HOW FINANCIAL LITERACY INFLUENCES LONG- AND SHORT-TERM FINANCIAL

BEHAVIORS IN DIFFERENT AGE COHORTS

by

ROBIN HENAGER GREENE

(Under the Direction of Brenda J. Cude)

ABSTRACT

The purpose of this study was to add to the literature in the field of financial literacy by examining the relationship between financial literacy and financial behaviors by age cohort. Financial literacy was assessed in three ways: objective financial knowledge, subjective financial knowledge, and subjective financial management ability. Age cohorts reflected increments as follows: 18-24, 25-34, 35-44, 45-54, 55-64, and 65 and older. Two hypotheses were written to explore the relationship between financial knowledge, financial management ability, and long- and short-term financial planning and managing behaviors specifically examining the age cohort effect. Both were supported; greater financial knowledge and subjective financial management ability were positively associated with the three long-term and the four short-term financial planning and managing behaviors while moderating for the age cohort effect. A key finding was the highly significant associations between each of the long- and short-term behaviors and the age cohort variable. Two hypotheses were written to examine the influence of financial knowledge and subjective financial management ability on long- and short-term financial planning and managing behaviors by restricting the sample for each age cohort. Specifically, the influence of financial knowledge and subjective financial management ability on long- and short-

term financial planning and managing behaviors was hypothesized to be different in different age cohorts. Overall, both hypotheses were supported; in addition, interesting differences were found by age cohort. A key finding for the long-term behaviors was that the strongest influence shifted from subjective knowledge for the younger age cohorts to objective knowledge for the older age cohorts.

INDEX WORDS: Financial literacy, Financial knowledge, Financial behavior, Age cohort

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DEDICATION

I dedicate this dissertation to the late Dr. Larry Burkett and all the listeners of his radio program over the years. His energy was the spark that ignited my interest in personal finance and his listeners fanned the flame.

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CHAPTER 1

INTRODUCTION

The recent economic downturn, known as the Great Recession, has magnified overall awareness of financial illiteracy and its impact on our economy. In response, academic research about financial literacy, interest in financial education, and attention to consumer policy has increased. Questions regarding the importance of financial literacy, as well as appropriate ways to measure current levels of consumers' financial knowledge, also have secured increased attention. In addition to research, financial education and related policy have had renewed interest. Financial education is increasingly prevalent in high schools and in colleges (Boshara, Gannon, Mandell, Phillips, & Sass, 2010; Hira, 2012; Mandell, 2008). Also, workplace education is more common in the form of financial information seminars and retirement planning orientation programs (Servon & Kaestner, 2008). Greater attention to financial literacy is reflected in increased interest in state mandates for financial education in high schools as well as the creation of several entities addressing financial literacy, including the President's Advisory Council on Financial Literacy (PACFL), the Financial Literacy and Education Commission (FLEC), and the Consumer Financial Protection Bureau. A policy in the spotlight of the last decade which many tied to financial illiteracy among young adults was the Credit Card Accountability Responsibility and Disclosure Act (CARD Act) of 2009, which limits young adults' access to their own credit card until they are 21 (Credit Card Act, 2009).

The way consumers make decisions has been an interest of researchers. Making good financial decisions has been associated with levels of financial literacy and with age. Indeed, James, Boyle, Bennett, and Bennett (2012) suggested that increased levels of financial literacy in

the younger years facilitate better decisions that lead to a higher quality of life in later years. Financial decisions at any stage in life can have lasting effects on the consumer and the household. The types of financial decisions vary depending on the age of the consumer. While young adults may be considering their first home purchase, they may not be thinking about retirement with the same sense of urgency as an older adult. Likewise, adults in their middle-ages may focus their financial decisions on their growing family, while retired adults may focus their financial decisions on downsizing their housing.

In addition, generational differences can influence financial decisions and often have a bearing on financial behaviors. The frugality demonstrated by the generation that lived through the Great Depression may not have been passed on to younger generations, but the Great Recession has brought a renewed interest in economic problems and financial behaviors. Experience and perspective often may trump objective knowledge. Not only does the younger generation lack experience when compared to older generations (Chen & Volpe, 1998; Mandell & Klein, 2007), but it also has a different perspective than those currently in their middle years or those nearer to retirement (Tishman, Van Looy, & Bruyere, 2012). Understanding these differences will help researchers, educators, and policy makers improve financial literacy and financial behaviors as consumers make decisions at various points in their lives. This dissertation addresses the question - how does the influence of financial literacy on financial behaviors differ by age cohort?

Research, education, and policy that is age sensitive is a recognized need. For example, for today's aging population, an issue is whether older adults are equipped to manage the complexities of the financial environment and how both education and regulation apply (Banks, 2010). Much of the research by Lusardi and Mitchell (2007a) has focused on preparing middle-

aged and older adults for retirement. For younger adults, the question is whether education, financial literacy, and effective related policy may preempt poor financial behaviors. The CARD Act of 2009, for example, was intended to protect young adults (under 21) against the misuse of credit (Lusardi, Mitchell, & Curto, 2010).

Even with the recent policy changes mentioned earlier, and the increasing focus on financial education in high schools, colleges, and the workplace, results from research continue to show low levels of financial literacy (Hira, 2012; van Rooij, Lusardi, & Alessie, 2012), poor day-to-day decision-making among consumers (Boshara et al., 2010), and longer term financial mistakes that impact wealth building (van Rooij, Lusardi, & Alessie, 2012). These low levels of financial literacy have been reported for various age groups from high school students to retirees.

The purpose of this study is to add to the literature in the field of financial literacy by examining the relationship between financial literacy and financial behaviors by age cohort. The next section of this chapter discusses the concept of age cohorts as it relates to the impact of financial literacy on financial behaviors. This is followed by a preview of the relevant literature about financial behaviors and financial literacy, a statement of the problem, and a description of the approach used to examine the research question for this dissertation.

Age Cohorts

Age and experience change an individual's perspective. Recent studies have shown that consumers in different age cohorts display different financial behaviors (Robb, Babiarz, & Woodyard, 2012; Zick, Mayer, & Glaubitz, 2012). Each age group has its own perspectives, influences, and pressures (Zick, Mayer, & Glaubitz, 2012). These differences are not surprising given changes in consumers' financial needs over time, but how does financial literacy influence

long- and short-term financial behaviors in different age cohorts? This dissertation addresses this question.

Many research studies have examined age groups defined by generation, such as Baby Boomers, Generation X, Generation Y, and Millennials (see, for example, DeVaney & Chiremba, 2005; Kowske, Rasch, & Wiley, 2010; Lancaster, 2003). Based on early work by Karl Mannheim (1952) generations are defined as age cohorts that were exposed to similar cultural and societal events and have exhibited similar perspectives and views. Researchers often use generalizations to describe important characteristics of a generation (Deyoe & Fox, 2012; Twenge & Campbell, 2008). For example, Generation X has been described as showing higher self-esteem, narcissism, lower dependence on social approval, and as having a greater external locus of control than their older counterparts – characteristics that may have a bearing on how they view or manage their money (Twenge & Campbell, 2008).

However, compared to defining age groups by generations, age or stage in life may provide a more useful approach to analyze consumer needs related to financial matters. Indeed, Wong, Gardiner, Lang, and Coulon (2008) found that generational stereotypes were less meaningful than age to provide insight into differences between individuals' behavior. Given that the life of a typical 20 year old is vastly different from the life of a 30 year old, both of whom are in the same generation, Arnett (2007) concluded it was unproductive to lump them into the same group for analysis. Despite the attention given to the Baby Boomer generation, it actually is a quite diverse group. Commonly defined as born between 1946 and 1964, some have already retired while others are still mid-career. Financial goals within the Baby Boomer generation likely vary based on these different perspectives.

Thus, the purpose of this study is to add to the literature in the field of financial literacy by examining the relationship between financial literacy and long- and short-term financial behaviors by age cohort. The overall research question is how financial literacy influences long- and short-term financial behaviors in different age cohorts. The analysis focuses on the following age cohorts: 18-24, 25-34, 35-44, 45-54, 55-64, and 65 and older. In this research, financial literacy is assessed in three ways: objective financial knowledge, subjective financial knowledge, and subjective financial management ability.

Financial Behaviors

Financial behavior research has encompassed a variety of approaches. Researchers have categorized both long- and short-term financial behaviors into groups such as savings, planning, and cash management. Often, a focus of research about financial behaviors is examining the influence of financial literacy. In general, researchers have found that financial literacy has a strong association with financial behaviors (Xiao et al., 2010). In studies focusing on some financial behaviors, especially saving and planning, researchers often have narrowed the scope to saving or planning for specific goals. In the area of long-term financial behaviors, many researchers have studied planning behaviors specifically in the area of retirement planning, usually focusing on an older age cohort (Banks, 2010; Banks, O'Dea, & Oldfield, 2010; Finke, Howe, & Huston, 2011; Lusardi & Mitchell, 2005, 2006, 2007a, 2007b). With the changes in defined benefit plans and the increasing prevalence of defined contribution plans, understanding consumer behavior as it relates to retirement planning and long-term financial management has increased in importance (Robb & Woodyard, 2011). Retirement planning research generally has associated this type of long-term planning behavior with higher levels of financial literacy (Lusardi & Mitchell, 2007a).

In addition to long-term behaviors, researchers have associated the likelihood of consumers engaging in positive short-term planning and managing behaviors with financial literacy (Hilgert, Hogarth, & Beverly, 2003). These behaviors often encompass having an emergency fund, living within one's economic means, paying bills on time, or managing a bank account (Hilgert, Hogarth, & Beverly, 2003).

Some of the research about financial behaviors has examined differences in behaviors by age cohort. Often the focus has been on older cohorts and retirement planning behavior. However, some research has examined younger cohorts such as college students, young parents, and young adults. Financial behavior impacts decisions made early in life that can have long-term consequences (de Bassa Scheresberg, 2013). The previous research has shown, however, that younger cohorts are ill-equipped to make some of these major decisions while those in middle-age cohorts often have already made financial mistakes and learned from the experience (de Bassa Scheresberg, 2013).

Understanding differences by age cohort will provide a foundation to learn more about how to impact individuals' financial literacy and behaviors at various points in their lives. Understanding the association of financial literacy with certain financial behaviors, both long- and short-term, will provide insight into research, education, and policy aimed at various age cohorts. Thus, the focus on age cohorts in this study will deepen our understanding of the relationship between financial literacy and long- and short-term financial behaviors by age cohort and add to the existing literature.

Financial Literacy

While there likely is general consensus about the meaning of financial literacy, there is no consensus about its operationalized definition. Most researchers in the field of financial

literacy indicate that the definition includes a certain level of objective knowledge. Many researchers also include in the definition confidence and ability, or skills in management, in addition to knowledge (Hung, Parker, & Yoong, 2009; Huston, 2010; Remund, 2010). Much of the financial literacy research has focused on objective levels of financial knowledge; for example, Lusardi and Mitchell (2006, 2007a, 2007b, 2008) specifically used questions about interest compounding and percentage calculations to assess the respondents' objective level of knowledge. The subjective approach to measure financial knowledge, reflective of confidence and ability, is relatively newer than the objective approach and its addition has added insight to the existing literature. Huston (2010), for instance, has included objective knowledge as well as confidence and ability in a financial literacy model. In accordance with Huston's (2010) model, in this study, financial literacy includes the constructs of financial knowledge, confidence in financial knowledge, and confidence in one's ability to manage financial matters. These are referred to as objective financial knowledge, subjective financial knowledge, and subjective financial management ability.

Statement of the Problem

The purpose of this study is to add to the literature in the field of financial literacy by examining the relationship between financial literacy and long- and short-term financial behaviors by age cohort. In this research, financial literacy is assessed in three ways: objective financial knowledge, subjective financial knowledge, and subjective financial management ability. No study has addressed a research question examining the relationship between both objectively and subjectively assessed financial knowledge as well as subjectively assessed financial management ability with financial behaviors in an analysis by age cohorts. Understanding how these relationships vary by age cohort will give researchers, educators, and

policy makers a fresh perspective on financial literacy that will help guide future research, curriculum, and policy for consumers of various ages.

Approach to the Problem

This analysis involved using specific financial knowledge, financial management, and financial behavior related questions from a nationally representative sample of more than 25,000 observations from the 2012 National Financial Capability Study (NFCS) State-by-State Survey Instrument sponsored by the Financial Industry Regulatory Authority (FINRA). The six age cohorts used were subdivided as follows: 18-24, 25-34, 35-44, 45-54, 55-64, and 65 and older, the categories created by the survey designers. There were between 2,300 and 4,800 observations in each age cohort. The dependent variables were binary variables representing yes or no answers to long- and short-term financial behavior questions. Specifically, the long-term behaviors were retirement planning, having a retirement account, and having investments in stock, bonds, mutual funds, or other securities. For short-term behaviors, the dependent variables were having an emergency fund, spending within one's income, not having overdrawn a checking account, and making mortgage payments on time. Logistic regression was used with the independent variables objective financial knowledge, subjective financial knowledge, subjective financial management ability, and age cohorts, controlling for other demographic and socio-economic factors.

Organization

The dissertation is organized in a format with five chapters. Following this introduction is a review of relevant literature about age cohorts, financial literacy, and financial behaviors. The literature review is followed by chapters describing the research methodology, results, and conclusions.

CHAPTER 2

LITERATURE REVIEW

The purpose of this study was to add to the literature in the field of financial literacy by examining the relationship between financial literacy and long- and short-term financial behaviors by age cohort. The overall research question was how financial literacy influences long- and short-term financial behaviors in different age cohorts. The organization of this research by six age cohorts from one national sample was a relatively unique approach to the study of financial literacy's influence on financial behaviors.

This review of literature includes literature discussing age and generations with respect to financial behaviors as well as why age matters in the research about financial literacy and financial behaviors. This brings the discussion into context and supports the need for additional literature regarding age cohorts and financial literacy. Sections will address the literature discussing the importance of age with regard to financial literacy and the decision to use age cohorts instead of generations. This is followed by literature about financial literacy and financial behaviors by age cohort and a brief discussion of financial literacy and financial behaviors in general. A definition of financial literacy is proposed for use in the dissertation followed by the conceptual model used to guide the research. A subsection of the conceptual model is explained including the measurement of financial literacy, the use of age cohorts, and the financial behaviors used in the analysis. Finally, the conclusion will provide a summary of the literature and how this dissertation contributes to it.

Age Cohorts

This dissertation addresses the question - how does the influence of financial literacy on financial behaviors differ by age cohort? This section of the literature review focuses on age cohorts, generations, and why age matters in the study of financial literacy. The discussion begins with literature that used age cohorts and generations in the research. This includes a discussion about the choice to use age cohorts instead of generations in this study. This is followed by a section about studies that discussed why age matters when studying financial literacy and financial behaviors. Finally, the discussion includes literature written about financial literacy, as it relates to financial behaviors, which is specific to age cohorts. For example, there are sections discussing financial literacy literature covering the college years, young adults, mid-career years, and older adults, respectively.

Cohorts and generations. Cohorts often are defined as an aggregate of individuals having experienced the same event within the same time frame. Generally, this is defined by the year the individuals were born. Cohorts also may be defined in terms of the year its members graduated from school, the year they married, or the year they entered the workforce (Ryder, 1959). Currently, common definitions of generations as age cohorts include Baby Boomers, Generation X, Generation Y, and Millennials, with each generation spanning approximately 20 years (Beekman, 2011; Lancaster, 2003; Timmerman, 2007).

Compared to defining age groups by generations, age, or stage in life may provide a more useful approach to analyze consumer needs related to financial matters. Indeed, many research studies have divided the Baby Boomer generation into two sections – each 10 years – separating younger boomers from the older boomers when analyzing financial knowledge and retirement planning (DeVaney & Chiremba, 2005; Lusardi & Mitchell, 2007a). Kock, Yoong, and Fatt

(2012) found that age cohorts, analyzed in 10 year increments, were significant indicators of personal orientation toward financial planning preparation and retirement planning. The authors suggested the study of age cohorts was important, especially for older individuals as they save and plan for retirement.

The choice to focus this study grouped by age cohorts instead of generations was based on this more-defined approach – that age or stage in life provides a more useful approach to analyze consumer needs related to financial matters. Indeed, in a study about consumer spending, Deegan (2002) found that age cohorts displayed different financial behaviors. Young adults, in the age cohort 14 – 34, were not good savers – they purchased more durable goods than they saved or invested. Early middle-aged adults 35-44 did not save or invest more than the younger cohort, although they did purchase fewer durable goods. In contrast, relative to the younger cohort, they purchased more non-durables; they had their homes and their furniture in place and they began purchasing for a growing family. Relative to the younger cohorts, the older middle-aged adults 55-64 saved more as they looked toward retirement while the over-65 cohort saved less. Although this study did not control for other demographic variables such as income and education, it does show the varying types of decisions made by different age groups.

Other data from the Consumer Expenditure Survey also found differences in consumer spending by age cohort. The researchers reported that older middle-aged adults ages 55-64 spent more on food away from home than did older adults ages 65 – 74. In fact, the older middle-aged adults spent more overall than any of the other age groups (Nair, 2001).

Thus, previous research reports evidence that financial behaviors provide insight into the effect of age or stage in life on the process of financial decision-making. The next section discusses why age matters when examining financial behaviors and financial literacy.

Age matters. A central theme of research related to decision-making in general as well as financial decision-making is knowledge increasing over time. One segment of research has distinguished between fluid intelligence and crystallized intelligence. Fluid intelligence is described as the capability to manipulate information and discriminate and perceive relationships between new and old information. Crystalized intelligence is described as accumulated knowledge based on experience and habits (Cattell, 1943; Li, Baldassi, Johnson, & Weber, 2013).

Positing that higher levels of crystallized intelligence provided older adults with a basis for good decision-making, researchers found that older people were better decision-makers than younger people. The researchers suggested that this was as a result of crystallized intelligence that operated as an offset for any loss of fluid intelligence (Li et al., 2013). Conversely, Bruine de Bruin, Parker, and Fischhoff (2012) divided a sample of adults into 10 year age cohorts in a study examining decision-making competence. They found that older adults rated themselves as worse decision-makers than did younger adults. Indeed, research provides evidence that younger adults tend to perform better on tests of fluid intelligence than older adults; however, older adults perform better on tests of crystalized intelligence (Castel, Humphreys, Lee, Galvan, Balota, & McCabe, 2011; Crawford & Stankov, 1996). Thus, knowledge accumulation may offset any cognitive impairment due to age.

Research specific to financial knowledge also supports the theme of knowledge increasing over time. Agarwal, Driscoll, Gabaix, and Laibson (2009) studied fluid versus crystallized intelligence in terms of finances. The authors found that experience and acquired knowledge increased with age while fluid intelligence declined. Using a combination of proprietary datasets dealing with credit, auto loans, mortgages, and credit card fees, they reported

that middle-aged adults borrowed more effectively, paid lower interest rates, and paid fewer fees than either younger adults or older adults. Indeed, the researchers reported that the age at which the most effective financial decisions were made was age 53.3. They labeled this the "age of reason" (p. 71). Younger borrowers tended to have less experience yet have a high level of analytical function, while older borrowers tended to have higher levels of experience yet less analytical function (Agarwal et al., 2009).

Findings from a study by Delavande, Rohwedder, and Willis (2008), using data from the American Life Panel (ALP), also supported the conclusion that financial knowledge increases with age. Older respondents scored higher on the Cognitive Economics Survey than younger respondents. The researchers aligned their findings with the human capital model and suggested that it supports the concept of accumulation of financial knowledge over time.

While other researchers explained the association between financial knowledge and age as related to experience, Mandell and Klein (2007) attributed the relationship to level of interest in financial matters. Using Jump$tart Coalition data based on high school seniors, the authors outlined subsequent relationships between financial literacy programs in high school, college, and in the workplace. The authors described interest in financial management as increasing over time. They explained that high school seniors do not recognize why financial matters pertain to their lives while college students' interest increases slightly. However, by the time individuals are in the workplace they are interested and motivated to understand the principles they need to invest in their companies' retirement plan.

In this dissertation, financial literacy is assessed in three ways: objective financial knowledge, subjective financial knowledge, and subjective financial management ability. With financial knowledge fulfilling an important component of financial literacy, the concepts

discussed above help explain why age matters in the study of financial literacy. Other studies have examined financial literacy in specific age cohorts; this literature is addressed in the following sections.

      College years. The college years are an important time to acquire knowledge, which is usually the basis for attending an institution of higher education. This makes this time period not only important for knowledge gain in general but also for the accumulation of financial knowledge. Authors Chen and Volpe (1998) surveyed 924 college students from 14 universities to study college students' financial knowledge. Their study examined why some students are more knowledgeable than others, and analyzed how a student's knowledge affected his or her opinions and decisions (Chen & Volpe, 1998). The results showed an overall low level of financial knowledge among the college students surveyed; interestingly, they had a higher level of knowledge in areas where they had personal experiences, for example, car insurance and apartment leases. Overall the researchers concluded that college students were not knowledgeable about personal finance (Chen & Volpe, 1998). Mandell and Klein (2007) found that the mean financial knowledge score on an assessment for college students in 1997 was 60%. This mean score dropped to 54.9% in 2006 when they tested another group of college students. This decrease represented an 8.5% drop in financial knowledge according to the assessment used. Even a mean score of 60% is concerning, but the downward trend in college students' financial knowledge is even more so.

      An important point recognized in the Chen and Volpe (1998) study was that since the majority of the sample was at an early stage of their financial life cycle, their experience was limited. Most of their income was spent on consumption versus saving or investing. As they progressed through their college career, experience improved their literacy. Seniors had a higher

level of knowledge than did freshmen and, indeed, knowledge progressively improved for each grade level in college through graduate school. Students with more work experience, and with more income, answered more questions correctly on the assessment. Likewise, this improvement may continue over their lives following school, implying that knowledge may accumulate over a lifetime and with experience (Chen & Volpe, 1998).

In addition, researchers have examined the relationship between financial knowledge and financial behaviors in college students. In a financial seminar post-test for college students, Borden, Lee, Serido, and Collins (2008) examined college students' financial knowledge in relation to financial behaviors. The authors found that with an increase in financial knowledge the college students reported intentions to engage in more positive financial behaviors and fewer risky behaviors in the future.

Young adults. Researchers in the field of financial literacy often focus on the young adult age cohort as this is viewed as a time to preempt poor financial behaviors. Findings generally have shown low levels of financial literacy (Lusardi, Mitchell, & Curto, 2010). A study outlining financial literacy specific to the age cohort 25-34 found a lack of financial literacy even as the young adults engaged in ongoing financial decisions (de Bassa Scheresberg, 2013). Using data from the National Longitudinal Survey of Youth (NLSY), Lusardi, Mitchell, and Curto (2010) found that fewer than one-third of young people have basic financial literacy. These young adults may be susceptible to making financial mistakes when they engage in their first financial contracts and decisions. This age group is likely to be involved in major financial decisions such as buying a home, buying a car, or starting a retirement account. Yet, about a third of the young adult respondents engaged in some form of high-cost borrowing (de Bassa

Scheresberg, 2013). Financial knowledge could be an important contributor to improving the quality of these major, longer-term financial decisions.

As young adults mature, the transition into financial self-sufficiency creates a need for increased financial knowledge and skill as they face more financial obligations. Shim, Serido, Bosch, and Tang (2013) stated that meaningful changes occur in young adults in their teens and twenties. Young adults were most familiar with financial behaviors such as budgeting, saving, and spending as opposed to paying, borrowing, and investing – which may not yet be fully developed skills in this age group. A possible hindrance to gaining financial experience may be the fact that many young adults live at home with their parents even after finishing college. A Pew Research Center report showed that 56.2% of young adults between the ages of 18 and 24 were living with their parents. This compares to 16.0% of young adults between the ages of 25 and 31 living with their parents (Fry, 2013).

Increasing financial literacy in young adults as well as their confidence in their financial abilities may be the key to improving financial behaviors. Research by de Bassa Scheresberg (2013) reported a significant association between a subjective measure of financial knowledge and positive financial behavior. Subjective financial knowledge, reported as financial confidence, was positively correlated with less use of high-cost borrowing methods, a higher likelihood of planning for retirement, and a higher likelihood to save for an emergency. In other words, the respondent's level of confidence in financial knowledge increased the likelihood of engaging in positive financial behaviors.

Mid-career years. Generally known as the peak earning years, individuals in their mid-career make key financial decisions (Fox, Bartholomae, & Lee, 2005; Lusardi & Mitchell, 2007b). Yet research has demonstrated that a lack of financial literacy is still apparent in this age

cohort. Using data analyzed about financial literacy from the 2008 Health and Retirement Study (HRS), Lusardi, Mitchell, and Curto (2009) showed a lack of financial literacy among adults ages 40 – 60. Likewise, the National Council on Economic Education (2005) reported limited knowledge of important economic concepts among working adults.

The association between financial literacy and financial behaviors is important in this mid-career age cohort as well. Using data from the ALP, Lusardi and Mitchell (2007b) reported research aimed at evaluating financial knowledge during workers' prime earning years. The ALP sample respondents were aged 40 – 60, and at this age most of them reported that they had spent some time thinking about retirement. Yet, only those who actually engaged in retirement planning had higher levels of financial literacy (Banks, O'Dea, & Oldfield, 2010; Lusardi & Mitchell, 2007a; Lusardi & Mitchell, 2007b). Likewise, Bernheim, Garrett, and Maki (2001) examined the age group 35-49 and found that those exposed to financial education in high school had higher levels of asset accumulation when they reached adulthood. Increasing financial literacy for these adults is viewed as important because other research has demonstrated that financial planning behavior explained the differences in personal savings and why some older adults retire with very little or no wealth (Lusardi & Mitchell, 2007a).

Regarding efforts to improve financial literacy and financial behaviors for this mid-career age cohort, Lusardi, Mitchell, and Curto (2009) posited that one-size-fits-all programs are unlikely to successfully address financial behaviors among these adults as they age. Given the different behavior patterns they found related to age, their research suggested using targeted programs to address the differences in preferences, saving needs, and financial knowledge among differing age groups (Lusardi, Mitchell, & Curto, 2009). Specifically targeted employee education often is the proposed solution which tends to focus solely on retirement savings for

employees (Clark, D'Ambrosio, McDermed, & Sawant, 2003). Indeed, Bernheim and Garrett (2003) examined the age group 30 – 48 and found employee education improved retirement saving amounts among employees. In other words, the financial knowledge gained improved saving behavior, an important financial behavior discussed in much of the research.

Older adults. Financial literacy continues to be vital even into the later years. Skills important in retirement planning also are important after retirement – skills such as understanding bonds, stocks, mutual funds, compound interest, loans, and mortgages (Herd, Holden, & Su, 2012). Respondents aged 60 and older from a sample in the Consumer Finance Monthly Survey were asked 20 financial literacy questions. The results showed a steady decline in financial literacy with age; however, confidence in decisions regarding finances increased slightly with age (Finke, Howe, & Huston, 2011).

Much of the financial literacy research about older adults has focused on planning behaviors, specifically planning for retirement. Indeed, Lusardi and Mitchell (2005) found a clear relationship between financial knowledge and retirement planning. Not only did their findings show respondents with a higher level of financial knowledge were likelier to plan, but they also were likelier to succeed in their planning. This theme carries throughout much of the research published by Lusardi and Mitchell (2005; 2006; 2007a; 2007b; 2010; 2011). In another study of adults 60 and older, the authors indicated a higher level of financial literacy was associated with better decision-making and suggested that an improvement in financial literacy would lead to a better quality of life in later years (James et al., 2012). In general, researchers have reported that the knowledge needed to be effective at financial management has increased due to the onset of defined contribution plans versus the traditional pension plan, as well as changes in Social Security policy (Boshara et al., 2010; Herd, Holden, & Su, 2012).

Age cohort summary. This dissertation addresses the question - how does the influence of financial literacy on financial behaviors differ by age cohort? The definition of age cohorts that span 10 years was discussed as a more useful approach to analyze consumer financial behaviors and needs as compared to generations that span 20 years. The discussion regarding age overall covered the central theme of financial knowledge increasing over time and the distinction between fluid intelligence and crystallized intelligence. The experience that is apparent in crystallized intelligence often offsets any cognitive impairment due to age or loss of fluid intelligence. Findings in support of this indicated that older adults scored higher on financial literacy assessments than younger adults (Agarwal et al., 2009; Delavande, Rohwedder, & Willis, 2008). Indeed, the National Council on Economics (2005) reported that older adults performed better on an assessment of concepts than did younger adults.

When addressing the age-specific research discussed in this section, it is important to acknowledge the research regarding low financial literacy in all age cohorts. Even with the theme of knowledge increasing over time, findings still showed that adults of all ages operate at a deficit in terms of financial literacy. In addition, each age cohort faces new and different financial decisions. For example, younger adults are likely to be involved in major financial decisions such as buying a home or car, yet lack the level of financial literacy needed to prevent financial mistakes. Mid-career adults, in their peak earning years, make major financial decisions with lasting consequences such as planning and saving for retirement. Likewise, older adults continue to need financial literacy into retirement as the understanding of bonds, stocks, mutual funds, compound interest, loans, and mortgages will continue to be important (Herd, Holden, & Su, 2012).

Financial Literacy, Knowledge, and Behavior

Financial literacy in general consists of a variety of constructs and has been discussed and defined in a variety of ways in the literature. As a foundational concept, literacy is a skill that enables an individual to read and learn. The classification of literacy in this form often is not a measure of achievement, but indicates what literacy enables us to do (Nutbeam, 2000). It is a form of communicating, recording, and learning. Financial literacy contains these familiar concepts; working with finances requires communicating with specific terms and using specific concepts. Individuals also use records to manage their resources (bank statements and checkbook registers, for example). Indeed, when compared to the definition of reading literacy, the term financial is easily substituted for written to achieve the following definition of financial literacy: "using [*financial*] information to function in society, to achieve one's goals, and to develop one's knowledge and potential" (Baer, Cook, & Baldi, 2006, p. 10).

Huston (2010) suggested defining financial literacy as "how well an individual can understand and use personal finance-related information" (p. 306). Huston (2012) considers financial literacy to be a component of human capital. This financial portion of human capital can be used in the process of maximizing utility in consumption. Also, Remund (2010) suggested that financial literacy has a relationship with a person's competency for managing money.

In January 2008, President George W. Bush established the President's Advisory Council on Financial Literacy (PACFL) with the charge to improve financial literacy among Americans. The definition set forth by this advisory council is as follows: "financial literacy is the ability to use knowledge and skills to manage resources effectively for a lifetime of well-being" (PACFL, 2008, p. 4). This definition was supported by Remund (2010) where he suggested that academics rally around such a definition of financial literacy, since it was adopted by the government, and

operationalize definitions to measure it. The definition suggests separate pieces to the construct of financial literacy: financial knowledge and financial skills (Knoll & Houts, 2012). Accepted by many in the field of financial literacy research, this definition also fits the conceptual model described by Huston (2010) which is used to define and study financial literacy for the purposes of this dissertation.

In accordance with Huston's (2010) model, in this study, financial literacy includes the constructs of financial knowledge, confidence in financial knowledge, and confidence in one's ability to manage financial matters. These are referred to as objective financial knowledge, subjective financial knowledge, and subjective financial management ability. Often, financial literacy and financial knowledge are terms used interchangeably in the literature and this dissertation distinguishes between the two. However, the literature review also uses the terminology as chosen by the authors of the respective studies.

A lack of financial knowledge has been associated with behaviors that led to financial mistakes such as over borrowing, high interest rate mortgages (Lusardi, 2008), and limited saving and investment. According to Braunstein and Welch (2002), a deficiency in financial knowledge impacts the day-to-day management of finances as well as the ability to save money for the long-term. For example, financial knowledge has been associated with positive financial behaviors such as having a checking account, paying bills on time, tracking expenses, having a savings account, and having an emergency fund (Hilgert, Hogarth, & Beverly, 2003). Having investments and saving for the long-term also were associated with levels of financial knowledge in a study specific to Washington State residents (Moore, 2003). In both studies, positive financial behaviors were associated with higher levels of financial knowledge (Hilgert, Hogarth, & Beverly, 2003; Moore, 2003). The same holds true for retirement planning and preparation

(Delavande, Rohwedder, & Willis, 2008). Overall these findings agree with those of others (Banks, O'Dea, & Oldfield, 2010; Lusardi & Mitchell, 2005) that individuals with a higher level of financial knowledge tend to be planners (Lusardi & Mitchell, 2005).

Measures of subjective financial knowledge, often referred to as financial confidence, have been linked to behaviors in managing finances as well. Indeed, van Rooij, Lusardi, and Alessie (2012) suggested in their research that respondents with higher levels of confidence in their financial knowledge tended to have a higher propensity to plan. Additionally, respondents with a higher level of subjective knowledge (holding objective knowledge constant) were likelier to enroll in a 401(k) plan (Hadar, Sood, & Fox, 2013). Robb and Woodyard (2011) also reported that financial confidence was positively associated with best practices in finances. Likewise, subjective financial knowledge was a stronger predictor of good credit card practices than actual (objective) financial knowledge (Allgood & Walstad, 2011). Allgood and Walstad (2011) recommended further research about the relationship of other types of financial behaviors with subjective financial knowledge. This dissertation addresses that recommendation.

Alternatively, researchers Schlosser, Dunning, Johnson, and Kruger (2013) confirmed the Dunning-Kruger effect that indicates subjects with lower levels of knowledge inaccurately overrate themselves on their performance. Findings indicated that deficits in the respondents' knowledge prevented them from not only answering questions correctly, but also from recognizing that they did not do well on an exam. Overconfidence has been studied in the financial behavior literature; one consequence of overconfidence is that investors make less than favorable decisions when they are overconfident (Barber & Odean, 2001). Indeed, Huston (2012) found that those with a low level of financial knowledge combined with a high level of confidence were in a "danger zone" for financial management abilities and were financially

overconfident (p. 568). Bias presents itself psychologically often as overconfidence –

specifically in relation to finances. Overconfidence can create reduced diversification and intense

reactions to changes in the market (Xiao et al., 2010). Notably, financial knowledge and financial

confidence have a low correlation – but both affect behavior (Robb & Woodyard, 2011). This is

an important point when considering the definition of financial literacy used in this dissertation.

Measuring Financial Literacy

In recent years, researchers have created many types of assessments aimed at measuring

financial literacy and levels of financial knowledge. Assessments have been created for high

school students, college students, military personnel, working individuals, low-income workers,

and the community at large. The instruments used for these assessments vary as the population

varies; for example, the financial literacy of high school students has been measured using a 56-

question instrument from the Jump$tart Coalition (Mandell, 2008). In an assessment of low-

income workers, Rand (2004) asked 48 knowledge-based questions. In an assessment of military

personnel, researchers Bell, Gorin, and Hogarth (2009) assessed financial behaviors using 77

questions. Texas Tech University compiled a 20-question assessment via the Financial Literacy

Assessment Project (Huston, 2012), focusing on both objective financial literacy and subjective

financial confidence. At the opposite extreme, Lusardi and Mitchell (2005) based an assessment

of financial literacy on three questions that examined numeracy and an understanding of current

financial concepts.

The measures used in this dissertation are questions that have been used extensively in

the literature and are based in a set of questions put forth by Lusardi and Mitchell (2007b). They

reflect a mixture of numerical questions and financial concept questions and they provide a basis

to measure objective financial knowledge. Although a longer assessment (Knoll & Houts, 2012)

of perhaps 20 questions may be desirable, the questions used in the FINRA dataset have been accepted by many in the field as standard and have been administered in a variety of settings. The questions include simple calculations involving compound interest, understanding inflation, knowledge of risk diversification, mortgage loans, and bond pricing. Lusardi and Mitchell (2010) stated that understanding compound interest and inflation is vital in the decisions surrounding savings. Additionally, knowledge of risk diversification is important to make more informed investing and retirement decisions. The questions are included at the end of this review of literature. (See Table 2.1.)

Financial Literacy Conceptual Model

This dissertation used a conceptual framework for a model of financial literacy that was founded in a model Huston (2010) proposed. For the model, inputs into the system are human capital, financial education, and other influences such as demographics, culture, and family influences. These influences impact financial literacy which in turn is associated with the individual's behavior. (See Figure 2.1.)

Figure 2.1

Relations among Financial Literacy, Knowledge, Education, Behavior and Well-Being
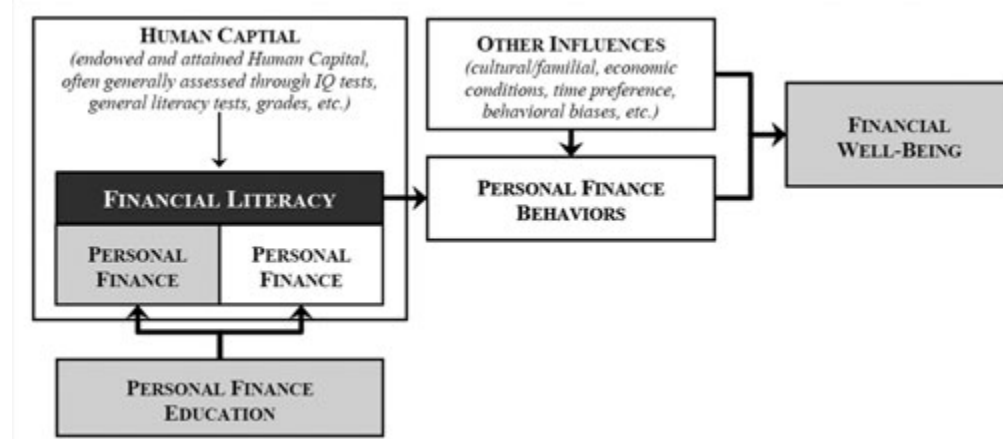
(Huston, 2010)

A more detailed view of Huston's (2010) model outlines the section that encompasses financial literacy. (See Figure 2.2.) Financial literacy involves financial knowledge and financial application. The application section emphasizes ability and confidence. An individual's objective level of financial knowledge is only part of financial literacy; the other part lies in the subjective level and confidence in an individual's ability.

Figure 2.2

Concept of Financial Literacy
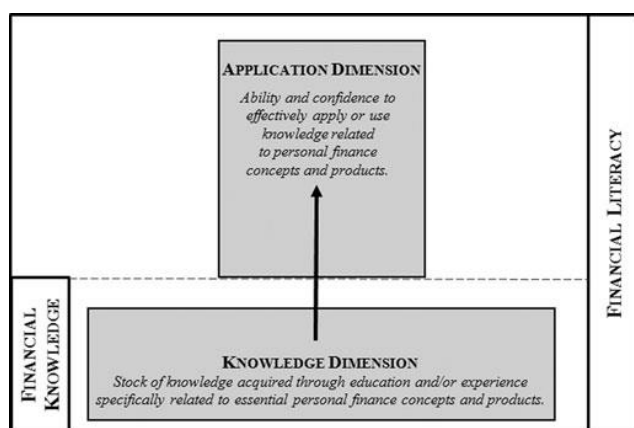
(Huston, 2010)

The conceptual model designed for this dissertation and founded in Huston's (2010) model directly links variables available in the FINRA data to sections of the model and the hypotheses. (See Figure 2.3.) Understanding the broad view of human capital, financial education, financial literacy (as defined here), financial behaviors, and financial well-being in this context helps to place the analysis of financial knowledge and financial behaviors in context.

Figure 2.3

A Conceptual Framework of Financial Literacy
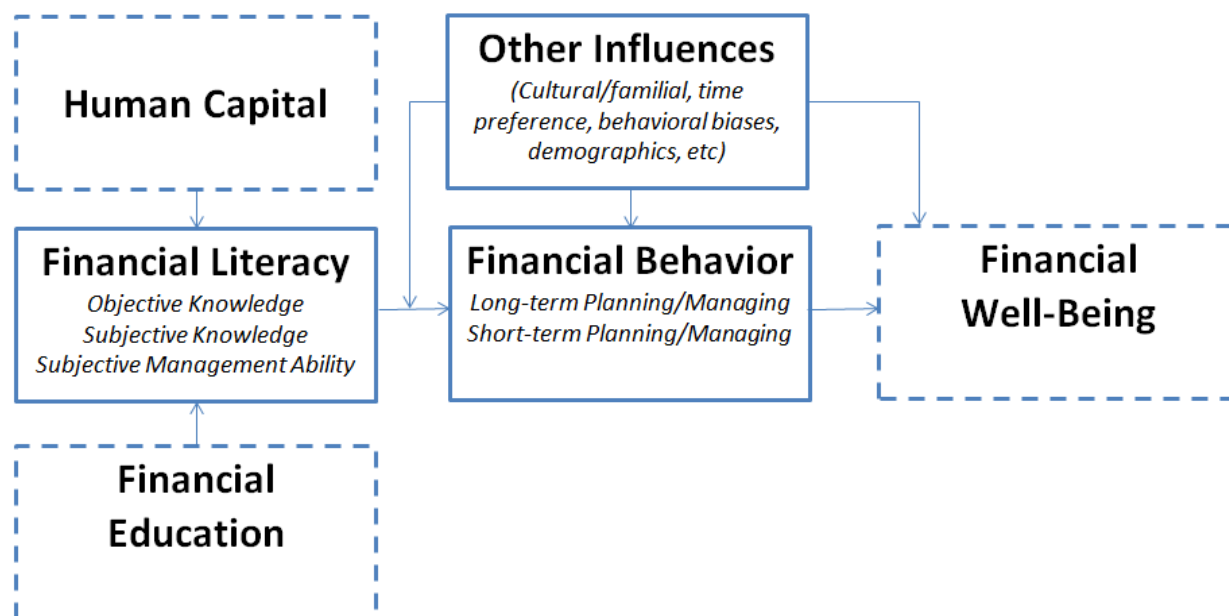
This model (see Figure 2.3), fashioned after the model proposed by Huston (2010), considered human capital, as well as the specific human capital related to personal finance, as contributors to financial literacy. The relationship between financial literacy and long- and short-term financial behaviors was specifically examined in this dissertation. Other influences were recognized by using demographics as control variables and age to restrict the sample for the age-specific analysis. Human capital, financial education, and financial well-being were not included in the analysis for this dissertation.

Within the financial literacy segment of the model (see Figure 2.2), Huston included ability and confidence to apply knowledge as an important construct. Not only is financial literacy a stock of knowledge, but it also is important to have the confidence to apply that knowledge to personal finance. Using this as a foundation for the definition of financial literacy was important for the conceptual model applied in this dissertation and the measures examined in

the sample. Thus, the variables were chosen to represent the individual's stock of knowledge (objectively assessed financial knowledge) as well as confidence to apply knowledge (subjectively assessed financial knowledge). A variable for subjectively assessed financial management ability was included to capture ability from the model. After establishing this concept of financial literacy, Huston (2010) hypothesized that other influences have a bearing on financial behaviors in addition to financial literacy. For example, behavioral biases, economic conditions, family influences, time preferences, and cultural influences affect the behaviors of an individual. Key among these other influences are demographic characteristics. The focus of this dissertation is the effect of age cohorts. (See Figure 2.4.)

Figure 2.4

Financial Literacy Conceptual Model Used to Test Hypotheses
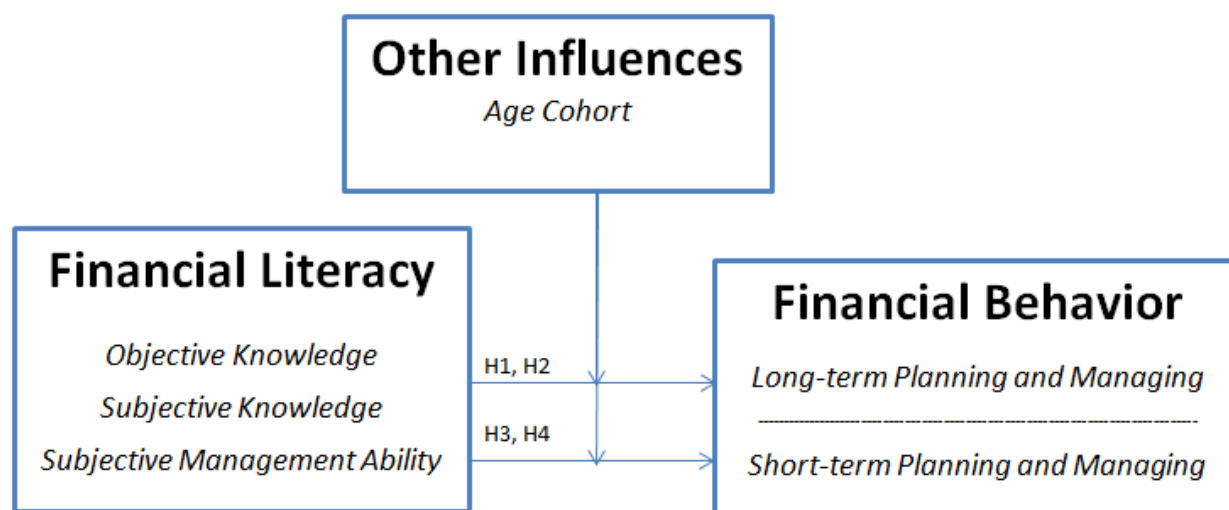
Figure 2.4 shows the specific components of financial literacy (objective and subjective financial knowledge and subjective financial management ability). Each component represents variables used in the model.

Hypotheses are added to the figure to show the focus of analysis as follows:

H1: While moderating for the age cohort effect, greater financial knowledge and subjective financial management ability are positively associated with positive long-term financial planning and managing behaviors.

H2: The influence of financial knowledge on long-term financial planning and managing behaviors is different in different age cohorts.

H3: While moderating for the age cohort effect, greater financial knowledge and subjective financial management ability are positively associated with positive short-term financial planning and managing behaviors.

H4: The influence of financial knowledge and subjective financial management ability on short-term financial planning and managing behaviors is different in different age cohorts.

Conclusion

In conclusion, the literature in the area of age cohorts has so far indicated meaningful differences in financial literacy and financial behaviors. For example, older adults have scored higher than younger adults on tests of financial literacy, suggesting that knowledge increases over time and that experience leads to more knowledge. Also, younger adults have experience with shorter term financial behaviors such as spending and budgeting (Shim et al., 2013). Therefore, younger adults may manage short-term financial behaviors better than they manage long-term financial behaviors. Understanding the changes in fluid intelligence and the importance of crystallized intelligence sets the stage for educators and policy makers to approach the issue of increasing financial literacy using methods tailored to various ages. Meeting the consumer's need for knowledge and information at a level they can apply and that they can relate to may help address the apparent need more directly than a generalized education forum.

In addition, a conceptual model based in the literature and the definition set forth by the PACFL helped guide the research. Much of the research surrounding the categorizations and definitions of financial behaviors has supported the decision to focus on long-term and short-term financial planning and managing behaviors and to analyze the impact of objective and subjective financial knowledge and subjective financial management ability. The combination of analysis of influences on financial behaviors by age cohorts fills a gap in the literature that not only supports previous work, but also provides a unique perspective and set of findings. Having discussed the need for additional literature about age cohorts and financial literacy, presented a conceptual model, and provided background about previous financial behavior research, this review of literature supports the value of an analysis of how influences on financial behaviors vary by age cohort. The next chapter will discuss the research methodology in detail.

Table 2.1

Description of Objective Financial Knowledge Variables

Question	Content of Question
Objective Financial Knowledge	
Growth Question	Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? More than $102 (correct), Exactly $102, Less than $102, Don't know, Prefer not to say
Inflation Question	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? More than today, Exactly the same, Less than today (correct), Don't know, Prefer not to say
Mutual Fund Question	Buying a single company's stock usually provides a safer return than a stock mutual fund. True, False (correct), Don't know, Prefer not to say
Mortgage Question	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. True (correct), False, Don't know, Prefer not to say
Bond Price Question	If interest rates rise, what will typically happen to bond prices? They will rise, They will fall (correct), They will stay the same, There is no relationship between bond prices and the interest rate, Don't know, Prefer not to say

Table 2.2

Description of Subjective Financial Knowledge and Management Variables

Question	Content of Question
Subjective Financial Knowledge	
	On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you assess your overall financial knowledge?
	1 – 7, Don't know, Prefer not to say
Subjective Financial Management Ability	
	How strongly do you agree or disagree with the following statement? On a scale of 1 to 7, where 1 = Strongly Disagree, 7 = Strongly Agree. I am good at dealing with day-to-day financial matters, such as checking accounts, credit and debit cards, and tracking expenses.
	1 – 7, Don't know, Prefer not to say

Table 2.3

Financial Knowledge Questions from Previous Research

Question	Source
Growth Question	Allgood & Walstad, 2011
	Allgood & Walstad, 2012
	Collins, 2012
	Lachance & Tang, 2012
	Lusardi, 2011
	Lusardi & de Bassa Scheresberg, 2013
	Lusardi & Mitchell, 2005
	Lusardi & Mitchell, 2007b
	Lusardi & Mitchell, 2008
	Lusardi & Mitchell, 2010
	Lusardi & Mitchell, 2011
	Lusardi, Mitchell, & Curto, 2010
	Robb, Babiarz, & Woodyard, 2012
	Robb & Woodyard, 2011

Inflation Question	Allgood & Walstad, 2011
	Allgood & Walstad, 2012
	Collins, 2012
	Lachance & Tang, 2012
	Lusardi, 2011
	Lusardi & de Bassa Scheresberg, 2013
	Lusardi & Mitchell, 2005
	Lusardi & Mitchell, 2007b
	Lusardi & Mitchell, 2008
	Lusardi & Mitchell, 2010
	Lusardi & Mitchell, 2011
	Lusardi, Mitchell, & Curto, 2010
	Robb, Babiarz, & Woodyard, 2012
	Robb & Woodyard, 2011

Mutual Fund Question	Allgood & Walstad, 2011
	Allgood & Walstad, 2012
	Collins, 2012
	Lachance & Tang, 2012
	Lusardi, 2011
	Lusardi & de Bassa Scheresberg, 2013
	Lusardi & Mitchell, 2005
	Lusardi & Mitchell, 2007b
	Lusardi & Mitchell, 2008
	Lusardi & Mitchell, 2010
	Lusardi & Mitchell, 2011
	Lusardi, Mitchell, & Curto, 2010
	Robb, Babiarz, & Woodyard, 2012
	Robb & Woodyard, 2011

Mortgage Question	Allgood & Walstad, 2011
	Allgood & Walstad, 2012
	Collins, 2012
	Lachance & Tang, 2012
	Lusardi, 2011
	Robb, Babiarz, & Woodyard, 2012
	Robb & Woodyard, 2011
Bond Price Question	Allgood & Walstad, 2011
	Allgood & Walstad, 2012
	Collins, 2012
	Lachance & Tang, 2012
	Lusardi, 2011
	Lusardi & Mitchell, 2007b
	Lusardi & Mitchell, 2010
	Lusardi, Mitchell, & Curto, 2009
	Robb, Babiarz, & Woodyard, 2012
	Robb & Woodyard, 2011

CHAPTER 3

RESEARCH METHODS

The purpose of this study was to add to the literature in the field of financial literacy by examining the relationship between financial literacy and long- and short-term financial behaviors by age cohort. In this research, financial literacy was assessed by measuring objective financial knowledge, subjective financial knowledge, and subjective financial management ability. Specifically, this study analyzed the relationship between financial literacy and financial behaviors in six age cohorts. The three long-term financial behaviors analyzed were retirement planning, having a retirement account, and having investments in stocks, bonds, mutual funds, or other securities. The four short-term financial behaviors analyzed were having an emergency fund, spending within one's income, having no overdraft activity in a checking account, and paying mortgage payments on time. Logistic regression was used to analyze the 2012 FINRA data.

Research Questions and Hypotheses

To guide the analysis, a conceptual model was used; the model was based on one by Huston (2010). Based on a review of the relevant literature and this conceptual model, four hypotheses were created. Each focused on financial literacy in the form of objective and subjective financial knowledge and subjective financial management ability, and its relationship to a specific set of financial behaviors across six age cohorts.

The overall research question was how financial literacy influences long- and short-term financial behaviors in different age cohorts. This was examined using the following hypotheses:

H1: While moderating for the age cohort effect, greater financial knowledge and subjective financial management ability are positively associated with positive long-term financial planning and managing behaviors.

H1A: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with long-term financial planning and managing behaviors.

H1A1: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with retirement planning.

H1A2: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with having a retirement account.

H1A3: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with having investments in stocks, bonds, mutual funds, or other securities.

H1B: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with positive long-term financial planning and managing behaviors.

H1B1: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with retirement planning.

H1B2: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with having a retirement account.

H1B3: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with having investments in stocks, bonds, mutual funds, or other securities.

H1C: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with positive long-term financial planning and managing behaviors.

> H1C1: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with retirement planning.

> H1C2: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with having a retirement account.

> H1C3: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with having investments in stocks, bonds, mutual funds, or other securities.

H2: The influence of financial knowledge and subjective financial management ability on long-term financial planning and managing behaviors is different in different age cohorts.

H2A: The influence of objective financial knowledge on long-term financial planning and managing behaviors is different in different age cohorts.

> H2A1: The influence of objective financial knowledge on retirement planning is different in different age cohorts.

> H2A2: The influence of objective financial knowledge on having a retirement account is different in different age cohorts.

> H2A3: The influence of objective financial knowledge on having investments in stocks, bonds, mutual funds, or other securities is different in different age cohorts.

H2B: The influence of subjective financial knowledge on long-term financial planning and managing behaviors is different in different age cohorts.

H2B1: The influence of subjective financial knowledge on retirement planning is different in different age cohorts.

H2B2: The influence of subjective financial knowledge on having a retirement account is different in different age cohorts.

H2B3: The influence of subjective financial knowledge on having investments in stocks, bonds, mutual funds, or other securities is different in different age cohorts.

H2C: The influence of subjective financial management ability on long-term financial planning and managing behaviors is different in different age cohorts.

H2C1: The influence of subjective financial management ability on retirement planning is different in different age cohorts.

H2C2: The influence of subjective financial management ability on having a retirement account is different in different age cohorts.

H2C3: The influence of subjective financial management ability on having investments in stocks, bonds, mutual funds, or other securities is different in different age cohorts.

H3: While moderating for the age cohort effect, greater financial knowledge and subjective financial management ability are positively associated with positive short-term financial planning and managing behaviors.

H3A: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with short-term financial planning and managing behaviors.

H3A1: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with having an emergency fund.

H3A2: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with spending less than or equal to one's income.

H3A3: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with not overdrawing a checking account.

H3A4: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with making mortgage payments on time.

H3B: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with positive short-term financial planning and managing behaviors.

H3B1: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with having an emergency fund.

H3B2: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with spending less than or equal to one's income.

H3B3: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with not overdrawing a checking account.

H3B4: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with making mortgage payments on time.

H3C: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with short-term financial planning and managing behaviors.

H3C1: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with having an emergency fund.

H3C2: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with spending less than or equal to one's income.

H3C3: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with not overdrawing a checking account.

H3C4: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with making mortgage payments on time.

H4: The influence of financial knowledge and subjective financial management ability on short-term financial planning and managing behaviors is different in different age cohorts.

H4A: The influence of objective financial knowledge on short-term financial planning and managing behaviors is different in different age cohorts.

H4A1: The influence of objective financial knowledge on having an emergency fund is different in different age cohorts.

H4A2: The influence of objective financial knowledge on spending less than or equal to one's income is different in different age cohorts.

H4A3: The influence of objective financial knowledge on not overdrawing a checking account is different in different age cohorts.

H4A4: The influence of objective financial knowledge on making mortgage payments on time is different in different age cohorts.

H4B: The influence of subjective financial knowledge on short-term financial planning and managing behaviors is different in different age cohorts.

H4B1: The influence of subjective financial knowledge on having an emergency fund is different in different age cohorts.

H4B2: The influence of subjective financial knowledge on spending less than or equal to one's income is different in different age cohorts.

H4B3: The influence of subjective financial knowledge on not overdrawing a checking account is different in different age cohorts.

H4B4: The influence of subjective financial knowledge on making mortgage payments on time is different in different age cohorts.

H4C: The influence of subjective financial management ability on short-term financial planning and managing behaviors is different in different age cohorts.

H4C1: The influence of subjective financial management ability on having an emergency fund is different in different age cohorts.

H4C2: The influence of subjective financial management ability on spending less than or equal to one's income is different in different age cohorts.

H4C3: The influence of subjective financial management ability on not overdrawing a checking account is different in different age cohorts.

H4C4: The influence of subjective financial management ability on making mortgage payments on time is different in different age cohorts.

Data and Sample

The data used for this dissertation came from the Financial Industry Regulatory Authority (FINRA) dataset, a nationally representative sample from the 2012 National Financial Capability

Study (NFCS). Funded by FINRA, the research was conducted by Applied Research and Consulting (FINRA, 2013). The questionnaire was administered on a state-by-state basis to achieve approximately 500 observations from each state and the District of Columbia. The original sample consisted of 25,509 adults (18 and older); quotas were set to approximate the US Census demographic distributions. The questionnaire was administered on a website over the months from July through October 2012 (FINRA, 2013). FINRA sampled from existing online panels provided by Survey Sampling International (SSI), EMI Online Research Solutions, and Research Now. The panels consisted of millions of individuals who participate in online surveys in exchange for incentives. The survey organizations used industry standard methods to verify the validity and accuracy of panel members' demographic characteristics.

The self-reported data were collected and made available to researchers in May 2013. The national data were weighted to reflect the US Census based on data from the American Community Survey. The final sample used for this dissertation was 23,727; dropped from the sample were observations where the respondent chose "prefer not to say" as their answer to the questions dealing with financial behaviors and objective financial knowledge used in the analysis and where the respondent answered "prefer not to say" or "don't know" as their answer to the subjective knowledge and management questions. In the case of the objective financial knowledge questions, an answer of "don't know" was coded as incorrect.

The survey questionnaire was organized into sections covering demographics, financial attitudes and behaviors, financial advisors, money management, retirement accounts, sources of income, home and mortgages, credit cards, other debt, insurance, and self-assessment and literacy. Questions used in the analysis for this dissertation, in addition to demographics, were

from the sections covering financial attitudes and behaviors, money management, retirement accounts, home and mortgages, and self-assessment and literacy.

Dependent variables. As shown in Table 3.1, three dependent binary variables were used to represent the survey respondents' long-term financial planning and managing behaviors. Each logistic regression used one of the three dependent binary variables. The first variable represents whether the respondent had ever figured out how much the household needs for retirement, or, for retired respondents, if they did so prior to retirement. This variable, referred to as retirement planning, was coded 1 for yes and 0 for no. Likewise, the second variable represents whether the respondent had a retirement account, and the third variable represents long-term investment activity by the respondent other than retirement accounts. These variables were based on the following questions from the survey:

Retirement Planning:

- Have you ever tried to figure out how much you need to save for retirement?

- Before you (or your spouse) retired, did you try to figure out how much you needed to save for retirement?

Retirement Account:

- Do you (or your spouse) have any retirement plans through a current or previous employer, like a pension plan or a 401(k)?

- Do you (or your spouse) have any other retirement accounts NOT through an employer, like an IRA, Keogh, SEP, or any other type of retirement account that you have set up yourself?

Investments:

- Not including retirement accounts, does your household have any investments in stock, bonds, mutual funds, or other securities?

Also shown in Table 3.1, four dependent binary variables were used to represent the survey respondents' short-term financial planning and managing behaviors. Each logistic regression used one of the four dependent binary variables. The first variable represents whether the respondent had an emergency fund. This variable was coded 1 for yes and 0 for no. Likewise, the second variable represents whether the respondent spent less than or equal to the household income. The third variable represents whether the respondent reported having overdrawn a checking account. Lastly, the fourth variable represents whether the respondent reported making mortgage payments on time; this variable was analyzed in the context of those respondents who reported currently having a mortgage on their home. These variables were based on the following questions from the survey:

Short-term financial behaviors: planning and managing

Spend less than or equal to income:

- Over the past year, would you say your household's spending was less than, more than, or about equal to your household's income? Please do not include the purchase of a new house or car, or other big investments you may have made.

Emergency Fund:

- Have you set aside emergency or rainy day funds that would cover your expenses for 3 months, in case of sickness, job loss, economic downturn, or other emergencies?

No overdrafts:

- Do you (or your spouse) overdraw your checking account occasionally?

Making mortgage payments on time:

- How many times have you been late with your mortgage payments in the last 2 years?
  - Never, once, more than once

Independent variables. A primary focus of this research was age cohorts. The age groups were dichotomized into six categories. For example, respondents between the ages of 18 and 24 were coded as a variable with a value of 1 if the respondent was between 18 and 24 or 0 otherwise. Likewise, this was done for each age group as follows: 25-34, 35-44, 45-54, 55-64, and 65 and older.

The 18-24 age group was the reference group in the logistic regression to test the first and third hypotheses. In the second and fourth hypotheses, the age categories were used to restrict the sample and six logistic regressions were run, one for each age group. This allowed an intra-group analysis of the association of financial behaviors and financial literacy.

Seven other demographic characteristics were included as control variables in the analysis. Five of the variables were dichotomized and defined as follows: gender (male = 1, female = 0), race (white = 1, 0 otherwise), marital status (married = 1, 0 otherwise), presence of children (1 or more financially dependent children living at home = 1, 0 otherwise), and employment status (employed = 1, 0 otherwise). Education and income were coded and placed into four dichotomous categories: high school, some college, college graduate, and post-secondary graduate; income less than $25,000, $25,001 - $50,000, $50,001 - $100,000, and $100,001 or more. The high school variable was the reference group for education while the less than $25,000 variable was the reference group for income.

The financial literacy variables were defined to reflect the conceptual model which includes objective knowledge, subjective knowledge, and subjective financial management

ability. Objectively assessed financial knowledge variable was based on the number of correct answers to five questions (0 – 5). Subjectively assessed financial knowledge was based on a question with responses on a scale of 1 – 7, with 1 being very low and 7 being very high. This provided the basis for the variable referred to as subjective financial knowledge. Subjectively assessed financial management ability was based on a question with responses on a scale of 1 – 7, with 1 being strongly disagree (that "I am good at dealing with day-to-day financial matters…") and 7 being strongly agree. This provided the basis for the variable referred to as subjective financial management ability. The specific questions are shown in Table 3.2.

The three components of financial literacy showed a very low correlation with one another indicating that the three measures were not likely to measure the same construct and each contributed a unique element to the measure of financial literacy. Correlations are provided in Table 3.3. This is similar to previous literature; notably, financial knowledge and financial confidence have a low correlation but both affect behavior (Robb & Woodyard, 2011). This is an important point when considering the definition of financial literacy used in this dissertation.

Data Analysis Procedures

Using the data from the 2012 FINRA NFCS, analyses were completed using Stata 12 to perform logistic regressions and other statistical tests and create a complete set of descriptive statistics for the sample. The logistic regression was formulated with the binary financial behavior variable as the dependent variable and the independent variables – objective financial knowledge, subjective financial knowledge, and subjective financial management. Age cohort also was an independent variable. Other demographic variables were included as control variables. Odds ratios were used to interpret results. Statistical tests were run including the Variance Inflation Factor (VIF) to test for multicollinearity and t-tests to test the relationships

between the dependent variables and the relevant variables identified in the literature and the conceptual model.

The VIF test indicated no multicollinearity between the independent variables proposed for use in this dissertation; all factors were less than four (Halcoussis, 2005). The preliminary t-tests for the long-term financial planning and managing behaviors indicated significant relationships for the majority of the relationships between each of the dependent variables and each of the independent variables with the exception of retirement planning and having financially dependent children, and some college and having a retirement account. Likewise, the preliminary t-tests for the short-term financial planning and managing behaviors indicated significant relationships for the majority of relationships between each of the dependent variables and each of the independent variables.

The choice of logistic regression reflects the dichotomous nature of the dependent variables. Logistic regression allows for probability estimates that are bounded by 0 and 1 (Halcoussis, 2005). A change in the independent variable (X) affects the log of the odds that the dependent variable (Y) is equal to 1. This explains, holding all other variables constant, the change in the log odds for a one unit change in X. The formula for the logistic model is as follows:

$$\ln (Y/1\text{-}Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_n X_n + \varepsilon = \frac{e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_n X_n + \varepsilon}}{1+e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_n X_n + \varepsilon}} \qquad (1)$$

where Y is the dependent binary variable, X_i represents the independent variables, and β_0 is the log odds when X_i is equal to 0. The specific logistic model proposed for this dissertation includes financial literacy influences on financial behaviors using the financial behavior as the dependent variable. Examples of the actual formulas follow using long- and short-term financial behavior as

a placeholder term for the individual binary dependent variables. Variable names are listed in Table 3.1.

For the unrestricted sample: (2)

$Long\text{-}term\ financial\ behavior = \beta_0 + \beta_1 finlit + \beta_2 subjfinknow + \beta_3 subjfinmgmt + \beta_4 male + \beta_5 white + \beta_6 married + \beta_7 childdep + \beta_8 educsocoll + \beta_9 educcoll + \beta_{10} educgrad + \beta_{11} inc2 + \beta_{12} inc3 + \beta_{13} inc4 + \beta_{n14} employed + \beta_{15} age2 + \beta_{16} age3 + \beta_{17} age4 + \beta_{18} age5 + \beta_{19} age6 + \varepsilon$

For the restricted sample, by age cohort: (3)

$Long\text{-}term\ financial\ behavior = \beta_0 + \beta_1 finlit + \beta_2 subjfinknow + \beta_3 subjfinmgmt + \beta_4 male + \beta_5 white + \beta_6 married + \beta_7 childdep + \beta_8 educsocoll + \beta_9 educcoll + \beta_{10} educgrad + \beta_{11} inc2 + \beta_{12} inc3 + \beta_{13} inc4 + \beta_{n14} employed + \varepsilon$

For the unrestricted sample: (4)

$Short\text{-}term\ financial\ behavior = \beta_0 + \beta_1 finlit + \beta_2 subjfinknow + \beta_3 subjfinmgmt + \beta_4 male + \beta_5 white + \beta_6 married + \beta_7 childdep + \beta_8 educsocoll + \beta_9 educcoll + \beta_{10} educgrad + \beta_{11} inc2 + \beta_{12} inc3 + \beta_{13} inc4 + \beta_{n14} employed + \beta_{15} age2 + \beta_{16} age3 + \beta_{17} age4 + \beta_{18} age5 + \beta_{19} age6 + \varepsilon$

For the restricted sample, by age cohort: (5)

$Short\text{-}term\ financial\ behavior = \beta_0 + \beta_1 finlit + \beta_2 subjfinknow + \beta_3 subjfinmgmt + \beta_4 male + \beta_5 white + \beta_6 married + \beta_7 childdep + \beta_8 educsocoll + \beta_9 educcoll + \beta_{10} educgrad + \beta_{11} inc2 + \beta_{12} inc3 + \beta_{13} inc4 + \beta_{n14} employed + \varepsilon$

Table 3.1

Description of Dependent and Independent Variables

Variable	Variable Description
Dependent Variables	
Long-term Planning and Managing Behaviors	
Retirement Planning (retfig)	= 1 if respondent reported having ever tried to figure out how much was needed to save for retirement or did try to figure out what was needed prior to retirement, 0 otherwise
Retirement Account (retacct)	= 1 if respondent reported having a retirement account, 0 otherwise
Investments (securities)	= 1 if respondent reported having investments in stock, bonds, mutual funds, or other securities (not including retirement accounts), 0 otherwise
Short-term Planning and Managing	
Emergency Fund (efyes)	= 1 if respondent reported having an emergency fund that would cover expenses for 3 months, 0 otherwise
Spending (spendlteqinc)	= 1 if respondent reported spending less than or equal to household income over the past year, 0 otherwise
No overdrafts (notoverdraft)	= 1 if respondent reported not having overdrawn a checking account occasionally, 0 otherwise
Mortgage payments on time (notlatemort)	= 1 if respondent reported never having been late on a mortgage payment in the past two years, 0 otherwise

Note: Observations dropped if respondents answered "prefer not to say" for dependent variables.

Variable	Variable Description
Independent Variables	
Objective Financial Knowledge (finlit)	Number of correct answers to five financial knowledge questions (0 - 5)
Subjective Financial Knowledge (subjfinknow)	Number respondent answered on a low to high Likert scale (1 - 7) (dropping observations that chose don't know or prefer not to say)
Subjective Financial Management Ability (subjfinmgmt)	Number respondent answered on a low to high Likert scale (1 - 7) (dropping observations that chose don't know or prefer not to say)
Demographics	
Gender (male)	= 1 if respondent is male, 0 otherwise
Race (white)	= 1 if respondent's race is white, 0 otherwise
Marital Status (married)	= 1 if respondent is married, 0 otherwise
Dependent Children (childdep)	= 1 if respondent has one or more children that are financially dependent, 0 otherwise
Employment Status (employed)	= 1 if respondent is employed, 0 otherwise

Variable	Variable Description
Education	
High School (educhs)	= 1 if respondent's highest level of education was high school, 0 otherwise
Some College (educsocoll)	= 1 if respondent attended some college, 0 otherwise
College Graduate (educcoll)	= 1 if respondent was a college graduate, 0 otherwise
Post-Secondary Graduate (educgrad)	= 1 if respondent had a post graduate education, 0 otherwise
Income	
Less than $25,000 (inc1)	= 1 if household income was reported at less than $25,000, 0 otherwise
$25,001 - $50,000 (inc2)	= 1 if household income was reported between $25,001 and $50,000, 0 otherwise
$50,001 - $100,000 (inc3)	= 1 if household income was reported at between $50,001 and $100,000, 0 otherwise
$100,001 and more (inc4)	= 1 if household income was reported at $100,001 or more, 0 otherwise

Variable	Variable Description
Age cohort	
18-24 (age1)	= 1 if respondent was in the age cohort 18-24, 0 otherwise
25-34 (age2)	= 1 if respondent was in the age cohort 25-34, 0 otherwise
35-44 (age3)	= 1 if respondent was in the age cohort 35-44, 0 otherwise
45-54 (age4)	= 1 if respondent was in the age cohort 45-54, 0 otherwise
55-64 (age5)	= 1 if respondent was in the age cohort 55-64, 0 otherwise
65 and older (age6)	= 1 if respondent was in the age cohort 65 +, 0 otherwise

Table 3.2

Description of Financial Literacy Variables

Question	Content of Question
Objective Financial Knowledge	
Growth Question	Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? More than $102 (correct), Exactly $102, Less than $102, Don't know, Prefer not to say = 1 if answered correctly, 0 otherwise
Inflation Question	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? More than today, Exactly the same, Less than today (correct), Don't know, Prefer not to say = 1 if answered correctly, 0 otherwise
Mutual Fund Question	Buying a single company's stock usually provides a safer return than a stock mutual fund. True, False (correct), Don't know, Prefer not to say = 1 if answered correctly, 0 otherwise
Mortgage Question	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. True (correct), False, Don't know, Prefer not to say = 1 if answered correctly, 0 otherwise

Question	Content of Question
Bond Price Question	If interest rates rise, what will typically happen to bond prices? They will rise, They will fall (correct), They will stay the same, There is no relationship between bond prices and the interest rate, Don't know, Prefer not to say
	= 1 if answered correctly, 0 otherwise
Subjective Financial Knowledge	
	On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you assess your overall financial knowledge?
	1 – 7, Don't know (98), Prefer not to say (99)
	= Number answered (dropping observations that chose don't know or prefer not to say)
Subjective Financial Management Ability	
	How strongly do you agree or disagree with the following statement? On a scale of 1 to 7, where 1 = Strongly Disagree, 7 = Strongly Agree. I am good at dealing with day-to-day financial matters, such as checking accounts, credit and debit cards, and tracking expenses.
	1 – 7, Don't know (98), Prefer not to say (99)
	= Number answered (dropping observations that chose don't know or prefer not to say)

Note: Objective financial knowledge responses were categorized as incorrect and coded with 0 in the case of "Don't know" or "Prefer not to say" (Knoll & Houts, 2012).

Table 3.3

Correlation of Financial Literacy Components

Variable	Objective Financial Knowledge	Subjective Financial Knowledge	Subjective Financial Management
Objective Financial Knowledge	1.0000		
Subjective Financial Knowledge	0.2510	1.0000	
Subjective Financial Management	0.2533	0.4220	1.0000

CHAPTER 4

RESULTS

Results from the empirical analyses are discussed in this chapter which is organized by hypotheses. The first section presents descriptive results for the demographics of the sample and the financial literacy questions in general and by age cohort. Tables 4.1 – 4.5 are referenced as well as Figure 5 to provide an understanding of the data. The second section presents results from the tests of the hypotheses including tests of the second and fourth by age cohort. Tables 4.6 – 4.9 are referenced to show empirical results for each regression. Additionally, table 4.10 is referenced to compare the results of the objective financial knowledge questions to previous research. The final section provides a summary of findings. A summary table of the hypotheses is provided as well in Table 4.11 that outlines which hypotheses the results supported.

Descriptive Results

Descriptive statistics shown in Table 4.1 describe the 23,727 respondents in the sample. The data were weighted using the available weights for national representation that reflect data from the American Community Survey. The educational profile of the sample showed the largest group as those who had completed high school or less education (37.0%), followed closely by those respondents with some college education (36.3%). Slightly more than one-quarter of the respondents had a college or post-secondary degree (26.7%). Forty-nine percent of the sample were male, two-thirds were white (66.8%), more than one-half were married (54.2%) and more than one-third (40%) had dependent children at home. For income, the largest group (30.8%) earned between $50,001 and $100,000 annually, while about a quarter earned less than $25,000 and another quarter earned between $25,001 and $50,000. Less than one-fifth (17.5%) earned

more than $100,000. Each of the age cohorts (See Figure 4.1) represented less than 20% of the sample; the age cohort 45-54 was the largest at 19.7% while the age cohort 18-24 was the smallest (12.1% of the sample).

Figure 4.1.

Percentage of Respondents by Age Cohort

Age Cohorts

Age Cohort	Percentage
18 - 24	12.1%
25 - 34	18.5%
35 - 44	16.5%
45 - 54	19.7%
55 - 64	17.8%
65 +	15.4%
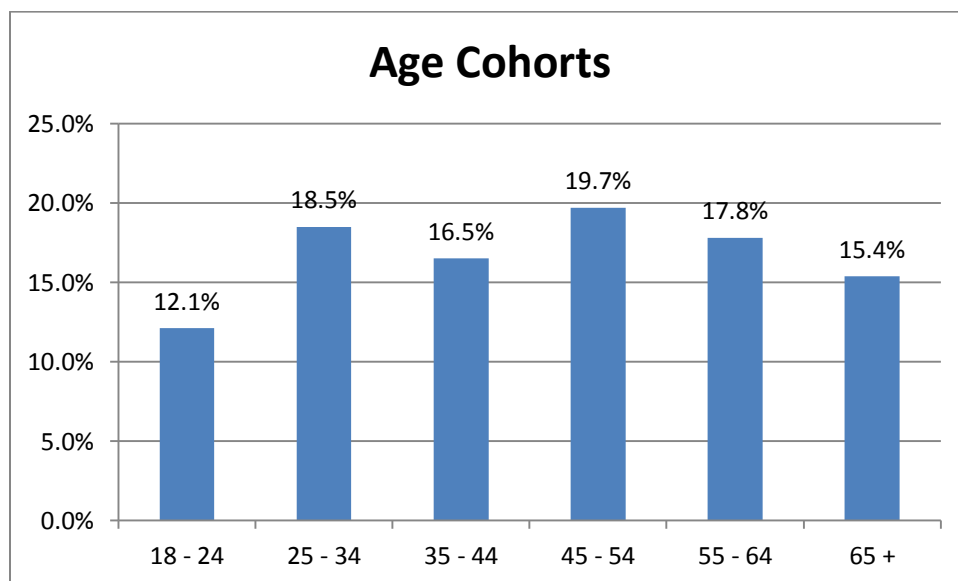
Table 4.2 reports the results of objectively and subjectively assessed financial knowledge as well as subjectively assessed financial management ability. For the objective assessment, a larger proportion of respondents answered the mortgage (76.8%) and growth questions (76.8%) correctly than any of the other objective financial knowledge questions, while the smallest proportion answered the bond price question (29.0%) correctly. Almost two-thirds (63.0%) answered the inflation question correctly, and one-half (50.0%) answered the mutual fund question correctly. Overall, 15.0% answered all five questions correctly. Lusardi and Mitchell (2007b) consider both the mutual fund question and the bond price question to be a more sophisticated level of financial knowledge so it is not surprising that these questions were answered correctly by fewer respondents. Other research has shown similar results (Lachance &

Tang, 2012; Lusardi, 2011; Lusardi, Mitchell, & Curto, 2009). See Table 4.10 for an overview of previous research organized by age that used the same questions to assess objective financial knowledge.

Table 4.2 also reports the means and standard deviations for each the three components of financial literacy: objective financial knowledge, subjective financial knowledge, and subjective financial management ability. The mean for the set of five objective financial knowledge questions was 2.96 (with a range of $0 - 5$) indicating an average of three out of five questions were answered correctly by the full sample. The standard deviation was 1.43 which represents how much the individual measures deviate from the mean, basically indicting that the average respondent answered between two and four questions correctly. A small percentage of respondents answered all five questions correctly. The subjectively assessed financial knowledge question asked "On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you assess your overall financial knowledge?" The mean for this subjective financial knowledge question was 5.15 indicating that the respondents overall had a fairly high level of subjectively assessed financial knowledge. The standard deviation was 1.29. The subjectively assessed financial management ability question asked "How strongly do you agree or disagree with the following statement? On a scale of 1 to 7, where 1 = Strongly Disagree, 7 = Strongly Agree. I am good at dealing with day-to-day financial matters, such as checking accounts, credit and debit cards, and tracking expenses." The mean for this subjective financial management question was 5.68. The standard deviation was 1.58. On average, this indicates an even higher level of subjectively assessed ability than subjectively assessed knowledge.

Table 4.3 shows the results by age cohort for each of the objective financial knowledge questions as well as the number of questions each age cohort answered correctly. Progressively,

each age cohort answered a larger proportion of the objective questions correctly. For example, 67.5% of the 18-24 age cohort answered the growth question correctly, followed respectively by 73.9%, 76.9%, 78.2% 79.3% and 82.4 % of the 65 and older age cohort. This represents a percentage change of 22.1% from the youngest age cohort to the oldest. This pattern also held true for each of the other four knowledge questions. The greatest difference in knowledge scores across age cohorts was for the inflation question; 81.1% of the respondents in the oldest age cohort answered this question correctly compared to 37.3% of the youngest age cohort. The difference in knowledge by age cohort was much smaller for the growth and mortgage questions. Just more than one-quarter (26.0%) of the oldest age cohort answered all five questions correctly compared to just 3.2% of the 18-24 age cohort.

Table 4.4 shows that for each of the age cohorts, the score for objective financial knowledge progressively increased from a mean of 2.1 for the youngest age cohort to a mean of 3.5 for the oldest age cohort. Not only did objective knowledge increase with age, but subjectively assessed knowledge (from a mean of 4.8 to a mean of 5.5) and subjectively assessed management ability (from a mean of 5.1 to a mean of 6.2) also increased with age. Age and experience support a sense of confidence in financial matters in addition to actual knowledge gain.

Table 4.5 reports the mean of the three measures of financial literacy (objective financial knowledge, subjective financial knowledge, and subjective financial management ability) by whether respondents reported engaging in each of the three positive long-term financial planning and managing behaviors and each of the four positive short-term financial planning and managing behaviors. In each case, the mean of the financial literacy measure was higher when

the respondent answered yes to the positive financial behavior. T-tests for each pairing were

significant at the 0.001 level and can be found in Table 4.5a.

Hypothesis 1 Results

The first hypothesis was written to explore the relationship between financial knowledge,

financial management ability, and long-term financial planning and managing behaviors while

moderating for the age cohort effect. H1 was supported; greater objective and subjective

financial knowledge and greater subjective financial management ability were positively

associated with the three positive long-term financial planning and managing behaviors. Table

4.6 shows the results of the logistic regressions organized by each of the long-term financial

behaviors. The pseudo R^2 is provided for the logistic regressions; each indicate a good model fit.

The logistic regression coefficients, standard errors, and odds ratios are included for the

dependent variables retirement planning, retirement account, and investments and each of the

independent variables. While the coefficients indicate a positive or negative relationship, the

odds ratios are referred to for interpretation of the results. For example, the relationship between

retirement planning and objective financial knowledge showed an odds ratio of 1.22 indicating

that a respondent with greater objective financial knowledge was 1.22 times likelier to have

planned for retirement. This also can be stated that the respondent was 22% likelier to have

planned for retirement when objective financial knowledge was greater. The relationship was

positive and was significant at the $p = 0.001$ level. The results were similar for having a

retirement account and having investments, with the respondents with greater objective financial

knowledge being 27% and 23%, respectively, likelier to participate in the respective financial

behavior. Likewise, subjective financial knowledge showed a positive and significant

relationship with each of the behaviors, again at the $p = 0.001$ level. Retirement planning and

having investments had a stronger association with subjective financial knowledge than objective financial knowledge while the reverse was true for having a retirement account. Subjective financial management ability was associated with both retirement planning and having investments at the p = .05, while the strength of the association with having a retirement account was at the p = .001 level.

In addition to the key financial literacy variables, the results showed that age cohorts, using the 18-24 age cohort as the reference group, were important variables in the logistic regression. The likelihood of planning for retirement increased with each age cohort; the 25-34 age cohort was 1.35 times likelier to engage in retirement planning than the 18-24 age cohort while the oldest age cohort was almost three times likelier. The 25-34 age cohort was almost twice as likely to have a retirement account than the 18-24 age cohort. This pattern was true for each age cohort; the odds ratios increased to more than five times as likely for the 65 and older age cohort to have a retirement account when compared to the reference group. Only the three oldest age cohorts showed an association with having investments in stocks, bonds, mutual funds, or other securities; these ranged from one-third more likely to more than two and one-half times more likely to have investments than the 18-24 age cohort.

Lastly, Table 4.6 shows the relationships between demographic variables and the long-term behaviors. The results showed that male respondents were less likely to have planned for retirement and to have a retirement account than female respondents. We do not know from the data if the respondent was either the primary financial decision-maker or the head of the household as these were not selection criteria for participation in the survey (FINRA, 2013). This is a limitation in the data and makes interpretation of the gender association difficult. Being white increased the odds of having a retirement account and having investments. Being married

increased the odds of retirement planning and having a retirement account while education, income and employment increased the odds for all three of the long-term financial behaviors. The odds ratios were higher for education and income than for any of the three financial literacy components. Also, having dependent children decreased the odds of having investments. There was no significant relationship between race and retirement planning, nor was there an association between having dependent children and retirement planning and having a retirement account.

Overall, the findings agree with the conceptual model and the expected association between the three components of financial literacy and the financial behaviors examined. Results indicate that overall subjective financial management had a stronger association with planning for retirement and having investments than did objective financial knowledge. However, the reverse was true for having a retirement account; the relationship between objective financial knowledge and having a retirement account was stronger than the relationship with subjective financial knowledge. The odds ratios for education and income were higher than the odds ratios for each of the financial literacy components indicating that in addition to financial literacy, general education and level of income play an important role in the long-term financial behaviors studied in this dissertation. This also was true for each of the age categories where the oldest age cohort ranged from almost three times to more than five times likelier to engage in the long-term behaviors. The significance of the age cohort variables provided a foundation for the next stage in the analysis. The following describes the results of the second hypothesis which used a restricted sample specific to each age cohort.

Hypothesis 2 Results

The second hypothesis was written to examine the relationship of financial knowledge and financial management ability with long-term financial planning and managing behaviors by age cohort. Overall, H2 was supported; the relationship of financial knowledge and subjective financial management ability with long-term financial planning and managing behaviors was different in different age cohorts. The results are reported in three tables, 4.7.1, 4.7.2, and 4.7.3, to provide a comparison by age cohort for each of the three long-term behaviors. The tables report the coefficient, standard error, and odds ratios for the key financial literacy variables as well as the demographic variables. The results showed associations between all three of the long-term behaviors and financial knowledge, while the relationship with subjective financial management ability was significant only in the two oldest age cohorts. Conversely, subjectively assessed financial management ability was significant for all three behaviors in the two oldest age cohorts only. Confidence in one's financial management ability did not relate to any of the long-term behaviors in the age cohorts younger than 55. The logistic regression for each age group for each of the three long-term dependent variables provided odds ratios interpreted by age cohort below. A summary is provided at the end of this section to discuss significant differences by age cohort.

Age cohort 18-24. In this age cohort, objective and subjective financial knowledge were associated with each of the three long-term behaviors examined, however no association was evident for subjective financial management ability. Tables 4.7.1, 4.7.2, and 4.7.3 show the results for each of the long-term behaviors. Using the odds ratios for each age cohort, all reported on one page, the age cohort 18-24 odds ratio results are in column 4 of each table. For example, a young adult with a higher level of objective financial knowledge was 11% likelier to have

planned for retirement (column 4, table 4.7.1) , 20% likelier to have a retirement account (column 4 table 4.7.2), and 18% likelier to have investments (column 4, table 4.7.3) than a young adult with a lower level of objective financial knowledge.

Subjective financial knowledge was associated with each of the three long-term behaviors in this age cohort as well. Indeed, a young adult with a higher level of subjective financial knowledge was 37% likelier to have planned for retirement, 31% likelier to have a retirement account, and 38% likelier to have investments.

No association was evident for subjective financial management ability and retirement planning, having a retirement account, or having investments in stocks, bonds, mutual funds, or other securities. In the youngest age cohort, and in each of the age cohorts with the exception of the two oldest age cohorts, subjective financial management ability bore no relationship with any of the long-term financial behaviors.

Overall, financial knowledge (both objective and subjective) had the strongest association with the long-term financial behaviors examined. Subjective financial knowledge, however, had the higher odds ratios for each of the three long-term financial behaviors. Subjective financial management ability had no significant relationship with any of the three long-term behaviors.

Age cohort 25-34. In this age cohort, objective and subjective financial knowledge were associated with each of the three long-term behaviors examined, however no association was evident for subjective financial management ability. Tables 4.7.1, 4.7.2, and 4.7.3 show the results for each of the long-term behaviors. Using the odds ratios for each age cohort, all reported on one page, the age cohort 25-34 odds ratio results are in column 7 of each table. For example, an individual with a higher level of objective financial knowledge was 20% likelier to have planned for retirement (table 4.7.1, column 7), 21% likelier to have a retirement account (table

4.7.2, column 7), and 10% likelier to have investments (table 4.7.3, column 7) than an individual with a lower level of objective financial knowledge.

Subjective financial knowledge was associated with each of the three long-term behaviors in this age cohort as well. An individual with a higher level of subjective financial knowledge was 35% likelier to have planned for retirement, 11% likelier to have a retirement account, and 48% likelier to have investments.

Overall, financial knowledge (both objective and subjective) had the strongest relationship with the long-term financial behaviors examined. Subjective financial knowledge, however, had the higher odds ratios for retirement planning and for investments while objective financial knowledge had the higher odds ratio for having a retirement account. Subjective financial management ability had no significant relationship with any of the three long-term behaviors.

Age cohort 35-44. In this age cohort, objective and subjective financial knowledge were associated with each of the three long-term behaviors examined, however no association was evident for subjective financial management ability. Referring to tables 4.7.1, 4.7.2, and 4.7.3, an individual with a higher level of objective financial knowledge was 21% likelier to have planned for retirement (table 4.7.1, column 10), 26% likelier to have a retirement account (table 4.7.2, column 10), and 19% likelier to have investments (table 4.7.3, column 10) than an individual with a lower level of objective financial knowledge.

Subjective financial knowledge was associated with each of the three long-term behaviors in this age cohort as well. An individual with a higher level of subjective financial knowledge was 26% likelier to have planned for retirement, 8% likelier to have a retirement

account, and 32% likelier to have investments. In other words, a self-reported level of financial confidence has an increased association with each of the long-term behaviors examined.

Overall, financial knowledge (both objective and subjective) had the strongest relationship with the long-term financial behaviors examined. Subjective financial knowledge, however, had the higher odds ratios for retirement planning and for investments while objective financial knowledge had the higher odds ratio for having a retirement account. Subjective financial management ability had no significant relationship with any of the three long-term behaviors.

Age cohort 45-54. In this age cohort, objective and subjective financial knowledge again were associated with each of the three long-term behaviors examined, however no association was evident for subjective financial management ability. Tables 4.7.1, 4.7.2, and 4.7.3 show the results for each of the long-term behaviors. Using the odds ratios for each age cohort, all reported on one page, the age cohort 45-54 odds ratio results are in column 4 on the lower half of each table. For example, an individual with a higher level of objective financial knowledge was 27% likelier to have planned for retirement (Table 4.7.1, column 4), 28% likelier to have a retirement account (Table 4.7.2, column 4), and 25% likelier to have investments than an individual with a lower level of objective financial knowledge.

Subjective financial knowledge was associated with each of the three long-term behaviors in this age cohort as well. An individual with a higher level of subjective financial knowledge was 36% likelier to have planned for retirement, 7% likelier to have a retirement account, and 33% likelier to have investments.

Overall, financial knowledge (both objective and subjective) had the strongest relationship with the long-term financial behaviors examined. Subjective financial knowledge,

however, had the higher odds ratios for retirement planning and for investments while objective financial knowledge had the higher odds ratio for having a retirement account. Subjective financial management ability had no significant relationship with any of the three long-term behaviors.

Age cohort 55-64. In this age cohort, objective financial knowledge again was associated with each of the three long-term behaviors examined. Referring to tables 4.7.1, 4.7.2, and 4.7.3, an individual with a higher level of objective financial knowledge was 26% likelier to have planned for retirement, 33% likelier to have a retirement account and 32% likelier to have investments than an individual with a lower level of objective financial knowledge.

Subjective financial knowledge was associated with two of the long-term behaviors. An individual with a higher level of subjective financial knowledge was 37% likelier to have planned for retirement and 27% likelier to have investments.

Subjective financial management ability was associated with each of the three long-term behaviors in this age cohort. An adult in this age cohort with a higher level of subjective management ability was slightly more likely to perform the positive long-term financial behaviors examined – likelier to have planned for retirement by 5%, have a retirement account by 7%, and have investments by 6%.

Overall, objective financial knowledge had a stronger association with the long-term financial behaviors examined than the other two components of financial literacy. Subjective financial knowledge had some bearing on retirement planning and having investments, but not on having a retirement account. Subjective financial management ability had a slight bearing on all three long-term behaviors in this age cohort.

Age cohort 65 and older. As in each of the other age cohorts, objective financial knowledge was associated with each of the three long-term behaviors in the age 65 and older cohort. Referring to tables 4.7.1, 4.7.2, and 4.7.3, an individual with a higher level of objective financial knowledge was 27% likelier to have planned for retirement, 31% likelier to have a retirement account and 32% likelier to have investments than an individual with a lower level of objective financial knowledge.

Subjective financial knowledge was associated with two of the long-term behaviors. An individual with a higher level of subjective financial knowledge was 31% likelier to have planned for retirement and 33% likelier to have investments.

Subjective financial management ability was associated with each of the three long-term behaviors in this age cohort. An older adult with a higher level of subjective management ability was likelier to have planned for retirement by 6%, have a retirement account by 11%, and have investments by 6% than an older adult with a lower level of subjective financial management ability.

Overall, objective financial knowledge had a stronger association with the long-term financial behaviors examined. Subjective financial knowledge had some bearing on retirement planning and having investments, but not on having a retirement account. Subjective financial management ability had a slight bearing on all three long-term behaviors in this age cohort.

Summary of cohort discussion. The results of the age cohort analyses showed differences between the cohorts as well as some similarities. Objective financial knowledge showed associations in all age cohorts for each of the three long-term behaviors, and the odds ratios increased with each age cohort. For example, the likelihood of an individual engaging in

retirement planning increased from 11% in the youngest age cohort to 27% in the oldest age cohort.

This effect, however, was reversed when examining subjective financial knowledge. In each age cohort, subjectively assessed financial knowledge had a positive association with at least two of the long-term behaviors, but the odds ratios decreased with each age cohort and were not significant at all for having a retirement account in the two oldest age cohorts. The likelihood of retirement planning decreased from 37% to 31% from the youngest to the oldest age cohort and from 38% to 33% for having investments. The biggest difference was the likelihood of having a retirement account. For the youngest age cohort, a higher level of self-reported financial confidence increased the odds that an individual would have a retirement account while the odds reduced to 7% for those 45-54 and were non-existent in the two oldest age cohorts.

The results for subjective financial management ability were a bit different than the knowledge results. No association was found for any of the long-term behaviors except in the two oldest age cohorts. The odds were small, between 5% and 11%, but the relationships were statistically significant.

Overall, the strongest influence shifted from subjective knowledge for the younger age cohorts to objective knowledge for the older age cohorts. This trend was an important finding and is discussed further in the conclusions.

Hypothesis 3 Results

The third hypothesis was written to explore the relationship between financial knowledge, subjective financial management ability, and short-term financial planning and managing behaviors while moderating for the age cohort effect. Overall H3 was supported; greater financial knowledge and subjective financial management ability were positively

associated with three of the four positive short-term financial planning and managing behaviors. The exception was the relationship between subjective financial knowledge and making mortgage payments on time.

Table 4.8 shows the results of the logistic regressions organized by each of the short-term financial behaviors. The pseudo R^2 is provided for the logistic regressions; each indicate a good model fit. The logistic regression coefficients, standard errors, and odds ratios are included for the dependent variables having an emergency fund, spending less than or equal to income, no overdrafts, and making mortgage payments on time and for each of the independent variables. While the coefficients indicate a positive or negative relationship, the odds ratios are referred to for interpretation of the results.

With increased objective financial knowledge and with increased subjective financial management ability, respondents were likelier to have performed each of the four short-term behaviors. All relationships were significant at the $p = 0.001$ level. The results were similar for the subjectively assessed financial knowledge variable with the exception of making mortgage payments on time; there was no association between the level of subjective knowledge and the behavior of making mortgage payments on time. In other words, confidence in one's financial knowledge does not relate to the timeliness of mortgage payments as it does to the other three behaviors.

The strongest association overall appeared in the subjectively assessed financial management ability variable where respondents were between 16% and 29% likelier to engage in the positive short-term financial behavior measured. Only one association showed a higher odds ratio – the likelihood of having an emergency fund was 34% higher when the respondent reported a higher level of subjectively assessed financial knowledge.

In addition to the key financial literacy variables, the results showed that age cohorts, using the 18-24 age cohort as the reference group, were important variables in the logistic regression. Each of the age cohorts was less likely than the 18-24 age cohort to have an emergency fund with the exception of the 65 and older age cohort which was one and a half times likelier to have an emergency fund. This was a surprising result and is discussed further in the conclusions. Only the two oldest age cohorts were associated with spending; respectively, the cohorts were between 19% and 26% more likely to spend less than or equal to their income than the youngest age cohort. With regard to checking overdrafts, the two youngest age cohorts were about 20% likelier to have overdrawn a checking account while the oldest age cohort was almost twice as likely to have not overdrawn a checking account. Each of the age cohorts was likelier to make mortgage payments on time than the 18-24 age cohort. Indeed, the oldest age cohort was almost four times more likely to make mortgage payments on time than the youngest.

Additionally, Table 4.8 shows the relationships between demographic variables and the short-term behaviors. The results showed that it was likelier for a male to have an emergency fund and spend less than or equal to income, but gender did not make a difference for overdrafts or making mortgage payments on time. Race made no difference in having an emergency fund, but being white did show a significant positive association with the other three short-term behaviors. Being married positively affected the emergency fund and overdraft behaviors, but had no association with spending or making mortgage payments on time. Having dependent children made a significant difference in all of the short-term behaviors. The respondents who reported having dependent children were about a third less likely to have an emergency fund or to spend within their means and about half as likely to have no overdraft issues or to make their

mortgage payments on time. Employment status showed no association with any of the short-term behaviors.

Lastly, education and income showed associations with the short-term behaviors but in varying degrees. Higher levels of education were associated with having an emergency fund and no overdrafts. This was also true for making mortgage payments on time, but only for those respondents with a graduate education. The short-term behavior of spending less than or equal to one's income was not affected by level of education in any way. Income, on the other hand, showed an association with all of the short-term behaviors that increased as income increased. For example, those with income reported at more than $100,000 were seven times likelier to have an emergency fund than those in the reference group of less than $25,000.

Overall, the findings agree with the conceptual model and the expected association between the three components of financial literacy and the financial behaviors examined. Results indicate that overall subjective financial knowledge had a higher level of association with having an emergency fund than both objective financial knowledge and subjective financial management ability. However, subjective financial management ability had a higher level of association with the other three short-term financial behaviors. Demographics also played a large role in this analysis with income being the common factor in each of the four regressions that held a significantly higher odds ratio than financial knowledge or subjective financial management ability. Age was a strong indicator as well and varied in significance with each of the four regressions. The significance of the age cohort variables provided a foundation for further study. The following describes the results of the fourth hypothesis which used a restricted sample specific to each age cohort.

Hypothesis 4 Results

The fourth hypothesis was written to examine the relationship of financial knowledge and financial management ability with short-term financial planning and managing behaviors by age cohort. Overall, H4 was supported; the relationship of financial knowledge and subjective financial management ability with short-term financial planning and managing behaviors was different in different age cohorts. The results are reported in four tables, 4.91, 4.92, 4.93, and 4.94, to provide a comparison by age cohort for each of the four short-term behaviors. The tables report the coefficients, standard errors, and odds ratios for the key financial literacy variables as well as the demographic variables.

The results showed significant relationships with regard to the subjectively assessed financial management ability variable for every age cohort and every short-term behavior examined. This was not true of the objectively and subjectively assessed financial knowledge variables. Many of the behaviors showed significant associations with financial knowledge, but to varying degrees. For example, subjective financial knowledge was associated with having an emergency fund in all age cohorts, but with spending and overdrafts in the three oldest age cohorts only. Also, subjective financial management was negatively associated with making mortgage payments on time for the 25-34 age cohort but positively associated with this behavior in the three oldest age cohorts. The logistic regression for each age group and each of the four short-term dependent variables provided odds ratios interpreted by age cohort below. A summary is provided at the end of this section to discuss significant differences by age cohort.

Age cohort 18-24. In this age cohort, objective financial knowledge was associated with spending and with not overdrawing. A young adult with a higher level of objective financial knowledge was not likelier to have an emergency fund (Table 4.9.1, Column 4) or make

mortgage payments on time (Table 4.7.2, Column 4), but was 11% likelier to spend less than or equal to their income (Table 4.7.3, Column 4) and 18% likelier to have not overdrawn a checking account (Table 4.7.4, Column 4) than a young adult with a lower level of objective financial knowledge.

Subjective financial knowledge was associated with having an emergency fund only. A young adult with a higher level of subjective financial knowledge was 25% likelier to have an emergency fund.

Subjective financial management ability was associated with each of the four short-term behaviors. In this age cohort, an individual with a higher level of subjective financial management ability was 10% likelier to have an emergency fund, 22% likelier to spend less than or equal to their income, 32% likelier to not overdraw a checking account, and 25% likelier to make mortgage payments on time.

Age cohort 25-34. In this age cohort, objective financial knowledge was associated with spending, with not overdrawing, and with making timely mortgage payments. An individual with a higher level of objective financial knowledge was not likelier to have an emergency fund, but was 10% likelier to spend less than or equal to their income, 20% likelier to have not overdrawn a checking account, and 39% likelier to make mortgage payments on time.

Subjective financial knowledge was associated with having an emergency fund and with making mortgage payments on time. A young adult with a higher level of subjective financial knowledge was 39% likelier to have an emergency fund and 20% less likely to make mortgage payments on time.

Subjective financial management ability was associated with each of the four short-term behaviors. In this age cohort, an individual with a higher level of subjective financial

management ability was 14% likelier to have an emergency fund, 14% likelier to spend less than or equal to their income, 30% likelier to not overdraw a checking account, and 23% likelier to make mortgage payments on time.

Age cohort 35-44. In this age cohort, objective financial knowledge was associated with spending, with not overdrawing, and with making mortgage payments on time. An individual with a higher level of objective financial knowledge was not likelier to have an emergency fund, but was 7% likelier to spend less than or equal to their income, 13% likelier to have not overdrawn a checking account, and 14% likelier to make mortgage payments on time.

Subjective financial knowledge was associated with having an emergency fund, but not with any of the other short-term financial behaviors examined. An adult with a higher level of subjective financial knowledge was 30% likelier to have an emergency fund.

Subjective financial management ability was associated with each of the four short-term behaviors. In this age cohort, an individual with a higher level of subjective financial management ability was 21% likelier to have an emergency fund, 15% likelier to spend less than or equal to their income, 35% likelier to not overdraw a checking account, and 33% likelier to make mortgage payments on time.

Age cohort 45-54. In this age cohort, objective financial knowledge was associated with not overdrawing a checking account. An individual with a higher level of objective financial knowledge was not likelier to have an emergency fund, spend less than or equal to their income, or make mortgage payments on time, but was 9% likelier to have not overdrawn a checking account.

Subjective financial knowledge was associated with each of the four short-term behaviors. An adult with a higher level of subjective financial knowledge was 33% likelier to

have an emergency fund, 10% likelier to spend less than or equal to their income, 12% likelier to have not overdrawn a checking account, and 10% likelier to make mortgage payments on time.

Subjective financial management ability was associated with each of the four short-term behaviors. In this age cohort, an individual with a higher level of subjective financial management ability was 21% likelier to have an emergency fund, 20% likelier to spend less than or equal to their income, 29% likelier to not overdraw a checking account, and 24% likelier to make mortgage payments on time.

Age cohort 55-64. In this age cohort, objective financial knowledge was significantly related to having an emergency fund, and with not overdrawing a checking account. An individual with a higher level of objective financial knowledge was 14% likelier to have an emergency fund and 9% likelier to have not overdrawn a checking account.

Subjective financial knowledge was significantly related to each of the four short-term financial behaviors examined. An adult with a higher level of subjective financial knowledge was 32% likelier to have an emergency fund, 10% likelier to spend less than or equal to their income, 17% likelier to have not overdrawn a checking account, and 20% likelier to make mortgage payments on time.

Subjective financial management ability was significant with each of the four short-term behaviors. In this age cohort, an individual with a higher level of subjective financial management ability was 22% likelier to have an emergency fund, 14% likelier to spend less than or equal to their income, 27% likelier to not overdraw a checking account, and 23% likelier to make mortgage payments on time.

Age cohort 65 and older. In this age cohort, objective financial knowledge was associated with having an emergency fund, and with not having overdrawn a checking account.

An older adult with a higher level of objective financial knowledge was 19% likelier to have an emergency fund and 13% likelier to have not overdrawn a checking account, but was not likelier to spend less than or equal to their income or make mortgage payments on time.

Subjective financial knowledge was associated with each of the four short-term behaviors. An adult with a higher level of subjective financial knowledge was 39% likelier to have an emergency fund, 12% likelier to spend less than or equal to their income, 24% likelier to have not overdrawn a checking account, and 39% likelier to make mortgage payments on time.

Subjective financial management ability was associated with each of the four short-term behaviors. An adult with a higher level of subjective financial management ability was 22% likelier to have an emergency fund, 10% likelier to spend less than or equal to their income, 21% likelier to have not overdrawn a checking account, and 21% likelier to make mortgage payments on time.

Summary of cohort discussion. The association between objective financial knowledge and the four short-term behaviors varied by age cohort, but with some identifiable patterns. Objective financial knowledge was associated with not overdrawing a checking account in every age cohort. In the three youngest age cohorts, objective financial knowledge was associated with spending. Making mortgage payments on time was associated with objective financial knowledge in just two age cohorts: 25-34 and 35-44. Finally, having an emergency fund was associated in only the two oldest age cohorts.

Likewise, the association between subjective financial knowledge and the four short-term behaviors varied by age cohort, but the pattern was different. Having an emergency fund was associated in every age cohort while making mortgage payments on time was associated only in

the 25-34 age cohort. The three oldest age cohorts showed relationships with each of the four short-term behaviors examined and subjective financial knowledge.

The most consistent pattern was identified with regard to subjective financial management ability. All four short-term behaviors were associated with this variable in all age cohorts. For three of the four short-term behaviors, the odds decreased with age that an individual with a higher self-assessed financial management ability had performed the specific behavior. It was only having an emergency fund where the odds increased from 10% to 22%.

Overall, not overdrawing a checking account was associated with elements of financial literacy in more age cohorts than the other short-term behaviors, followed by having an emergency fund, and then spending and mortgage payments. Not overdrawing was more associated with objective knowledge where having an emergency fund was more associated with subjective knowledge. Also, for each of the four short-term behaviors, subjective financial management ability was associated in every age cohort.

Summary of Results

Overall, the findings agree with the conceptual model and the expected association between the three components of financial literacy and the financial behaviors examined, both long-term and short-term. (See Table 4.11.) The differences by age cohort were an important outcome of this study. The association with both objectively and subjectively assessed financial knowledge was more evident in the long-term behavior analyses, while the reverse was true in the case of subjectively assessed financial management ability and the association with short-term behaviors. The following chapter provides further discussion of the results and includes a summary of the research findings, a discussion of limitations in the data, and implications with regard to the conceptual model, policy considerations, and future research.

Table 4.1
Descriptive Statistics

Variable	N = 23,727
Education (%)	
High School or Less	37.0
Some College	36.3
College Graduate	16.4
Post-Secondary Graduate	10.3
Male (%)	49.0
White (%)	66.8
Married (%)	54.2
Dependent Children (%)	40.0
Employed (%)	53.6
Income (%)	
$0 - $25,000	25.8
$25,001 - $50,000	25.9
$50,001 - $100,000	30.8
$100,001 +	17.5
Age (%)	
18-24	12.1
25-34	18.5
35-44	16.5
45-54	19.7
55-64	17.8
65 +	15.4

Note: Statistics are weighted using national weights provided by
FINRA [wgt_n2].

Table 4.2

Pattern of Objective and Subjective Financial Knowledge and Management

Questions Correct (%)	N = 23,727
Growth	76.8
Inflation	63.0
Mutual Fund	50.0
Bond Price	29.0
Mortgage	76.8
Number of Questions Correct (%)	
0 Correct	6.1
1 Correct	11.6
2 Correct	18.5
3 Correct	23.4
4 Correct	25.4
5 Correct	15.0
Objective Financial Knowledge (0 - 5)	
Mean	2.96
Std Dev	1.43
Subjective Financial Knowledge (1 - 7)	
Mean	5.15
Std Dev	1.29
Subjective Financial Management (1 - 7)	
Mean	5.68
Std Dev	1.58

Note: Statistics are weighted using national weights provided by FINRA [wgt_n2].

Table 4.3

Pattern of Objective and Subjective Financial Knowledge and Management by Age Cohort

Questions Correct (%)							N = 23,727
	18-24	25-34	35-44	45-54	55-64	65+	% Δ
Growth	67.5	73.9	76.9	78.2	79.3	82.4	22.1
Inflation	37.3	47.1	60.0	70.2	76.3	81.1	117.4
Mutual Fund	31.4	42.6	49.5	51.5	56.5	64.6	105.7
Mortgage	59.5	72.9	76.6	80.3	82.1	84.6	42.2
Bond Prices	18.4	23.5	26.8	31.3	32.9	39.3	113.6
Number of Questions Correct (%)							
0 Correct	12.7	7.4	6.6	4.6	4.1	2.8	-78.0
1 Correct	20.6	16.3	11.5	9.9	7.7	5.7	-72.3
2 Correct	27.3	23.4	19.3	16.4	14.4	12.1	-55.7
3 Correct	21.9	23.3	24.3	24.3	24.6	21.4	-2.3
4 Correct	14.3	21.1	24.7	28.2	29.4	32.0	123.8
5 Correct	3.2	8.5	13.6	16.6	19.9	26.0	712.5

Note: Statistics are weighted using national weights provided by FINRA [wgt_n2].

Table 4.4

Comparison of Financial Literacy Means by Age Cohort

						N = 23,727
Variable	18-24	25-34	35-44	45-54	55-64	65 +
Mean – Objective Financial Knowledge (0 – 5)	2.1	2.6	2.9	3.1	3.3	3.5
Mean – Subjective Financial Knowledge (1 – 7)	4.8	5.1	5.1	5.1	5.2	5.5
Mean – Subjective Financial Management (1 – 7)	5.1	5.4	5.6	5.7	6.0	6.2

Note: Statistics are weighted using national weights provided by FINRA [wgt_n2].

Chi-square tests are significant at the .001 level.

Table 4.5

Comparison of Financial Literacy Means by Financial Behavior

N = 23,727

Variable (0, 1)	Mean – Objective Financial Knowledge (0 – 5)		Mean – Subjective Financial Knowledge (1 – 7)		Mean – Subjective Financial Management (1 – 7)	
	Yes	No	Yes	No	Yes	No
Retirement Planning	3.4	2.6	5.5	4.9	6.0	5.5
Retirement Account	3.4	2.4	5.4	4.8	5.9	5.3
Investments	3.6	2.6	5.6	4.9	6.1	5.5
Emergency Fund	3.3	2.7	5.6	4.9	6.1	5.4
Spend Less than/Equal to Income	3.1	2.6	5.2	4.9	5.8	5.2
No Overdrafts	3.2	2.5	5.2	4.8	6.0	5.0
Timely Mortgage Payments	3.5	2.8	5.4	5.1	6.0	5.5

Note: Statistics are weighted using national weights provided by FINRA [wgt_n2].

Statistical t-tests for each pairing are significant at the .001 level.

Table 4.5a

T Tests

Long-Term Financial Planning and Managing Behaviors			N = 23,727
	Retirement Planning	Retirement Account	Investments
Objective Financial Knowledge	0.094***	0.116***	0.102***
	(0.002)	(0.002)	(0.002)
Subjective Financial Knowledge	0.096***	0.078***	0.094***
	(0.003)	(0.003)	(0.002)
Subjective Financial Management	0.053***	0.058***	0.054***
	(0.002)	(0.002)	(0.002)

Short-Term Financial Planning and Managing Behaviors

	Emergency Fund	Spending	No Overdrafts	Mortgage Payments
Objective Financial Knowledge	0.077***	0.037***	0.073***	0.070***
	(0.003)	(0.002)	(0.002)	(0.002)
Subjective Financial Knowledge	0.101***	0.032***	0.058***	0.046***
	(0.003)	(0.003)	(0.003)	(0.002)
Subjective Financial Management	0.072***	0.039***	0.076***	0.040***
	(0.002)	(0.002)	(0.002)	(0.002)

Note: Statistics are weighted using national weights provided by FINRA [wgt_n2].

Table 4.6

Results for Hypothesis 1

Variable	Long-Term Financial Planning and Managing Behaviors								N = 23,727
	Retirement Planning			Retirement Account			Investments		
	Coefficient	(Std Err)	Odds Ratio	Coefficient	(Std Err)	Odds Ratio	Coefficient	(Std Err)	Odds Ratio
Objective Financial Knowledge	0.202***	(0.012)	1.22	0.235***	(0.014)	1.27	0.203***	(0.014)	1.23
Subjective Financial Knowledge	0.295***	(0.014)	1.34	0.095***	(0.015)	1.10	0.301***	(0.016)	1.35
Subjective Financial Management	0.024*	(0.011)	1.02	0.040***	(0.012)	1.04	0.028*	(0.012)	1.03
Age Cohort:									
25-34	0.301***	(0.068)	1.35	0.665***	(0.070)	1.95	-0.068	(0.078)	0.93
35-44	0.293***	(0.069)	1.34	0.714***	(0.072)	2.04	-0.035	(0.078)	0.97
45-54	0.474***	(0.067)	1.61	0.880***	(0.068)	2.41	0.175*	(0.075)	1.29
55-64	0.833***	(0.067)	2.30	1.290***	(0.071)	3.63	0.448***	(0.075)	1.57
65 +	1.058***	(0.071)	2.88	1.677***	(0.076)	5.35	0.995***	(0.078)	2.70
Gender	-0.063*	(0.031)	0.94	-0.317***	(0.036)	0.73	0.032	(0.033)	1.03
Race	0.000	(0.035)	1.00	0.184***	(0.040)	1.20	0.232***	(0.039)	1.26
Marital Status	0.104**	(0.035)	1.11	0.381***	(0.038)	1.46	0.039	(0.038)	1.04
Dependent Children	0.046	(0.035)	1.05	0.033	(0.040)	1.03	-0.135***	(0.038)	0.87
Education:									
Some College	0.331***	(0.038)	1.39	0.200***	(0.041)	1.22	0.267***	(0.043)	1.31
College Graduate	0.547***	(0.044)	1.73	0.611***	(0.050)	1.84	0.688***	(0.048)	1.99
Post-Secondary Graduate	0.650***	(0.053)	1.92	0.694***	(0.068)	2.00	0.794***	(0.056)	2.21
Income:									
$25,001 - $50,000	0.428***	(0.046)	1.53	1.195***	(0.045)	3.30	0.767***	(0.057)	2.15
$50,001 - $100,000	0.847***	(0.047)	2.33	2.080***	(0.050)	8.00	1.503***	(0.057)	4.50
$100,001 and more	1.246***	(0.057)	3.47	2.654***	(0.071)	14.21	2.159***	(0.065)	8.67
Employment	0.213***	(0.034)	1.24	0.724***	(0.038)	2.06	0.199***	(0.038)	1.22

* p < .05; ** p < .01; *** p < .001   *Pseudo R^2 = 0.16*   *Pseudo R^2 = 0.31*   *Pseudo R^2 = 0.23*

Table 4.7.1

Results for Hypothesis 2 (H2A1, H2B1, & H2C1) by Age Cohort and Retirement Planning

Variable	Coefficient		Std Err	Odds Ratio	Coefficient		Std Err	Odds Ratio	Coefficient		Std Err	Odds Ratio
	18-24			(N = 2,353)	25-34			(N = 4,021)	35-44			(N = 4,027)
Objective Financial Knowledge	0.102	*	(0.044)	1.11	0.181	***	(0.029)	1.20	0.190	***	(0.029)	1.21
Subjective Financial Knowledge	0.318	***	(0.049)	1.37	0.301	***	(0.034)	1.35	0.231	***	(0.034)	1.26
Subjective Financial Management	-0.026		(0.038)	0.97	0.038		(0.026)	1.04	0.003		(0.026)	1.00
Gender	0.272	*	(0.009)	1.31	0.135		(0.076)	1.14	0.066		(0.074)	1.07
Race	-0.297	**	(0.114)	0.74	-0.155	*	(0.075)	0.86	0.016		(0.077)	1.02
Marital Status	0.081		(0.153)	1.08	0.085		(0.084)	1.09	-0.036		(0.085)	0.96
Dependent Children	0.522	***	(0.134)	1.69	0.273	***	(0.082)	1.31	-0.017		(0.081)	0.98
Education: Some College	0.087		(0.126)	1.09	0.406	***	(0.102)	1.50	0.368	***	(0.096)	1.45
College Graduate	0.328		(0.182)	1.39	0.573	***	(0.107)	1.77	0.524	***	(0.103)	1.69
Post-Secondary Graduate	0.941	**	(0.357)	2.56	0.556	***	(0.128)	1.74	0.707	***	(0.128)	2.03
Income: $25,001 - $50,000	0.388	**	(0.141)	1.47	0.192		(0.108)	1.21	0.563	***	(0.124)	1.76
$50,001 - $100,000	0.878	***	(0.148)	2.41	0.591	***	(0.113)	1.81	0.988	***	(0.125)	2.69
$100,001 and more	0.888	***	(0.212)	2.43	1.048	***	(0.144)	2.85	1.304	***	(0.143)	3.68
Employment	0.401	***	(0.116)	1.49	0.430	***	(0.088)	1.54	0.167		(0.088)	1.18
Variable	45-54			(N = 4,860)	55-64			(N = 4,490)	65 +			(N = 3,976)
Objective Financial Knowledge	0.236	***	(0.028)	1.27	0.234	***	(0.030)	1.26	0.236	***	(0.031)	1.27
Subjective Financial Knowledge	0.311	***	(0.030)	1.36	0.314	***	(0.032)	1.37	0.268	***	(0.036)	1.31
Subjective Financial Management	0.003		(0.024)	1.00	0.050	*	(0.025)	1.05	0.056	*	(0.026)	1.06
Gender	-0.109		(0.068)	0.90	-0.178	*	(0.070)	0.84	-0.377	***	(0.075)	0.69
Race	0.044		(0.077)	1.05	0.139		(0.086)	1.15	0.329	**	(0.126)	1.39
Marital Status	0.045		(0.076)	1.05	0.080		(0.080)	1.08	0.310	***	(0.085)	1.36
Dependent Children	0.009		(0.067)	1.01	-0.163	*	(0.082)	0.85	-0.010		(0.126)	0.99
Education: Some College	0.469	***	(0.082)	1.60	0.386	***	(0.086)	1.47	0.259	**	(0.087)	1.30
College Graduate	0.702	***	(0.093)	2.02	0.639	***	(0.100)	1.89	0.532	***	(0.119)	1.70
Post-Secondary Graduate	0.797	***	(0.123)	2.22	0.689	***	(0.116)	1.99	0.712	***	(0.120)	2.04
Income: $25,001 - $50,000	0.422	***	(0.108)	1.52	0.458	***	(0.105)	1.58	0.518	***	(0.115)	1.68
$50,001 - $100,000	0.932	***	(0.109)	2.54	0.922	***	(0.110)	2.52	0.800	***	(0.119)	2.22
$100,001 and more	1.334	***	(0.129)	3.81	1.493	***	(0.132)	4.45	1.105	***	(0.139)	3.02
Employment	0.113		(0.077)	1.12	0.155	*	(0.070)	1.17	0.043		(0.090)	1.04

* p < .05; ** p < .01; *** p < .001

Table 4.7.2

Results for Hypothesis 2 (H2A2, H2B2, & H2C2) by Age Cohort and Having a Retirement Account

Variable	Coefficient		Std Err	Odds Ratio	Coefficient		Std Err	Odds Ratio	Coefficient		Std Err	Odds Ratio
		18-24		(N = 2,353)		25-34		(N = 4,021)		35-44		(N = 4,027)
Objective Financial Knowledge	0.183	***	(0.042)	1.20	0.195	***	(0.029)	1.21	0.228	***	(0.033)	1.26
Subjective Financial Knowledge	0.272	***	(0.047)	1.31	0.104	**	(0.033)	1.11	0.079	*	(0.037)	1.08
Subjective Financial Management	-0.067		(0.037)	0.94	0.040		(0.026)	1.04	0.023		(0.030)	1.02
Gender	0.020		(0.117)	1.02	-0.378	***	(0.082)	0.69	-0.243	**	(0.091)	0.78
Race	0.037		(0.112)	1.04	0.177	*	(0.079)	1.19	0.324	***	(0.091)	1.38
Marital Status	0.587	***	(0.142)	1.80	0.428	***	(0.087)	1.53	0.414	***	(0.097)	1.51
Dependent Children	0.591	***	(0.130)	1.81	0.066		(0.087)	1.07	0.003		(0.097)	1.00
Education: Some College	0.199		(0.122)	1.22	0.291	**	(0.098)	1.34	0.249	*	(0.103)	1.28
College Graduate	1.016	***	(0.171)	2.76	0.594	***	(0.138)	1.81	0.887	***	(0.119)	2.43
Post-Secondary Graduate	0.405		(0.369)	1.50	0.602	***	(0.138)	1.82	1.082	***	(0.176)	2.95
Income: $25,001 - $50,000	0.632	***	(0.133)	1.88	1.077	***	(0.101)	2.94	1.238	***	(0.123)	3.45
$50,001 - $100,000	1.142	***	(0.143)	3.13	1.761	***	(0.112)	5.82	2.356	***	(0.131)	10.55
$100,001 and more	1.050	***	(0.211)	2.85	2.189	***	(0.166)	8.93	2.943	***	(0.180)	18.98
Employment	0.846	***	(0.112)	2.33	0.851	***	(0.087)	2.34	0.867	***	(0.096)	2.38
Variable		45-54		(N = 4,860)		55-64		(N = 4,490)		65 +		(N = 3,976)
Objective Financial Knowledge	0.246	***	(0.031)	1.28	0.282	***	(0.034)	1.33	0.270	***	(0.037)	1.31
Subjective Financial Knowledge	0.070	*	(0.032)	1.07	0.032		(0.036)	1.03	0.588		(0.043)	1.06
Subjective Financial Management	0.034		(0.027)	1.03	0.072	*	(0.029)	1.07	0.105	***	(0.032)	1.11
Gender	-0.389	***	(0.081)	0.68	-0.430	***	(0.087)	0.65	-0.353	***	(0.096)	0.70
Race	0.034		(0.090)	1.03	0.218	*	(0.102)	1.24	0.585	***	(0.147)	1.80
Marital Status	0.111		(0.086)	1.12	0.206	*	(0.093)	1.23	0.316	**	(0.103)	1.37
Dependent Children	0.034		(0.079)	1.03	-0.360	***	(0.102)	0.70	-0.370	*	(0.157)	0.69
Education: Some College	0.258	**	(0.090)	1.29	0.293	**	(0.098)	1.34	-0.050		(0.108)	0.95
College Graduate	0.453	***	(0.110)	1.57	0.699	***	(0.124)	2.01	0.182		(0.154)	1.20
Post-Secondary Graduate	0.594	***	(0.172)	1.81	0.743	***	(0.161)	2.10	0.450	**	(0.173)	1.57
Income: $25,001 - $50,000	1.358	***	(0.105)	3.89	1.437	***	(0.106)	4.21	1.484	***	(0.119)	4.41
$50,001 - $100,000	2.397	***	(0.116)	10.99	2.402	***	(0.124)	11.05	2.501	***	(0.141)	12.28
$100,001 and more	3.124	***	(0.167)	22.74	3.427	***	(0.197)	30.79	3.210	***	(0.203)	24.79
Employment	0.859	***	(0.082)	2.36	0.509	***	(0.086)	1.66	-0.208		(0.120)	0.81

* p < .05; ** p < .01; *** p < .001

Table 4.7.3

Results for Hypothesis 2 (H2A3, H2B3, & H2C3) by Age Cohort and Having Investments

Variable	Coefficient		Std Err	Odds Ratio	Coefficient		Std Err	Odds Ratio	Coefficient		Std Err	Odds Ratio
	18-24			(N = 2,353)	25-34			(N = 4,021)	35-44			(N = 4,027)
Objective Financial Knowledge	0.166	***	(0.048)	1.18	0.094	**	(0.032)	1.10	0.173	***	(0.032)	1.19
Subjective Financial Knowledge	0.325	***	(0.056)	1.38	0.389	***	(0.041)	1.48	0.279	***	(0.040)	1.32
Subjective Financial Management	-0.055		(0.142)	0.95	0.013		(0.031)	1.01	0.027		(0.030)	1.03
Gender	0.490	***	(0.131)	1.63	0.246	**	(0.086)	1.28	0.274	***	(0.082)	1.32
Race	0.432	***	(0.133)	1.54	0.060		(0.085)	1.06	0.171	*	(0.086)	1.19
Marital Status	0.020		(0.173)	1.13	0.024		(0.097)	1.02	0.116		(0.097)	1.12
Dependent Children	0.362	*	(0.155)	1.44	-0.127		(0.093)	0.88	-0.091		(0.091)	0.91
Education: Some College	0.500	***	(0.145)	1.65	0.315	*	(0.128)	1.37	0.297	**	(0.116)	1.35
College Graduate	0.892	***	(0.197)	2.44	0.811	***	(0.126)	2.25	0.874	***	(0.118)	2.40
Post-Secondary Graduate	1.286	***	(0.372)	3.62	0.998	***	(0.144)	2.71	1.015	***	(0.141)	2.76
Income: $25,001 - $50,000	0.111		(0.166)	1.12	0.456	***	(0.142)	1.58	0.917	***	(0.175)	2.50
$50,001 - $100,000	0.752	***	(0.162)	2.12	1.145	***	(0.142)	3.14	1.593	***	(0.171)	4.91
$100,001 and more	1.352	***	(0.211)	3.87	1.798	***	(0.167)	6.04	2.205	***	(0.184)	9.07
Employment	0.515	***	(0.131)	1.67	0.634	***	(0.109)	1.88	0.278	**	(0.104)	1.32
Variable	45-54			(N = 4,860)	55-64			(N = 4,490)	65 +			(N = 3,976)
Objective Financial Knowledge	0.225	***	(0.031)	1.25	0.278	***	(0.032)	1.32	0.278	***	(0.033)	1.32
Subjective Financial Knowledge	0.282	***	(0.034)	1.33	0.242	***	(0.034)	1.27	0.283	***	(0.039)	1.33
Subjective Financial Management	0.005		(0.026)	1.01	0.060	*	(0.027)	1.06	0.059	*	(0.028)	1.06
Gender	-0.032		(0.073)	0.97	-0.201	**	(0.073)	0.82	-0.232	**	(0.079)	0.79
Race	0.134		(0.084)	1.14	0.367	***	(0.092)	1.44	0.728	***	(0.137)	2.07
Marital Status	-0.144		(0.083)	0.87	-0.008		(0.084)	0.99	0.125		(0.089)	1.13
Dependent Children	-0.130		(0.072)	0.88	-0.181	*	(0.085)	0.83	-0.207		(0.132)	0.81
Education: Some College	0.400	***	(0.091)	1.49	0.324	***	(0.094)	1.38	0.032		(0.093)	1.03
College Graduate	0.778	***	(0.100)	2.18	0.725	***	(0.105)	2.06	0.290	*	(0.126)	1.34
Post-Secondary Graduate	0.887	***	(0.127)	2.43	0.709	***	(0.118)	2.03	0.437	***	(0.127)	1.55
Income: $25,001 - $50,000	1.052	***	(0.140)	2.86	0.941	***	(0.128)	2.56	0.922	***	(0.129)	2.51
$50,001 - $100,000	1.744	***	(0.140)	5.72	1.680	***	(0.129)	5.36	1.834	***	(0.134)	6.26
$100,001 and more	2.448	***	(0.156)	11.57	2.367	***	(0.147)	10.66	2.459	***	(0.157)	11.68
Employment	0.156		(0.085)	1.17	-0.024		(0.073)	0.98	-0.153		(0.094)	0.86

* p < .05; ** p < .01; *** p < .001

Table 4.8

Results for Hypothesis 3

Variable	Short-Term Financial Planning and Managing Behaviors											
	Emerg Fund (N = 23,727)			Spending (N = 23,727)			No Overdraft (N = 23,727)			Mortgage Pymt (N = 8,964)		
	Coeff.	(Std Err)	Odds Ratio	Coeff.	(Std Err)	Odds Ratio	Coeff.	(Std Err)	Odds Ratio	Coeff.	(Std Err)	Odds Ratio
Obj Financial Knowledge	0.062***	(0.013)	1.06	0.049***	(0.013)	1.05	0.134***	(0.013)	1.14	0.150***	(0.023)	1.16
Subj Financial Knowledge	0.292***	(0.015)	1.34	0.058***	(0.014)	1.06	0.056***	(0.013)	1.06	0.029	(0.026)	1.03
Subj Financial Management	0.172***	(0.012)	1.19	0.150***	(0.011)	1.16	0.257***	(0.011)	1.29	0.220***	(0.019)	1.25
Age Cohort:												
25-34	-0.459***	(0.065)	0.63	-0.015	(0.062)	0.99	-0.215***	(0.059)	0.81	0.606***	(0.152)	1.83
35-44	-0.695***	(0.066)	0.50	0.055	(0.064)	1.06	-0.180**	(0.061)	0.84	0.484***	(0.148)	1.62
45-54	-0.643***	(0.063)	0.53	0.102	(0.062)	1.11	-0.049	(0.059)	0.95	0.401**	(0.148)	1.49
55-64	-0.217***	(0.063)	0.81	0.177**	(0.065)	1.19	0.110	(0.062)	1.12	0.686***	(0.151)	1.99
65 +	0.410***	(0.067)	1.51	0.227**	(0.072)	1.26	0.663***	(0.073)	1.94	1.322***	(0.172)	3.75
Gender	0.106***	(0.031)	1.11	0.091**	(0.035)	1.10	0.006	(0.033)	1.00	0.043	(0.059)	1.04
Race	0.014	(0.036)	1.01	0.152***	(0.037)	1.16	0.237***	(0.035)	1.27	0.564***	(0.064)	1.76
Marital Status	0.098**	(0.036)	1.10	-0.043	(0.039)	0.96	0.164***	(0.037)	1.18	0.074	(0.069)	1.08
Dependent Children	-0.414***	(0.036)	0.66	-0.374***	(0.038)	0.69	-0.589***	(0.036)	0.55	-0.558***	(0.064)	0.57
Education:												
Some College	0.064	(0.039)	1.07	-0.001	(0.041)	1.00	0.129***	(0.039)	1.14	-0.086	(0.074)	0.92
College Graduate	0.476***	(0.045)	1.61	0.033	(0.050)	1.03	0.270***	(0.047)	1.31	0.160	(0.083)	1.17
Post-Secondary Graduate	0.525***	(0.054)	1.69	-0.093	(0.063)	0.91	0.222***	(0.061)	1.25	0.315**	(0.104)	1.37
Income:												
$25,001 - $50,000	0.604***	(0.048)	1.83	0.235***	(0.045)	1.27	0.327***	(0.043)	1.39	0.336**	(0.107)	1.40
$50,001 - $100,000	1.282***	(0.049)	3.61	0.584***	(0.050)	1.79	0.687***	(0.048)	1.99	0.802***	(0.108)	2.23
$100,001 and more	1.949***	(0.059)	7.02	1.044***	(0.068)	2.84	0.903***	(0.062)	2.47	1.339***	(0.124)	3.81
Employment	0.021	(0.035)	1.02	0.027	(0.037)	1.03	0.020	(0.036)	1.02	-0.064	(0.067)	0.94

*$p < .05$; ** $p < .01$; *** $p < .001$ *Pseudo R^2 = 0.19*   *Pseudo R^2 = 0.06*   *Pseudo R^2 = 0.13*   *Pseudo R^2 = 0.16*

Table 4.9.1

Results for Hypothesis 4 (H4A1, H4B1, & H4C1) by Age Cohort and Having an Emergency Fund

Variable	Coefficient		Std Err	Odds Ratio	Coefficient		Std Err	Odds Ratio	Coefficient		Std Err	Odds Ratio
	18-24			(N = 2,353)	25-34			(N = 4,021)	35-44			(N = 4,027)
Objective Financial Knowledge	0.013		(0.037)	1.01	(0.047)		(0.030)	0.95	0.056		(0.031)	1.06
Subjective Financial Knowledge	0.220	***	(0.041)	1.25	0.330	***	(0.036)	1.39	0.261	***	(0.038)	1.30
Subjective Financial Management	0.099	**	(0.033)	1.10	0.132	***	(0.028)	1.14	0.190	***	(0.030)	1.21
Gender	0.292	**	(0.101)	1.34	0.326	***	(0.079)	1.39	0.140		(0.080)	1.15
Race	(0.128)		(0.097)	0.88	(0.171)	*	(0.077)	0.84	(0.215)	**	(0.082)	0.81
Marital Status	0.135		(0.136)	1.14	0.039		(0.088)	1.04	0.279	**	(0.094)	1.32
Dependent Children	(0.181)		(0.120)	0.83	(0.387)	***	(0.085)	0.68	(0.554)	***	(0.087)	0.57
Education: Some College	0.175		(0.105)	1.19	0.260	*	(0.109)	1.30	0.053		(0.108)	1.05
College Graduate	0.588	***	(0.158)	1.80	0.802	***	(0.110)	2.23	0.661	***	(0.111)	1.94
Post-Secondary Graduate	0.530		(0.340)	1.70	0.809	***	(0.131)	2.25	0.917	***	(0.135)	2.50
Income: $25,001 - $50,000	0.340	**	(0.119)	1.40	0.281	*	(0.114)	1.32	0.528	***	(0.145)	1.70
$50,001 - $100,000	0.874	***	(0.128)	2.41	0.876	***	(0.118)	2.40	1.130	***	(0.142)	3.10
$100,001 and more	1.083	***	(0.186)	2.95	1.547	***	(0.150)	4.70	1.685	***	(0.159)	5.39
Employment	0.173		(0.098)	1.19	0.268	**	(0.091)	1.31	0.155		(0.097)	1.17
Variable	45-54			(N = 4,860)	55-64			(N = 4,490)	65 +			(N = 3,976)
Objective Financial Knowledge	0.027		(0.029)	1.03	0.128	***	(0.030)	1.14	0.171	***	(0.033)	1.19
Subjective Financial Knowledge	0.283	***	(0.033)	1.33	0.276	***	(0.033)	1.32	0.330	***	(0.039)	1.39
Subjective Financial Management	0.192	***	(0.026)	1.21	0.203	***	(0.027)	1.22	0.195	***	(0.028)	1.22
Gender	0.196	**	(0.071)	1.22	(0.015)		(0.071)	0.99	(0.220)	**	(0.081)	0.80
Race	0.032		(0.081)	1.03	0.462	***	(0.089)	1.59	0.504	***	(0.135)	1.66
Marital Status	(0.070)		(0.080)	0.93	0.067		(0.081)	1.07	0.065		(0.092)	1.07
Dependent Children	(0.343)	***	(0.071)	0.71	(0.391)	***	(0.084)	0.68	(0.342)		(0.135)	0.71
Education: Some College	0.039		(0.088)	1.04	0.143		(0.089)	1.15	(0.113)		(0.096)	0.89
College Graduate	0.395	***	(0.097)	1.48	0.456	***	(0.102)	1.58	0.131		(0.132)	1.14
Post-Secondary Graduate	0.429	***	(0.124)	1.54	0.491	***	(0.118)	1.63	0.042		(0.133)	1.04
Income: $25,001 - $50,000	0.699	***	(0.123)	2.01	0.740	***	(0.112)	2.09	1.069	***	(0.120)	2.91
$50,001 - $100,000	1.473	***	(0.124)	4.36	1.410	***	(0.117)	4.09	1.916	***	(0.129)	6.79
$100,001 and more	2.193	***	(0.142)	8.96	2.172	***	(0.139)	8.77	2.655	***	(0.162)	14.22
Employment	(0.034)		(0.082)	0.97	(0.113)		(0.072)	0.89	(0.413)	***	(0.098)	0.66

*$p < .05$; ** $p < .01$; *** $p < .001$

Table 4.9.2

Results for Hypothesis 4 (H4A2, H4B2, & H4C2) by Age Cohort and Spending Less than or Equal to Income

Variable	Coefficient		Std Err	Odds Ratio	Coefficient		Std Err	Odds Ratio	Coefficient		Std Err	Odds Ratio
	18-24			(N = 2,353)	25-34			(N = 4,021)	35-44			(N = 4,027)
Objective Financial Knowledge	0.102	**	(0.038)	1.11	0.098	***	(0.030)	1.10	0.070	*	(0.031)	1.07
Subjective Financial Knowledge	-0.008		(0.038)	0.99	0.009		(0.031)	1.00	0.056		(0.033)	1.06
Subjective Financial Management	0.199	***	(0.030)	1.22	0.135	***	(0.024)	1.14	0.138	***	(0.026)	1.15
Gender	0.044		(0.104)	1.04	0.074		(0.080)	1.08	0.219	**	(0.083)	1.25
Race	0.263	**	(0.096)	1.30	0.281	***	(0.077)	1.32	0.002		(0.084)	1.00
Marital Status	0.065		(0.136)	1.07	0.107		(0.087)	1.11	-0.093		(0.093)	0.91
Dependent Children	-0.330	**	(0.114)	0.72	-0.471	***	(0.086)	0.62	-0.319	***	(0.091)	0.73
Education: Some College	-0.031		(0.105)	0.97	0.126		(0.097)	1.13	-0.135		(0.100)	0.87
College Graduate	-0.263		(0.170)	0.77	0.152		(0.109)	1.16	-0.034		(0.113)	0.97
Post-Secondary Graduate	-0.298		(0.375)	0.74	-0.014		(0.168)	0.99	-0.057		(0.151)	0.94
Income: $25,001 - $50,000	0.277	*	(0.120)	1.32	0.191		(0.098)	1.21	0.149		(0.112)	1.16
$50,001 - $100,000	0.464	***	(0.145)	1.59	0.442	***	(0.112)	1.56	0.602	***	(0.122)	1.83
$100,001 and more	0.492	*	(0.217)	1.64	0.861	***	(0.168)	2.37	1.071	***	(0.159)	2.92
Employment	0.226	*	(0.100)	1.25	0.085		(0.085)	1.09	-0.095		(0.092)	0.91
Variable	45-54			(N = 4,860)	55-64			(N = 4,490)	65 +			(N = 3,976)
Objective Financial Knowledge	0.007		(0.031)	1.01	0.015		(0.035)	1.01	-0.036		(0.040)	0.96
Subjective Financial Knowledge	0.095	***	(0.030)	1.10	0.092	**	(0.034)	1.10	0.109	**	(0.043)	1.12
Subjective Financial Management	0.180	***	(0.024)	1.20	0.132	***	(0.027)	1.14	0.103	***	(0.031)	1.10
Gender	0.215	**	(0.078)	1.24	-0.058		(0.085)	0.94	0.155		(0.097)	1.17
Race	0.132		(0.085)	1.14	-0.050		(0.103)	0.95	0.306	*	(0.149)	1.36
Marital Status	-0.143		(0.085)	0.87	-0.116		(0.095)	0.89	-0.161		(0.111)	0.85
Dependent Children	-0.265	***	(0.076)	0.77	-0.516	***	(0.094)	0.60	-0.414	**	(0.150)	0.66
Education: Some College	0.037		(0.090)	1.04	-0.062		(0.103)	0.94	-0.008		(0.115)	0.99
College Graduate	0.142		(0.110)	1.15	-0.025		(0.122)	0.98	-0.075		(0.156)	0.93
Post-Secondary Graduate	-0.236		(0.145)	0.79	0.064		(0.150)	1.07	-0.282		(0.155)	0.75
Income: $25,001 - $50,000	0.229	*	(0.104)	1.26	0.321	**	(0.114)	1.38	0.479	***	(0.134)	1.61
$50,001 - $100,000	0.554	***	(0.115)	1.74	0.754	***	(0.129)	2.13	0.971	***	(0.149)	2.64
$100,001 and more	1.161	***	(0.154)	3.19	1.241	***	(0.166)	3.46	1.414	***	(0.187)	4.11
Employment	0.047		(0.084)	1.05	-0.068		(0.087)	0.93	-0.071		(0.120)	0.93

*$p < .05$; ** $p < .01$; *** $p < .001$

Table 4.9.3

Results for Hypothesis 4 (H4A3, H4B3, & H4C3) by Age Cohort and Not Overdrawing Checking Account

Variable	Coefficient		Std Err	Odds Ratio	Coefficient		Std Err	Odds Ratio	Coefficient		Std Err	Odds Ratio
	18-24			(N = 2,353)	25-34			(N = 4,021)	35-44			(N = 4,027)
Objective Financial Knowledge	0.167	***	(0.036)	1.18	0.179	***	(0.028)	1.20	0.123	***	(0.028)	1.13
Subjective Financial Knowledge	-0.065		(0.037)	0.94	-0.037		(0.030)	0.96	0.002		(0.032)	1.00
Subjective Financial Management	0.278	***	(0.031)	1.32	0.262	***	(0.024)	1.30	0.301	***	(0.026)	1.35
Gender	-0.033		(0.099)	0.97	-0.002		(0.075)	1.00	0.142		(0.077)	1.15
Race	0.189	*	(0.093)	1.21	0.110		(0.073)	1.12	0.040		(0.078)	1.04
Marital Status	0.401	**	(0.133)	1.49	0.201	*	(0.083)	1.22	0.103		(0.086)	1.10
Dependent Children	-0.844	***	(0.112)	0.43	-0.772	***	(0.081)	0.46	-0.600	***	(0.085)	0.55
Education: Some College	0.596	***	(0.099)	1.82	0.176		(0.092)	1.19	0.101		(0.092)	1.11
College Graduate	0.543	***	(0.165)	1.72	0.433	***	(0.102)	1.54	0.389	***	(0.104)	1.48
Post-Secondary Graduate	0.814	*	(0.396)	2.26	0.462	***	(0.131)	1.59	0.392	**	(0.139)	1.48
Income: $25,001 - $50,000	0.197		(0.115)	1.22	0.348	***	(0.095)	1.42	0.349	***	(0.108)	1.42
$50,001 - $100,000	0.193		(0.133)	1.21	0.531	***	(0.106)	1.70	0.752	***	(0.114)	2.12
$100,001 and more	-0.004		(0.194)	1.00	0.544	***	(0.146)	1.72	0.919	***	(0.141)	2.50
Employment	0.069		(0.095)	1.07	0.029		(0.081)	1.03	-0.028		(0.086)	0.97
Variable	45-54			(N = 4,860)	55-64			(N = 4,490)	65 +			(N = 3,976)
Objective Financial Knowledge	0.084	**	(0.028)	1.09	0.082	*	(0.032)	1.09	0.118	**	(0.043)	1.13
Subjective Financial Knowledge	0.109	***	(0.028)	1.12	0.159	***	(0.032)	1.17	0.211	***	(0.045)	1.24
Subjective Financial Management	0.252	***	(0.023)	1.29	0.242	***	(0.025)	1.27	0.188	***	(0.033)	1.21
Gender	0.074		(0.071)	1.08	-0.036		(0.081)	0.97	-0.034		(0.109)	0.97
Race	0.281	***	(0.078)	1.32	0.537	***	(0.091)	1.71	0.659	***	(0.151)	1.93
Marital Status	0.078		(0.077)	1.08	0.074		(0.090)	1.08	0.123		(0.122)	1.13
Dependent Children	-0.312	***	(0.071)	0.73	-0.556	***	(0.090)	0.57	-0.282		(0.173)	0.75
Education: Some College	0.082		(0.083)	1.09	-0.062		(0.098)	0.94	-0.341	**	(0.131)	0.71
College Graduate	0.165		(0.100)	1.18	-0.065		(0.116)	0.94	-0.132		(0.185)	0.88
Post-Secondary Graduate	0.207		(0.140)	1.23	-0.079		(0.140)	0.92	-0.674	***	(0.176)	0.51
Income: $25,001 - $50,000	0.229	*	(0.096)	1.26	0.442	***	(0.107)	1.56	0.686	***	(0.143)	1.99
$50,001 - $100,000	0.729	***	(0.106)	2.07	0.921	***	(0.121)	2.51	1.225	***	(0.164)	3.40
$100,001 and more	0.997	***	(0.136)	2.71	1.359	***	(0.157)	3.89	1.594	***	(0.211)	4.93
Employment	0.153	*	0.077	1.16	-0.128		(0.083)	0.88	-0.358	**	(0.131)	0.70

*p < .05; ** p < .01; *** p < .001*

Table 4.9.4

Results for Hypothesis 4 (H4A4, H4B4, & H4C4) by Age Cohort and Timely Mortgage Payments

Variable	Coefficient 18-24	Std Err	Odds Ratio (N = 271)	Coefficient 25-34	Std Err	Odds Ratio (N = 1,281)	Coefficient 35-44	Std Err	Odds Ratio (N = 1,909)
Objective Financial Knowledge	0.072	(0.101)	1.07	0.329 ***	(0.055)	1.39	0.135 **	(0.047)	1.14
Subjective Financial Knowledge	-0.106	(0.109)	0.90	-0.206 **	(0.068)	0.81	-0.019	(0.057)	0.98
Subjective Financial Management	0.226 *	(0.093)	1.25	0.208 ***	(0.052)	1.23	0.286 ***	(0.042)	1.33
Gender	-0.184	(0.282)	0.83	-0.344 *	(0.151)	0.71	0.257 *	(0.125)	1.29
Race	0.054	(0.275)	1.06	0.299 *	(0.148)	1.35	0.516 ***	(0.127)	1.67
Marital Status	0.387	(0.309)	1.47	0.382 *	(0.175)	1.47	0.242	(0.153)	1.27
Dependent Children	-0.529	(0.296)	0.59	-1.111 ***	(0.179)	0.33	-0.531 ***	(0.149)	0.59
Education: Some College	0.147	(0.298)	1.16	-0.119	(0.205)	0.89	0.013	(0.157)	1.01
College Graduate	0.234	(0.385)	1.26	-0.267	(0.206)	0.77	0.571 ***	(0.170)	1.77
Post-Secondary Graduate	1.840	(1.155)	6.30	-0.101	(0.254)	0.90	0.505 *	(0.209)	1.66
Income: $25,001 - $50,000	-0.016	(0.381)	0.98	0.488	(0.290)	1.63	0.241	(0.264)	1.27
$50,001 - $100,000	0.105	(0.376)	1.11	0.704 *	(0.292)	2.02	0.679 **	(0.259)	1.97
$100,001 and more	0.044	(0.477)	1.04	1.138 ***	(0.335)	3.12	1.253 ***	(0.283)	3.50
Employment	-0.073	(0.272)	0.93	-0.031	(0.187)	0.97	0.051	(0.147)	1.05

Variable	Coefficient 45-54	Std Err	Odds Ratio (N = 2,242)	Coefficient 55-64	Std Err	Odds Ratio (N = 1,899)	Coefficient 65 +	Std Err	Odds Ratio (N = 1,362)
Objective Financial Knowledge	0.071	(0.049)	1.07	0.043	(0.057)	1.04	-0.014	(0.095)	0.99
Subjective Financial Knowledge	0.099 ***	(0.049)	1.10	0.178 **	(0.059)	1.20	0.327 ***	(0.100)	1.39
Subjective Financial Management	0.218 ***	(0.037)	1.24	0.207 ***	(0.043)	1.23	0.192 **	(0.065)	1.21
Gender	0.242 *	(0.117)	1.27	0.095	(0.137)	1.10	-0.111	(0.224)	0.89
Race	0.857 ***	(0.126)	2.36	0.699 ***	(0.155)	2.01	0.676 *	(0.317)	1.97
Marital Status	-0.270	(0.140)	0.76	-0.152	(0.161)	0.86	0.227	(0.247)	1.26
Dependent Children	-0.470 ***	(0.115)	0.62	-0.432 **	(0.144)	0.65	-0.429	(0.302)	0.65
Education: Some College	-0.255	(0.138)	0.77	-0.035	(0.170)	0.97	-0.337	(0.265)	0.71
College Graduate	-0.046	(0.159)	0.95	0.160	(0.198)	1.17	0.641	(0.433)	1.90
Post-Secondary Graduate	0.496 *	(0.220)	1.64	0.397	(0.241)	1.49	-0.387	(0.345)	0.68
Income: $25,001 - $50,000	0.343	(0.208)	1.41	0.248	(0.240)	1.28	0.888 **	(0.306)	2.43
$50,001 - $100,000	1.115 ***	(0.213)	3.05	0.618 *	(0.243)	1.85	1.853 ***	(0.351)	6.38
$100,001 and more	1.710 ***	(0.244)	5.53	1.480 ***	(0.291)	4.39	1.884 ***	(0.410)	6.58
Employment	0.105	(0.130)	1.11	-0.271	(0.139)	0.76	-0.503 *	(0.239)	0.60

*$p < .05$; ** $p < .01$; *** $p < .001$

Table 4.10

Comparison of Objective Financial Knowledge Questions from Previous Research

Question	Correct (%)	Source
Growth Question		
Age 18 +	91.8	Lusardi & Mitchell, 2010
Age 18 +	77.7	Allgood & Walstad, 2011; 2012
Age 18 +	64.9	Lusardi & Mitchell, 2011; Lusardi, 2011
Age 18 +	80.0	Lachance & Tang, 2012
Age 18 +	79.3	Lusardi & de Bassa Scheresberg, 2012
Age 18-34	77.0	Lusardi & de Bassa Scheresberg, 2012
Age 23-28	79.3	Lusardi, Mitchell, & Curto, 2010
Age 25-65	67.7	Lusardi & Mitchell, 2011
Age 50 +	67.1	Lusardi & Mitchell, 2005
Age 40-60 (high income)	92.9	Lusardi & Mitchell, 2007b
Age < 50 (high income)	90.1	Lusardi & Mitchell, 2007b
Age 50 + (high income)	94.4	Lusardi & Mitchell, 2007b
Age 50 + (female)	61.9	Lusardi & Mitchell, 2008

Question	Correct (%)	Source
Inflation Question		
Age 18 +	87.1	Lusardi & Mitchell, 2010
Age 18 +	64.5	Allgood & Walstad, 2011; 2012
Age 18 +	64.3	Lusardi & Mitchell, 2011; Lusardi, 2011
Age 18 +	68.0	Lachance & Tang, 2012
Age 18 +	66.3	Lusardi & de Bassa Scheresberg, 2012
Age 18-34	50.1	Lusardi & de Bassa Scheresberg, 2012
Age 23-28	54.0	Lusardi, Mitchell, & Curto, 2010
Age 25-65	68.4	Lusardi & Mitchell, 2011
Age 50 +	75.2	Lusardi & Mitchell, 2005
Age 40-60 (high income)	91.4	Lusardi & Mitchell, 2007b
Age < 50 (high income)	88.0	Lusardi & Mitchell, 2007b
Age 50 + (high income)	93.9	Lusardi & Mitchell, 2007b
Age 50 + (female)	70.6	Lusardi & Mitchell, 2008

Question	Correct (%)	Source
Mutual Fund Question		
Age 18 +	71.4	Lusardi & Mitchell, 2010
Age 18 +	53.4	Allgood & Walstad, 2011; 2012
Age 18 +	51.8	Lusardi & Mitchell, 2011; Lusardi, 2011
Age 18 +	56.0	Lachance & Tang, 2012
Age 18 +	55.2	Lusardi & de Bassa Scheresberg, 2012
Age 18-34	45.8	Lusardi & de Bassa Scheresberg, 2012
Age 23-28	46.7	Lusardi, Mitchell, & Curto, 2010
Age 25-65	55.5	Lusardi & Mitchell, 2011
Age 50 +	52.2	Lusardi & Mitchell, 2005
Age 40-60 (high income)	80.2	Lusardi & Mitchell, 2007b
Age < 50 (high income)	74.9	Lusardi & Mitchell, 2007b
Age 50 + (high income)	84.2	Lusardi & Mitchell, 2007b
Age 50 + (female)	47.6	Lusardi & Mitchell, 2008

Question	Correct (%)	Source
Mortgage Question		
Age 18 +	70.0	Lusardi, 2011
Age 18 +	75.6	Allgood & Walstad, 2011; 2012
Age 18 +	79.0	Lachance & Tang, 2012
Bond Price Question		
Age 18 +	31.6	Lusardi & Mitchell, 2010
Age 18 +	27.6	Allgood & Walstad, 2011; 2012
Age 18 +	21.0	Lusardi, 2011
Age 18 +	30.0	Lachance & Tang, 2012
Age 55 +	40.0	Lusardi, Mitchell, & Curto, 2009
Age 40-60 (high income)	36.7	Lusardi & Mitchell, 2007b
Age < 50 (high income)	32.6	Lusardi & Mitchell, 2007b
Age 50 + (high income)	39.8	Lusardi & Mitchell, 2007b

Table 4.11

Summary of Hypotheses Supported

H1: While moderating for the age cohort effect, greater financial knowledge and subjective financial management ability are positively associated with positive long-term financial planning and managing behaviors.	Supported
H1A: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with long-term financial planning and managing behaviors.	Supported
H1A1: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with retirement planning.	Supported
H1A2: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with having a retirement account.	Supported
H1A3: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with having investments in stocks, bonds, mutual funds, or other securities.	Supported
H1B: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with positive long-term financial planning and managing behaviors.	Supported
H1B1: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with retirement planning.	Supported
H1B2: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with having a retirement account.	Supported

H1B3: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with having investments in stocks, bonds, mutual funds, or other securities.	Supported
H1C: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with positive long-term financial planning and managing behaviors.	Supported
H1C1: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with retirement planning.	Supported
H1C2: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with having a retirement account.	Supported
H1C3: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with having investments in stocks, bonds, mutual funds, or other securities.	Supported
H2: The influence of financial knowledge and subjective financial management ability on long-term financial planning and managing behaviors is different in different age cohorts.	
H2A: The influence of objective financial knowledge on long-term financial planning and managing behaviors is different in different age cohorts.	Supported
H2A1: The influence of objective financial knowledge on retirement planning is different in different age cohorts.	Supported
H2A2: The influence of objective financial knowledge on having a retirement account is different in different age cohorts.	Supported

H2A3: The influence of objective financial knowledge on having investments in stocks, bonds, mutual funds, or other securities is different in different age cohorts.	Supported
H2B: The influence of subjective financial knowledge on long-term financial planning and managing behaviors is different in different age cohorts.	Supported
H2B1: The influence of subjective financial knowledge on retirement planning is different in different age cohorts.	Supported
H2B2: The influence of subjective financial knowledge on having a retirement account is different in different age cohorts.	Supported
H2B3: The influence of subjective financial knowledge on having investments in stocks, bonds, mutual funds, or other securities is different in different age cohorts.	Supported
H2C: The influence of subjective financial management ability on long-term financial planning and managing behaviors is different in different age cohorts.	*Not Supported*
H2C1: The influence of subjective financial management ability on retirement planning is different in different age cohorts.	*Not Supported*
H2C2: The influence of subjective financial management ability on having a retirement account is different in different age cohorts.	*Not Supported*
H2C3: The influence of subjective financial management ability on having investments in stocks, bonds, mutual funds, or other securities is different in different age cohorts.	*Not Supported*

H3: While moderating for the age cohort effect, greater financial knowledge and subjective financial management ability are positively associated with positive short-term financial planning and managing behaviors.	
H3A: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with short-term financial planning and managing behaviors.	Supported
H3A1: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with having an emergency fund.	Supported
H3A2: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with spending less than or equal to one's income.	Supported
H3A3: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with not overdrawing a checking account.	Supported
H3A4: While moderating for the age cohort effect, greater objective financial knowledge is positively associated with making mortgage payments on time.	Supported
H3B: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with positive short-term financial planning and managing behaviors.	
H3B1: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with having an emergency fund.	Supported
H3B2: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with spending less than or equal to one's income.	Supported
H3B3: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with not overdrawing a checking account.	Supported

H3B4: While moderating for the age cohort effect, greater subjective financial knowledge is positively associated with making mortgage payments on time.	*Not Supported*
H3C: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with short-term financial planning and managing behaviors.	Supported
H3C1: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with having an emergency fund.	Supported
H3C2: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with spending less than or equal to one's income.	Supported
H3C3: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with not overdrawing a checking account.	Supported
H3C4: While moderating for the age cohort effect, greater subjective financial management ability is positively associated with making mortgage payments on time.	Supported
H4: The influence of financial knowledge and subjective financial management ability on short-term financial planning and managing behaviors is different in different age cohorts.	Supported
H4A: The influence of objective financial knowledge on short-term financial planning and managing behaviors is different in different age cohorts.	Supported
H4A1: The influence of objective financial knowledge on having an emergency fund is different in different age cohorts.	Supported
H4A2: The influence of objective financial knowledge on spending less than or equal to one's income is different in different age cohorts.	Supported

H4A3: The influence of objective financial knowledge on not overdrawing a checking account is different in different age cohorts.	Supported
H4A4: The influence of objective financial knowledge on making mortgage payments on time is different in different age cohorts.	Supported
H4B: The influence of subjective financial knowledge on short-term financial planning and managing behaviors is different in different age cohorts.	Supported
H4B1: The influence of subjective financial knowledge on having an emergency fund is different in different age cohorts.	Supported
H4B2: The influence of subjective financial knowledge on spending less than or equal to one's income is different in different age cohorts.	Supported
H4B3: The influence of subjective financial knowledge on not overdrawing a checking account is different in different age cohorts.	Supported
H4B4: The influence of subjective financial knowledge on making mortgage payments on time is different in different age cohorts.	Supported
H4C: The influence of subjective financial management ability on short-term financial planning and managing behaviors is different in different age cohorts.	Supported
H4C1: The influence of subjective financial management ability on having an emergency fund is different in different age cohorts.	Supported
H4C2: The influence of subjective financial management ability on spending less than or equal to one's income is different in different age cohorts.	Supported

H4C3: The influence of subjective financial management ability on not overdrawing a checking account is different in different age cohorts.	Supported
H4C4: The influence of subjective financial management ability on making mortgage payments on time is different in different age cohorts.	Supported

CHAPTER 5

SUMMARY AND DISCUSSION

The overall purpose of this dissertation was to add to the literature in the field of financial literacy by examining the relationship between financial literacy and long- and short-term financial behaviors by age cohort. Chapter 1 introduced the research question and the importance of age and age cohorts. Chapter 2 reviewed the relevant literature and presented the conceptual model used in the analysis, ending with an overview of the four hypotheses. Chapter 3 provided a more detailed view of the hypotheses and a description of the data as well as described the research methodology used in the subsequent analysis. Chapter 4 presented the results of the logistic regressions. This final chapter includes a summary of the research findings, a discussion of limitations, and identifies implications with regard to the conceptual model, policy considerations, and future research.

Summary of Findings

The overall purpose of this dissertation was to add to the literature in the field of financial literacy by examining the relationship between financial literacy and long- and short-term financial behaviors by age cohort. Financial literacy was assessed in three ways: objective financial knowledge, subjective financial knowledge, and subjective financial management ability. Age cohorts reflected increments as follows: 18-24, 25-34, 35-44, 45-54, 55-64, and 65 and older. Data for the research came from the Financial Industry Regulatory Authority (FINRA) dataset, a nationally representative sample from the 2012 National Financial Capability Study (NFCS). This cross-sectional dataset provided a snapshot of the nation via a questionnaire

administered on a website over the months July through October 2012 and made available to researchers in May 2013 (FINRA, 2013).

The following hypotheses were examined: H1: While moderating for the age cohort effect, greater financial knowledge and subjective financial management ability are positively associated with positive long-term financial planning and managing behaviors; H2: The influence of financial knowledge and subjective financial management ability on long-term financial planning and managing behaviors is different in different age cohorts; H3: While moderating for the age cohort effect, greater financial knowledge and subjective financial management ability are positively associated with positive short-term financial planning and managing behaviors; and H4: The influence of financial knowledge and subjective financial management ability on short-term financial planning and managing behaviors is different in different age cohorts.

The first and third hypotheses were written to explore the relationship between financial knowledge, financial management ability, and long- and short-term financial planning and managing behaviors specifically addressing age cohorts. Both were supported; greater financial knowledge and subjective financial management ability were positively associated with the three long-term and the four short-term financial planning and managing behaviors while moderating for the age cohort effect.

The significant relationships between financial literacy and the financial behaviors were not surprising and support previous research as well as the conceptual model. In previous research, greater financial literacy often has been associated with a greater likelihood to plan for retirement as well as saving behaviors (Bernheim, Garrett, & Maki, 2001; Braunstein & Welch, 2002; Lusardi, 2008; Lusardi & Mitchell, 2007b). These findings also agree with work by

Hilgert, Hogarth, and Beverly (2003) and others who reported on financial literacy's relationship with day-to-day financial management (Banks, O'Dea, & Oldfield, 2010; Lusardi & Mitchell, 2005; Moore, 2003). This also aligns with the conceptual model where the three facets of financial literacy measured in this study are associated with financial behaviors. The three elements of financial literacy – objective financial knowledge, subjective financial knowledge, and subjective financial management ability – showed different relationships with each of the financial behaviors. This is similar to previous literature; notably, financial knowledge and financial confidence have a low correlation with each other – but both affect behavior (Robb & Woodyard, 2011).

A key finding was the highly significant associations between each of the long- and short-term behaviors and the age cohort variable. Using the 18-24 age cohort as a reference group, each of the age cohorts was progressively more likely to engage in each of the behaviors. The exceptions were the two youngest age cohorts with regard to investments where no association was evident. This increase with each age cohort is meaningful and supports findings from Agarwal et al. (2009). Additionally, the odds ratios for the age cohorts were higher in many cases than for education or for any of the components of financial literacy. Indeed, only income had an overall larger association with financial behavior than age cohort. Having controlled for the other demographics, the fact that age demonstrated different influences on financial behaviors indicated a need to further examine the relationships within each age cohort. With this foundation, a deeper investigation was completed by age cohort in the analysis to test the second and fourth hypotheses.

The second and fourth hypotheses were written to examine the influence of financial knowledge and subjective financial management ability on long- and short-term financial

planning and managing behaviors by age cohort. Specifically, the influence of financial

knowledge and subjective financial management ability on long- and short-term financial

planning and managing behaviors was hypothesized to be different in different age cohorts.

Overall, both hypotheses were supported; in addition, interesting differences were found by age
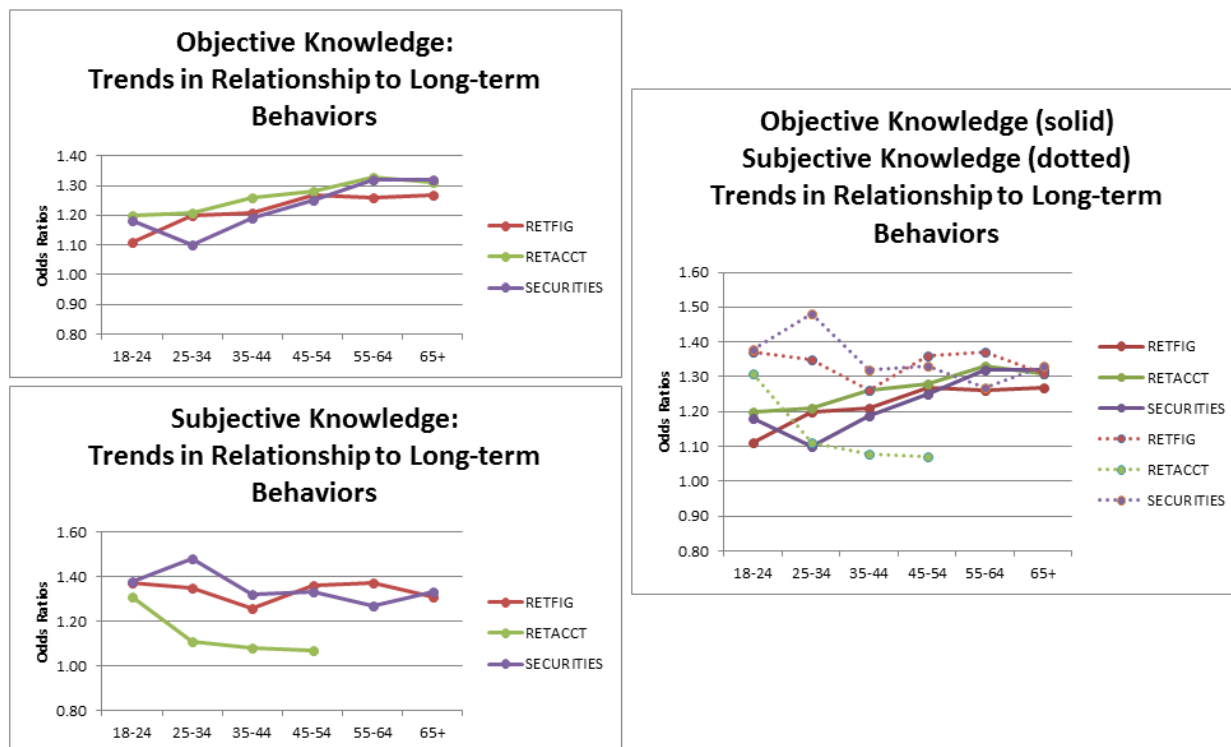
cohort.

A key finding for the long-term behaviors was that the strongest influence shifted from

subjective knowledge for the younger age cohorts to objective knowledge for the older age

cohorts. The odds increased with each age cohort that objective financial knowledge was

associated with the long-term behaviors. In contrast, the odds decreased with each age cohort

that subjective financial knowledge was associated with the long-term financial behaviors. This

trend supports the concept that experience is important in relation to knowledge (Agarwal et al.,

2009; Chen & Volpe, 1998; de Bassa Scheresberg, 2013). Graphs are included to depict the

trends in odds ratios by age cohort. (See Figure 5.1.) Using the odds ratios as the y-axis and the

age cohorts as the x-axis, the graphs show the increase or decrease in the odds ratios as age

increases.

As previous research has shown that financial knowledge improves over time and with

age (Delavande, Rohwedder, & Willis, 2008), this study goes a step further to show that this

improved knowledge also has an increasingly stronger association with financial behaviors by

age cohort. Studies have shown improved financial knowledge increases the likelihood of

planning for retirement (Hilgert, Hogarth, & Beverly, 2003; Lusardi & Mitchell, 2007a). This

finding often is associated with an older age group; this dissertation's research indicates that it

plays an important role for young adults as well as those in mid-career. Other literature has

shown increased positive financial behaviors in young adults with higher levels of financial

literacy (de Bassa Scheresberg, 2013; Xiao, Tang, Serido, & Shim, 2011), and this study agrees

with those findings and specifically associates financial literacy with long-term planning

behaviors.

Figure 5.1

Trends in Odds Ratios by Age Cohort for Long-Term Financial Behaviors

Results for the short-term behaviors were more disparate. Key findings for the short-term

behaviors indicated that subjective financial management ability was associated in every age

cohort for every behavior. This was not true of objective and subjective knowledge. The

exception was having an emergency fund, where the odds ratios increased for each age cohort for

both subjective financial knowledge and subjective financial management ability. The influence

of objective knowledge decreased with age in the short-term behaviors – the opposite of the

long-term behaviors. In other words, objective knowledge played a larger role for the younger

cohorts with the short-term behaviors and a larger role with the older cohorts with long-term

behaviors. Previous research that may help explain this reported that young adults have experience with financial behaviors such as budgeting and spending where the older adults have experience with borrowing and investing – which may not be fully developed skills in younger adults (Shim et al., 2013). This again supports the concept of experience building knowledge. Graphs are included to depict the trends in odds ratios by age cohort. (See Figure 5.2.) Using the odds ratios as the y-axis and the age cohorts as the x-axis, the graphs show the changes in odds ratios as age increases.

Subjective financial knowledge, or a perceived level of financial confidence, also played an important role for the younger adults. In other words, if they had a higher level of financial confidence, they were likelier to engage in the long-term behaviors as well as the short-term behavior of having an emergency fund. These findings agree with the research that found that subjective financial knowledge played an important role in financial behavior (Robb & Woodyard, 2011). When reporting a similar outcome in their research, Allgood and Walstad (2011) recommended further research in the area of financial behaviors and subjective financial knowledge. Finding that subjective knowledge makes a larger difference than objective knowledge in the younger generation is a step toward understanding the effect of these two types of knowledge. To boil it down, the younger cohorts will engage in positive financial behaviors if they think they can, where the older cohorts need to know they can.

Subjective financial management ability was more strongly associated with short-term behaviors than with long-term behaviors. This variable has not been studied extensively in the literature and provides unique insight into the financial behaviors examined here. However, the strong association with short-term and limited association with long-term behaviors could be explained by the wording of the single question used to measure this variable. The wording

specifically asked about perception of day-to-day management. Respondents might answer the question differently if it emphasized long-term management or more general aspects of financial management. In addition, the perspective of the respondent may have influenced the responses. It is possible that those who manage short-term financial behaviors well are simply better at the day-to-day management of life. The skill set to manage short-term finances is different than the skill set to manage long-term finances.

Figure 5.2

Trends in Odds Ratios by Age Cohort for Short-Term Financial Behaviors
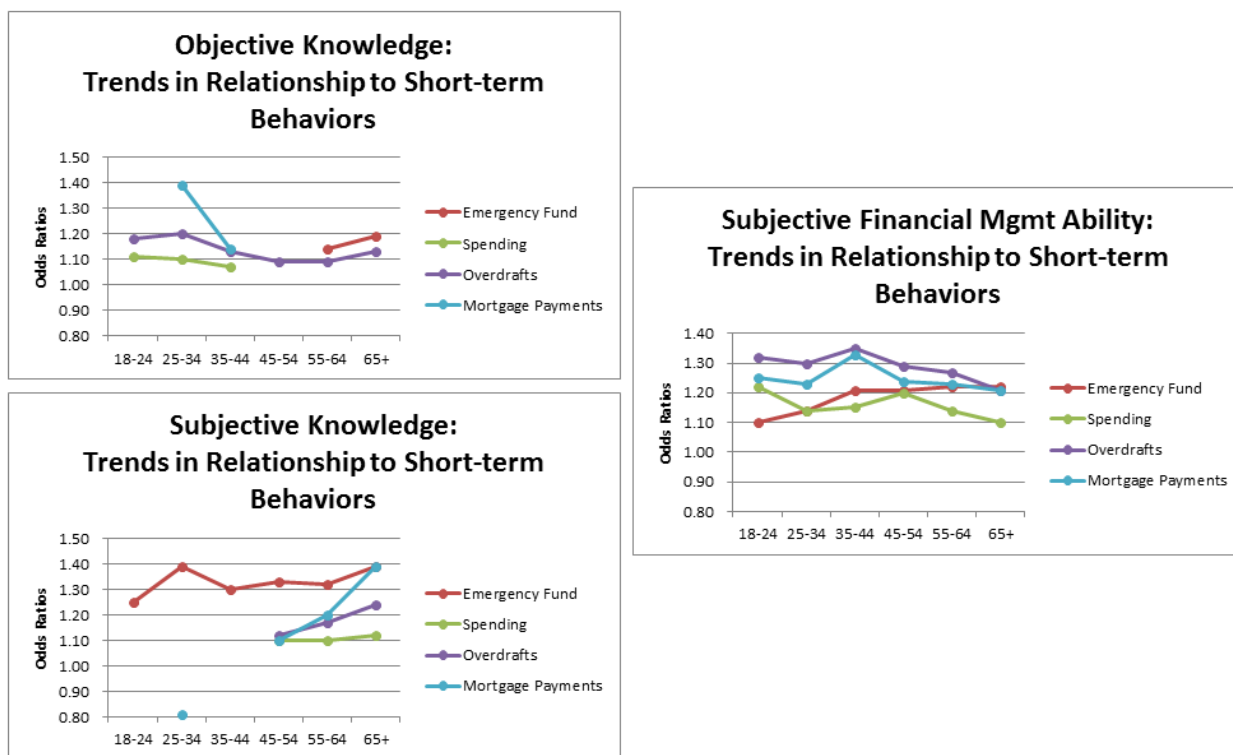
Limitations

The purpose of this study was to examine the relationship between financial literacy and long- and short-term financial behaviors by age cohort. The data used were from a robust national sample; however, some limitations existed as the data were self-reported and cross-sectional. There also were limitations in examining the construct of financial literacy and the causality of the relationships.

Both cross-sectional and self-reported data have limitations. Given the cross-sectional nature of the data, it was not possible to determine causality. A study using longitudinal data would be ideal to further investigate the relationships presented here. Some limitations may be attributed to the self-reported data as well. For example, the intention of the respondent with regard to the subjective questions is open to interpretation. The likeliest interpretation is that the subjective financial knowledge questions expressed the respondent's level of confidence in his/her financial understanding; however, it could reflect some degree of general optimism (or pessimism) or some other factor involving financial satisfaction (or lack of).The subjective questions preceded the objective questions and therefore did not likely influence the self-perception of the respondent with regard to financial knowledge (Allgood & Walstad, 2011).

On the other hand, the subjective financial management ability question followed all of the financial behavior and money management questions and so could have been influenced by the answers respondents provided to the earlier questions. In other words, if the respondent had a good feeling about their financial situation after answering the behavior and money management questions positively, then the respondent might have had a higher opinion of their management ability than someone who did not. In the future, the order of the questions in the questionnaire could be randomized to address this issue. It also may be useful to ask the subjective financial

management ability question at the beginning of the survey as well as at the end to examine any influence of the series of behavior and money management questions on the respondents' assessment of subjective financial management ability.

The five questions used to analyze objective financial knowledge were somewhat narrow in scope. They covered such topics as growth from compound interest, inflation, diversification of mutual funds versus stocks, mortgages, and bond prices. The objective financial knowledge questions did not include, for example, questions about the understanding of insurance, the management of credit, or the time value of money. Knoll and Houts (2012) indicated that a more robust set of questions may provide a better indication of objective financial knowledge.

The dataset lacks information about any of the other influences addressed in the conceptual model by Huston (2010). We do not know, for example, the behavioral biases or time preferences of the respondents such as having a long-term planning horizon versus a short-term focus. We also do not have a measure of interest as indicated by Mandell and Klein (2007) as a potential influence on the acquisition of financial knowledge. The data available allowed examination using demographics including family situations regarding marital status and the presence of children, but did not allow for examination of the potential influence of parental upbringing on financial behaviors.

Huston (2010) also included economic conditions as an "other influence" and while we may be able to surmise some of the impact of the Great Recession on this 2012 dataset, it would be helpful to have pre- and post-recession data. Perhaps an analysis of both the 2009 and the 2012 FINRA data could be used for further research. As stated earlier, however, longitudinal data would be ideal.

Implications

  Conceptual model. The conceptual model stands up to the application of the hypotheses in this study. The relationships were supported and significant. The definition of financial literacy allowed the concept to be measured in three ways: objective financial knowledge, subjective financial knowledge, and subjective financial management ability. Each of these had a bearing on the financial behaviors measured in this dissertation in terms of long-term and short-term financial planning and managing behaviors. In addition, when age was used to restrict the sample and analyze the relationships between financial literacy and financial behaviors, the regressions showed the anticipated differences by age cohort. Understanding these differences by age cohort will help educators, policy makers, and researchers in future decision-making with regard to financial literacy. The findings here support the section of the conceptual model which focused on financial literacy and financial behaviors. Further research of interest may look into how these behaviors affect financial well-being and how financial education affects financial literacy and ultimately financial well-being – each with a specific look at age cohorts. These would further substantiate the conceptual model and its usefulness in financial literacy policy, education, and research as well as meeting the needs of consumers of various ages.

  Policy. Policy makers should consider a tailored approach to handling financial issues by age cohort. A one-size-fits-all approach to education is not ideal to meet the needs of Americans of various ages (Lusardi, Mitchell, & Curto, 2009). It also may not be the ideal approach for policy. For example, the CARD Act was created to protect young adults from the potential misuse of credit at a young age. It was not deemed necessary for older adults.

  Findings here indicate that experience with finances supports a better understanding of financial matters. If this is the case, policy makers should consider methods to deliver financial

education that provides experience, in addition to knowledge and information, in an environment where mistakes will not have lasting effects. This is especially important for the younger age cohorts. Currently, some states have mandates for financial or economic education. However, the curriculums are varied and results are mixed regarding an actual increase in knowledge. This is a perfect testing ground for experience-based financial education. Such curriculum needs to include simulation-based learning or other low-risk practice opportunities. For example, the Junior Achievement organization recently launched a business simulation project for youth in Georgia (Thomas-Aguilar, 2013). Something similar with a specific focus on personal financial management would be ideal.

In addition to experience, results showed the importance of confidence. In the younger cohorts, subjective knowledge, or level of confidence in one's financial knowledge, was associated with positive financial behavior. Increasing an individual's confidence level in the management of finances may play an important role in changing behavior. In work by Bandura and Shunk (1981), children increased their level of confidence in math via a curriculum based in self-directed learning. This method of instruction also increased the student's level of self-knowledge of capabilities. In other words, not only was the student more confident in his/her abilities but also better able to accurately assess his/her level of knowledge. Additionally, this method of instruction increased the intrinsic interest in math. This intrinsic interest is similar to the concern reported by Mandell and Klein (2007) regarding level of interest in financial matters as it related to the level of knowledge.

Policy should be considered for workplace education as well, especially in the case of early- to mid-career age cohorts. Employers and/or their financial representatives often connect with employees by offering financial information seminars and retirement planning orientation

programs through the workplace (Servon & Kaestner, 2008). However, as a rule, information provided through the workplace is distributed through information sessions often provided by formal advisors or other professionals employed by the company's retirement plan provider (Clark et al., 2003). While it is difficult to impose restrictions on businesses, the workplace represents a potential point of broader delivery. In other words, the platform exists to deliver more information and experience to an existing audience. An option is a curriculum for employees that covers a broader range of topics than those presented by a representative of an investment firm (that is likely narrower and self-serving). Another approach is a concept called "enhanced active choice" reported in retirement planning research by Keller, Harlam, Loewenstein, and Volpp (2011, p. 376). This was used for employees choosing among alternatives for their retirement accounts. The less-preferred alternative was framed in terms of the potential losses, thus both educating and "nudging" the individual toward the preferred choice.

Challenges exist in reaching individuals with information, knowledge, or experience based on their particular situation. Braunstein and Welch (2002) point out the importance of understanding the intended audience for financial literacy programs; indeed they emphasize who, what, when, where, and how to design and deliver financial literacy education. For example, when the appropriate time is to expose individuals to general and specific financial topics, where the best location is to reach the broadest audience, and how a curriculum can be delivered over time to best assist consumers and their current circumstances. While it is not practical to analyze each individual's needs to provide customized education, educators need to identify an effective and efficient way to deliver relevant information to consumers. The use of age cohort differences provides a targeted, age-appropriate approach.

Future research. To gain a better understanding of the changes a consumer goes through in a lifetime, a longitudinal study would be ideal. Many researchers have stated this previously; it is surprising that a study has not been initiated for this purpose given the importance of financial literacy to our economy.

In general, future research could employ a more robust set of financial literacy questions. Using the scale proposed by Knoll and Houts (2012) would provide a more robust measurement for objective financial knowledge, while adding questions pertaining to subjective knowledge would enhance the measurement of financial confidence. Multiple measures for these constructs would improve upon the limited measures used here.

In addition to objective knowledge and confidence, ability to manage finances represents an important component of financial literacy in Huston's (2010) model. A robust measure of actual ability, objectively assessed, would complement the subjectively assessed financial management ability in this study. An example of a practical tool to measure ability is testing understanding of appropriate actions in response to a bank statement or a credit card statement. Indeed, Knoll and Houts (2012) suggested their knowledge measurement be used in conjunction with another tool measuring financial management and skill use. In the field of health literacy, researchers Weiss et al. (2005) presented a brief assessment for medical staff to use to evaluate patient health literacy. The patient was given a nutrition label and asked to answer specific questions. This concept has great potential in the financial literacy field.

Further research of interest may look into how these and other financial behaviors affect financial well-being and how financial education is related to these short- and long-term behaviors and ultimately financial well-being – each with a specific look at age cohorts. In addition, a time horizon variable or some of the "other influences" included in the model would

further substantiate the conceptual model and its usefulness to financial literacy policy, education, and research as well as meeting the needs of consumers of various ages.

Lastly, the impact of young adults moving back in with their parents has created a shift in our society. It will likely create a change in their financial futures. This study did not analyze the housing situation of the respondents; however, a question was asked in the survey about the respondent's living situation. Analyzing those young adults who are living in their parents' home may produce interesting results.

This dissertation has addressed a gap in research. No previous study has addressed a research question regarding both objectively and subjectively assessed financial knowledge and subjectively assessed financial management ability as associated with financial behaviors in an analysis of age cohorts. Understanding how each of these varies by age cohort will give researchers, educators, and policy makers a fresh perspective on financial literacy and its influence on financial behaviors that will help guide future research, curriculum, and policy for consumers of various ages.

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