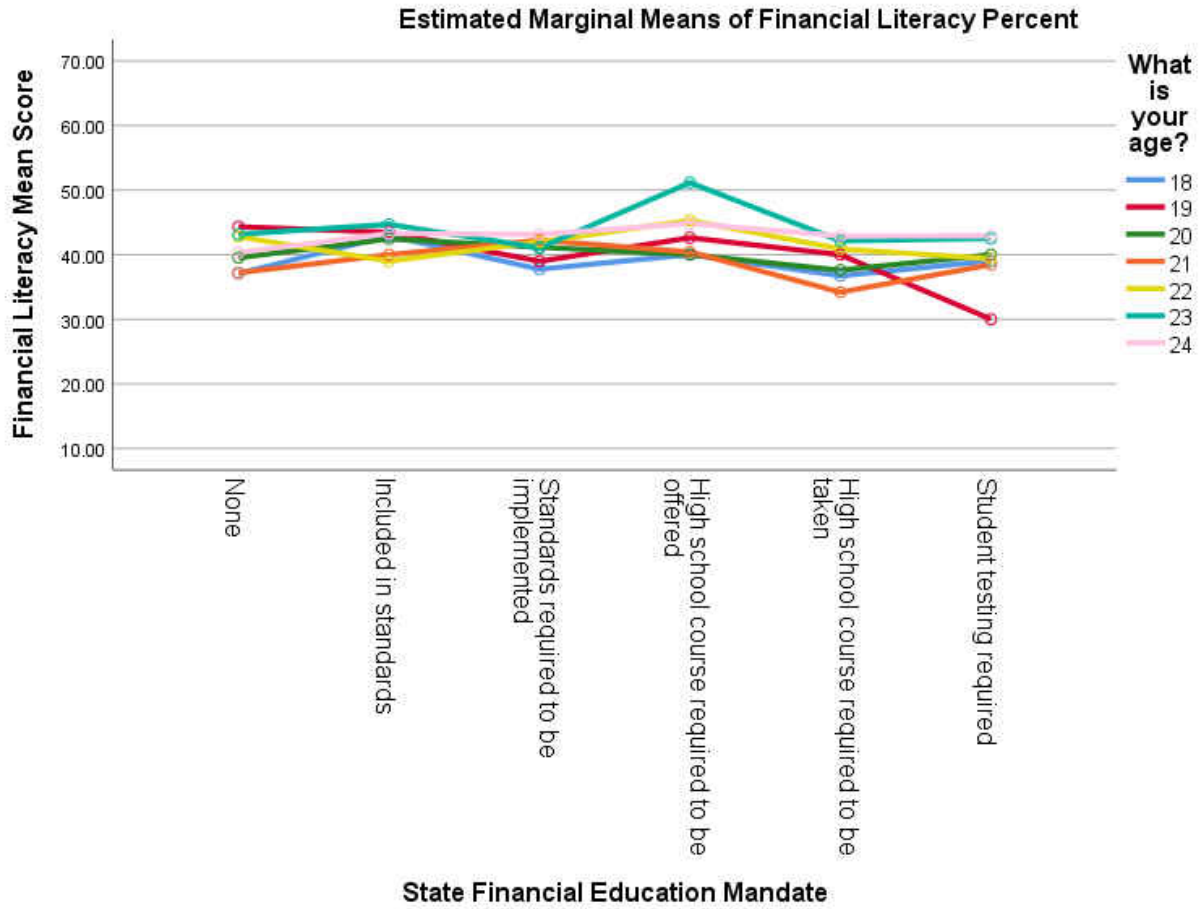


Figure 8 Graph of two-way ANOVA for financial literacy and age for 2018

## Two-Way ANOVA: Educational Attainment

A two-way ANOVA investigated whether young adults' financial literacy varied according to education mandate, educational attainment, and mandate by educational attainment (interaction effect). For the types of mandates, there were 338 lack of mandate, 435 included in standards, 854 standards required to be implemented, 315 high school courses required to be offered, 667 high school courses required to be taken, and 186 student testing required. There were 156 respondents who did not complete high school, 688 with a regular high school diploma, 230 with a GED, 959 with some college but no degree, 188 with an associate's degree, 491 with a bachelor's degree, and 83 with a post-graduate degree. The financial literacy mean of those without a high school degree was 27.82, with a standard deviation of 23.67; of those with a regular high school degree was 33.78, with a standard deviation of 25.42; of those with a GED was 33.30, with a standard deviation of 23.17; of those with some college but no degree was 44.82, with a standard deviation of 27.16; of those with an associate's degree was 42.55, with a standard deviation of 26.77; of those with a bachelor's degree was 50.35, with a standard deviation of 27.94; and of those with a post-graduate degree was 46.51, with a standard deviation of 26.52. The descriptive statistics are presented in Table 40.

Table 40

*Descriptive statistics for educational attainment and mandate for literacy for 2018*

Educational Attainment	Education Mandate	N	Financial Literacy Mean	Standard Deviation
Did not complete high school		156	27.82	23.67
High school graduate - regular		688	33.78	25.42
High school graduate - GED		230	33.30	23.17
Some college, no degree		959	44.82	27.16
Associate's degree		188	42.55	26.77
Bachelor's degree		491	50.35	27.94
Post-graduate degree		83	46.51	26.52
Education Mandate	None	338	40.53	26.04
	Included in standards	435	42.11	26.88
	Standards required to be implemented	854	41.10	27.78
	High school course required to be offered	315	43.94	27.18
	High school course required to be taken	667	39.73	27.50
	Student testing required	186	39.46	25.76
Total		2795	41.07	27.23

There was a statistically significant main effect with educational attainment,  $F(6, 2753) = 24.283, p = .000$ , partial eta squared = .050. The significance of the effect was measured by a partial eta squared to determine the size of the effect, which suggested that the practical difference was small. There was not a statistically significant main effect with mandate,  $F(5, 2753) = .327, p = .897$ . There was not a statistically significant interaction between the effects of education level and state financial education mandate on financial literacy,  $F(30, 2753) = .740, p = .845$ . The results of the two-way ANOVA are provided in Table 41.

Table 41

*Tests of between-subject effects for educational attainment and mandate for literacy for 2018*

	Type III Sum of Squares	df	Mean Square	F	Significance	Partial eta squared
Educational Attainment	101,349.19	6	16,891.53	24.283	** .000	.050
Education Mandate	1,135.77	5	227.15	.327	.897	.001
Educational Attainment by Education Mandate	15,451.15	30	515.04	.740	.845	.008
Error	1,914,990.43	2753	695.61			
Corrected Total	2,071,179.96	2794				

\*p < .05, \*\*p < .01

A cross-tabulation is contained in Table 42. The results show each educational attainment level's mean financial literacy scores within each education mandate level and indicate that respondents with bachelor's degrees generally scored higher than other respondents.

Table 42

*Cross-tabulation of financial literacy marginal mean scores by educational attainment for 2018*

Factor	Did not complete high school	High school graduate - regular	High school graduate – GED	Some college, no degree	Associate's degree	Bachelor's degree	Post-graduate degree
No mandate	25.71	32.46	23.33	42.59	41.54	48.25	53.33
Included in standards	24.14	33.75	36.80	46.24	44.00	53.17	42.00
Standards required to be implemented	26.09	33.28	38.26	45.51	41.61	50.28	45.22
High school course required to be offered	37.33	36.62	34.48	47.11	46.09	52.59	37.50
High school course required to be taken	29.52	32.52	30.61	44.80	42.27	47.10	48.75
Student testing required	28.00	38.40	28.70	36.60	41.54	56.92	47.27

The results are presented graphically in Figure 9. The graph shows that respondents with bachelor's degrees generally have a higher financial literacy mean score than those with lower levels of educational attainment.

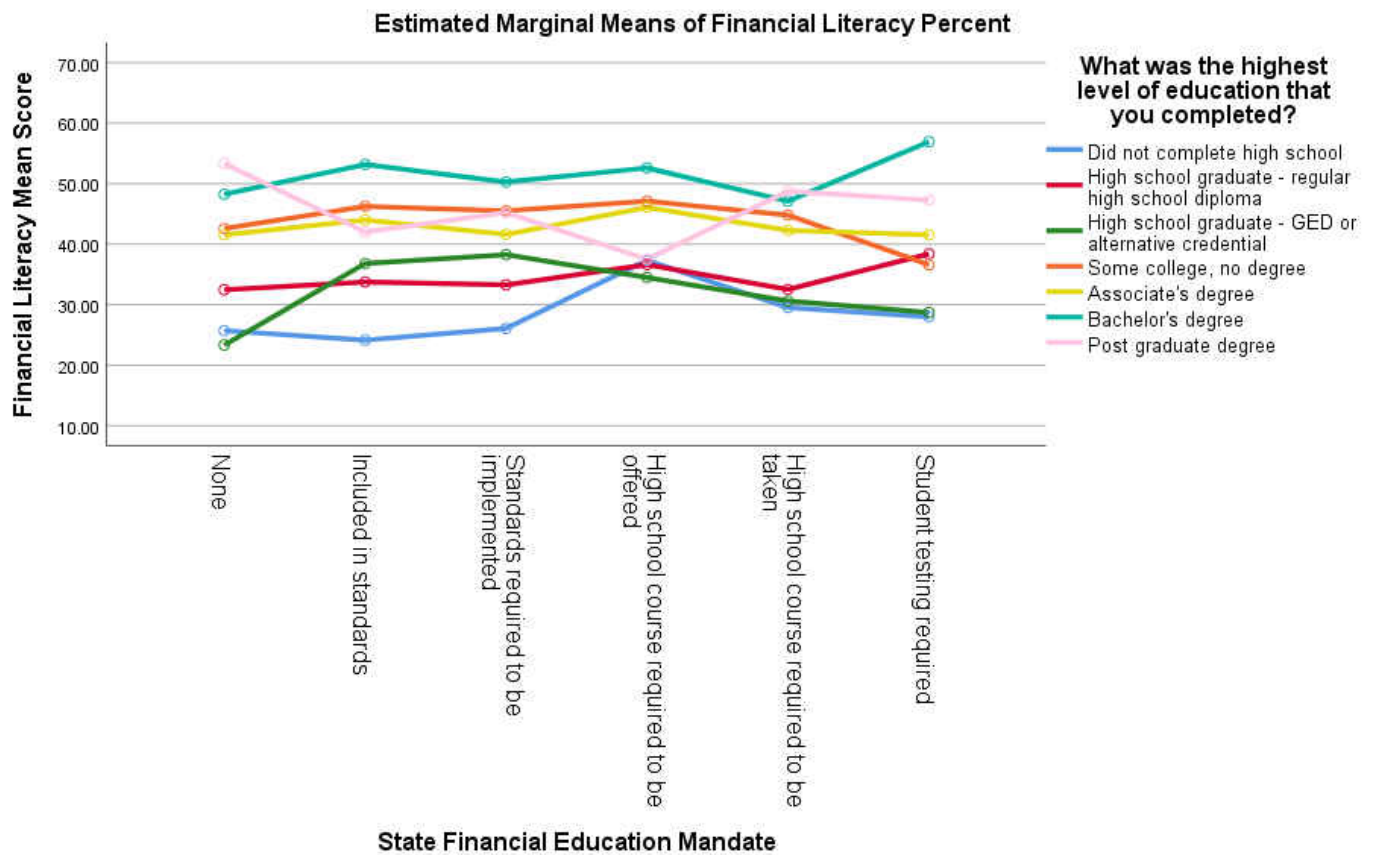


Figure 9 Graph of two-way ANOVA for financial literacy and educational attainment for 2018

Because the two-way ANOVA showed a statistically significant difference in the main effect of educational attainment, a test for simple main effects was conducted for all categories. The results indicated that there was a statistically significant difference in mean financial literacy among many different levels of educational attainment.

These results align with previous research, which shows that those who had not completed high school showed only a 0.29 correlation to being financially stable while those who had at least some college education showed a 0.50 correlation to being financially stable (Sinha et al., 2018). Others, such as Chen and Volpe (2002), Robb and Sharpe (2009), and Robb (2011), found similar correlations. The results of this study are displayed in Table 43.

Table 43

*Significant mean financial literacy scores by educational attainment for 2018*

Educational Attainment	Comparison Educational Attainment	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Did not complete high school	Some college, no degree	-17.00	2.28	** .000	10.07	23.92
	Associate's degree	-14.73	2.86	** .000	6.05	23.42
	Bachelor's degree	-22.53	2.42	** .000	15.15	29.90
	Post-graduate degree	-18.69	3.58	** .000	7.79	29.58
High school graduate - regular	Some college, no degree	-11.04	1.32	** .000	7.03	15.05
	Associate's degree	-8.77	2.17	** .001	2.17	15.37
	Bachelor's degree	-16.57	1.56	** .000	11.83	21.31



	Post-graduate degree	-12.73	3.06	** .001	3.41	22.05
High school graduate - GED	Some college, no degree	-11.51	1.94	** .000	5.62	17.40
	Bachelor's degree	-17.04	2.11	** .000	10.63	23.45
	Post-graduate degree	-13.20	3.38	** .002	2.93	23.47
Some college, no degree	Bachelor's degree	-5.53	1.46	** .003	1.07	9.98
Associate's degree	Bachelor's degree	-7.79	2.26	* .012	.91	14.67

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\*p < .05, \*\*p < .01

### Two-Way ANOVA: Income

A two-way ANOVA investigated whether young adults' financial literacy varied according to education mandate, income, and mandate by income (interaction effect). For the types of mandates, there were 338 lack of mandate, 435 included in standards, 854 standards required to be implemented, 315 high school courses required to be offered, 667 high school courses required to be taken, and 186 student testing required. There were 836 respondents whose income was less than \$15,000; 448 whose income was \$15,000 to \$25,000; 363 whose income was \$25,000 to \$35,000; 399 whose income was \$35,000 to \$50,000; 373 whose income was \$50,000 to \$75,000; 192 whose income was \$75,000 to \$100,000; 124 whose income was \$100,000 to \$150,000; and 60 whose income was \$150,000 or more. The financial literacy mean of those with less than \$15,000 was 39.04, with a standard deviation of 27.72; of those whose income was \$15,000 to \$25,000 was 38.84, with a standard deviation of 27.03; of those whose income was \$25,000 to \$35,000 was 40.50, with a standard deviation of 26.11; of those whose income was \$35,000 to \$50,000 was 41.85, with a standard deviation of 26.21; of those whose income was \$50,000 to \$75,000 was 45.58, with a standard deviation of 27.81; of those whose income was \$75,000 to \$100,000 was 42.92, with a standard deviation of 26.61; of those whose income was \$100,000 to \$150,000 was 45.32, with a standard deviation of 27.24; and of those whose income was \$150,000 or more was 41.67, with a standard deviation of 29.75. The descriptive statistics are presented in Table 44.

Table 44

*Descriptive statistics for income and mandate for literacy for 2018*

Income	Education Mandate	N	Financial Literacy Mean	Standard Deviation
Less than \$15,000		836	39.04	27.72
\$15,000 - \$25,000		448	38.84	27.03
\$25,000 - \$35,000		363	40.50	26.11
\$35,000 - \$50,000		399	41.85	26.21
\$50,000 - \$75,000		373	45.58	27.81
\$75,000 - \$100,000		192	42.92	26.61
\$100,000 - \$150,000		124	45.32	27.24
More than \$150,000		60	41.67	29.75
Education Mandate	None	338	40.53	26.04
	Included in standards	435	42.11	26.88
	Standards required to be implemented	854	41.10	27.78
	High school course required to be offered	315	43.94	27.18
	High school course required to be taken	667	39.73	27.50
	Student testing required	186	39.46	25.76
Total		2795	41.07	27.23

There was a statistically significant main effect with income,  $F(7, 2747) = 2.929, p = .005$ , partial eta squared = .007. The significance of the effect was measured by a partial eta squared to determine the size of the effect, which suggested that the practical difference was small. There was not a statistically significant main effect with mandate,  $F(5, 2747) = 1.152, p = .331$ . There was not a statistically significant interaction between the effects of income and state financial education mandate on financial literacy,  $F(35, 2747) = .957, p = .542$ . The results of the two-way ANOVA are provided in Table 45.

Table 45

*Tests of between-subject effects for income and mandate for literacy for 2018*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Income	15,115.55	7	2,159.37	2.929	** .005	.007
Education Mandate	4,245.25	5	849.05	1.152	.331	.002
Income by Education Mandate	24,681.81	35	705.19	.957	.542	.012
Error	2,025,147.25	2747	737.22			
Corrected Total	2,071,179.96	2794				

\* $p < .05$ , \*\* $p < .01$

A cross-tabulation is contained in Table 46. The results show each income range's mean financial literacy scores within each education mandate level, which does not show a clear difference in each group's scores.

Table 46

*Cross-tabulation of financial literacy marginal mean scores by income for 2018*

Factor	Less than \$15,000	\$15,000 - \$25,000	\$25,000 - \$35,000	\$35,000 - \$50,000	\$50,000 - \$75,000	\$75,000 - \$100,000	\$100,000 - \$150,000	More than \$150,000
No mandate	38.18	41.13	34.76	42.33	43.91	46.21	40.95	48.00
Included in standards	39.57	38.00	41.70	47.17	49.21	37.60	50.00	40.00
Standards required to be implemented	40.57	39.67	37.64	38.92	48.25	44.67	40.00	44.62
High school course required to be offered	39.30	38.81	51.58	46.29	46.40	50.00	53.33	45.71
High school course required to be taken	37.61	38.48	41.06	42.43	40.00	35.24	54.17	37.65
Student testing required	37.58	33.64	45.33	37.42	42.61	50.00	37.50	40.00

The results are presented graphically in Figure 10. The graph does not show a clear difference in financial literacy scores based on income levels. Additionally, the number of respondents was sometimes low in a particular category, which makes the score appear significant when it is not. For example,  $n = 8$  for respondents with an income of \$100,000-\$150,000 for the mandate that required a high school course to be taken.

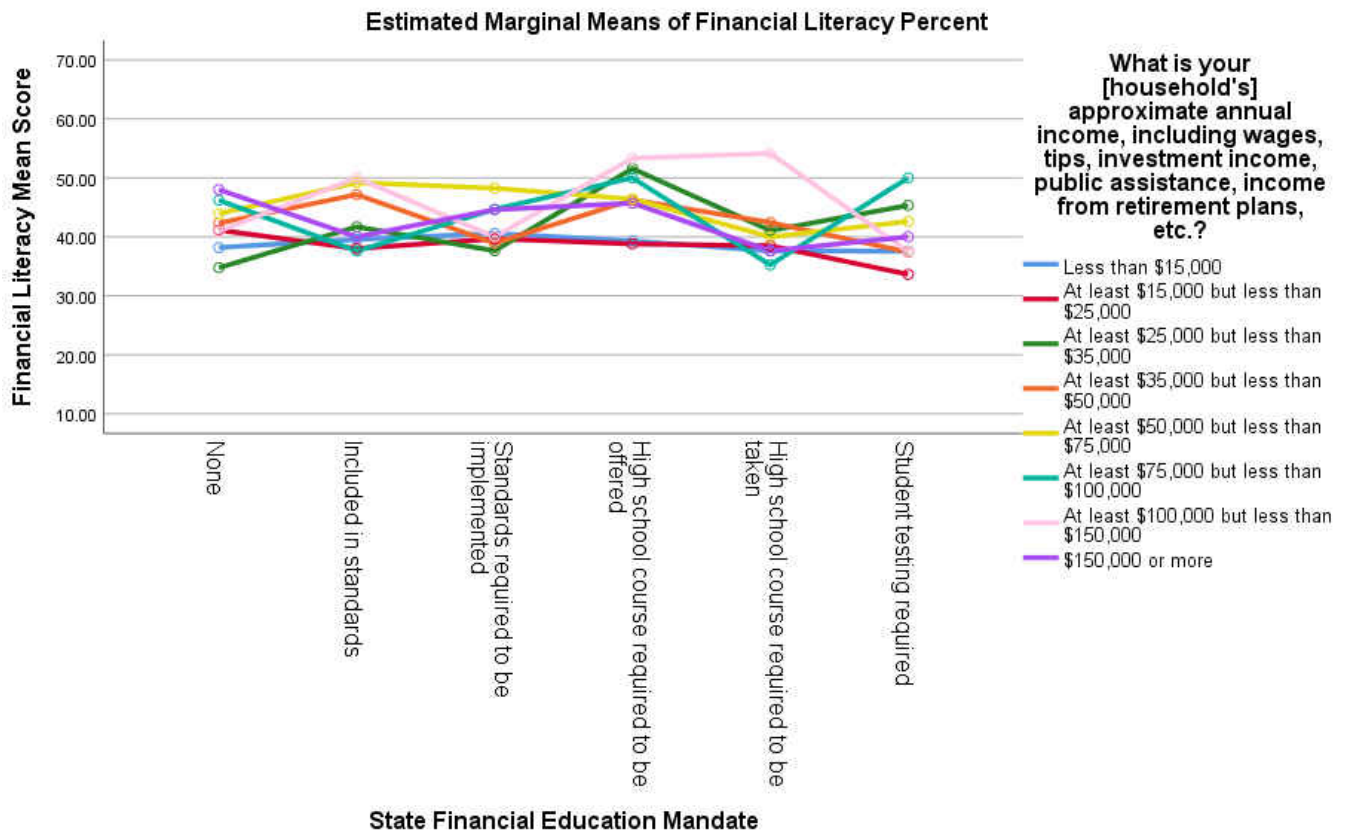


Figure 10 Graph of two-way ANOVA for financial literacy and income for 2018

Because the two-way ANOVA showed a statistically significant difference for the main effect of income, a test for simple main effects was conducted. For respondents with income from \$50,000-\$75,000 and those with less than \$15,000, mean financial literacy scores were 6.53 points, 95% CI [1.25, 11.82], higher for those with the higher income. For respondents with

income from \$50,000-\$75,000 and those with \$15,000-\$25,000, mean financial literacy scores were 6.74 points, 95% CI [.79, 12.69], higher for those with the higher income.

These results agree with previous literature. Deenanath, Danes, and Jang (2019) found that student behaviors are most strongly influenced by intentional factors, such as student-earned income, which showed a strong relationship to student financial behavior at  $B = 0.74$ . Another study found that young adults with low-income backgrounds or low levels of literacy were less likely to have sound financial footing (Sinha et al., 2018). Additionally, Luksander, Beres, Huzdik, and Nemeth (2014) discovered that, in Hungary, gender, age, and income had a relationship to levels of financial literacy.

The mean differences in financial literacy scores for the incomes are presented in Table 47.

Table 47

*Significant mean financial literacy scores by income for 2018*

Income	Comparison Income	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
\$50,000 - \$75,000	Less than \$15,000	6.53	1.69	** .003	1.25	11.82
	\$15,000 - \$25,000	6.74	1.90	* .011	.79	12.69

\*p < .05, \*\*p < .01

## Summary of Literacy Findings

A summary of significant findings concerning financial literacy is provided in Table 48.

These results, though practically small, do indicate significant differences within the various factors. Most of the significant results reflect differences in the demographic groups, with interaction effects only appearing twice.

Table 48

*Summary of significant findings about financial literacy*

Year	Factor	Significance	Partial eta squared
2015	Gender by Education Mandate	**.008	.005
	Ethnicity	**.000	.010
	Education Mandate (within Ethnicity)	*.025	.004
	Educational Attainment	**.000	.021
	Income by Education Mandate	*.040	.016
2018	Gender	**.000	.010
	Ethnicity	**.000	.016
	Educational Attainment	**.000	.050
	Income	**.005	.007

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\*p < .05, \*\*p < .01



## Results: Research Question 2 - Financial Capability

*In what ways does the financial capability of 18-24-year-olds vary according to the requirements for financial education?*

This question was analyzed first for the data from the 2015 FINRA study and the 2011 CEE Survey of the States, then for the data from the 2018 FINRA study and the 2014 CEE Survey of the States. To answer this question, descriptive statistics provided context for the data, cross-tabulation tables presented the results in one table, and a series of two-way ANOVAs showed the relationship between education mandate, financial literacy, and the demographic factors of gender, ethnicity, age, educational attainment, and income. For statistically significant effects as measured at  $p < .05$ , partial eta squared was calculated to determine the practical effect size. According to Tabachnick and Fidell (1989), partial eta squared differences are small at .01 to .089, medium at .09 to .249, and large at .25 or more.

### 2015 Financial Capability Analysis

Two-way ANOVAs were conducted to determine the significance of the main effects between the type of mandate for financial education and various demographic main effects, and 18-24-year-olds' financial capability.

#### Two-Way ANOVA: Gender

A two-way ANOVA investigated whether young adults' financial capability varied according to education mandate, gender, and mandate by gender (interaction effect). For the types of mandates, there were 367 lack of mandate, 453 included in standards, 1264 standards required to be implemented, 72 high school courses required to be offered, 653 high school

courses required to be taken, and 239 student testing required. There were 1182 males and 1866 females. The financial capability mean of males was 48.27, with a standard deviation of 25.54, while the financial capability mean of females was 44.31, with a standard deviation of 25.09. The descriptive statistics are presented in Table 49.

Table 49

*Descriptive statistics for gender and mandate for capability for 2015*

Gender	Education Mandate	N	Financial Capability Mean	Standard Deviation
Male		1182	48.27	25.54
Female		1866	44.31	25.09
Education Mandate	None	367	45.83	25.09
	Included in standards	453	44.94	24.50
	Standards required to be implemented	1264	46.26	25.97
	High school course required to be offered	72	43.89	24.35
	High school course required to be taken	653	45.48	25.36
	Student testing required	239	46.95	24.19
Total		3048	45.84	25.33

There was not a statistically significant main effect with gender,  $F(1, 3036) = 1.942, p = .164$ . There was not a statistically significant main effect with mandate,  $F(5, 3036) = .477, p = .794$ . There was a statistically significant interaction between the effects of gender and state financial education mandate on financial capability,  $F(5, 3036) = 2.719, p = .019$ , partial eta squared = .004. The partial eta squared suggested that the practical difference was small. The results of the two-way ANOVA are provided in Table 50.

Table 50

*Tests of between-subject effects for gender and mandate for capability for 2015*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Gender	1,237.71	1	1,237.71	1.942	.164	.001
Education Mandate	1,519.71	5	303.94	.477	.794	.001
Gender by Education Mandate	8,661.92	5	1732.38	2.719	*.019	.004
Error	1,935,158.23	3036	637.19			
Corrected Total	1,956,250.31	3047				

\* $p < .05$ , \*\* $p < .01$

A cross-tabulation is contained in Table 51. The results show each gender's mean financial capability scores within each education mandate level, which shows that males sometimes outscored females and females sometimes outscored males.

Table 51

*Cross-tabulation of financial capability marginal mean scores by gender for 2015*

Factor	Male	Female
No mandate	42.99	47.33
Included in standards	48.94	42.70
Standards required to be implemented	49.19	44.40
High school course required to be offered	42.11	44.53
High school course required to be taken	49.26	42.55
Student testing required	47.68	46.43

The results are presented graphically in Figure 11. The graph shows that males have a higher financial capability mean score when the education mandate includes financial education in standards, when those standards are required to be implemented, and when a high school course is required to be taken.

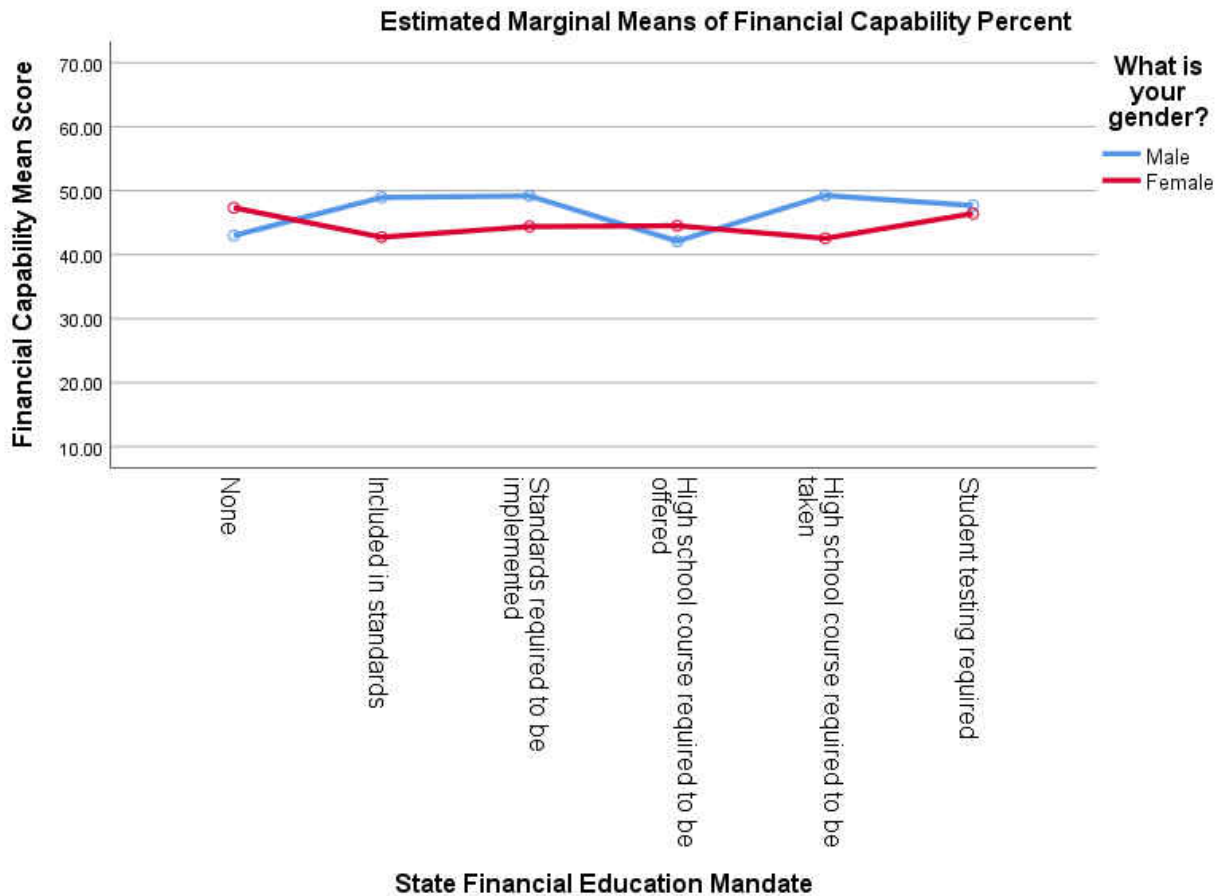


Figure 11 Graph of two-way ANOVA for financial capability and gender for 2015

Because the two-way ANOVA showed a statistically significant difference in the interaction effect between genders and education mandate, a test for simple main effects was conducted for all categories. For males and females from a state where financial education was included in standards, mean financial capability scores were 6.20 points, 95% CI [1.35, 11.06],

higher for males than females,  $F(1, 3037) = 6.27, p = .012$ , partial eta squared = .002. For males and females from a state where standards were required to be implemented, mean financial capability scores were 4.79 points, 95% CI [1.93, 7.64], higher for males than females,  $F(1, 3037) = 10.82, p = .001$ , partial eta squared = .004. For males and females from a state where a high school course was required to be taken, mean financial capability scores were 6.71 points, 95% CI [2.80, 10.61], higher for males than females,  $F(1, 3037) = 11.35, p = .001$ , partial eta squared = .004. The partial eta squared results suggest that the practical differences were small.

These results align with previous research. After controlling for variables in education and other student characteristics, researchers determined that parents have an influence on financial literacy, with a preference for ensuring male children have stronger financial capability (Chambers et al., 2019). Sinha, Tan, and Zhan (2018) analyzed data from a national survey to identify characteristics of young adults that correlate to their financial behaviors. While researching relationships among demographics, one study found that young adults who identified as females were less likely to have sound financial footing (Sinha et al., 2018).

The differences in mean scores for the genders is presented in Table 52.

Table 52

*Mean financial capability scores by education mandate and gender for 2015*

Education Mandate	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
None	4.34	2.77	.117	1.09	9.77
Included in Standards	6.20	2.48	*.012	1.35	11.06
Standards required to be implemented	4.79	1.46	** .001	1.93	7.64
High school course required to be offered	2.42	6.75	.720	10.81	15.66
High school course required to be taken	6.71	1.99	*.001	2.80	10.61
Student testing required	1.25	3.32	.707	5.25	7.75

\*p < .05, \*\*p < .01

### Two-Way ANOVA: Ethnicity

A two-way ANOVA investigated whether young adults' financial capability varied according to education mandate, ethnicity, and mandate by ethnicity (interaction effect). For the types of mandates, there were 367 lack of mandate, 453 included in standards, 1264 standards required to be implemented, 72 high school courses required to be offered, 653 high school courses required to be taken, and 239 student testing required. There were 1615 white respondents, 426 black respondents, 580 Hispanic respondents, 229 Asian respondents, and 198 other respondents. The financial capability mean of whites was 46.68, with a standard deviation of 26.04; the financial capability mean of blacks was 41.22, with a standard deviation of 22.43; the financial capability mean of Hispanics was 45.68, with a standard deviation of 24.78; the financial capability mean of Asians was 51.62, with a standard deviation of 25.12; and the financial capability mean of others was 42.83, with a standard deviation of 25.49. The descriptive statistics are presented in Table 53.



Table 53

*Descriptive statistics for ethnicity and mandate for capability for 2015*

Ethnicity	Education Mandate	N	Financial Capability Mean	Standard Deviation
White		1615	46.68	26.04
Black		426	41.22	22.43
Hispanic		580	45.68	24.78
Asian		229	51.62	25.12
Other		198	42.83	25.49
Education Mandate	None	367	45.83	25.09
	Included in standards	453	44.94	24.50
	Standards required to be implemented	1264	46.26	25.97
	High school course required to be offered	72	43.89	24.35
	High school course required to be taken	653	45.48	25.36
	Student testing required	239	46.95	24.19
Total		3048	45.84	25.33

There was a statistically significant main effect with ethnicity,  $F(4, 3018) = 4.687, p = .001$ , partial eta squared = .006. The significance was measured by a partial eta squared to determine the size of the effect, which suggested that the practical difference was small. There was not a statistically significant main effect with mandate,  $F(5, 3018) = .364, p = .873$ . There was not a statistically significant interaction between the effects of ethnicity and state financial education mandate on financial capability,  $F(20, 3018) = .892, p = .598$ . The results of the two-way ANOVA are provided in Table 54.

Table 54

*Tests of between-subject effects for ethnicity and mandate for capability for 2015*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Ethnicity	11,945.50	4	2,986.37	4.687	** .001	.006
Education Mandate	1,160.44	5	232.09	.364	.873	.001
Ethnicity by Education Mandate	11,370.76	20	568.54	.892	.598	.006
Error	1,923,640.52	3018	637.18			
Corrected Total	1,956,250.31	3047				

\* $p < .05$ , \*\* $p < .01$

A cross-tabulation is contained in Table 55. The results show each ethnicity's mean financial capability scores within each education mandate level and indicate that Asian respondents generally had higher scores than other ethnicities.

Table 55

*Cross-tabulation of financial capability marginal mean scores by ethnicity for 2015*

Factor	White	Black	Hispanic	Asian	Other
No mandate	49.93	42.11	42.75	49.47	39.49
Included in standards	44.38	43.05	45.25	52.50	41.18
Standards required to be implemented	46.95	41.93	46.12	52.50	42.03
High school course required to be offered	47.00	37.60	53.33	53.33	20.00
High school course required to be taken	46.63	37.05	45.59	50.00	50.86
Student testing required	45.95	45.00	53.33	54.29	42.00

The results are presented graphically in Figure 12. The graph shows that Asian respondents frequently have higher mean financial capability scores than other respondents. Additionally, the number of respondents was sometimes low in a particular category, which makes the score appear significant when it is not. For example,  $n = 1$  for other respondents for the mandate that required a high school course to be offered.

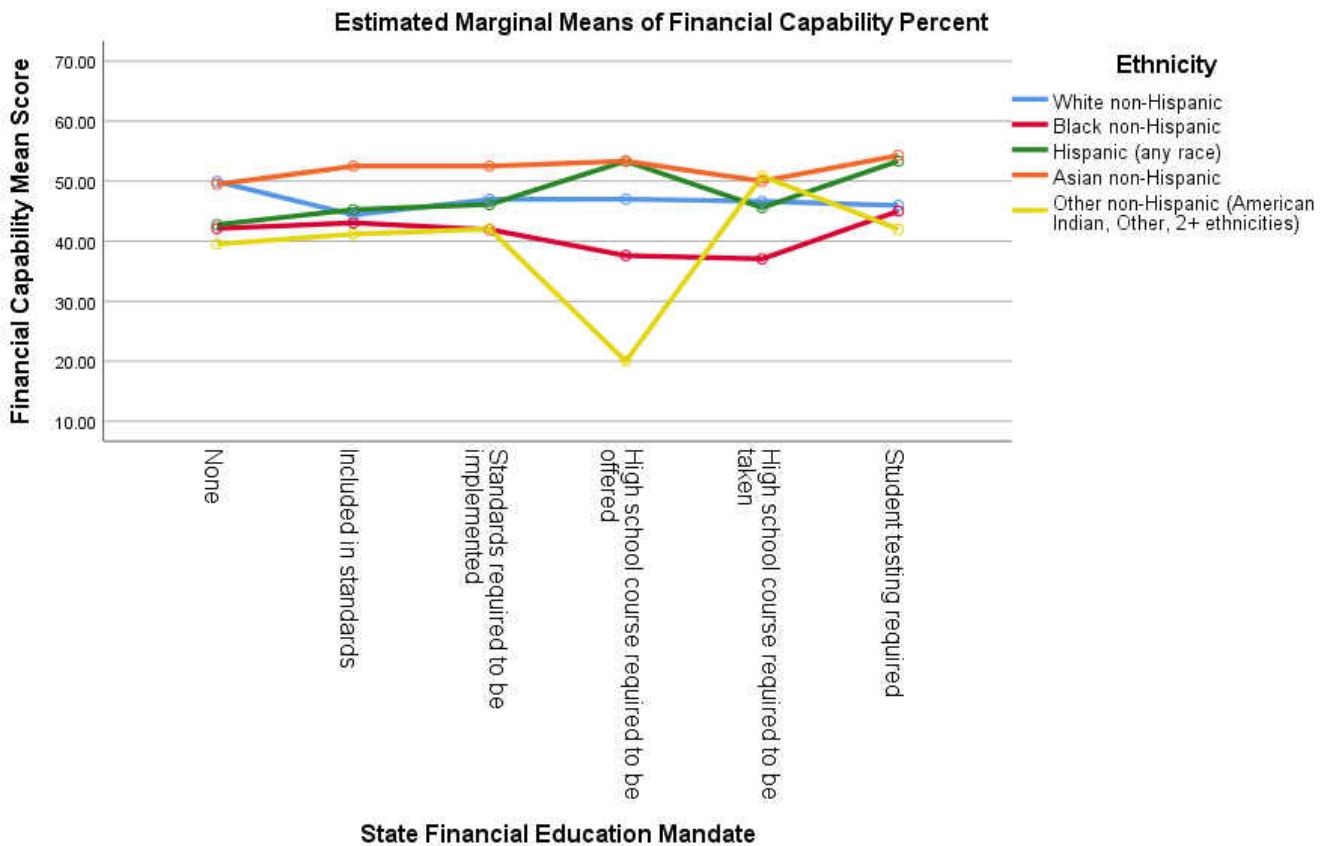


Figure 12 Graph of two-way ANOVA for financial capability and ethnicity for 2015

Because the two-way ANOVA showed a statistically significant difference between the ethnicities, a test for simple main effects was conducted for all categories. For whites and blacks, mean financial capability scores were 5.45 points, 95% CI [1.59, 9.32], higher for whites

than blacks. For Asians and blacks, mean financial capability scores were 10.40 points, 95% CI [4.58, 16.21], higher for Asians than blacks. For Asians and Hispanics, mean financial capability scores were 5.94 points, 95% CI [.40, 11.47], higher for Asians than Hispanics. For Asians and others, mean financial capability scores were 8.79 points, 95% CI [1.91, 15.67], higher for Asians than others.

These results align with previous research. Influential factors that were considered moderator variables include demographics such as ethnicity and socioeconomic status (Sinha et al., 2018). The significant mean differences in financial capability mean scores for ethnicity are presented in Table 56.

Table 56

*Significant mean financial capability scores by ethnicities for 2015*

Ethnicity	Comparison Ethnicity	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
White	Black	5.45	1.37	** .001	1.59	9.32
Asian	Black	10.40	2.07	** .000	4.58	16.21
	Hispanic	5.94	1.97	* .026	.40	11.47
	Other	8.79	2.45	** .003	1.91	15.67

\*p < .05, \*\*p < .01

### Two-Way ANOVA: Age

A two-way ANOVA investigated whether young adults' financial capability varied according to education mandate, age, and mandate by age (interaction effect). For the types of mandates, there were 367 lack of mandate, 453 included in standards, 1264 standards required to be implemented, 72 high school courses required to be offered, 653 high school courses required to be taken, and 239 student testing required. There were 390 18-year-olds, 407 19-year-olds, 423 20-year-olds, 467 21-year-olds, 404 22-year-olds, 460 23-year-olds, and 497 24-year-olds. The financial capability mean of 18-year-olds was 44.60, with a standard deviation of 22.63; the financial capability mean of 19-year-olds was 45.21, with a standard deviation of 24.56; the financial capability mean of 20-year-olds was 45.53, with a standard deviation of 23.42; the financial capability mean of 21-year-olds was 47.84, with a standard deviation of 25.96; the financial capability mean of 22-year-olds was 44.90, with a standard deviation of 26.07; the financial capability mean of 23-year-olds was 45.52, with a standard deviation of 26.99; and the financial capability mean of 24-year-olds was 46.80, with a standard deviation of 26.72. The descriptive statistics are presented in Table 57.

Table 57

*Descriptive statistics for age and mandate for capability for 2015*

Age	Education Mandate	N	Financial Capability Mean	Standard Deviation
18		390	44.60	22.63
19		407	45.21	24.56
20		423	45.53	23.42
21		467	47.84	25.96
22		404	44.90	26.07
23		460	45.52	26.99
24		497	46.80	26.72
Education Mandate	None	367	45.83	25.09
	Included in standards	453	44.94	24.50
	Standards required to be implemented	1264	46.26	25.97
	High school course required to be offered	72	43.89	24.35
	High school course required to be taken	653	45.48	25.36
	Student testing required	239	46.95	24.19
Total		3048	45.84	25.33

There was not a statistically significant main effect with age,  $F(6, 3006) = .472, p = .829$ .  
 There was not a statistically significant main effect with mandate,  $F(5, 3006) = .449, p = .814$ .  
 There was not a statistically significant interaction between the effects of age and state financial education mandate on financial capability,  $F(30, 3006) = .728, p = .859$ . The results of the two-way ANOVA are provided in Table 58.

Table 58

*Tests of between-subject effects for age and mandate for capability for 2015*

	Type III Sum of Squares	df	Mean Square	F	Significance	Partial eta squared
Age	1,826.04	6	304.34	.472	.829	.001
Education Mandate	1,447.69	5	289.54	.449	.814	.001
Age by Education Mandate	14,079.09	30	469.30	.728	.859	.007
Error	1,937,411.81	3006	644.30			
Corrected Total	1,956,250.31	3047				

\*p < .05, \*\*p < .01



A cross-tabulation is contained in Table 59. The results show each age's mean financial capability scores within each education mandate level and indicate that there was not a consistent difference by age.

Table 59

*Cross-tabulation of financial capability marginal mean scores by age for 2015*

Factor	18	19	20	21	22	23	24
No mandate	45.31	38.42	46.15	44.07	44.19	48.11	50.00
Included in standards	45.83	46.32	47.71	46.67	42.95	40.00	44.41
Standards required to be implemented	44.84	45.59	44.28	48.62	46.20	46.93	47.01
High school course required to be offered	40.00	44.44	46.15	46.15	55.00	36.67	40.00
High school course required to be taken	40.74	46.28	44.71	48.48	45.39	44.69	46.96
Student testing required	50.67	46.45	49.66	50.59	38.75	47.89	45.33

The results are presented graphically in Figure 13. The graph shows that there is no significant difference in mean financial capability scores across age or education mandate.

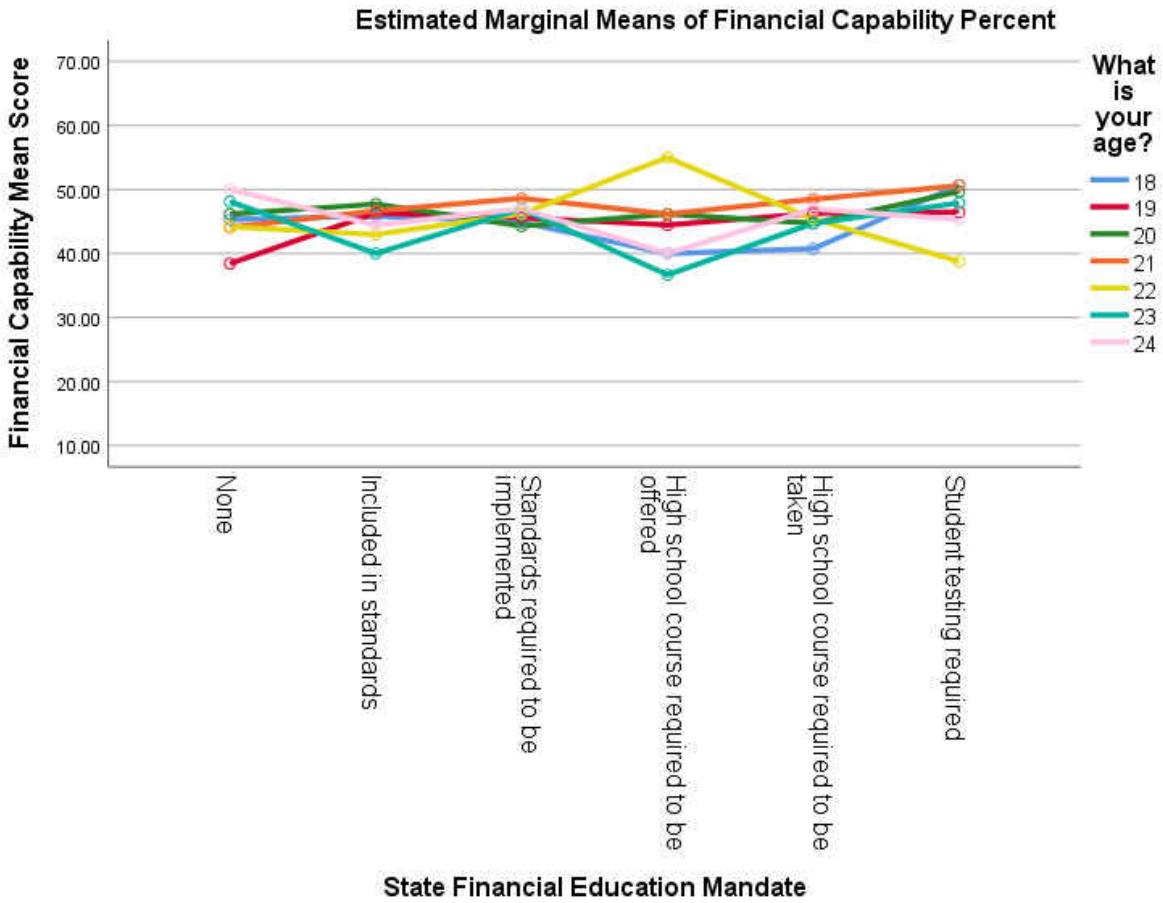


Figure 13 Graph of two-way ANOVA for financial capability and age for 2015

## Two-Way ANOVA: Educational Attainment

A two-way ANOVA investigated whether young adults' financial capability varied according to education mandate, educational attainment, and mandate by educational attainment (interaction effect). For the types of mandates, there were 367 lack of mandate, 453 included in standards, 1264 standards required to be implemented, 72 high school courses required to be offered, 653 high school courses required to be taken, and 239 student testing required. There were 132 respondents who did not complete high school, 803 with a regular high school diploma, 225 with a GED, 1137 with some college but no degree, 261 with an associate's degree, 425 with a bachelor's degree, and 65 with a post-graduate degree. The financial capability mean of those without a high school degree was 38.33, with a standard deviation of 20.23; of those with a regular high school degree was 42.24, with a standard deviation of 23.45; of those with a GED was 40.09, with a standard deviation of 24.60; of those with some college but no degree was 45.75, with a standard deviation of 24.86; of those with an associate's degree was 47.66, with a standard deviation of 27.28; of those with a bachelor's degree was 55.25, with a standard deviation of 27.32; and of those with a post-graduate degree was 58.46, with a standard deviation of 24.83. The descriptive statistics are presented in Table 60.

Table 60

*Descriptive statistics for educational attainment and mandate for capability for 2015*

Educational Attainment	Education Mandate	N	Financial Capability Mean	Standard Deviation
Did not complete high school		132	38.33	20.23
High school graduate - regular		803	42.24	23.45
High school graduate - GED		225	40.09	24.60
Some college, no degree		1137	45.75	24.86
Associate's degree		261	47.66	27.28
Bachelor's degree		425	55.25	27.32
Post-graduate degree		65	58.46	24.83
Education Mandate	None	367	45.83	25.09
	Included in standards	453	44.94	24.50
	Standards required to be implemented	1264	46.26	25.97
	High school course required to be offered	72	43.89	24.35
	High school course required to be taken	653	45.48	25.36
	Student testing required	239	46.95	24.19
Total		3048	45.84	25.33

There was a statistically significant main effect with educational attainment,  $F(6, 3008) = 10.810, p = .000$ , partial eta squared = .021. The significance of the effect was measured by a partial eta squared to determine the size of the effect, which suggested that the practical difference was small. There was not a statistically significant main effect with mandate,  $F(5, 3008) = .189, p = .967$ . There was not a statistically significant interaction between the effects of education level and state financial education mandate on financial capability,  $F(28, 3008) = 1.114, p = .310$ . The results of the two-way ANOVA are provided in Table 61.

Table 61

*Tests of between-subject effects for educational attainment and mandate for capability for 2015*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Educational Attainment	40,119.36	6	6,686.56	10.810	** .000	.021
Education Mandate	584.16	5	116.83	.189	.967	.000
Educational Attainment by Education Mandate	19,287.84	28	688.85	1.114	.310	.010
Error	1,861,266.70	3008	618.56			
Corrected Total	1,956,250.31	3047				

\* $p < .05$ , \*\* $p < .01$

A cross-tabulation is contained in Table 62. The results show each educational attainment level's mean financial capability scores within each education mandate level and indicate that respondents with college degrees generally scored higher than other respondents.

Table 62

*Cross-tabulation of financial capability marginal mean scores by educational attainment for 2015*

Factor	Did not complete high school	High school graduate - regular	High school graduate - GED	Some college, no degree	Associate's degree	Bachelor's degree	Post-graduate degree
No mandate	38.75	41.93	40.00	42.52	53.33	57.81	47.69
Included in standards	41.00	42.31	35.63	47.04	36.13	53.68	75.00
Standards required to be implemented	39.00	41.32	38.978	46.98	49.50	57.09	57.60
High school course required to be offered	N/A	38.89	37.14	39.29	54.00	62.22	N/A
High school course required to be taken	34.19	43.92	42.18	44.33	47.71	51.46	62.22
Student testing required	44.00	44.85	46.36	47.08	43.33	51.85	64.00

The results are presented graphically in Figure 14. They show that, generally, respondents with higher education also had higher financial capability. Additionally, the number of respondents was sometimes low in a particular category, which makes the score appear significant when it is not. For example,  $n = 4$  for respondents with a post-graduate degree for the mandate that financial education be included in standards.

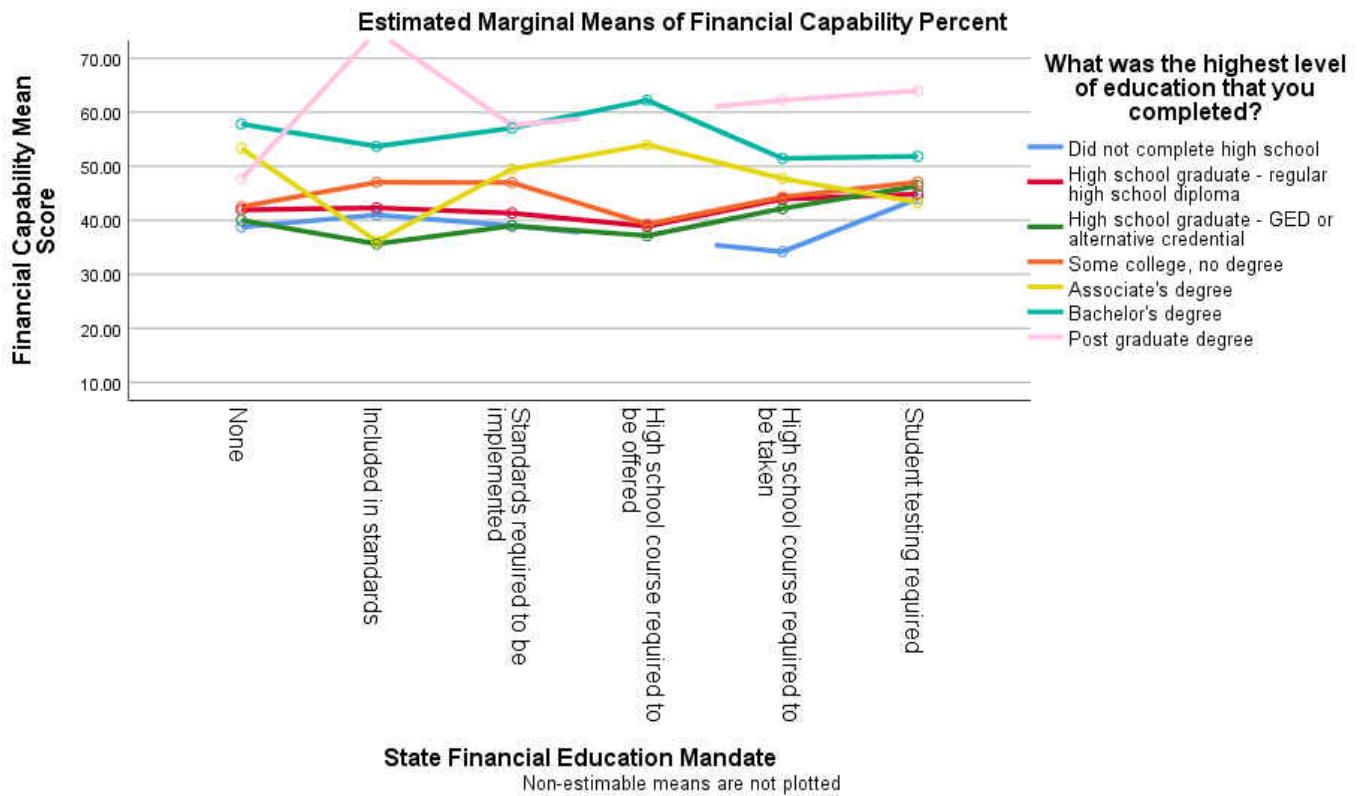


Figure 14 Graph of two-way ANOVA for financial capability and educational attainment for 2015

Because the two-way ANOVA showed a statistically significant difference in the main effect of educational attainment, a test for simple main effects was conducted for all categories. The results indicated that there was a statistically significant difference in mean financial

capability among many different levels of educational attainment. The results are displayed in Table 63.



Table 63

*Significant mean financial capability scores by educational attainment for 2015*

Educational Attainment	Comparison Educational Attainment	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Did not complete high school	Some college, no degree	-7.42	2.29	*.025	.47	14.37
	Associate's degree	-9.33	2.66	**0.009	1.25	17.41
	Bachelor's degree	-16.91	2.48	**0.000	9.38	24.45
	Post-graduate degree	-20.13	3.77	**0.000	8.67	31.59
High school graduate - regular	Some college, no degree	-3.51	1.15	*.046	.03	7.00
	Associate's degree	-5.42	1.77	*.047	.04	10.81
	Bachelor's degree	-13.01	1.49	**0.000	8.47	17.54
	Post-graduate degree	-16.22	3.21	**0.000	6.47	25.97
High school graduate - GED	Some college, no degree	-5.66	1.81	*.038	.15	11.18
	Associate's degree	-7.57	2.26	*.017	.69	14.45
	Bachelor's degree	-15.16	2.05	**0.000	8.92	21.39

	Post-graduate degree	-18.37	3.50	** .000	7.72	29.02
Some college, no degree	Bachelor's degree	-9.50	1.41	** .000	5.20	13.79
	Post-graduate degree	-12.71	3.17	** .001	3.07	22.35
Associate's degree	Bachelor's degree	-7.58	1.96	** .002	1.63	13.53
	Post-graduate degree	-10.80	3.45	* .037	.32	21.28

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\*p < .05, \*\*p < .01

## Two-Way ANOVA: Income

A two-way ANOVA investigated whether young adults' financial capability varied according to education mandate, income, and mandate by income (interaction effect). For the types of mandates, there were 367 lack of mandate, 453 included in standards, 1264 standards required to be implemented, 72 high school courses required to be offered, 653 high school courses required to be taken, and 239 student testing required. There were 963 respondents whose income was less than \$15,000; 516 whose income was \$15,000 to \$25,000; 483 whose income was \$25,000 to \$35,000; 382 whose income was \$35,000 to \$50,000; 356 whose income was \$50,000 to \$75,000; 176 whose income was \$75,000 to \$100,000; 122 whose income was \$100,000 to \$150,000; and 50 whose income was \$150,000 or more. The financial capability mean of those with less than \$15,000 was 41.08, with a standard deviation of 22.09; of those whose income was \$15,000 to \$25,000 was 41.35, with a standard deviation of 25.50; of those whose income was \$25,000 to \$35,000 was 45.26, with a standard deviation of 25.01; of those whose income was \$35,000 to \$50,000 was 47.23, with a standard deviation of 25.76; of those whose income was \$50,000 to \$75,000 was 53.31, with a standard deviation of 26.13; of those whose income was \$75,000 to \$100,000 was 57.05, with a standard deviation of 27.53; of those whose income was \$100,000 to \$150,000 was 57.54, with a standard deviation of 26.92; and of those whose income was \$150,000 or more was 58.00, with a standard deviation of 26.88. The descriptive statistics are presented in Table 64.

Table 64

*Descriptive statistics for income and mandate for capability for 2015*

Income		N	Financial Capability Mean	Standard Deviation
Less than \$15,000		963	41.08	22.09
\$15,000 - \$25,000		516	41.35	25.50
\$25,000 - \$35,000		483	45.26	25.01
\$35,000 - \$50,000		382	47.23	25.76
\$50,000 - \$75,000		356	53.31	26.13
\$75,000 - \$100,000		176	57.05	27.53
\$100,000 - \$150,000		122	57.54	26.92
More than \$150,000		50	58.00	26.88
Education Mandate	None	367	45.83	25.09
	Included in standards	453	44.94	24.50
	Standards required to be implemented	1264	46.26	25.97
	High school course required to be offered	72	43.89	24.35
	High school course required to be taken	653	45.48	25.36
	Student testing required	239	46.95	24.19
Total		3048	45.84	25.33

There was a statistically significant main effect with income,  $F(7, 3001) = 6.293, p = .000$ , partial eta squared = .014. According to the partial eta squared, the practical significance is small. There was not a statistically significant main effect with mandate,  $F(5, 3001) = .532, p = .752$ . There was not a statistically significant interaction between the effects of income and state financial education mandate on financial capability,  $F(34, 3001) = .755, p = .846$ . The results of the two-way ANOVA are provided in Table 65.

Table 65

*Tests of between-subject effects for income and mandate for capability for 2015*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Income	26,995.48	7	3,856.50	6.293	** .000	.014
Education Mandate	1,629.67	5	325.93	.532	.752	.001
Income by Education Mandate	15,728.40	34	462.60	.755	.846	.008
Error	1,839,729.40	3001	612.84			
Corrected Total	1,956,250.31	3047				

\* $p < .05$ , \*\* $p < .01$

A cross-tabulation is contained in Table 66. The results show each income range's mean financial capability scores within each education mandate level, which shows that those with higher incomes generally have higher financial capability scores.

Table 66

*Cross-tabulation of financial capability marginal mean scores by income for 2015*

Factor	Less than \$15,000	\$15,000 - \$25,000	\$25,000 - \$35,000	\$35,000 - \$50,000	\$50,000 - \$75,000	\$75,000 - \$100,000	\$100,000 - \$150,000	More than \$150,000
No mandate	42.52	40.61	48.73	47.84	48.70	51.43	56.92	60.00
Included in standards	42.10	38.24	41.37	44.83	52.73	64.35	50.00	58.18
Standards required to be implemented	40.10	42.20	46.06	47.35	56.40	54.75	58.18	60.00
High school course required to be offered	38.26	43.64	45.56	52.50	48.00	40.00	40.00	N/A
High school course required to be taken	42.07	39.64	44.11	45.88	51.88	59.47	63.64	52.31
Student testing required	40.47	46.98	47.03	52.12	46.67	61.54	60.00	65.00

The results are presented graphically in Figure 15. The graph depicts that respondents with higher incomes generally had higher financial capability scores. Additionally, the number of respondents was sometimes low in a particular category, which makes the score appear significant when it is not. For example,  $n = 1$  for respondents with an income of \$75,000-\$100,000 for the mandate that required a high school course to be offered, and  $n = 1$  for respondents with an income of \$100,000-\$150,000 for the mandate that required a high school course to be offered.

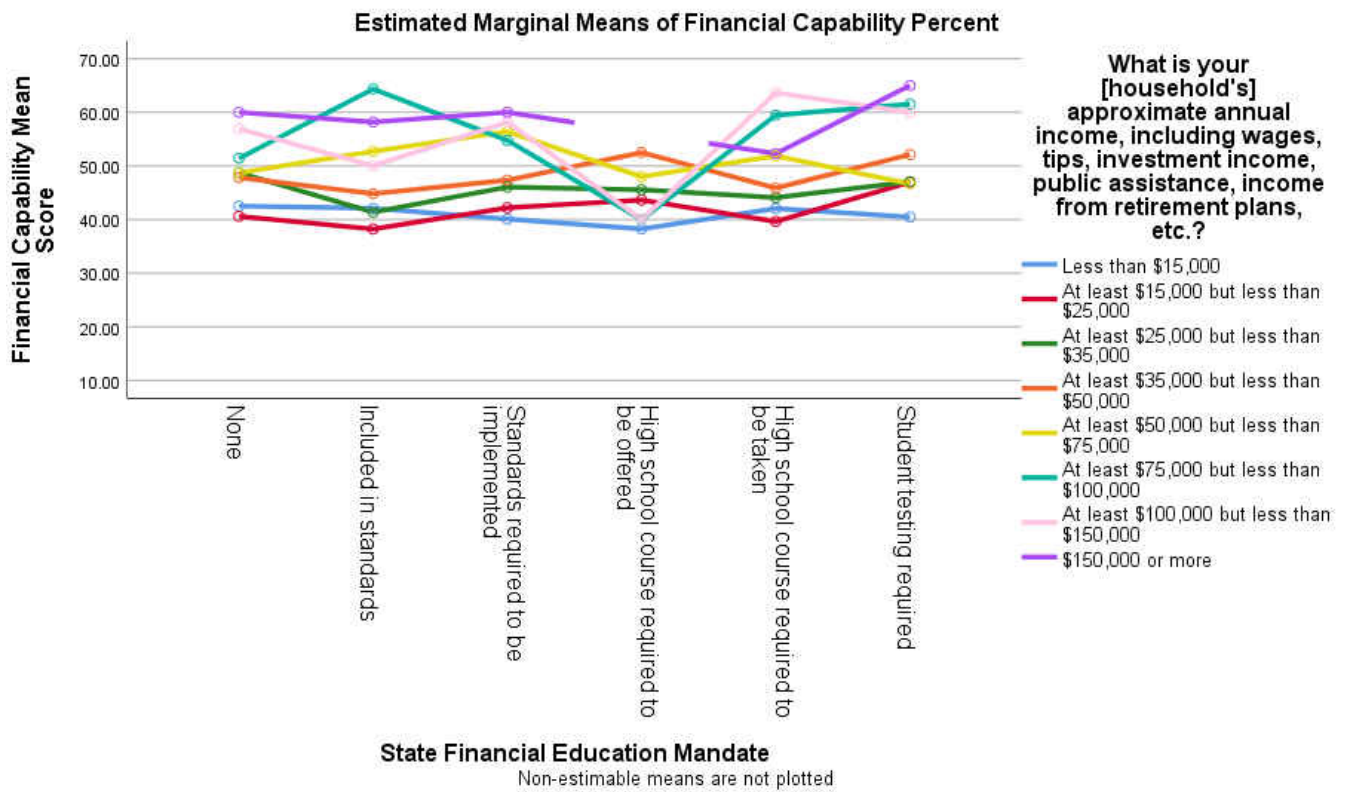


Figure 15 Graph of two-way ANOVA for financial capability and income for 2015

Because the two-way ANOVA showed a statistically significant difference between the incomes, a test for simple main effects was conducted. The results show that respondents with

higher incomes generally had higher financial capability than did respondents with lower incomes.

These results agree with previous literature. Deenanath, Danes, and Jang (2019) found that student behaviors are most strongly influenced by intentional factors, such as student-earned income, which showed a strong relationship to student financial behavior at  $B = 0.74$ . Another study found that young adults with low-income backgrounds or low levels of literacy were less likely to have sound financial footing (Sinha et al., 2018). Additionally, Luksander, Beres, Huzdik, and Nemeth (2014) discovered that, in Hungary, gender, age, and income had a relationship to levels of financial capability.

The mean differences in financial capability scores for the incomes are presented in Table 67.



Table 67

*Significant mean financial capability scores by income for 2015*

Income	Comparison Income	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Less than \$15,000	\$35,000 - \$50,000	-6.15	1.50	** .001	1.47	10.83
	\$50,000 - \$75,000	-12.23	1.54	** .000	7.43	17.04
	\$75,000 - \$100,000	-15.97	2.03	** .000	9.62	22.31
	\$100,000 - \$150,000	-16.46	2.37	** .000	9.02	23.90
	More than \$150,000	-16.92	3.59	** .000	5.69	28.15
\$15,000 - \$25,000	\$35,000 - \$50,000	-5.87	1.67	* .012	.65	11.09
	\$50,000 - \$75,000	-11.96	1.70	** .000	6.63	17.29
	\$75,000 - \$100,000	-15.69	2.16	** .000	8.94	22.45
	\$100,000 - \$150,000	-16.19	2.49	** .000	8.40	23.98
	More than \$150,000	-16.65	3.67	** .000	5.18	28.11
\$25,000 - \$35,000	\$50,000 - \$75,000	-8.06	1.73	** .000	2.65	13.46
	\$75,000 - \$100,000	-11.79	2.18	** .000	4.97	18.60

	\$100,000 - \$150,000	-12.28	2.51	** .000	4.44	20.12
	More than \$150,000	-12.74	3.68	* .015	1.24	24.24
\$35,000 - \$50,000	\$50,000 - \$75,000	-6.09	1.82	* .024	.39	11.79
	\$75,000 - \$100,000	-9.82	2.26	** .000	2.77	16.87
	\$100,000 - \$150,000	-10.32	2.57	** .002	2.27	18.36

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\*p < .05, \*\*p < .01

## 2018 Financial Capability Analysis

Two-way ANOVAs were conducted to determine the significance of the main effects between the type of mandate for financial education and various demographic main effects, and 18-24-year-olds' financial capability.

### Two-Way ANOVA: Gender

A two-way ANOVA investigated whether young adults' financial capability varied according to education mandate, gender, and mandate by gender (interaction effect). For the types of mandates, there were 338 lack of mandate, 435 included in standards, 854 standards required to be implemented, 315 high school courses required to be offered, 667 high school courses required to be taken, and 186 student testing required. There were 1082 males and 1713 females. The financial capability mean of males was 47.43, with a standard deviation of 27.60, while the financial capability mean of females was 44.17, with a standard deviation of 26.77. The descriptive statistics are presented in Table 68.

Table 68

*Descriptive statistics for gender and mandate for capability for 2018*

Gender	Education Mandate	N	Financial Capability Mean	Standard Deviation
Male		1082	47.43	27.60
Female		1713	44.17	26.77
Education Mandate	None	338	46.80	26.77
	Included in standards	435	45.70	26.65
	Standards required to be implemented	854	44.85	26.62
	High school course required to be offered	315	44.89	27.79
	High school course required to be taken	667	44.95	27.62
	Student testing required	186	47.63	28.51
Total		2795	45.43	27.13

There was a statistically significant main effect with gender,  $F(1, 2783) = 5.789, p = .016$ , partial eta squared = .002. The significance of the effect was measured by a partial eta squared to determine the size of the effect, which suggested that the practical difference was small. There was not a statistically significant main effect with mandate,  $F(5, 2783) = .302, p = .912$ . There was not a statistically significant interaction between the effects of gender and state financial education mandate on financial capability,  $F(5, 2783) = 1.265, p = .276$ . The results of the two-way ANOVA are provided in Table 69.

Table 69

*Tests of between-subject effects for gender and education mandate for capability for 2018*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Gender	4,250.51	1	4,250.51	5.789	*.016	.002
Education Mandate	1,109.32	5	221.86	.302	.912	.001
Gender by Education Mandate	4,643.51	5	928.70	1.265	.276	.002
Error	2,043,501.84	2783	734.28			
Corrected Total	2,057,155.49	2794				

\*p < .05, \*\*p < .01

A cross-tabulation is contained in Table 70. The results show each gender’s mean financial capability scores within each education mandate level, which shows that males generally scored higher than females.

Table 70

*Cross-tabulation of financial capability marginal mean scores by gender for 2018*

Factor	Male	Female
No mandate	44.63	48.02
Included in standards	48.19	44.09
Standards required to be implemented	47.24	43.39
High school course required to be offered	49.22	42.40
High school course required to be taken	47.27	43.42
Student testing required	48.64	46.73

The results are presented graphically in Figure 16. The graph shows that males generally have a higher financial capability mean score.

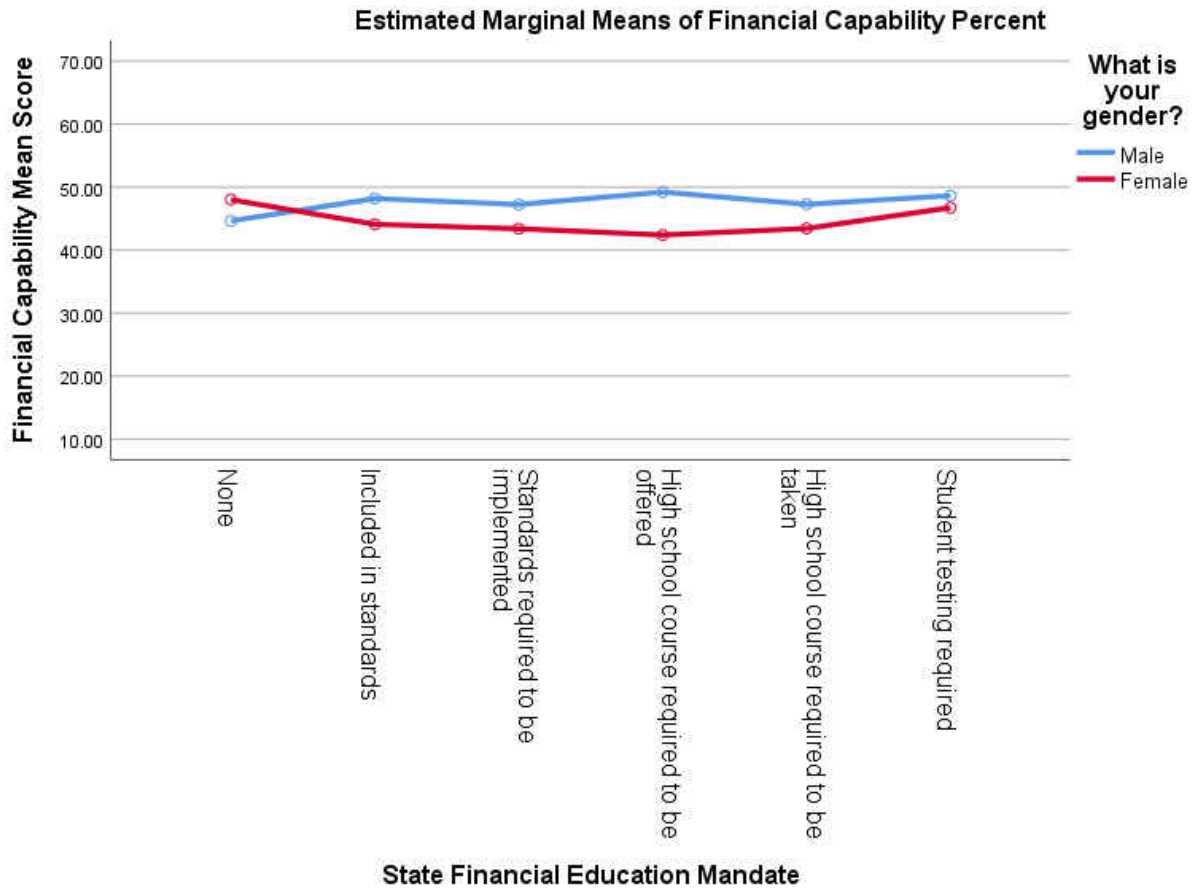


Figure 16 Graph of two-way ANOVA for financial capability and gender for 2018

Because the two-way ANOVA showed a statistically significant difference in the main effect between genders, a test for simple main effects was conducted. For males and females from a state where standards were required to be implemented, mean financial capability scores were 3.86 points, 95% CI [.11, 7.60], higher for males than females. For males and females from a state where a high school course was required to be offered, mean financial capability scores were 6.82 points, 95% CI [.60, 13.04], higher for males than females.

These results align with previous research. After controlling for variables in education and other student characteristics, researchers determined that parents have an influence on financial literacy, with a preference for ensuring male children have stronger financial capability (Chambers et al., 2019). Sinha, Tan, and Zhan (2018) analyzed data from a national survey to identify characteristics of young adults that correlate to their financial behaviors. While researching relationships among demographics, one study found that young adults who identified as females were less likely to have sound financial footing (Sinha et al., 2018).

The mean differences in financial capability mean scores for genders are presented in Table 71.

Table 71

*Significant mean financial capability scores by males and females for 2018*

Education Mandate	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Standards required to be implemented	3.86	1.91	*.044	.11	7.60
High school course required to be offered	6.82	3.17	*.032	.60	13.04

\*p < .05, \*\*p < .01



### Two-Way ANOVA: Ethnicity

A two-way ANOVA investigated whether young adults' financial capability varied according to education mandate, ethnicity, and mandate by ethnicity (interaction effect). For the types of mandates, there were 338 lack of mandate, 435 included in standards, 854 standards required to be implemented, 315 high school courses required to be offered, 667 high school courses required to be taken, and 186 student testing required. There were 1685 white respondents, 394 black respondents, 431 Hispanic respondents, 165 Asian respondents, and 120 other respondents. The financial capability mean of whites was 46.86, with a standard deviation of 27.11; the financial capability mean of blacks was 41.37, with a standard deviation of 27.91; the financial capability mean of Hispanics was 42.41, with a standard deviation of 26.51; the financial capability mean of Asians was 40.09, with a standard deviation of 25.32; and the financial capability mean of others was 44.50, with a standard deviation of 27.50. The descriptive statistics are presented in Table 72.

Table 72

*Descriptive statistics for ethnicity and mandate for capability for 2018*

Ethnicity	Education Mandate	N	Financial Capability Mean	Standard Deviation
White		1685	46.86	27.11
Black		394	41.37	27.91
Hispanic		431	42.41	26.51
Asian		165	40.09	25.32
Other		120	44.50	27.50
Education Mandate	None	338	46.80	26.77
	Included in standards	435	45.70	26.65
	Standards required to be implemented	854	44.85	26.62
	High school course required to be offered	315	44.89	27.79
	High school course required to be taken	667	44.95	27.62
	Student testing required	186	47.63	28.51
Total		2795	45.43	27.13

There was a statistically significant main effect with ethnicity,  $F(4, 2765) = 6.342, p = .000$ , partial eta squared = .001. The significance was measured by a partial eta squared to determine the size of the effect, which suggested that the practical difference was small. There was not a statistically significant main effect with mandate,  $F(5, 2765) = .610, p = .692$ . There was not a statistically significant interaction between the effects of ethnicity and state financial education mandate on financial capability,  $F(20, 2765) = .571, p = .934$ . The results of the two-way ANOVA are provided in Table 73.

Table 73

*Tests of between-subject effects for ethnicity and mandate for capability for 2018*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Ethnicity	18,614.86	4	4,653.72	6.342	** .000	.001
Education Mandate	2,239.59	5	447.92	.610	.692	.001
Ethnicity by Education Mandate	8,378.38	20	418.92	.571	.934	.004
Error	2,029,082.39	2765	733.85			
Corrected Total	2,057,155.49	2794				

\* $p < .05$ , \*\* $p < .01$

A cross-tabulation is contained in Table 74. The results show each ethnicity’s mean financial capability scores within each education mandate level and indicate that white and Asian respondents generally had higher scores than other ethnicities.

Table 74

*Cross-tabulation of financial capability marginal mean scores by ethnicity for 2018*

Factor	White	Black	Hispanic	Asian	Other
No mandate	49.41	42.86	39.72	54.59	47.41
Included in standards	46.79	40.00	43.44	52.50	43.33
Standards required to be implemented	46.38	38.51	42.76	44.58	44.80
High school course required to be offered	47.02	37.95	41.76	46.15	40.95
High school course required to be taken	45.17	43.93	43.54	49.38	45.00
Student testing required	53.03	42.55	42.00	45.45	40.00

The results are presented graphically in Figure 17. The graph shows that white and Asian respondents generally have higher mean financial capability scores than black and Hispanic respondents, regardless of education mandate.

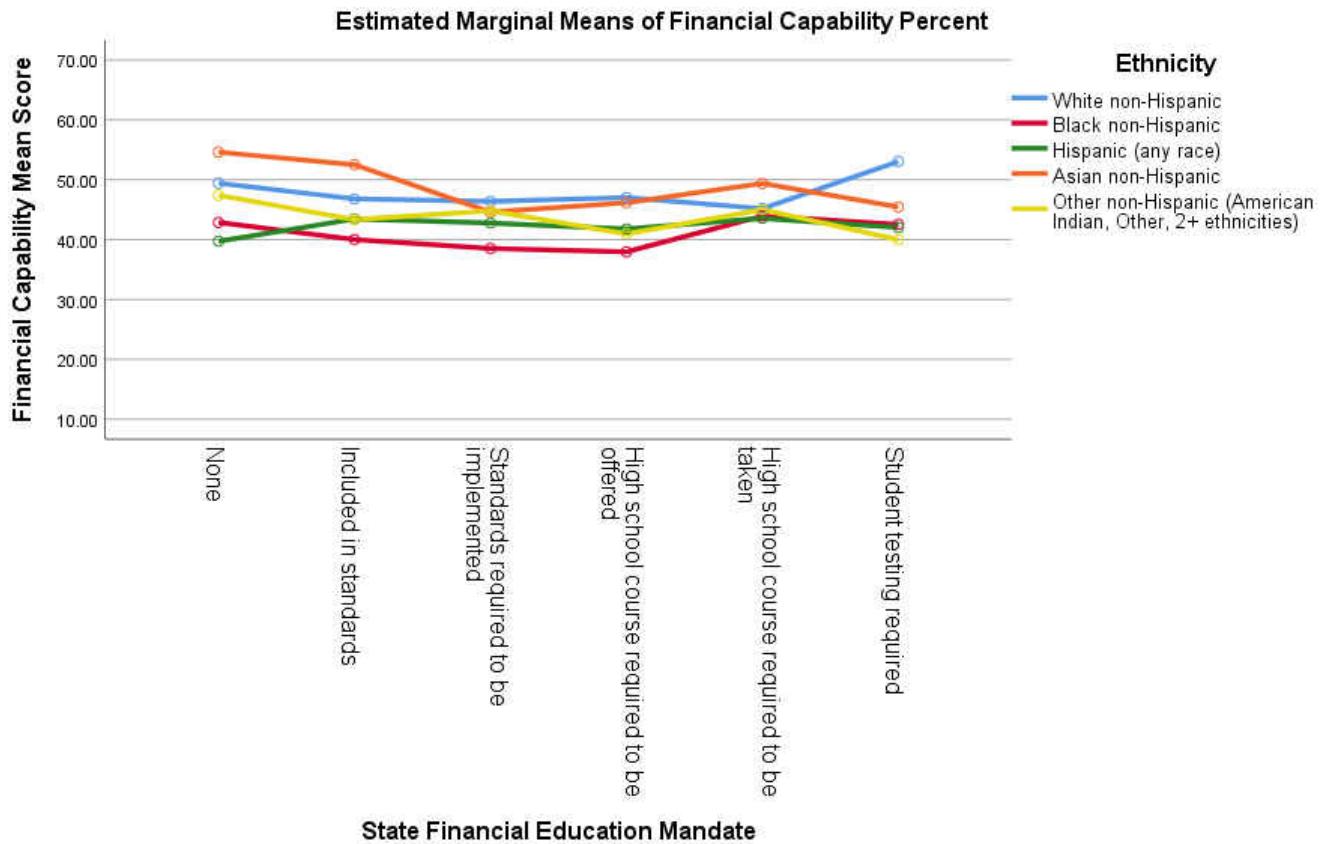


Figure 17 Graph of two-way ANOVA for financial capability and ethnicity for 2018

Because the two-way ANOVA showed a statistically significant difference between the ethnicities, a test for simple main effects was conducted for all categories. For whites and blacks, mean financial capability scores were 5.49 points, 95% CI [1.23, 9.75], higher for whites than blacks. For whites and Hispanics, mean financial capability scores were 4.45 points, 95%

CI [.34, 8.56], higher for whites than Hispanics. For Asians and blacks, mean financial capability scores were 7.72 points, 95% CI [.66, 14.78], higher for Asians than blacks.

These results align with previous research. Influential factors that were considered moderator variables include demographics such as ethnicity and socioeconomic status (Sinha et al., 2018). The mean differences in financial capability mean scores for ethnicity are presented in Table 75.

Table 75

*Significant mean financial capability scores by ethnicities for 2018*

Ethnicity	Comparison Ethnicity	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
White	Black	5.49	1.52	** .003	1.23	9.75
	Hispanic	4.45	1.46	* .024	.34	8.56
Asian	Black	7.72	2.51	* .021	.66	14.78

\*p < .05, \*\*p < .01

### Two-Way ANOVA: Age

A two-way ANOVA investigated whether young adults' financial capability varied according to education mandate, age, and mandate by age (interaction effect). For the types of mandates, there were 338 lack of mandate, 435 included in standards, 854 standards required to be implemented, 315 high school courses required to be offered, 667 high school courses required to be taken, and 186 student testing required. There were 309 18-year-olds, 337 19-year-olds, 339 20-year-olds, 407 21-year-olds, 424 22-year-olds, 457 23-year-olds, and 522 24-year-olds. The financial capability mean of 18-year-olds was 42.46, with a standard deviation of 26.07; the financial capability mean of 19-year-olds was 47.83, with a standard deviation of 26.33; the financial capability mean of 20-year-olds was 43.78, with a standard deviation of 26.82; the financial capability mean of 21-year-olds was 43.93, with a standard deviation of 26.12; the financial capability mean of 22-year-olds was 47.50, with a standard deviation of 26.92; the financial capability mean of 23-year-olds was 45.69, with a standard deviation of 28.14; and the financial capability mean of 24-year-olds was 46.13, with a standard deviation of 28.35. The descriptive statistics are presented in Table 76.

Table 76

*Descriptive statistics for age and mandate for capability for 2018*

Age	Education Mandate	N	Financial Capability Mean	Standard Deviation
18		309	42.46	26.07
19		337	47.83	26.33
20		339	43.78	26.82
21		407	43.93	26.12
22		424	47.50	26.92
23		457	45.69	28.14
24		522	46.13	28.35
Education Mandate	None	338	46.80	26.77
	Included in standards	435	45.70	26.65
	Standards required to be implemented	854	44.85	26.62
	High school course required to be offered	315	44.89	27.79
	High school course required to be taken	667	44.95	27.62
	Student testing required	186	47.63	28.51
Total		2795	45.43	27.13



There was not a statistically significant main effect with age,  $F(6, 2753) = 1.113, p = .352$ . There was not a statistically significant main effect with mandate,  $F(5, 2753) = .433, p = .826$ . There was not a statistically significant interaction between the effects of age and state financial education mandate on financial capability,  $F(30, 2753) = 1.047, p = .396$ . The results of the two-way ANOVA are provided in Table 77.

Table 77

*Tests of between-subject effects for age and mandate for capability for 2018*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Age	4,907.54	6	817.92	1.113	.352	.002
Education Mandate	1,591.82	5	318.37	.433	.826	.001
Age by Education Mandate	23,090.68	30	769.69	1.047	.396	.011
Error	2,023,498.76	2753	735.02			
Corrected Total	2,057,155.49	2794				

\* $p < .05$ , \*\* $p < .01$

A cross-tabulation is contained in Table 78. The results show each age's mean financial capability scores within each education mandate level and indicate that there was not a consistent difference by age.

Table 78

*Cross-tabulation of financial capability marginal mean scores by age for 2018*

Factor	18	19	20	21	22	23	24
No mandate	47.32	48.11	46.98	44.21	45.58	47.37	48.33
Included in standards	44.39	51.30	42.46	47.38	42.28	47.35	46.08
Standards required to be implemented	36.45	51.52	46.92	42.56	47.63	43.26	45.88
High school course required to be offered	46.88	45.79	39.47	45.42	48.98	42.31	45.17
High school course required to be taken	45.07	44.12	40.80	41.86	51.11	47.77	43.05
Student testing required	44.76	43.00	43.64	45.38	47.50	47.50	55.12

The results are presented graphically in Figure 18. The graph shows that there is no significant difference in mean financial capability scores across age or education mandate.

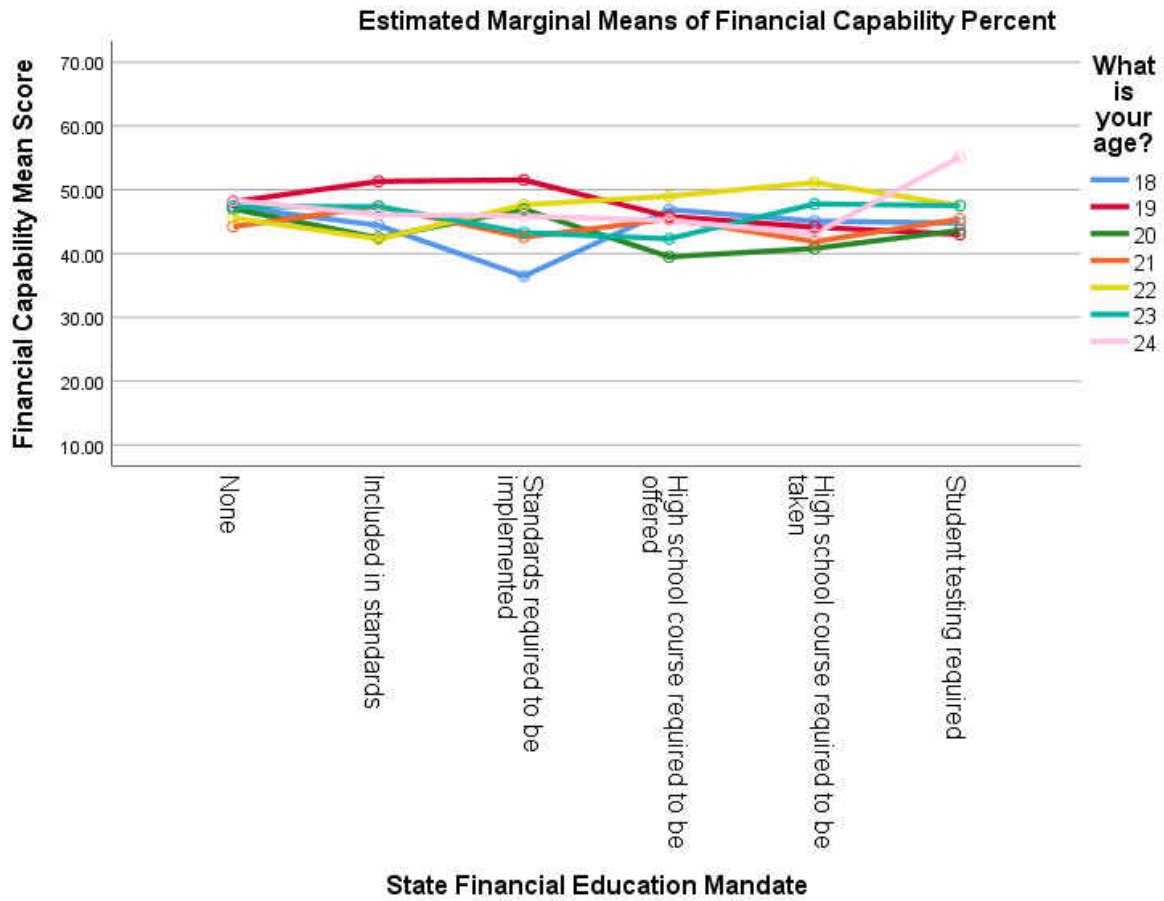


Figure 18 Graph of two-way ANOVA for financial capability and age for 2018

## Two-Way ANOVA: Educational Attainment

A two-way ANOVA investigated whether young adults' financial capability varied according to education mandate, educational attainment, and mandate by educational attainment (interaction effect). For the types of mandates, there were 338 lack of mandate, 435 included in standards, 854 standards required to be implemented, 315 high school courses required to be offered, 667 high school courses required to be taken, and 186 student testing required. There were 156 respondents who did not complete high school, 688 with a regular high school diploma, 230 with a GED, 959 with some college but no degree, 188 with an associate's degree, 491 with a bachelor's degree, and 83 with a post-graduate degree. The financial capability mean of those without a high school degree was 33.97, with a standard deviation of 22.77; of those with a regular high school degree was 39.88, with a standard deviation of 24.34; of those with a GED was 37.48, with a standard deviation of 25.54; of those with some college but no degree was 45.21, with a standard deviation of 27.19; of those with an associate's degree was 46.17, with a standard deviation of 26.89; of those with a bachelor's degree was 59.06, with a standard deviation of 27.10; and of those with a post-graduate degree was 55.18, with a standard deviation of 27.13. The descriptive statistics are presented in Table 79.

Table 79

*Descriptive statistics for educational attainment and mandate for capability for 2018*

Educational Attainment	Education Mandate	N	Financial Capability Mean	Standard Deviation
Did not complete high school		156	33.97	22.77
High school graduate - regular		688	39.88	24.34
High school graduate - GED		230	37.48	25.54
Some college, no degree		959	45.21	27.19
Associate's degree		188	46.17	26.89
Bachelor's degree		491	59.06	27.10
Post-graduate degree		83	55.18	27.34
Education Mandate	None	338	46.80	26.77
	Included in standards	435	45.70	26.65
	Standards required to be implemented	854	44.85	26.62
	High school course required to be offered	315	44.89	27.79
	High school course required to be taken	667	44.95	27.62
	Student testing required	186	47.63	28.51
Total		2795	45.43	27.13

There was a statistically significant main effect with educational attainment,  $F(6, 2753) = 27.234, p = .000$ , partial eta squared = .056. The significance of the effect was measured by a partial eta squared to determine the size of the effect, which suggested that the practical difference was small. There was not a statistically significant main effect with mandate,  $F(5, 2753) = 1.747, p = .121$ . There was a statistically significant interaction between the effects of education level and state financial education mandate on financial capability,  $F(30, 2753) = 1.578, p = .024$ , partial eta squared = .017. The partial eta squared suggested that the practical difference was small. The results of the two-way ANOVA are provided in Table 80.

Table 80

*Tests of between-subject effects for educational attainment and mandate for capability for 2018*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Educational Attainment	110,860.84	6	18,476.81	27.234	** .000	.056
Education Mandate	5,926.21	5	1,185.24	1.747	.121	.003
Educational Attainment by Education Mandate	32,119.78	30	1070.66	1.578	*.024	.017
Error	1,867,792.63	2753	678.46			
Corrected Total	2,057,155.49	2794				

\* $p < .05$ , \*\* $p < .01$

A cross-tabulation is contained in Table 81. The results show each educational attainment level's mean financial capability scores within each education mandate level and indicate that respondents with bachelor's degrees generally scored higher than other respondents.

Table 81

*Cross-tabulation of financial capability marginal mean scores by educational attainment for 2018*

Factor	Did not complete high school	High school graduate - regular	High school graduate - GED	Some college, no degree	Associate's degree	Bachelor's degree	Post-graduate degree
No mandate	45.71	42.61	32.22	44.31	52.31	50.75	73.33
Included in standards	38.62	38.57	36.00	45.61	52.00	60.00	42.00
Standards required to be implemented	29.13	38.17	40.29	46.71	39.68	60.70	49.57
High school course required to be offered	33.33	39.69	35.17	43.97	49.57	58.89	50.00
High school course required to be taken	30.00	40.12	40.00	44.10	45.91	61.87	50.00
Student testing required	44.00	46.40	30.43	45.66	50.77	61.54	65.46

The results are presented graphically in Figure 19. The graph shows that respondents with bachelor's degrees generally have a higher financial capability mean score than those with lower levels of educational attainment.

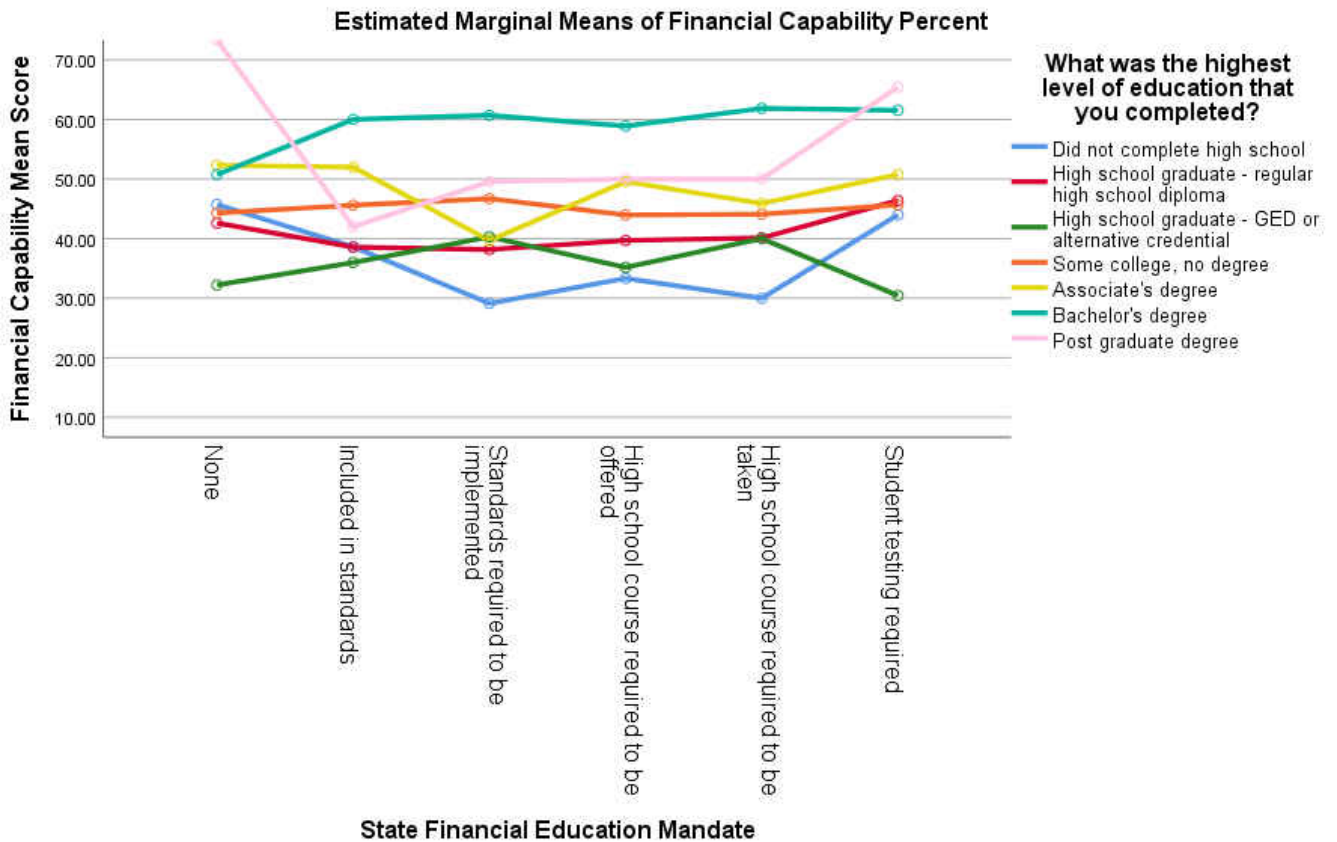


Figure 19 Graph of two-way ANOVA for financial capability and educational attainment for 2018

Because the two-way ANOVA showed a statistically significant difference between some educational attainment levels as well as for an interaction effect between educational attainment and education mandate, a test for simple main effects was conducted. The results indicated that there was a statistically significant difference in mean financial capability among many different levels of educational attainment. The results are displayed in Table 82.



Table 82

*Significant mean financial capability scores by educational attainment for 2018*

Educational Attainment	Comparison Educational Attainment	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Did not complete high school	Some college, no degree	-11.24	2.25	** .000	4.40	18.08
	Associate's degree	-12.20	2.82	** .000	3.62	20.77
	Bachelor's degree	-25.09	2.39	** .000	17.81	32.37
	Post-graduate degree	-21.21	3.54	** .000	10.45	31.97
High school graduate - regular	Some college, no degree	-5.33	1.30	** .001	1.37	9.29
	Bachelor's degree	-19.18	1.54	** .000	14.50	23.86
	Post-graduate degree	-15.30	3.03	** .000	6.09	24.50
High school graduate - GED	Some college, no degree	-7.74	1.91	** .001	1.92	13.55
	Bachelor's degree	-21.58	2.08	** .000	15.26	27.91
	Post-graduate degree	-17.70	3.34	** .000	7.56	27.84

Some college, no degree	Bachelor's degree	-13.85	1.45	** .000	9.45	18.24
	Post-graduate degree	-9.97	2.98	* .018	.90	19.03
Associate's degree	Bachelor's degree	-12.89	2.23	** .000	6.10	19.69

---

\*p < .05, \*\*p < .01

The results for the interaction effect indicated that there was a statistically significant difference in mean financial capability scores between respondents with post graduate degrees from states with no financial education mandate and those from states that included financial education in the standards. For respondents with a post graduate degree, mean financial capability scores were 31.33 points, 95% CI [.09, 62.57], higher for those from states with no financial education mandate than those from states that included financial education in the standards.

These results align with the literature. Shim, Barber, Card, Xiao, and Serido (2009) conducted a cross-sectional study that found that both parental financial socialization and formal education impacted young adults' attitudes toward finances; this attitude then impacted the subjects' actions. Another study found that those who had not completed high school showed only a 0.29 correlation to being financially stable while those who had at least some college education showed a 0.50 correlation to being financially stable (Sinha et al., 2018). Other research, such as that of Chen and Volpe (2002), Robb and Sharpe (2009), and Robb (2011), reported similar results.

The mean difference in financial capability scores for educational attainment by financial mandate is presented in Table 83.

Table 83

*Mean financial capability scores by education mandate and educational attainment for 2018*

Education Mandate	Educational Attainment	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Lower Bound
None and Included in standards	Post graduate degree	31.33	10.63	*.049	.09	62.57

\*p < .05, \*\*p < .01

### Two-Way ANOVA: Income

A two-way ANOVA investigated whether young adults' financial capability varied according to education mandate, income, and mandate by income (interaction effect). For the types of mandates, there were 338 lack of mandate, 435 included in standards, 854 standards required to be implemented, 315 high school courses required to be offered, 667 high school courses required to be taken, and 186 student testing required. There were 836 respondents whose income was less than \$15,000; 448 whose income was \$15,000 to \$25,000; 363 whose income was \$25,000 to \$35,000; 399 whose income was \$35,000 to \$50,000; 373 whose income was \$50,000 to \$75,000; 192 whose income was \$75,000 to \$100,000; 124 whose income was \$100,000 to \$150,000; and 60 whose income was \$150,000 or more. The financial capability mean of those with less than \$15,000 was 39.64, with a standard deviation of 23.08; of those whose income was \$15,000 to \$25,000 was 40.40, with a standard deviation of 25.47; of those whose income was \$25,000 to \$35,000 was 42.92, with a standard deviation of 27.60; of those whose income was \$35,000 to \$50,000 was 46.51, with a standard deviation of 28.60; of those whose income was \$50,000 to \$75,000 was 53.94, with a standard deviation of 27.84; of those whose income was \$75,000 to \$100,000 was 52.92, with a standard deviation of 27.68; of those whose income was \$100,000 to \$150,000 was 60.65, with a standard deviation of 26.62; and of those whose income was \$150,000 or more was 63.33, with a standard deviation of 27.10. The descriptive statistics are presented in Table 84.

Table 84

*Descriptive statistics for income and mandate for capability for 2018*

Income	Education Mandate	N	Financial Capability Mean	Standard Deviation
Less than \$15,000		836	39.64	23.08
\$15,000 - \$25,000		448	40.40	25.47
\$25,000 - \$35,000		363	42.92	27.60
\$35,000 - \$50,000		399	46.51	28.60
\$50,000 - \$75,000		373	53.94	27.84
\$75,000 - \$100,000		192	52.92	27.68
\$100,000 - \$150,000		124	60.65	26.62
More than \$150,000		60	63.33	27.10
Education Mandate	None	338	46.80	26.77
	Included in standards	435	45.70	26.65
	Standards required to be implemented	854	44.85	26.62
	High school course required to be offered	315	44.89	27.79
	High school course required to be taken	667	44.95	27.62
	Student testing required	186	47.63	28.51
Total		2795	45.45	27.13

There was a statistically significant main effect with income,  $F(7, 2747) = 22.585, p = .000$ , partial eta squared = .054. The significance of the effect was measured by a partial eta squared to determine the size of the effect, which suggested that the practical difference was small. There was not a statistically significant main effect with mandate,  $F(5, 2747) = 1.396, p = .223$ . There was not a statistically significant interaction between the effects of income and state financial education mandate on financial capability,  $F(35, 2747) = 1.117, p = .293$ . The results of the two-way ANOVA are provided in Table 85.

Table 85

*Tests of between-subject effects for income and mandate for capability for 2018*

	Type III Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Income	109,383.04	7	15,626.15	22.585	** .000	.054
Education Mandate	4,828.84	5	965.77	1.396	.223	.003
Income by Education Mandate	27,039.76	35	772.56	1.117	.293	.014
Error	1,900,559.20	2747	691.87			
Corrected Total	2,057,155.49	2794				

\* $p < .05$ , \*\* $p < .01$

A cross-tabulation is contained in Table 86. The results show each income range’s mean financial capability scores within each education mandate level, which does not show a clear difference in each group’s scores by mandate but does show a difference within each income level.

Table 86

*Cross-tabulation of financial capability marginal mean scores by income for 2018*

Factor	Less than \$15,000	\$15,000 - \$25,000	\$25,000 - \$35,000	\$35,000 - \$50,000	\$50,000 - \$75,000	\$75,000 - \$100,000	\$100,000 - \$150,000	More than \$150,000
No mandate	45.05	38.87	41.90	44.65	56.96	49.66	56.19	76.00
Included in standards	38.99	41.75	36.17	52.45	59.05	48.00	60.00	61.54
Standards required to be implemented	39.67	39.17	43.78	44.62	52.46	53.33	59.53	53.85
High school course required to be offered	38.37	45.07	36.84	42.29	51.60	60.00	65.00	54.29
High school course required to be taken	38.51	39.24	45.32	47.48	51.69	51.43	61.67	68.24
Student testing required	37.88	37.27	60.00	48.39	53.91	60.00	70.00	76.00

The results are presented graphically in Figure 20. The graph shows that higher income levels tend to have higher financial capability scores. Additionally, the number of respondents was sometimes low in a particular category, which makes the score appear significant when it is not. For example,  $n = 5$  for respondents with an income of \$50,000 or more for no mandate and for student testing required.

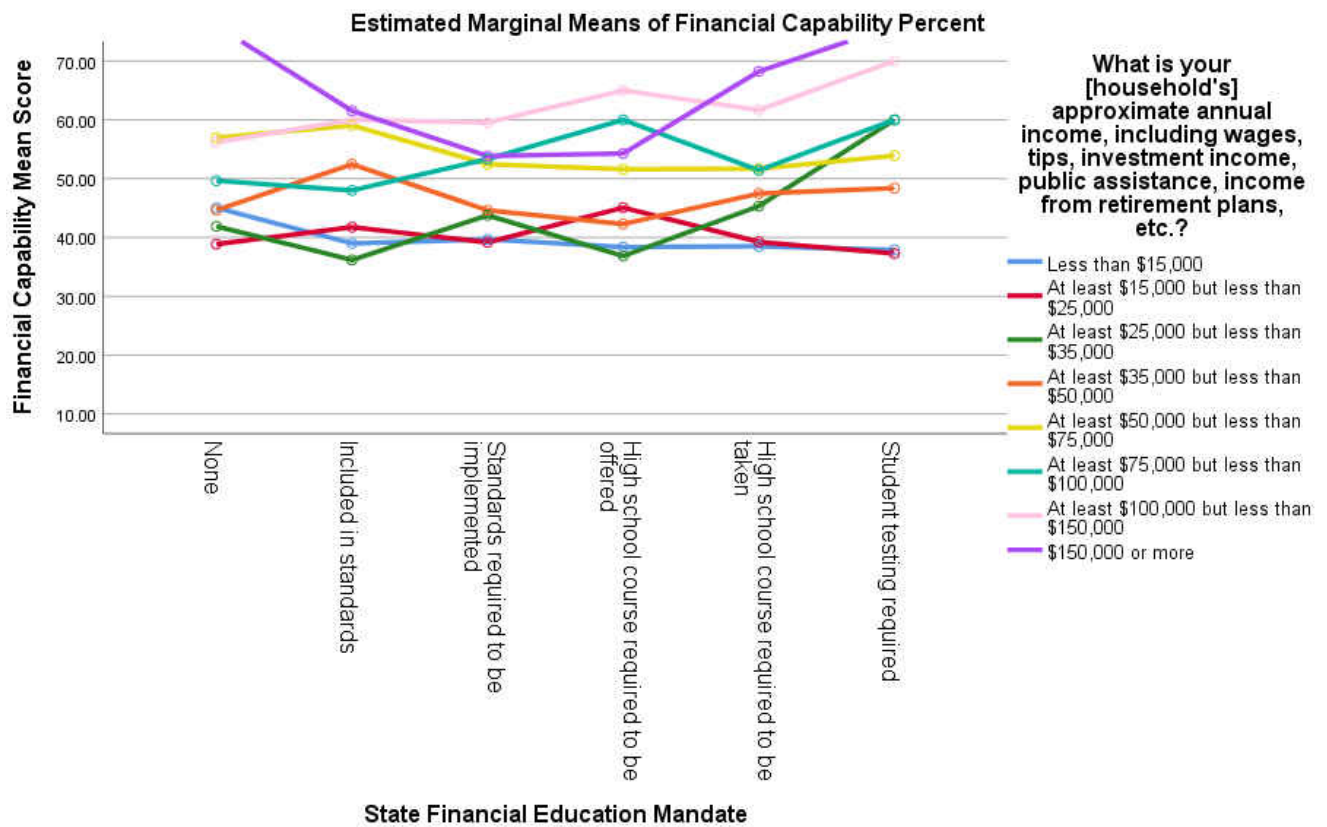


Figure 20 Graph of two-way ANOVA for financial capability and income for 2018

Because the two-way ANOVA showed a statistically significant difference for the main effect of income, a test for simple main effects was conducted. There are many relationships among differing income levels, with higher income levels having higher financial capability scores.



These results agree with previous literature. Deenanath, Danes, and Jang (2019) found that student behaviors are most strongly influenced by intentional factors, such as student-earned income, which showed a strong relationship to student financial behavior at  $B = 0.74$ . Another study found that young adults with low-income backgrounds or low levels of literacy were less likely to have sound financial footing (Sinha et al., 2018). Additionally, Luksander, Beres, Huzdik, and Nemeth (2014) discovered that, in Hungary, gender, age, and income had a relationship to levels of financial literacy.

The mean differences in financial capability scores for the incomes are presented in Table 87.

Table 87

*Significant mean financial capability scores by income for 2018*

Income	Comparison Income	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Less than \$15,000	\$35,000 - \$50,000	-6.88	1.60	** .001	1.87	11.88
	\$50,000 - \$75,000	-14.30	1.64	** .000	9.18	19.42
	\$75,000 - \$100,000	-13.28	2.11	** .000	6.69	19.86
	\$100,000 - \$150,000	-21.00	2.53	** .000	13.09	28.92
	More than \$150,000	-23.69	3.52	** .000	12.70	34.68
\$15,000 - \$25,000	\$35,000 - \$50,000	-6.11	1.81	* .021	.45	11.78
	\$50,000 - \$75,000	-13.54	1.84	** .000	7.77	19.34
	\$75,000 - \$100,000	-12.51	2.27	** .000	5.42	19.61
	\$100,000 - \$150,000	-20.24	2.67	** .000	11.90	28.59
	More than \$150,000	-22.93	3.62	** .000	11.63	34.24
\$25,000 - \$35,000	\$50,000 - \$75,000	-11.02	1.94	** .000	4.96	17.08
	\$75,000 - \$100,000	-10.00	2.35	** .001	2.66	17.34

	\$100,000 - \$150,000	-17.73	2.74	** .000	9.17	26.28
	More than \$150,000	-20.41	2.74	** .000	8.95	31.88
\$35,000 - \$50,000	\$50,000 - \$75,000	-7.42	1.89	* .003	1.50	13.35
	\$100,000 - \$150,000	-14.13	2.70	** .000	5.67	22.58
	More than \$150,000	-16.82	3.64	** .000	5.43	28.21

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\*p < .05, \*\*p < .01

## Summary of Capability Findings

A summary of significant findings concerning financial capability is provided in Table 88. Though the practical significance is small, the results do show a significant difference between the factors.

Table 88

*Summary of significant findings about financial capability*

Year	Factor	Significance	Partial eta squared
2015	Gender by Education Mandate	*.019	.004
	Ethnicity	**.001	.006
	Educational Attainment	**.000	.021
	Income	**.000	.014
2018	Gender	*.016	.002
	Ethnicity	**.000	.001
	Educational Attainment	**.000	.056
	Educational Attainment by Education Mandate	*.024	.017
	Income	**.000	.054

\*p < .05, \*\*p < .01

### Results: Research Question 3 - Changes Over Time

*What trends in these relationships, between financial education and financial literacy and capability, are observable over time?*

This question was analyzed first for the data from the 2015 FINRA study and the 2011 CEE Survey of the States, then for the data from the 2018 FINRA study and the 2014 CEE Survey of the States. To answer this question, a one-way ANOVA provided visual comparison. According to this comparison, there has not been much change in 18-24-year-olds' financial literacy and financial capability between 2015 and 2018. This may be due to the differences in implementation through different districts and schools within a state, as well as a result of various factors that are beyond the school's control, such as family and other factors. Additionally, the ways that financial education was delivered may not have changed over the years, which would produce similar results across each study.

The results of the relationship between state mandates and financial literacy in 2015 and 2018 are presented graphically in Figure 21. The graph depicts little difference in the scores across educational mandates.

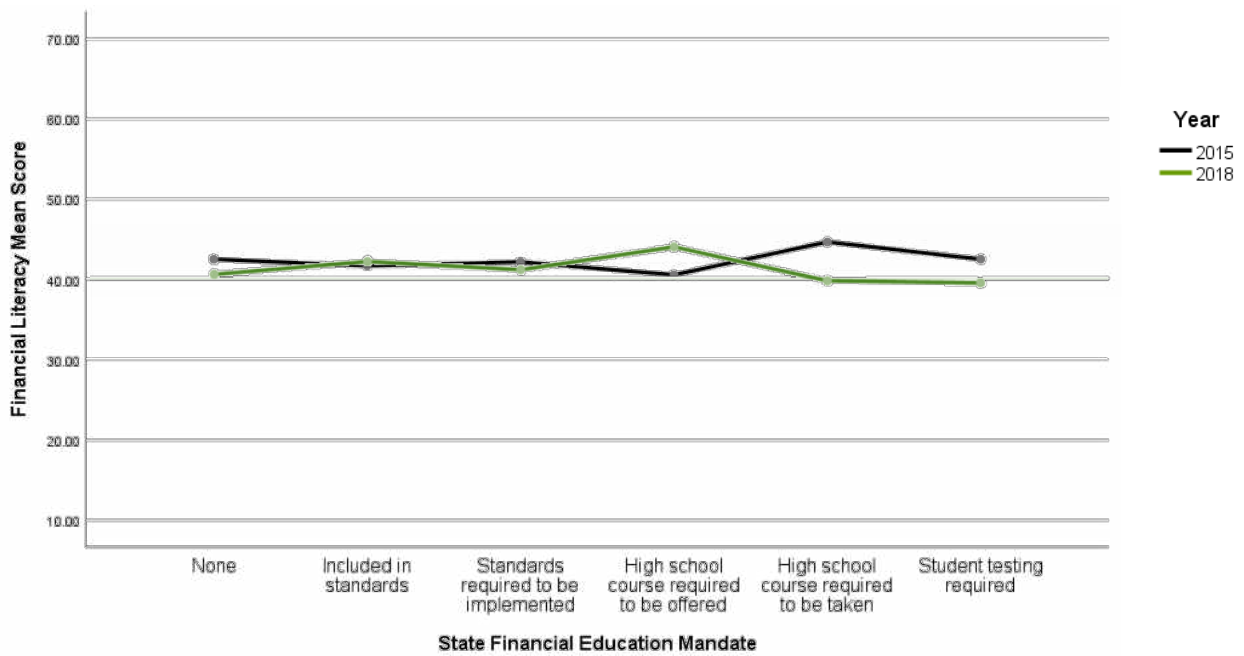


Figure 21 Graph of one-way ANOVA for financial literacy for 2015 and 2018

The results of the relationship between state mandates and financial capability in 2015 and 2018 are presented graphically in Figure 22. The graph depicts little difference in the scores across educational mandates.

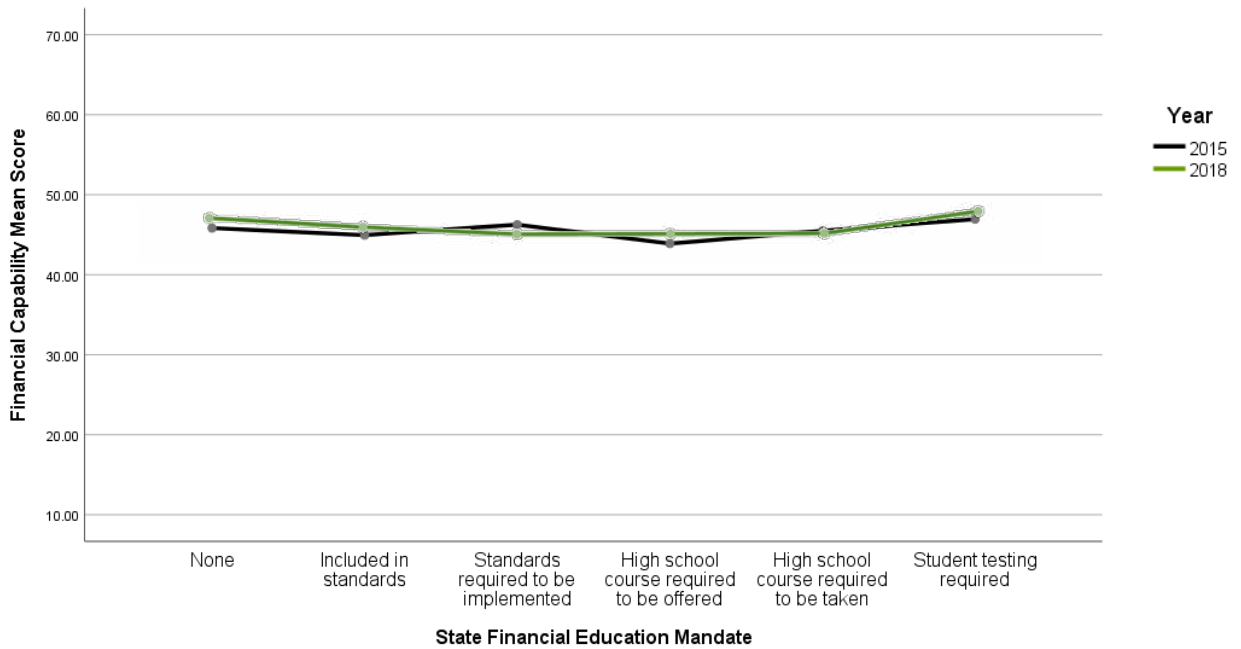


Figure 22 Graph of one-way ANOVA for financial capability for 2015 and 2018

### Results: Research Question 4 - Literacy and Capability

*In what ways is the financial literacy of 18-24-year-olds associated with their financial capability?*

This question was analyzed first for the data from the 2015 FINRA study and the 2011 CEE Survey of the States, then for the data from the 2018 FINRA study and the 2014 CEE Survey of the States. To answer this question, descriptive statistics provided context for the data and a one-way ANOVA examined the main effects. For statistically significant effects as measured at  $p < .05$ , partial eta squared was calculated to determine the practical effect size. According to Tabachnick and Fidell (1989), partial eta squared differences are small at .01 to .089, medium at .09 to .249, and large at .25 or more.

#### 2015 One-Way ANOVA

In 2015, 396 respondents scored 0.00 on financial capability, 628 scored 20.00, 804 scored 40.00, 707 scored 60.00, 421 scored 80.00, and 92 scored 100.00. The descriptive statistics are presented in Table 89.



Table 89

*Descriptive statistics for financial capability main effect 2015*

Financial Literacy Score	N	Financial Capability Mean	Standard Deviation	Standard Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
0.00	396	38.94	23.43	1.18	36.63	41.25
20.00	628	42.20	23.09	.92	40.39	44.01
40.00	804	44.28	24.72	.87	42.57	45.99
60.00	707	47.86	25.60	.96	45.97	49.75
80.00	421	53.68	27.10	1.32	51.09	56.28
100.00	92	62.83	25.43	2.65	57.56	68.09
Total	3048	45.85	25.34	.46	44.95	46.75

These results showed that financial capability scores were statistically significant for different financial literacy scores  $F(5, 3042) = 27.460, p = .000$ , partial eta squared = .043. The partial eta squared suggests that the practical difference was small. Young adults who attained differing levels of financial literacy did have significantly different levels of financial capability, which indicates that the level of financial literacy does have a small impact upon young adults' financial capability. The results of the one-way ANOVA are provided in Table 90.

Table 90

*Results of one-way ANOVA for financial capability for 2015*

	Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Between Groups	84,478.96	5	16895.79	27.46	** .000	.043
Within Groups	1,871,737.19	3042	615.30			
Total	1,956,216.14	3047				

\* $p < .05$ , \*\* $p < .01$

The results are presented graphically in Figure 23. The graph depicts that higher financial literacy relates to higher financial capability.

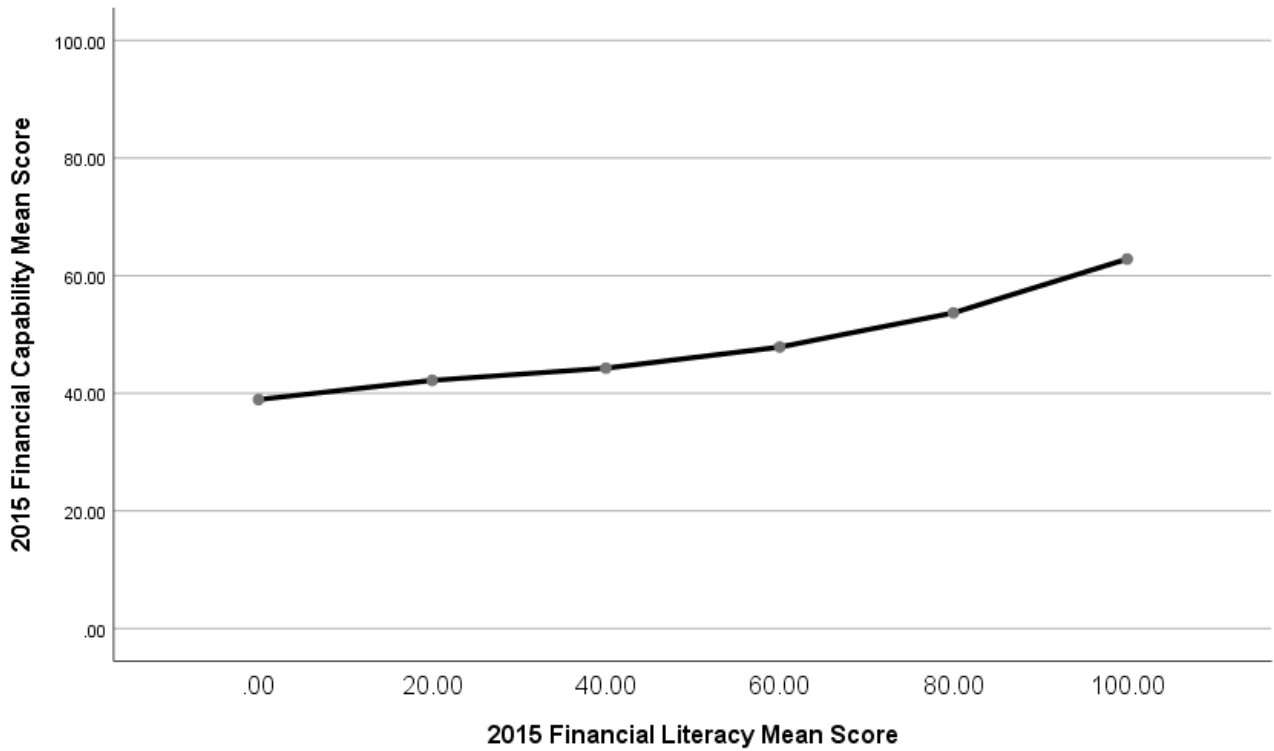


Figure 23 Graph of one-way ANOVA for financial capability for 2015

There was a significant difference in financial capability scores based on financial literacy scores. Table 91 displays the significant differences among scores, which shows that, the further apart a literacy score, the larger the mean difference in capability score.

Table 91

*Significant mean financial literacy scores for financial capability for 2015*

Financial Literacy Score	Comparison Financial Literacy Score	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
0.00	40.00	-5.34	1.52	** .006	.99	9.68
	60.00	-8.92	1.56	** .000	4.49	13.36
	80.00	-14.74	1.74	** .000	9.79	19.64
	100.00	-23.87	2.87	** .000	15.70	32.07
20.00	60.00	-5.67	1.36	** .000	1.79	9.55
	80.00	-11.48	1.56	** .000	7.03	15.94
	100.00	-20.63	2.77	** .000	12.73	28.52
40.00	80.00	-9.43	1.49	** .000	5.15	13.66
	100.00	-18.55	2.73	** .000	10.76	26.33
60.00	80.00	-5.82	1.53	** .002	1.46	10.17
	100.00	-14.96	2.74	** .000	7.12	22.80
80.00	100.00	-9.14	2.85	* .017	1.00	17.28

\*p &lt; .05, \*\*p &lt; .01

## 2018 One-Way ANOVA

In 2018, 441 respondents scored 0.00 on financial capability, 571 scored 20.00, 720 scored 40.00, 607 scored 60.00, 372 scored 80.00, and 84 scored 100.00. The descriptive statistics are presented in Table 92.

Table 92

*Descriptive statistics for financial capability main effect 2018*

Financial Literacy Score	N	Financial Capability Mean	Standard Deviation	Standard Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
0.00	441	36.46	24.39	1.16	34.18	38.75
20.00	571	39.23	24.38	1.02	37.23	41.23
40.00	720	44.78	26.38	.98	42.85	46.71
60.00	607	49.16	27.12	1.10	47.00	51.32
80.00	372	55.91	28.26	1.46	53.03	58.79
100.00	84	66.90	28.71	3.13	60.68	73.13
Total	2795	45.43	27.13	.51	44.42	46.44

These results showed that financial capability scores were statistically significant for different financial literacy scores  $F(5, 2794) = 42.547, p = .000$ , partial eta squared = .071. The partial eta squared suggest that the practical significance is small. Young adults who attained differing levels of financial literacy did have significantly different levels of financial capability, which indicates that the level of financial literacy does have a small impact upon young adults' financial capability. The results of the one-way ANOVA are provided in Table 93.

Table 93

*Results of one-way ANOVA for financial capability for 2018*

	Sum of Squares	<i>df</i>	Mean Square	F	Significance	Partial eta squared
Between Groups	145,792.49	5	29158.50	42.55	** .000	.071
Within Groups	1,911,363.01	2789	685.32			
Total	2,057,155.49	2794				

\* $p < .05$ , \*\* $p < .01$

The results are presented graphically in Figure 24. The graph depicts that higher financial literacy relates to higher financial capability.

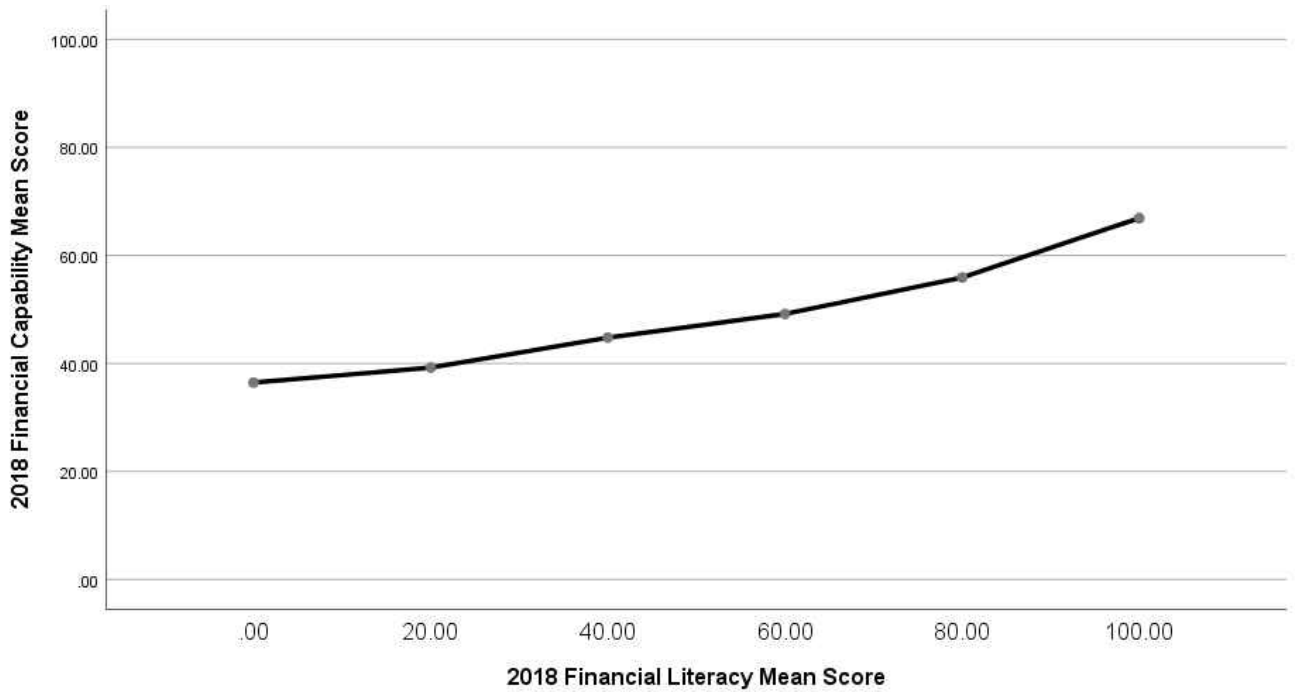


Figure 24 Graph of one-way ANOVA for financial capability for 2018

There was a significant difference in financial capability scores based on financial literacy scores. Table 94 displays the significant differences among scores, which shows that, the further apart a literacy score, the larger the mean difference in capability score. Additionally, the mean difference in capability scores between each financial literacy comparison is larger throughout 2018 than in 2015.

Table 94

*Significant mean financial literacy scores for financial capability for 2018*

Financial Literacy Score	Comparison Financial Literacy Score	Mean Difference	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
0.00	40.00	-8.32	1.58	** .006	3.80	12.83
	60.00	-12.70	1.64	** .000	8.03	17.37
	80.00	-19.45	1.84	** .000	14.20	24.71
	100.00	-30.44	3.12	** .000	21.55	39.33
20.00	40.00	-5.55	1.47	** .002	1.37	9.73
	60.00	-9.93	1.53	** .000	5.58	14.28
	80.00	-16.68	1.74	** .000	11.71	21.66
	100.00	-27.68	3.06	** .000	18.95	36.40
40.00	60.00	-4.38	1.44	* .029	.27	8.50
	80.00	-11.14	1.67	** .000	6.37	15.90
	100.00	-22.13	3.02	** .000	13.52	30.73
60.00	80.00	-6.75	1.72	** .001	1.84	11.67



	100.00	-17.74	3.05	** .000	9.05	26.44
80.00	100.00	-10.99	3.16	** .007	1.97	20.01

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\*p < .05, \*\*p < .01

## Summary

This chapter detailed the results of the statistical analysis of the data. Overall, the data showed that there was not a significant relationship between the type of financial education mandate and young adults' financial literacy and financial capability. However, there were small interaction effects for certain demographic moderator factors and independent factors. Additionally, there were small significant differences in financial capability as based on different mean financial literacy scores. Table 95 summarizes these significant factors.

Table 95

*Summary of significant findings about financial literacy and financial capability*

Dependent Factor	Year	Factor	Significance	Partial eta squared	Effect Size	Research Question
Literacy	2015	Moderator – Gender by Education Mandate	** .008	.005	Small	RQ 1 Literacy
		Independent – Ethnicity	** .000	.010	Small	RQ 1 Literacy
		Independent – Education Mandate (within Ethnicity)	* .025	.004	Small	RQ 1 Literacy
		Independent – Educational Attainment	** .000	.021	Small	RQ 1 Literacy
		Moderator – Income by Education Mandate	* .040	.016	Small	RQ 1 Literacy
	2018	Independent – Gender	** .000	.010	Small	RQ 1 Literacy
		Independent – Ethnicity	** .000	.016	Small	RQ 1 Literacy

		Independent – Educational Attainment	** .000	.050	Small	RQ 1 Literacy
		Independent – Income	** .005	.007	Small	RQ 1 Literacy
Capability	2015	Moderator – Gender by Education Mandate	* .019	.004	Small	RQ 2 Capability
		Independent – Ethnicity	** .001	.006	Small	RQ 2 Capability
		Independent – Educational Attainment	** .000	.021	Small	RQ 2 Capability
		Independent – Income	** .000	.014	Small	RQ 2 Capability
	2018	Independent – Gender	* .016	.002	Small	RQ 2 Capability
		Independent – Ethnicity	** .000	.001	Small	RQ 2 Capability
		Independent – Educational Attainment	** .000	.056	Small	RQ 2 Capability
		Moderator - Educational Attainment by Education Mandate	* .024	.017	Small	RQ 2 Capability
		Independent – Income	** .000	.054	Small	RQ 2 Capability
Capability	2015	Independent - Literacy	** .000	.043	Small	RQ 4 Literacy & Capability
Capability	2018	Independent - Literacy	** .000	.071	Small	RQ 4 Literacy & Capability

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\*p < .05, \*\*p < .01

Chapter five will discuss these findings and their implications for policy and practice. Each research question will be addressed individually, then recommendations will be presented for implementation and future research.

## CHAPTER FIVE: DISCUSSION

The results were presented and analyzed in Chapter Four. This chapter includes a restatement of the study's purpose, a summary of the study, implications for practice, recommendations for future research, and a conclusion.

Only 17 states required personal financial education as of 2018; within those states, financial literacy programs varied widely (CEE, 2018). Based on the available research, it was not clear whether there is a relationship between state mandates for financial literacy education and the financial literacy and financial capability of young adults. It is widely recognized that financial decision-making impacts individuals on a daily basis, and current research indicates that financial education can have an impact upon financial decision-making, including use of debt. It is important to understand how formal financial education impacts later financial literacy and financial capability so that policymakers can determine what routes to pursue.

The purpose of this study was to describe the relationships between financial literacy and financial capability rates of 18-24-year-olds and formal financial education in public K-12 schools.

### Summary of the Study

These questions were the basis for this study and aimed to determine whether formal financial education programs can impact the financial literacy and financial capability of young adults. Human capital theory indicates that education and learning can help people have higher-quality lives than if they did not have such an education (Olaniyan & Okemakinde, 2008). Based on this theory, the following questions were developed to determine what impact financial education has upon later financial outcomes for young adults.

- 1) In what ways does the financial literacy of 18-24-year-olds vary according to the requirements for financial education?
- 2) In what ways does the financial capability of 18-24-year-olds vary according to the requirements for financial education?
- 3) What trends in these relationships, between financial education and financial literacy and capability, are observable over time?
- 4) In what ways is the financial literacy of 18-24-year-olds associated with their financial capability?

#### Discussion of Findings: Research Question 1 - Financial Literacy

*In what ways does the financial literacy of 18-24-year-olds vary according to the requirements for financial education?*

Analysis of demographic factors as moderator factors showed that such demographic factors may impact financial literacy outcomes, sometimes as main effects and sometimes while acting as moderators. Significant main effects and interaction effects are discussed below, including gender, gender by education mandate, ethnicity, education mandate (within ethnicity), educational attainment, and income by education mandate.

#### Gender Main Effects and Interaction Effects

Gender had a main effect on financial literacy in 2018. For males and females from a state where there was no mandate, mean financial literacy scores were 6.12 points, 95% CI [.10, 12.14], higher for males than females,  $F(1, 2783) = 3.98, p = .046$ , partial eta squared = .001. For males and females from a state where financial literacy was included in standards, mean

financial literacy scores were 9.43 points, 95% CI [4.22, 14.63], higher for males than females,  $F(1, 2783) = 12.61, p = .000$ , partial eta squared = .005. For males and females from a state where standards were required to be implemented, mean financial literacy scores were 4.80 points, 95% CI [1.06, 8.55], higher for males than females,  $F(1, 2783) = 6.33, p = .012$ , partial eta squared = .002. For males and females from a state where a high school course was required to be offered, mean financial literacy scores were 12.70 points, 95% CI [6.49, 18.91], higher for males than females,  $F(1, 2783) = 16.10, p = .000$ , partial eta squared = .006. The partial eta squared results suggests that the practical differences were small.

Additionally, the interaction effect of gender by financial education mandate was significant in 2015. For males and females from a state where financial literacy was included in standards, mean financial literacy scores were 8.38 points, 95% CI [3.29, 13.47], higher for males than females,  $F(1, 3036) = 10.43, p = .001$ , partial eta squared = .003. The partial eta squared suggests that the practical significance is small. For males and females from a state where standards were required to be implemented, mean financial literacy scores were 7.18 points, 95% CI [4.19, 10.17], higher for males than females,  $F(1, 3036) = 22.13, p = .000$ , partial eta squared = .007. The partial eta squared suggests that the practical significance is small.

These results suggest that males have a small but significantly better performance in financial literacy than females when both were exposed to state mandates that included financial education in the standards or that required financial education standards to be implemented. This may be due, in part, to differences in parental socialization of finances. Previous studies have shown that parents emphasize financial abilities more strongly in male children than in female children. For example, after controlling for variables in education and other student characteristics, researchers determined that parents have an influence on financial literacy, with a

preference for ensuring male children have stronger financial capability (Chambers et al., 2019). Sinha, Tan, and Zhan (2018) analyzed data from a national survey to identify characteristics of young adults that correlate to their financial behaviors. While researching relationships among demographics, one study found that young adults who identified as females were less likely to have sound financial footing (Sinha et al., 2018). Due to these noted differences in parental socialization, males may perform better at the lower levels of financial education mandates, while females may catch up when exposed to more rigorous education that can make up for their lower levels of parental socialization.

#### Implications for Policy

Though the data showed that there was a statistically significant difference in males' and females' financial literacy under two types of mandates, the other mandate levels did not present significant differences in financial literacy scores. These results suggest that the more rigorous financial education mandates resulted in more equal outcomes, as females may have caught up to males' parental socialization levels of financial literacy.

#### Implications for Practice

The study did not include details about how each mandate was implemented in each state, so it is unclear exactly which measures may have impacted males' and females' financial literacy differently. Further study is required to make clear recommendations for raising females' financial literacy scores and would need to include factors to represent variations in curriculum, rigor, and delivery.



### Ethnicity Main Effects

For respondents of varying ethnicities, results were significant in both 2015 and 2018. In 2015, for whites and blacks, mean financial literacy scores were 8.62 points, 95% CI [4.59, 12.66], higher for whites than blacks. For whites and Hispanics, mean financial literacy scores were 6.59 points, 95% CI [3.00, 10.17], higher for whites than Hispanics. In 2018, for whites and blacks, mean financial literacy scores were 11.27 points, 95% CI [7.03, 15.51], higher for whites than blacks. For whites and Hispanics, mean financial literacy scores were 7.73 points, 95% CI [3.64, 11.81], higher for whites than Hispanics. For Asians and blacks, mean financial literacy scores were 9.51 points, 95% CI [2.49, 16.53], higher for Asians than blacks. For other ethnicities and blacks, mean financial literacy scores were 8.87 points, 95% CI [.98, 16.77], higher for others than blacks.

These results align with previous research. Influential factors that were considered moderator variables include demographics such as ethnicity and socioeconomic status (Sinha et al., 2018).

### Implications for Policy

The data show that certain ethnicities, usually whites and Asians, tend to outscore others on financial literacy, without any significant effect from the education mandate. These results suggest that policy should find ways to address differences in ethnic approaches to and understanding of financial education, especially for black students, whose scores are generally lowest and even fell further behind in 2018.

## Implications for Practice

Educators may also play a role in delivering effective financial education. Previous studies have shown that relevant, hands-on financial education is most effective, so it may be necessary to ensure that the context of the financial education relates to various ethnic groups. Respondents in the black and Hispanic ethnicities may have different cultural concepts about money, which may require variations in the curriculum to make the study relevant and memorable for such students. Further study is required to make clear recommendations and would need to include factors to represent variations in curriculum, rigor, and delivery.

### Education Mandate Main Effects within Ethnicity

The only result that showed that education mandates had a significant main effect occurred alongside the 2015 ethnicity data. The results indicated that there was a statistically significant difference in mean financial literacy scores from states where financial literacy standards were required to be implemented,  $F(4, 3018) = 6.37, p = .000$ , partial eta squared = .008, which indicates a small practical difference. There was also a statistically significant difference in mean financial literacy scores from states where a high school course was required to be taken,  $F(4, 3018) = 4.36, p = .002$ , partial eta squared = .006, which indicates a small practical difference.

These results align with previous research, which reveals mixed results about the efficacy of financial education mandates. In 2001, researchers compared students' scores on a financial literacy quiz to their states' mandates for financial education (Tennyson & Nguyen, 2001). The study's results suggested that the type of mandate did matter, with students scoring higher on the test if they had taken a specific course about financial topics; however, the study could not

determine causation (Tennyson & Ngyuen, 2001). Brown, Collins, Schmeiser, and Urban (2014) found that young adults' credit scores were better in states that had more rigorous financial education requirements. Through a related correlational study of the implementation of rigorous personal finance education mandates in three states, Urban et al. (2015) concluded that such education could positively impact financial behavior related to credit scores in early adulthood, if implemented correctly.

### Implications for Policy

Though these results suggest that financial education mandates may impact financial literacy scores, the fact that these are the only results in which the mandate has a significant main effect also suggests that financial education mandates may not, at this time, play a strong role in financial literacy outcomes. Instead, these results show that variations in financial education mandates, as they stand, may not make a large impact. If policymakers wish to create true impacts in students' financial literacy, they must consider the actual meaning of the mandates as well as the full implementation of each.

### Implications for Practice

Though financial education mandates were classified into six levels for this study, each of those levels may be implemented differently within states, districts, and schools. Educators must truly understand the purpose of the mandates, acquire appropriate training, and implement a thorough curriculum if the mandates are to have their intended impact. Further study is required to fully understand what actions educators should take to ensure quality implementation of financial education mandates.

## Educational Attainment Main Effects

In 2015 and 2018, educational attainment was a significant main effect for financial literacy. In both years, respondents with higher levels of education had higher financial literacy scores than those with a lower level of education in almost all comparisons.

These results align with previous research, which reveals that those who had not completed high school showed only a 0.29 correlation to being financially stable while those who had at least some college education showed a 0.50 correlation to being financially stable (Sinha et al., 2018). Others, such as Chen and Volpe (2002), Robb and Sharpe (2009), and Robb (2011), found similar correlations. Mandell and Klein (2009) surveyed 79 young adults who had graduated from multiple schools within one school district. In their findings, they reported that there was no statistical difference in the financial behaviors of students who took a financial education course and those who did not; rather, they found that full-time college and graduate students had the most responsible financial behaviors, such as paying off credit cards and having savings (Mandell & Klein, 2009).

### Implications for Policy

These results indicate that education beyond the K-12 realm can also impact young adults' financial literacy. Even obtaining some college or an associate's degree appears to have a beneficial impact, which suggests that even minor increases in the number of post-secondary students could increase the general rate of financial literacy. As such, it appears that higher education can improve young adults' financial literacy, which may influence policymakers to consider the requirements, cost, accessibility, and outcomes of state policies concerning higher education.

## Implications for Practice

Though educational attainment is a factor that is beyond the scope of K-12 educators, this knowledge could provide more impetus to teachers to ensure that more students are college-ready. Focusing on core skills and study habits with students may help increase the percentage of students who pursue higher education options. Alternatively, educators could identify ways to provide additional financial education support to students that do not choose to pursue higher education.

### Income Main Effects and Interaction Effects

In 2018, income level had a significant main effect on financial literacy scores. For respondents with income from \$50,000-\$75,000 and those with less than \$15,000, mean financial literacy scores were 6.53 points, 95% CI [1.25, 11.82], higher for those with the higher income. For respondents with income from \$50,000-\$75,000 and those with \$15,000-\$25,000, mean financial literacy scores were 6.74 points, 95% CI [.79, 12.69], higher for those with the higher income. These results suggest that those with a medium income (as defined in this study) generally had higher levels of financial literacy than those with the lowest two income levels.

In 2015, income by education mandate produced a significant interaction effect. For respondents from a state where financial literacy was included in standards, mean financial literacy scores were 12.67 points, 95% CI [.22, 25.55], higher for those with an income between \$35,000 and \$50,000 than those with an income less than \$15,000,  $F(7, 3001) = 2.38, p = .020$ , partial eta squared = .006. The partial eta squared suggests that the practical significance is small. For respondents from a state where student testing was required, mean financial literacy scores were 19.11 points, 95% CI [2.14, 36.08], higher for those with an income less than

\$15,000 than those with an income between \$35,000 and \$50,000,  $F(1, 3001) = 2.06, p = .044$ , partial eta squared = .005. The partial eta squared suggests that the practical significance is small. These differences may be due to differences in parental socialization to financial literacy, which previous studies have shown can have an impact upon students' financial literacy.

These results suggest that respondents whose income was between \$35,000 and \$50,000 have a small but significantly better performance in financial literacy than respondents whose income was less than \$15,000 when both were exposed to state mandates that included financial education in the standards or that required student testing in financial education. These findings agree with previous literature. Deenanath, Danes, and Jang (2019) found that student behaviors are most strongly influenced by intentional factors, such as student-earned income, which showed a strong relationship to student financial behavior at  $B = 0.74$ . Additionally, Luksander, Beres, Huzdik, and Nemeth (2014) discovered that, in Hungary, gender, age, and income had a relationship to levels of financial literacy. Other research suggests that content knowledge may be less crucial than soft skills of control, such as planning and being proactive; they also determined that people with low incomes are less likely to have control of their circumstances and, thus, may not internalize the soft skills as readily (Fernandes et al., 2014).

### Implications for Policy

Though the data showed that there was a statistically significant difference in financial literacy scores between two income groups in relationship to two education mandates, the remaining six income groups and four education mandates do not appear to have an interaction effect. However, respondents with higher incomes generally had higher financial literacy scores than those with lower incomes. This aligns with previous research, which says that those with

higher incomes are better able to internalize soft skills, like control and decision-making, than those with lower incomes. Policymakers may wish to consider policies that not only support lower-income students, but also help address income levels and financial literacy for adults.

### Implications for Practice

Similarly, as educators implement financial education mandates, they must consider students' personal relationships with money and how those relationships inform their abilities, views, and understanding of financial matters. By offering hands-on practice that goes beyond strict knowledge, educators may be able to help lower-income students significantly.

### Discussion of Findings: Research Question 2 - Financial Capability

*In what ways does the financial capability of 18-24-year-olds vary according to the requirements for financial education?*

Analysis of demographic factors as moderator factors showed that such demographic factors may impact financial capability outcomes, sometimes as main effects and sometimes while acting as moderators. Significant main effects and interaction effects are discussed below, including gender, gender by education mandate, ethnicity, educational attainment, educational attainment by mandate, and income.

#### Gender Main Effects and Interaction Effects

In 2018, gender produced a significant main effect. For males and females from a state where standards were required to be implemented, mean financial capability scores were 3.86 points, 95% CI [.11, 7.60], higher for males than females. For males and females from a state

where a high school course was required to be offered, mean financial capability scores were 6.82 points, 95% CI [.60, 13.04], higher for males than females.

In 2015, gender by education mandate produced a significant interaction effect. For males and females from a state where financial literacy was included in standards, mean financial capability scores were 6.20 points, 95% CI [1.35, 11.06], higher for males than females,  $F(1, 3037) = 6.27, p = .012$ , partial eta squared = .002. The partial eta squared suggests that the practical significance is small. For males and females from a state where standards were required to be implemented, mean financial capability scores were 4.79 points, 95% CI [1.93, 7.64], higher for males than females,  $F(1, 3037) = 10.82, p = .001$ , partial eta squared = .004. The partial eta squared suggests that the practical significance is small. For males and females from a state where a high school course was required to be taken, mean financial capability scores were 6.71 points, 95% CI [2.80, 10.61], higher for males than females,  $F(1, 3037) = 11.35, p = .001$ , partial eta squared = .004. The partial eta squared suggests that the practical significance is small.

These results suggest that males have a small but significantly better performance in financial capability than females when both were exposed to state mandates that included financial education in the standards, or that required financial education standards to be implemented, or that required a high school course to be taken. This may be due, in part, to differences in parental socialization of finances. Previous studies have shown that parents emphasize financial abilities more strongly in male children than in female children. For example, after controlling for variables in education and other student characteristics, researchers determined that parents have an influence on financial literacy, with a preference for ensuring male children have stronger financial capability (Chambers et al., 2019). Sinha, Tan, and Zhan



(2018) analyzed data from a national survey to identify characteristics of young adults that correlate to their financial behaviors. While researching relationships among demographics, one study found that young adults who identified as females were less likely to have sound financial footing (Sinha et al., 2018). Due to these noted differences in parental socialization, males may perform better at the lower levels of financial education mandates, while females may catch up when exposed to more rigorous education that can make up for their lower levels of parental socialization.

### Implications for Policy

Though the data showed that there was a statistically significant difference in males' and females' financial capability under three types of mandates, the other mandate levels did not present significant differences in financial capability scores. Additionally, the study did not include details about how each significant mandate was implemented in each state, so it is unclear exactly which measures may have impacted males' and females' financial literacy differently.

However, two of the types of mandates, state mandates that included financial education in the standards or that required financial education standards to be implemented, are the same mandates for which males had significantly higher financial literacy scores than females. This suggests that males are not only more knowledgeable when exposed to these mandates, but that they are also more capable. Such results also align with previous research that states that parents emphasize males' financial literacy more than that of females (Chambers et al., 2019). Due to these noted differences in parental socialization, males may perform better at the lower levels of financial education mandates, while females may catch up when exposed to more rigorous

education that can make up for their lower levels of parental socialization. Policies should address this to help female improve their financial literacy and, therefore, capability.

### Implications for Practice

Educators should consider these external, parental impacts upon the genders. To do so, they should examine the different expectations that have been placed upon each gender and add elements to the curriculum that can close the gap between each gender's scores more quickly. Further study is required to make clear recommendations. Understanding factors, such as how parents interact with the genders as well as how each gender perceives its financial role, may help to shed light upon these differences in financial literacy and financial capability.

### Ethnicity Main Effects

In 2015 and 2018, ethnicity revealed a significant main effect on financial capability. In 2015, for whites and blacks, mean financial capability scores were 5.45 points, 95% CI [1.59, 9.32], higher for whites than blacks. For Asians and blacks, mean financial capability scores were 10.40 points, 95% CI [4.58, 16.21], higher for Asians than blacks. For Asians and Hispanics, mean financial capability scores were 5.94 points, 95% CI [.40, 11.47], higher for Asians than Hispanics. For Asians and others, mean financial capability scores were 8.79 points, 95% CI [1.91, 15.67], higher for Asians than others. In 2018, for whites and blacks, mean financial capability scores were 5.49 points, 95% CI [1.23, 9.75], higher for whites than blacks. For whites and Hispanics, mean financial capability scores were 4.45 points, 95% CI [.34, 8.56], higher for whites than Hispanics. For Asians and blacks, mean financial capability scores were 7.72 points, 95% CI [.66, 14.78], higher for Asians than blacks.

These results align with previous research. Influential factors that were considered moderator variables include demographics such as ethnicity and socioeconomic status (Sinha et al., 2018).

### Implications for Policy

The data show that certain ethnicities tend to outscore others on financial capability, without any significant effect from the education mandate. Generally, white and Asian respondents score higher than black and Hispanic respondents. These results suggest that policy should find ways to address differences in ethnic approaches to and understanding of financial education, especially because the results of Research Question 4 show that financial literacy has an impact on financial capability.

### Implications for Practice

Previous studies have shown that relevant, hands-on financial education is most effective, so it may be necessary to ensure that the context of the financial education relates to various ethnic groups. Such real-life experience would allow students to gain abilities that they could use in adult life. Further study is required to make clear recommendations and would need to include factors to represent variations in curriculum, rigor, and delivery.

### Educational Attainment Main Effects and Interaction Effects

In 2015 and 2018, educational attainment results show a significant main effect upon financial capability. In both years, respondents with higher levels of education had higher financial literacy scores than those with a lower level of education in almost all comparisons.

These results suggest that respondents with higher degrees have a small but significantly better performance in financial capability than those with lower education. Previous literature found that those who had not completed high school showed only a 0.29 correlation to being financially stable while those who had at least some college education showed a 0.50 correlation to being financially stable (Sinha et al., 2018). Other research, such as that of Chen and Volpe (2002), Robb and Sharpe (2009), and Robb (2011), reported similar results. Mandell and Klein (2009) surveyed 79 young adults who had graduated from multiple schools within one school district. In their findings, they reported that there was no statistical difference in the financial behaviors of students who took a financial education course and those who did not; rather, they found that full-time college and graduate students had the most responsible financial behaviors, such as paying off credit cards and having savings (Mandell & Klein, 2009).

### Implications for Policy

These results show that education beyond the K-12 realm can also impact young adults' financial literacy. Even obtaining some college or an associate's degree appears to have a beneficial impact, which suggests that even minor increases in the number of post-secondary students could increase the general rate of financial literacy. As such, it appears that higher education can improve young adults' financial literacy, which may influence policymakers to consider the requirements, cost, and outcomes of state policies concerning higher education. Additionally, higher levels of education are generally believed to correlate to higher levels of income, which may help increase financial capability. Policymakers should consider ways to address the affordability, accessibility, and outcomes of higher education that may allow more students to access such education.

### Implications for Practice

Though educational attainment is a factor that is beyond the scope of K-12 educators, this knowledge could provide more impetus to teachers to ensure that more students are college-ready. Focusing on core skills and study habits with students may help increase the percentage of students who pursue higher education options. Educators should consider the variations in rigor and modify them accordingly to ensure the best results for students, especially for those that may not choose to pursue higher education. Alternatively, educators could identify ways to provide additional financial education support to students that do not choose to pursue higher education.

### Income Main Effects

In 2105 and 2018, the results show that respondents with higher incomes generally had higher financial capability than did respondents with lower incomes. These findings agree with previous literature. Deenanath, Danes, and Jang (2019) found that student behaviors are most strongly influenced by intentional factors, such as student-earned income, which showed a strong relationship to student financial behavior at  $B = 0.74$ . Additionally, Luksander, Beres, Huzdik, and Nemeth (2014) discovered that, in Hungary, gender, age, and income had a relationship to levels of financial literacy. Other research suggests that content knowledge may be less crucial than soft skills of control, such as planning and being proactive; they also determined that people with low incomes are less likely to have control of their circumstances and, thus, may not internalize the soft skills as readily (Fernandes et al., 2014).

### Implications for Policy

Generally, higher income is thought to correlate to better financial capability. As such, these results suggest that finding ways to increase young adults' income may lead to higher general financial capability. Policymakers should consider not only educational changes, but perhaps also modifications within wage and employment law, as these areas can impact income levels directly.

### Implications for Practice

As educators implement financial education mandates, they may wish to spend time working with students on career plans and helping students capitalize on each of their strengths. Such a focus could help young adults understand their future paths and take advantage of appropriate opportunities.

### Discussion of Findings: Research Question 3 - Changes Over Time

*What trends in these relationships, between financial education and financial literacy and capability, are observable over time?*

A visual comparison of financial literacy scores across types of mandates in 2015 and 2018 shows little variation, with all mean scores residing in the low-40% range. This aligns with previous literature, as concerns have circled around low levels of financial literacy for many years (Scheresberg & Lusardi, 2014). The ongoing study of the topic indicates that there has not been significant improvement over the past few decades.

A visual comparison of financial capability scores across types of mandates in 2015 and 2018 shows little variation, with all mean scores residing in the mid-40% range. This aligns with previous literature, as concerns have circled around low levels of financial capability for many years (Office of Financial Education, 2002; PACFCYA, 2015). The ongoing study of the topic indicates that there has not been significant improvement over the past few decades.

These results may be due a lack of significant change in curriculum, rigor, and delivery over the four-year span. Even though some states increased or decreased their mandate levels, the implementation of such changes may not have been completed within the four-year period, especially if the change was enacted near the end of the period. Additionally, constant changes in the national economic situation may create perspectives for youth that vary from those of the adults creating policy and implementing educational curriculums. These generational and economic differences may create a gap in communication that prevents effective implementation of financial education until the differences are recognized and addressed. Finally, part of the lack of financial literacy and capability and youth may simply be due to a lack of experience, which could indicate that little will change across each new 18-24-year-old cohort. Generally,

older respondents show higher levels of financial understanding and ability, which may result from trial and error and improved financial footing throughout their careers.

### Implications for Policy

According to these results, young adults' financial literacy and financial capability rates have not changed noticeably between 2015 and 2018. This suggests that either little has changed or that changes in education have been less than effective at this time. Policymakers should consider further analysis of mandates as well as provide better training and support for educators.

### Implications for Practice

Educational practitioners should create subsidiary programs that satisfy the mandates of policymakers. If there is a gap in understanding between generations, educators must find ways to make financial education relevant and applicable for students. Tracking the outcomes of such efforts is key to determining whether they have an impact.

### Discussion of Findings: Research Question 4 - Literacy and Capability

*In what ways is the financial literacy of 18-24-year-olds associated with their financial capability?*

The results of a one-way ANOVA show that, overall, there was a significant difference in young adults' financial capability scores when based upon their financial literacy scores in both 2015 and 2018. According to these results, financial literacy plays a role in overall financial capability for 18-24-year-olds.



In 2015, financial capability scores were statistically significant for different financial literacy scores  $F(5, 3042) = 27.460, p < .000$ , partial eta squared = .043. In 2018, financial capability scores were statistically significant for different financial literacy scores  $F(5, 2794) = 42.547, p < .000$ , partial eta squared = .071. The partial eta squared values indicate that the relationship between financial literacy and financial capability in 2018, though still small in a practical sense, was stronger than in 2015.

### Implications for Policy

These results indicate that higher financial literacy does have a positive relationship to higher financial capability. This suggests that financial literacy does matter and that finding ways to help students improve their financial literacy is worth the effort. As seen in results from the U.S. Chamber of Commerce (2018), higher levels of financial literacy and capability result in better personal and national economics. Due to this, it is important that policymakers develop mandates that have a significant impact upon young adults' financial literacy and, thus, financial futures.

### Implications for Practice

Educational practitioners must develop effective curriculum that supports policy mandates and creates the desired outcomes of improved financial literacy and financial capability. To achieve these results, states, districts, and schools must consider how various factors impact student learning. The data in this study show that young adults' financial abilities often correlate to demographic factors, which educators can address with modified or varied options for financial education. From this study and from the work of Sinha et al. (2018), it is

clear that gender, ethnicity, and income can have an impact upon financial literacy and financial capability. Educators must find ways to address these differences to enable sound financial footing for all students. Such methods may include socializing finances in ways that connect to students' backgrounds and perceptions as well as providing access to practical applications of financial concepts.

### Limitations

One of the limitations of this study was that it did not consider the variations in implementation of financial mandates across individual school districts or schools. Investigating variations at the level of curriculum delivery may shed light upon why, as a whole, there was not a significant difference in young adults' financial literacy and financial capability when compared to various state mandates for financial education.

Another limitation of this study was that it did not follow any subgroup longitudinally. It would be worth investigating whether the same cohort improved financial literacy and capability as it aged. Such results could indicate whether financial literacy and capability develop through practice and, if so, how to integrate more practice into financial education efforts.

A limitation of the data was in the ability to determine whether respondents were fully truthful in their responses. If a significant number of respondents were less than truthful, the results could be skewed.

Finally, anyone reading this study cannot generalize these results to any population or year beyond those for which this study was conducted. Other groups, other years, and other educational mandates may yield different results.

### Recommendations for Future Research

This study provides an investigation into whether differing types of state mandates for financial education have an impact upon young adults' financial literacy and financial capability. It also explores whether certain demographic factors have a moderating influence on the types of education. Because the results do not show clear causal-comparative relationships, further research is needed to determine which types of financial education can be effective.

National researchers, including private entities, may consider reproducing this study with other years' sets of data from FINRA and CEE to create a longitudinal view of the results, which would help establish a stronger pattern. Additionally, performing this study across more age groups could provide more insight, as could tracking one age group across multiple years' worth of the study.

Understanding whether there are any commonalities among states that mandate each level of education may also prove illuminating. There may be patterns according to political leanings, region, state economics, or other factors, which could help describe the status and importance of financial education of these states. State and national groups alike could benefit from this information.

States and school districts may wish to conduct studies that investigate how financial education is delivered, which could provide key insights that this broad-based study could not. Understanding how districts and schools implement financial education may shed more light upon the reasons that, from a broad view, there was not a significant difference in young adults' results across the different types of financial education mandates.

Additionally, school districts and teachers should analyze which methods of instruction and which elements of curricula are most effective in providing memorable, useful financial education. Such data would inform methods going forward for all states.

Understanding respondents' locus of control may also shed light upon the impacts of financial education. Those with an external locus of control may respond differently to education efforts than those with an internal locus and, if such differences exist, they could inform other aspects of policy and implementation. Further, there may be connections between respondents' locus of control and other demographic factors. These details could be studied at the district, state, and national levels.

Holistically, further research is needed into the effects of demographic factors on young adults' financial literacy and capability. The results show that there is a significant main effect for most of the demographic factors and suggest that certain demographics tend to have better financial literacy and financial capability than others. Understanding what causes these differences beyond the classroom could be invaluable for future policy decisions.

### Summary

This study used national data sets to analyze young adults' financial literacy and financial capability rates as they related to differing state-level financial education mandates. Two-way ANOVAS investigated the influence of select demographic factors, education mandates, and their interactions. According to the results, there is not currently a significant difference in young adults' financial literacy and financial capability as based upon different state financial education mandates. These results showed that there are other factors that influence young adults' financial literacy and financial capability, some of which were explored in this study. The results are summarized visually in Figure 25.

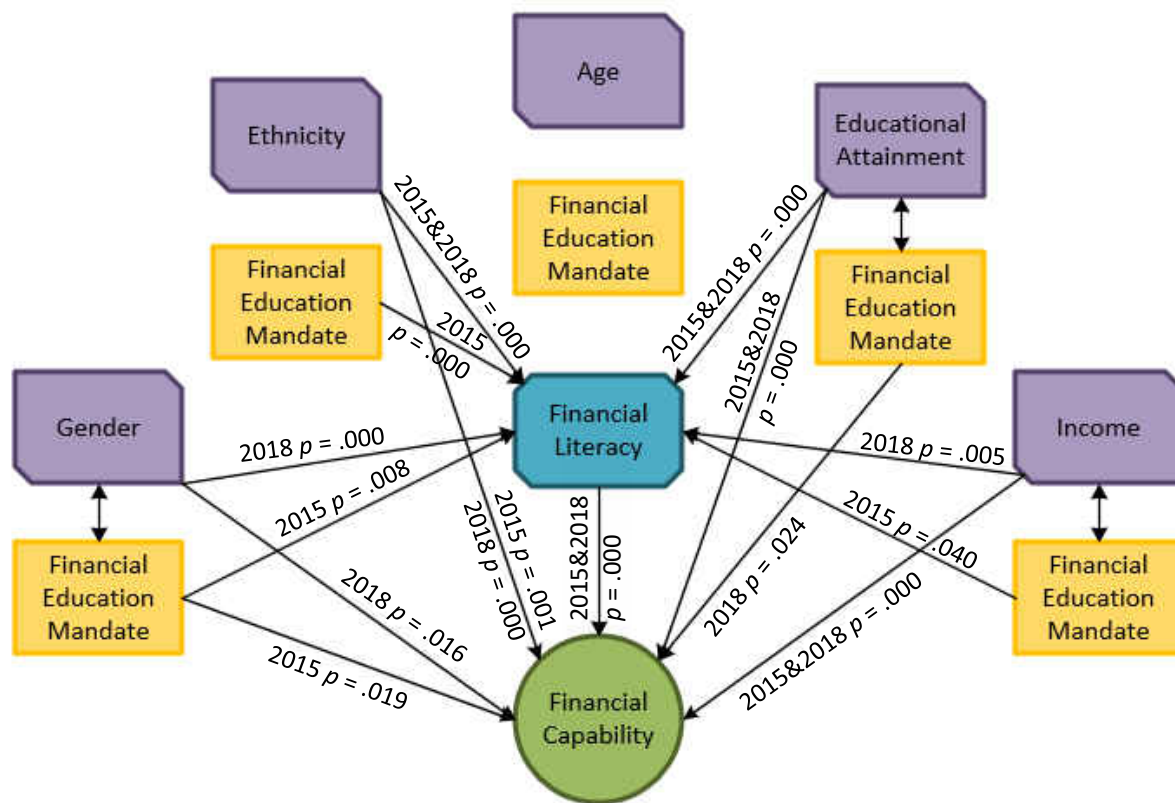


Figure 25 Visual map of relationships among variables

It is clear that males tend to perform better on both financial literacy and financial capability with low levels of financial education mandates. Females only close this gap with higher levels of financial education mandates, which suggests that males receive more financial education outside of the school system and that females require the school's financial education to catch up.

Different ethnicities also have different rates of financial literacy and capability, with white and Asian groups outscoring black and Hispanic groups. This suggests that financial education should address differences in ethnic perceptions and experiences to effectively close the gap.

Higher educational attainment resulted in higher financial literacy and capability scores, which suggests that students may find tangible financial benefits as a result of post-secondary education.

Finally, higher income generally results in higher financial literacy and capability, which indicates that policymakers may want to consider ways to address earnings that go beyond K-12 education.

Recommendations for further study include: replicating this study with other years' data, conducting a study with a more detailed examination of the delivery of financial education, and investigating how demographic factors influence financial literacy and capability beyond the classroom.

### Conclusion

This study aimed to determine whether formal financial education programs can impact the financial literacy and financial capability of young adults. This is an important topic for policymakers because it can inform whether and how financial education is implemented in K-12 education. From the results, it is clear that financial literacy and capability are not strong across any group, so creating and delivering better financial education will help all young adults. Additionally, implementing such education effectively appears to depend upon a host of factors, many of which are external to the school environment, but which can nevertheless inform decision-making at the state, district, and school level as policymakers and practitioners develop and deliver curricula that address these various factors.

Policymakers and educational practitioners must develop mandates and curriculums that cut across the barriers of gender, ethnicity, educational attainment, and income to effectively

improve all students' understanding of financial literacy and financial capability. By improving these rates, they will improve individuals' and, by natural extension, hopefully, the nation's economic status.



## **APPENDIX: IRB LETTER**



UNIVERSITY OF CENTRAL FLORIDA

Institutional Review Board  
FWA00000351  
IRB00001138  
Office of Research  
12201 Research Parkway  
Orlando, FL 32826-3246

NOT HUMAN RESEARCH DETERMINATION

May 24, 2019

Dear [Elise Carlson](#):

On 5/24/2019, the IRB reviewed the following protocol:

Type of Review:	Initial Study
Title of Study:	An Analysis of the Relationships Between State Mandates for Financial Education and Young Adults' Financial Literacy and Financial Capability
Investigator:	<a href="#">Elise Carlson</a>
IRB ID:	STUDY00000581
Funding:	None
Grant ID:	None
IND, IDE, or HDE:	None
Documents Reviewed:	<ul style="list-style-type: none"> <li>• HRP-251 - FORM - Faculty Advisor Review_jdj052219.pdf, Category: Faculty Research Approval;</li> <li>• Financial Literacy/Capability and State Policies, Category: IRB Protocol;</li> </ul>

The IRB determined that the proposed activity is not research involving human subjects as defined by DHHS and FDA regulations.

IRB review and approval by this organization is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities are research involving human in which the organization is engaged, please submit a new request to the IRB for a determination. You can create a modification by clicking **Create Modification / CR** within the study.

If you have any questions, please contact the UCF IRB at 407-823-2901 or [irb@ucf.edu](mailto:irb@ucf.edu). Please include your project title and IRB number in all correspondence with this office.

Sincerely,

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