THE MODERATING EFFECTS OF CONSUMER FINTECH USE, FINANCIAL KNOWLEDGE CONFIDENCE, AND FINANCIAL SELF-EFFICACY ON THE RELATIONSHIP BETWEEN FINANCIAL LITERACY AND MILLENNIAL SAVING BEHAVIOR

by

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ABSTRACT

JOSEPH DAVID MULLA. The Moderating Effects of Consumer Fintech Use, Financial Knowledge Confidence, and Financial Self-Efficacy on the Relationship Between Financial Literacy and Millennial Saving Behavior
(Under the direction of DR. REGINALD SILVER)

This dissertation explores the moderating effects of consumer fintech use, financial knowledge confidence, and financial-self efficacy on the relationship between financial literacy and the saving behavior of Millennials. The current financial literacy research acknowledges that these variables may impact this relationship, however, little research has been conducted addressing the impacts of these three factors collectively. Using a publicly available data set of 6,624 Millennial respondents, I hypothesized that these factors have a positive moderating effect; that is to say that when present and at higher levels, they increase the strength and direction of the relationship. The data show that only financial self-efficacy positively moderates the relationship while consumer fintech use is related to a negative relationship and financial knowledge confidence has no impact on the relationship.

Keywords: Financial Literacy, Millennials, Financial Technology, Self-Efficacy, Confidence

DEDICATION

This dissertation is dedicated to the three most important people in my life – my mother, my father, and my wife. Without their support over the years, none of this would have been possible. They each provided unwavering support of my dreams and aspirations, as far-fetched as they may have been sometimes (case in point – this dissertation), and for that, I am eternally grateful.

My mother is no longer with us, but I know in my heart that she is smiling down upon me, reveling in my accomplishments as if they were her own. Through an upbringing of questionable life choices and a tendency to learn things the hard way, she never gave me grief or passed judgment. Instead, she remained a consistent provider of advice and inspiration as if she knew that I had greatness inside of me even when I did not.

My father possesses an endless amount of grit and determination. Migrating to the U.S. in his 20's, he set out to claim his piece of the American dream and establish a better life for himself. He led a successful marriage and career while raising four children. Although things were never easy, he had a stern, yet approachable way about him that helped mold me into the half serious, half sarcastic person that I am today.

And finally, my wife. Jodi, you've been by my side since we were 13 years old. You've sacrificed your own dreams so that I could follow mine. No words can ever express how much I love you and appreciate what you've done for me. I can only hope that you view my accomplishments as "our" accomplishments, as they've been for you and us more than for me alone. All I do is for you.

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I'd also like to thank Dr. Gary Mottola, Research Director at the FINRA Investor Education Foundation. His hard work and dedication to personal finance provided the data I needed to complete this dissertation. Thank you, Gary, to you and your staff.

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To the UNC-Charlotte DBA faculty and support staff – thank you!!! This has by far been the most enjoyable and engaging academic pursuit that I've experienced. I'm now and forever a Charlotte 49'er and will represent my new alma mater proudly!

DBA Cohort 3 – we did it! We went from being strangers to classmates, and from friends to family. When you endure something as intense and taxing as pursuing a doctorate together, a unique bond is created – I will always remember all of you and hope to see you do great things!

Finally, thank you to all the mentors I've had over the years. Greg Biehl (Maj., USMC Ret.), Bob Herkenham (Col., USMC, Ret.), and Bruce Henderson (Capt., USMC, Ret.) – you gentlemen have been an inspiration to me. I'm where I am today because of you.

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CHAPTER I

INTRODUCTION

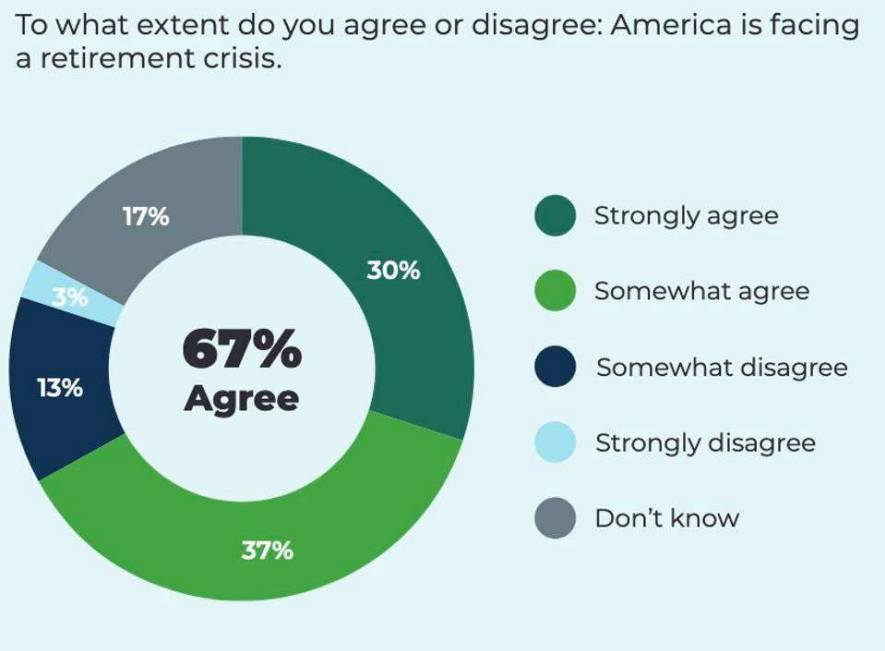
Financial literacy is perhaps more important now than ever before, particularly for Millennials born between 1981 and 1996 who make up the largest living adult generation (Dimock 2019, Fry 2020). Older workers relied on defined benefit (DB) plans and Social Security (Lusardi and Mitchell 2014, Topoleski and Myers 2020). Between 1981 and 2020, the percentage of full-time workers at large companies (over 500 employees) who participated in defined benefit plans has declined from 84% to only 28% (Topoleski and Myers 2020). Today, defined benefit plans are the exception rather than the rule, and Social Security is being drawn down faster than it is being replenished. In fact, the Social Security Administration states that they expect to pay full benefits only through the year 2037, when the reserves are expected to be exhausted (Glenn 2010). Millennials must then utilize other saving and investing vehicles to contribute to their future and should not rely on antiquated retirement plans and social welfare programs to provide income in retirement. Account types like Individual Retirement Accounts (IRAs) and defined contribution (DC) plans are the primary vessels that many individuals invest in for retirement today (Lusardi and Mitchell 2014, Collinson, Rowey et al. 2021) in lieu of defined benefit plans or other historical pension plan types. However, research shows that participation in retirement plans decreased between 2016 and 2019 (Bhutta, Bricker et al. 2020) while at the same time, the proportion of private sector employees who expect to receive retirement income from a private pension plan has increased from 63% in 2013 to 78% in 2017 (Crawford, Cribb et al. 2020). Additionally, as opposed to older generations who used defined benefit plans that had investment managers making investing decisions, Millennials must decide what investments they invest in. This decision is added onto the decision of investing to begin

with, which investment vehicles to invest in, the dollar amount to invest, and the frequency of those investments (Bond, Doonan et al. 2021). Needless to say, Millennial investors must make several important financial decisions that prior generations did not have to make.

Research from The National Institute on Retirement Security shows that more than two-thirds of Americans (67%) believe that the U.S. is facing a retirement crisis (Doonan 2021). Figure 1.1 provides the overall distribution of poll responses based upon a 5-point Likert scale where respondents were asked "to what extent do they agree or disagree that America is facing a retirement crisis" (Bond, Doonan et al. 2021). The data were collected between December 4-10, 2020 with a total of 1,203 individuals aged 25 and older and weight-adjusted by age, gender, and income to be representative of the American demographics of those age 25 and older (Bond, Doonan et al. 2021).

Figure 1.1.

Retirement Crisis

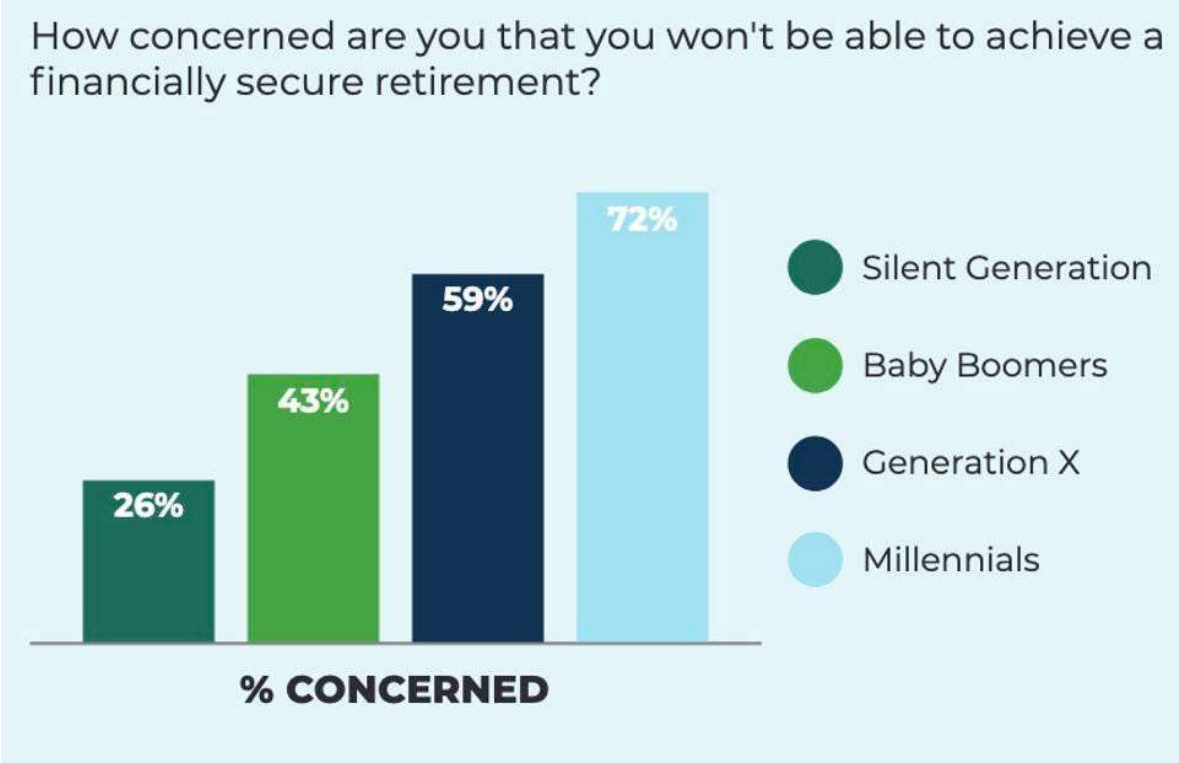


(Bond, Doonan et al. 2021)

When these data are viewed generationally, a steep curve can be drawn showing that older generations are much less concerned about their ability to achieve a financially secure retirement than the younger generations. The youngest generation surveyed were Millennials who scored the worst with 72% of the Millennials surveyed stating that they are concerned about their ability to achieve a financially secure retirement (Bond, Doonan et al. 2021). Figure 1.2 provides a bar graph indicating the responses by generation.

Figure 1.2.

Financially Secure Retirement Concern



(Bond, Doonan et al. 2021)

In addition to the sentiment of American's regarding their ability to achieve financial security in retirement, The National Retirement Risk Index (NRRI) conducts research to

determine the share of American households that are at risk of being unable to continue their pre-retirement standard of living once in retirement based upon four key factors: equity prices, house prices, interest rates, and social security. Their most recent study found that the dismal sentiment of the American people was well-deserved, with 50% of households at risk in 2016 and 49% in 2019 (Munnell, Chen et al. 2021). They note that while this reduction may appear positive, the data were calculated utilizing early-2020 statistics and if it had been conducted in the third quarter of 2020, after the economic downturn experienced due to COVID-19, the index would have risen by one percentage point to 51% rather than decreasing by one percentage point.

An individual's overall well-being may be linked in part to their financial capability (Serido and Shim 2017). A study by the Arizona Pathways to Life Success (APlus) executed a longitudinal study by monitoring a group of Millennials over the course of a decade. They discovered a significant positive correlation between well-being and financial capability, particularly with financial self-confidence, along with a strong positive correlation between well-being and employment status (Serido and Shim 2017). As they noted, financial literacy and self-efficacy (self-confidence) are key elements to the overall well-being and success of a Millennial today. Therefore, special attention must be given to conduct research and improve the link between financial literacy and outcomes as well as the moderating factors that impact that relationship.

The technology boom that we have experienced over the last two decades means that the average person has more information available to them than at any other point in history (Wu, Wang et al. 2018), yet many individuals still find themselves struggling to make ends meet, or to achieve a successful and financially independent retirement. This is particularly true for the poor, as availability of digital finance resources does not equate to accessibility which often

comes at a steep cost to those without the financial resources necessary to obtain the means to access digital finance resources (Ozili 2018). A financially illiterate individual will continuously struggle with financial matters which can add unnecessary stress and hardship to an already difficult life. In a sample of respondents age 50 and older, researchers found that the older U.S. population is quite financially illiterate with only half of the respondents able to answer a question calculating 2% inflation, and only a third able to answer three simple financial questions correctly (Lusardi and Mitchell 2014). This alarming statistic should supply the motivation necessary to ensure the generations behind them do not fall victim to the same fate, especially when considering the previous point concerning the Social Security Administration's projected reserve depletion.

Millennials in particular struggle with financial matters related to debt, often times in the form of student loans (Lusardi 2019), which can hinder saving and investing progress if left unchecked, especially in the early years that represent prime opportunity to begin investing due the concept of the time value of money. The TIAA Institute found that, while many Millennials own a home (39%), 70% of them have a mortgage (Bolognesi, Hasler et al. 2020). Having a mortgage in your 30's is to be expected, as homes typically come with a 30-year mortgage, and Millennials are not old enough to have paid down such debt by this time. However, the report also notes that 26% of Millennials who own a home also have a home equity loan, 34% have car loans, and 43% have one or more student loans (Bolognesi, Hasler et al. 2020). Over half of those with student loans say that they are concerned that they will not be able to pay off their loan, and 33% say that they have been late on a student loan payment in the prior year. If those statistics are not alarming enough, they note that 48% of those who have a student loan reported that they did not try to figure out what the monthly payment would be prior to obtaining the loan.

Rather, they took the loan without regard to how it would impact their monthly expenses. This statistic lends itself well to the need for financial literacy and ongoing research in the factors that contribute to Millennial financial behavior. This same group reported a 49% retirement plan ownership rate, and only 30% say that they have other investments aside from a retirement account. This combination of high debt use and low retirement investing behavior is in opposition to the habits desired when attempting to create a successful financial future.

A 2018 joint study between financial services firm TIAA and George Washington University's Global Financial Literacy Excellence Center (GFLEC) found that over 90% of Millennials own a smartphone, and that 80% of them use their smartphones for financial transactions while 90% use them for informational financial purposes (Yakoboski, Lusardi et al. 2018). The fact that such a large proportion of Millennials utilize smartphones for financial information and transactions coupled with the historically significant size of this generation (Fry 2020) should encourage research in financial outcomes of fintech use, as Millennials are projected to have a significant impact on the economy (Yakoboski, Lusardi et al. 2018) and as of 2018, already comprised the largest share of the U.S. economy at 35% (56 million individuals). They note that, while it is unclear whether this fintech use helps or hinders personal financial outcomes, the use of mobile devices for the purposes of making payments and tracking expenses are not linked to better financial management, but rather, mobile payment users are more likely to overdraw their accounts, and those who track their spending with smartphones were no better at doing so than those who do not use a smartphone to track their spending (Yakoboski, Lusardi et al. 2018). These indicators suggest that the use of mobile devices for financial purposes may have a detrimental effect on financial outcomes in general, though this conclusion cannot be

made without first analyzing the data presented in this dissertation which will assess the impact of fintech use on the relationship between financial literacy and saving behavior.

The theoretical framework used in this paper is a combination of goal setting theory, self-efficacy theory, and motivation theory. These theories relate to financial literacy and the conceptual model that is proposed in this dissertation due to the link between financial literacy and behavior. There is a strong human element in financial behavior because of the emotional ties people have to their money, therefore financial literacy and subsequent financial behavior must be looked at through multiple lenses including psychologically and behaviorally (Serido and Shim 2017, American Psychological Association 2020, Hasler, Lusardi et al. 2021).

Mandell and Klein state that "goal setting theory is grounded in the belief that conscious goals and intentions drive results" (Mandell and Klein 2007). Without a clear goal in mind, a person's intentions, and therefore, their actions and behaviors, have no clear focus. Goals that are specific, challenging, and clearly defined tend to lead to higher performance and better outcomes than goals that are less challenging, or based solely upon best effort. This theory overlaps with self-efficacy theory, as Bandura writes that people with high levels of assurance in their abilities often approach problems as challenges to master and overcome rather than impediments to their progress (Bandura 1994). A strong sense of self-efficacy allows an individual to set the bar higher than they would have otherwise and establish challenging and rewarding goals for themselves.

In contrast to those with high levels of self-efficacy and motivation, people who doubt themselves often shy away from difficult tasks and have trouble finding the motivation to take on challenges and set goals (Bandura 1994). From a financial perspective, those with low levels of financial self-efficacy and motivation to achieve financial success may ultimately pay the price

in the future when their nest egg runs out and they no longer have any human capital remaining to earn income to support themselves. They lack the ability to plan and set goals and if this behavior persists, they will miss the opportunity to save and invest in an adequate manner to achieve financial success.

Motivation is a process that explains the intensity, direction, and persistence of an individual to obtain a goal (Mitchel 1997). It is ultimately the deciding factor that determines if a person takes an action or not. If someone is not motivated to do something, they lack the cognitive wherewithal to take the first step to accomplish the task. A study by Hogarth and Anguelov found an association between poor families with a low amount of savings and low levels of motivation (Hogarth and Anguelov 2013). They note the relationship between the consequences of short-term inaction (not saving) and long-term outcomes (no savings) and having a reason to save (goal) to mitigate this issue. The authors provide a simple mathematical example to illustrate the point, explaining that creating a goal and working backwards with a few assumptions can establish a clear and attainable goal that anyone can follow, provided they have the motivation and self-efficacy to do so. However, it is important to note that socioeconomic differences such as race, gender, education, and income can be attributed to the lack of saving and investing assets a person or household may have (Lusardi 2008, Brevoort, Canilang et al. 2021). The lack of planning by people in these groups, partly fueled by pessimism (Kuhnen and Miu 2017), a lack of self-control (Bernheim, Ray et al. 2015), a lack of a long-term planning horizon, and lower incomes or incomes that failed to outpace inflation (Hogarth and Anguelov 2013), further reiterates the need to conduct research into motivation theory, as it is estimated that those who do not plan hold approximately 10-15% less wealth than those who do (Lusardi 1999). Additionally, people who are young, women, less-educated, Hispanic, and African-

American tend to exhibit low levels of financial literacy while self-assessing themselves as well-informed about financial matters (Lusardi and Mitchell 2011). This disparity adds additional complexity to the relationship between motivation, confidence, self-efficacy and actual financial knowledge and outcomes.

Existing literature investigates financial literacy and saving outcomes while reviewing factors that impact the relationship (Lusardi and Mitchell 2007, Lusardi 2008, Nidar and Bestari 2012, Urban, Schmeiser et al. 2020). However, a gap exists in examining the moderating effects of consumer fintech use, financial self-efficacy, and financial knowledge confidence on the relationship. With fintech becoming such a prominent tool available to nearly every adult, especially Millennials who utilize mobile technology more than other generations, this construct deserves attention to determine exactly what effect it is having on the relationship between financial literacy and saving behaviors. If it is a positive effect, educators and others should promote its use. If negative, more research will be needed to determine what specific attributes of fintech applications are associated with Millennial users who make poor saving and investing decisions. Advances in fintech allow users to obtain financial information, pay their bills, make investing decisions, and even establish recurring contributions to their accounts (Becker 2017, Fong, Koh et al. 2021). However, this same advancement in technology makes it easier than ever to make frivolous online purchases and spend money in convenient ways, even when it is detrimental to long-term success and the achievement of their financial goals (Becker 2017, D'Acunto, Rauter et al. 2020).

Perceived self-efficacy is “people’s beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives” (Bandura 1994). Simply stated, self-efficacy is believing in oneself in a way that allows them to behave in a way

that produces an outcome that they desire. Financial self-efficacy applies this concept to a person's belief in their ability to control their financial matters in an optimal way, going beyond the norm of financial literacy (knowledge) leading to desirable outcomes. This construct can be applied to the relationship between financial literacy and financial behaviors to determine what impacts, if any, financial self-efficacy has on financial behavior. Farrell et al. discuss the significance of financial self-efficacy in women, noting that a 2013 survey of Australian women indicate that financial self-efficacy is one of the strongest predictors of the type and number of financial products that a woman holds (Farrell, Fry et al. 2016). However, a gap in the literature appears to exist, as I was unable to find any research to suggest the impacts of financial self-efficacy on the relationship between financial literacy and saving behavior for Millennials. This dissertation intends on addressing the gap by analyzing the moderating effects of financial self-efficacy on the relationship between financial literacy and the saving behaviors of Millennials. The results of the analysis will provide both practitioners and researchers with a reference point to help guide future research in this area and add to the body of knowledge by providing a thorough assessment of various interaction effects and correlations.

An additional consideration concerning financial self-efficacy applies to those in underrepresented and underserved groups. These individuals tend to have lower levels of education, income, and wealth than other groups, and often times suffer from impulsive tendencies and a lack of self-control stemming from poverty (Bernheim, Ray et al. 2015). Financial self-efficacy may have limited generalizability once the characteristics of race, ethnicity, and socioeconomic status are applied, as these factors can sometimes impose disproportion barriers to financial success as well as the internal belief in one's ability to succeed (Yakoboski 2019, Yakoboski, Lusardi et al. 2020). A key takeaway from extant research shows

that African-Americans with greater levels of financial literacy are more likely to plan for retirement, own non-retirement savings, are less likely to be constrained by debt, and are less likely to be financially fragile (Yakoboski 2019). These findings suggest that financial literacy is a strong indicator of desirable financial outcomes provided the individual can overcome the socioeconomic challenges they may face, however, research also shows that the gap between those who are financially struggling and those who are prospering continues to widen, particularly for younger Americans, lower income households, and African-Americans (Lin, Mottola et al. 2019).

Financial knowledge confidence is a novel idea in the field of financial literacy, differing from financial literacy (knowledge about financial matters) and financial self-efficacy (belief in one's ability to make optimal decisions). Financial knowledge confidence investigates a person's confidence level in the knowledge they possess about finances. Put another way, confidence is simply being sure of yourself, but does not consider if you are correct or incorrect, nor does it indicate what the certainty is about (Bandura 1997). Overconfidence is the overestimation of one's knowledge, ability, or chance of success, so while being confident in your level of financial knowledge sounds like a positive attribute, it may not be if a person is overly confident in their knowledge while they are inadequately equipped (Anderson, Baker et al. 2017). Confidence in and of itself is a poor indicator of a person's knowledge of a particular subject.

The literature gaps identified are the impacts of three moderators on the relationship between financial literacy and Millennial saving behaviors: 1. Financial technology 2. Financial self-efficacy 3. Financial Knowledge Confidence. Although these factors have been researched independently, a gap exists in how they interact with each other and their collective impact on

the relationship between financial literacy and Millennial saving behavior. Additionally, this dissertation will focus solely on Millennials as they comprise 35% of the workforce and represent the largest generation of workers in U.S. history (Yakoboski, Lusardi et al. 2018, Fry 2020).

I intend to address these gaps by conducting experiments using a dataset provided by the FINRA Investor Education Foundation (Mottola 2018). The data was collected and made available in 2018 and contains over 27,000 responses to an extensive survey. Of the 27,000 responses, 7,676 respondents (greater than 28%) were Millennials at the time, thereby providing a suitable data set to be used in the present research. The questions asked of the respondents encompass many areas of financial literacy and behavior to include financial literacy, fintech use, self-efficacy, confidence, and saving behaviors. An analysis of the survey questions will allow me to measure each variable in the model proposed in chapter 2 while linking these variables to the underlying theories introduced previously.

This dissertation focuses on three distinct variables and the moderating effects that they have on the relationship between financial literacy and Millennial saving behavior. The underlying theories mentioned at the beginning of this dissertation relate to the variables to be studied as they attempt to explain human behavior which has been documented to have an impact on behavior (Tversky and Kahneman 1974, Kahneman and Tversky 1979, Kahneman and Tversky 1984). A better understanding of the way people make decisions, set goals, and motivate themselves to act helps to understand the reasoning behind their financial behavior. Therefore, the underlying research questions at the center of this dissertation are:

1. *How does Financial Literacy relate to Millennial Saving Behavior?*

2. *What factors moderate the relationship between Financial Literacy and Millennial Saving Behavior?*

This limited scope will allow me to dive deeper into extant literature and provide readers with a more in-depth analysis of these three moderators after conducting the experiments and analysis. It is also limited in its demographical scope as the research focuses solely on Millennials and no other age group or generation. Additionally, while the use of debt by Millennials is mentioned as a factor that impedes saving behavior, this dissertation does not consider the use of debt, debt balances, and behaviors related to debt other than the previously mentioned factor. Another consideration is that this research focuses solely on the saving behavior and not the strength of the behavior, nor does it focus on financial accumulation behavior outside of saving such as day-trading or speculative short-term investing. Finally, this paper focuses on one particular outcome as the dependent variable: saving behavior. Other outcomes related to financial literacy are not in scope for this dissertation.

The data set does not contain actual figures concerning the contribution amounts, contribution frequency, or total saving and investing balances of the respondents. However, it does contain eight questions that are indicative of saving behavior, such as "do you regularly contribute to a retirement account," and "not including retirement accounts, does your household have any investments in stocks, bonds, mutual funds, or other securities?" Therefore, saving behavior will be measured by analyzing the responses of these survey questions and will be compared to the survey questions being used to measure the independent variable in this dissertation, financial literacy. Additionally, the relationship will be moderated by fintech use, financial self-efficacy, and financial knowledge confidence to determine what impacts these three factors have on the relationship.

From a practical perspective, this research will provide practitioners with information concerning the psychological factors that impact human behavior relating to saving behavior. The literature review in chapter two will show that this combination of moderating variables has not been studied collectively, though they have been studied independently with research results suggesting that they do impact saving behaviors and outcomes. The presentation of this research should help guide financial advisors, financial consultants, and financial educators to the appropriate constructs that impact the behaviors of the people they work with and will allow them to better understand their needs and to provide better service.

The next chapter of the dissertation contains an in-depth literature review that examines the current state of financial literacy research and saving outcomes utilizing various methodological techniques, moderators, mediators, and other factors that impact the relationship between the independent variable (financial literacy) and the dependent variable (saving behavior). Chapter three describes the theoretical model used in this paper and offers several hypotheses about the data and expected outcomes as well as the methods to be used in conducting the experiments. Chapter four provides the results of the hypotheses testing and a discussion of the results. Chapter five provides a summary and conclusion of the paper. This dissertation also adds to the existing body of literature surrounding financial literacy and behavior. Relating the three theories discussed in this dissertation to the moderating variables and dependent variable will provide researchers with a baseline understanding of the ways that the theories are practically used by people across the world.

CHAPTER II

LITERATURE REVIEW

Financial literacy literature dates back many decades, though much of the research in the 1970's and 1980's focused on behavioral finance and behavioral economics while not naming financial literacy as a concept. Tversky and Kahneman wrote about heuristics and biases in 1974 as they analyzed the way that people think when they are faced with uncertain situations and must make a decision (Tversky and Kahneman 1974). This work was followed by their 1979 paper that critiqued expected utility theory, which states that a prospect, or choice, is acceptable if the outcome and probability, when combined with current assets, exceeds the value of those assets alone**,** and proposed an alternative model called prospect theory (Kahneman and Tversky 1979). These seminal pieces established the framework that is in use today as researchers and scholars continue to advance the field of financial literacy and connect the financial knowledge one possesses with their decision-making ability.

While financial literacy itself is simply a way of measuring the level of knowledge one possesses concerning financial concepts (Knoll and Houts 2012, Schuhen and Schurkmann 2014), the actual outcomes of a person's level of financial literacy is in part dependent upon their ability to make optimal decisions, even when faced with uncertainty, as noted in the preceding paragraph. Without action, knowledge holds no purpose and cannot be implemented in a way that provides an outcome. Therefore, theories such as self-efficacy theory, motivation theory, and goal-setting theory are critical areas to consider when attempting to determine why people make the decisions that they do, and how someone utilizes their knowledge to produce outcomes.

2.1 Theoretical Background

2.1.1 Self-Efficacy Theory

The ability to manage one's own finances can certainly be linked to their level of financial literacy, though simply knowing something does not result in action. Self-efficacy literature states that an individual must have a sense of self-assuredness, or self-belief, in order to manage their personal finances and utilize the knowledge that they possess (Farrell, Fry et al. 2016, Muizzuddin, Taufik et al. 2017). Bandura began writing about self-efficacy in 1977 as he described a framework to explain and predict psychological changes as outcomes to different modes of treatment (Bandura 1977). In the face of adverse experiences and obstacles, he hypothesized that varying levels of self-efficacy will determine whether a coping behavior will be initiated, how much effort will be expended, and how long it will last. This led to future work where he discusses ways of creating and intensifying the belief in oneself through the psychological processes of cognition, motivation, affect, and selection (Bandura 1994, Bandura 1997). Bandura also noted several factors that influence self-efficacy including mastery experience, modeling, verbal persuasion, and physiological and affective state. In the context of financial literacy and management, these factors along with the psychological processes previously mentioned allow an individual to utilize self-efficacy concepts to become more financially literate and to become better money managers by believing in their own ability to make optimal financial decisions and executing on those choices (Muizzuddin, Taufik et al. 2017).

A person's behavior is said to be a determining factor on whether they will be successful or not successful in managing their personal finances, and can also determine how good they are at managing savings and other expenses (Shim and Siegel 1991, Hilgert and Hogarth 2003). Both Muizzuddin et al. and Farrell et al. believe that self-efficacy has a significant impact on a person's personal financial behavior and can even predict the level of financial literacy one

attains (Farrell, Fry et al. 2016, Muizzuddin, Taufik et al. 2017). In the Farrell et al. study, they conclude that higher levels of financial self-efficacy are one of the greatest predictors of both the type and number of financial products that a woman holds, and that they are less likely to hold debt-related products. The study also considered things such as education, financial risk preferences, age, and even household income, yet financial self-efficacy was still found to be significant within a 99% confidence interval. Therefore, the theory of self-efficacy and its impacts on financial behavior cannot be overlooked when considering the outcomes related to financial literacy.

Self-efficacy is also an important factor when considering financial resiliency and the ability for a person to absorb a financial shock, such as those experienced during the "Great Recession" of 2008 or the economic downturn during the 2020 Covid-19 pandemic (Greenwald 2020, Deevy, Streeter et al. 2021). Self-efficacy is linked to resilience in that those that exhibit resiliency are much more adept at rebounding quickly from adversity, a common trait associated with high levels of self-efficacy (Prince-Embury and Saklofske 2013).

2.1.2 Motivation Theory

Vroom's early work discusses the link between human behavior and the expectation of a certain outcome (Vroom 1964). That is to say that people are motivated to do things as a function of trading their time, energy, and attention for the utility of what they believe they will receive in exchange for it. Motivation theory is related to financial literacy in that the measurements used to evaluate financial literacy should be related to a financial behavior that is beneficial to the individual (Mandell and Klein 2007). A "Financial Practices Index" was developed in 2003 by Hilgert and Hogarth as they tried to link a household's participation in a particular activity (behavior) to their financial literacy scores (knowledge) (Hilgert and Hogarth

2003). Comparing the results of the scores from a financial literacy quiz with the answers to the financial practices index, they found that there is a positive relationship between the two, indicating that financial knowledge is related to financial practices and behaviors. They note that the largest amount of variation in the financial practices index scores related to personal experience, and that high scores were achieved by those more likely to report that they learned from personal experience. They go on to hypothesize that the large variation may be due in part to the motivation of those with high scores to actively seek out information and apply it to their lives. Alternatively, Mandell and Klein note that the Jump$tart surveys from 2000 – 2007 indicated that high school students who completed a semester long personal finance or money management course were no more financially literate than students who had not taken the course (Mandell and Klein 2007). This lack of an increase in financial literacy could be due to many factors, one of which may be a lack of motivation to retain the information or a lack of motivation to apply it.

2.1.3 Goal-Setting Theory

Goal-setting theory is closely tied to motivation, often referred to as the goal-setting theory of motivation (Lunenburg 2011). This theory discusses the relationship between goals and performance which indicates that performance outcomes are superior when linked to specific and challenging goals (Locke and Latham 2006, Lunenburg 2011). Hundreds of studies over the last several decades suggest that individuals who are provided with difficult, yet attainable goals consistently perform better than those who are given easy, non-specific goals, or no goals at all. Psychological experiments indicate that "do your best" guidance in performing tasks underperform those that are SMART (specific, measurable, attainable, relevant, time-frame) due to the ability for individuals to benchmark their performance to the goal and adjust as necessary

(Latham 2003). Latham wrote about superordinate goals in 2003 as they pertain to affect, noting that goal setting is a cognitive variable used to make the superordinate goal more concrete. Superordinate goals represent the intended outcome, such as the accumulation of a certain level of wealth by a specified age. Goal setting then allows the individual to put steps in place and in motion to realize the superordinate goal, moving it from "emotional rhetoric" to concrete actionable steps that the individual can take.

As it pertains to financial planning, goal setting has a large influence on the performance of financial planning targets and the ability to achieve desired financial outcomes (Muizzuddin, Taufik et al. 2017). A 2017 study indicates that 88% of Millennials who are married or living with a partner report that financial decisions are a source of tension in their relationship, yet only 42% state that they discuss their financial goals as a couple (Eiger and Schiavone 2016). This is in contrast to the 97% of survey respondents who stated that they talked about money at some stage of their relationship development. One possible contributing factor is that males are underrepresented in post-secondary institutions, complete their education at lower rates, and obtain lower grades (Buchmann, DiPrete et al. 2008, Conger and Long 2010, Schippers, Scheepers et al. 2015). This may constitute not only a gender gap as it pertains to education and academic achievement but could also manifest in other performance and goal-based outcomes such as financial behavior and outcomes. Additionally, socioeconomic differences may play a role in the variation of income achievement, as the stress produced by economic disparities can increase skepticism among those in lower socioeconomic classes concerning the connection between effort, ability and life outcomes (Wilkinson and Pickett 2009, Doonan 2021, Hasler, Lusardi et al. 2021). A 2020 study by the American Psychological Association indicate that nearly 2 in 3 adults (64%) say that money is a significant source of stress in their lives, and when

broken down by income, the figures indicate that 73% of those with an annual household income of less than $50,000 report that money is a significant source of stress compared to 59% of those households with more than $50,000 in annual income (American Psychological Association 2020).

2.2 Antecedents of Financial Literacy

To begin reviewing the current state of literature in the field of financial literacy, we must first define what financial literacy is. The definition resides in the name, as it is generally viewed as a person's level of literacy in the context of financial matters. However, in researching extant literature, defining financial literacy is not that simple. A study was conducted in 2010 that analyzed 52 data sets and 71 individual studies (Huston 2010), the majority of which were U.S. samples and published in a wide variety of academic journals and conference proceedings. The studies were published between 1996 and 2008 and are viewed as representative of all studies in financial literacy and financial knowledge during that period. Of the 71 individual studies, Huston found that over 50 of them failed to provide a clear definition of the concept of financial literacy (Huston 2010, Knoll and Houts 2012). A study the year prior by Hung, Parker, and Yoong discovered a wide variety of definitions or lack thereof with some using only the term financial knowledge while others provided a bit more context (Hung, Parker et al. 2009). A more recent paper indicates that the predominant method in which financial literacy is measured is through the administration of a three-question test where participants answer questions surrounding three concepts: numeracy, inflation, risk diversification (Lusardi and Mitchell 2014, Skagerlund, Lind et al. 2018).

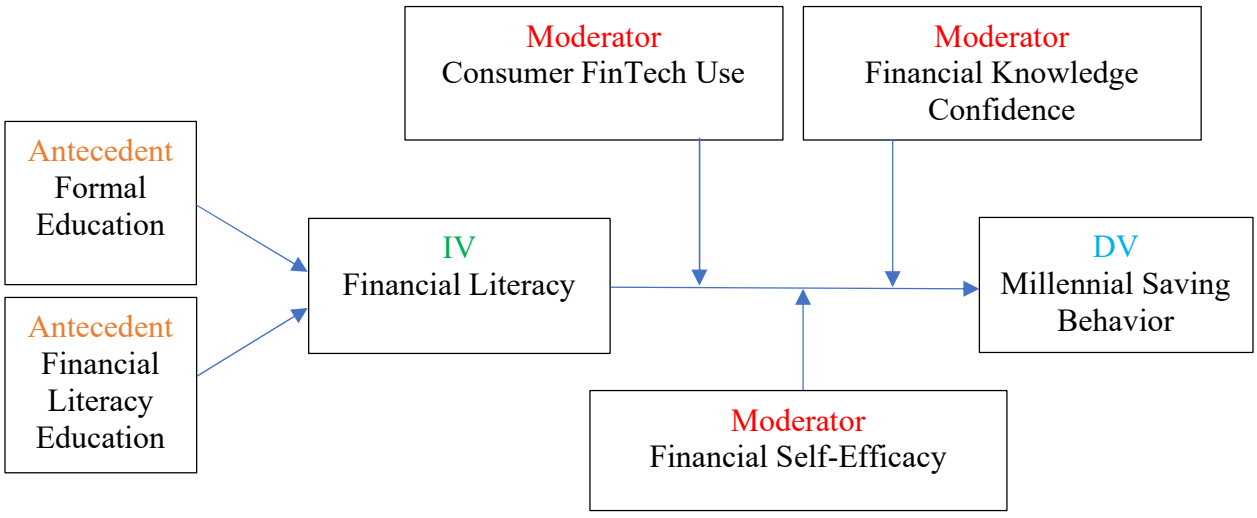
There are many terms that are used interchangeably to describe financial literacy such as financial knowledge, financial education, and of course financial literacy itself, and unlike many

other fields where these terms have standard measures, the field of financial literacy does not (Huston 2010, Knoll and Houts 2012, Schuhen and Schurkmann 2014). The lack of a standardized method of measuring financial literacy leads to a similar lack in a strict definition that can be adopted by those who work in the field and leads to the current gap in the literature.

The antecedents of financial literacy to be studied in this paper are formal education and financial literacy education. Both antecedents have been studied and identified as having a positive correlation to a person's level of financial literacy (Lusardi 2008, Lusardi and Mitchell 2011, Lusardi and Mitchell 2011, Kaiser and Menkhoff 2018, Frisancho 2019, Rothwell and Wu 2019, Urban, Schmeiser et al. 2020). The research suggests that the more general education a person has, the higher their level of financial literacy (Lusardi and Mitchell 2011). Similarly, the more financial literacy education a person has experienced, the higher their level of financial literacy will be (Lusardi 2008, Kaiser and Menkhoff 2018, Frisancho 2019, Rothwell and Wu 2019, Urban, Schmeiser et al. 2020). Therefore, the model proposed in figure 2.1 indicates that formal education and financial literacy education are the antecedents to financial literacy.

Figure 2.1

Conceptual Model



2.3 Formal Education

A correlation has been established between a person's level of formal education and their level of financial literacy (Lusardi 2008, Lusardi and Mitchell 2011). The evidence suggests that low levels of formal education are associated with low levels of financial literacy and as such, people with low levels of financial literacy tend to make poor financial decisions such as having less wealth accumulation, owning higher interest rate loans, less stock market involvement, and a lack of retirement planning (Lusardi and Mitchell 2011). Not only does financial illiteracy correlate to a low level of formal education, but it is also more prevalent for black people, Hispanic people, and women (Lusardi and Mitchell 2007). Based upon this established link, formal education is utilized as an antecedent to financial literacy in the model for this dissertation and becomes the first proposed hypothesis as stated below.

H_1: *Formal Education is positively associated with Financial Literacy.*

2.4 Financial Literacy Education

The literature on the relationship between financial literacy and wellness education programs and financial literacy rates is clear and concludes that financial education programs improve financial literacy rates (Lusardi 2008, Kaiser and Menkhoff 2018, Frisancho 2019, Rothwell and Wu 2019, Urban, Schmeiser et al. 2020). The interest in this area is due in part to the economic impacts that low-levels of financial literacy can have, especially on those nearing retirement who often have little or no wealth and do not understand concepts like interest rates, social security, and pension plans (Lusardi and Mitchell 2007). Research suggests that many households lack even the most basic understanding of financial concepts required to make optimal saving and investing decisions and in turn, display a low level of financial literacy which can lead to undesirable financial outcomes (Lusardi and Mitchell 2007). Therefore, financial

literacy education is the second antecedent to financial literacy and is stated as hypothesis number two as shown below.

H_2: Financial Literacy Education is positively associated with Financial Literacy.

2.5 Financial Literacy

Millennials currently comprise the largest share of the U.S. workforce and are considered to be the most diverse, highest educated, and largest generation in U.S. history (Serido and Shim 2017, Bolognesi, Hasler et al. 2020, Fry 2020). However, they are also considered to be at risk for financial fragility, as they are consumed with debt products, are sometimes late in making debt payments, exhibit poor money management behavior, and at times, have begun withdrawing funds from their retirement accounts far earlier than they should which will undoubtedly have detrimental long-term effects (Lusardi, Scheresberg et al. 2018, Schneider, Tufano et al. 2020). A study by the TIAA Institute in collaboration with the Global Financial Literacy Excellence Center out of George Washington University found that there is a clear gap in Millennial financial literacy (Yakoboski, Lusardi et al. 2018). When posed with a 28-question survey aimed at assessing each respondent's knowledge in eight functional areas, Millennials tended to score poorer than those in the older generations (Gen X, Baby Boomers) with an average correct response rate of 44% compared to the average adult population correct response rate of 50% and exhibited a notable lack of knowledge in the areas of insuring and comprehending risk (Yakoboski, Lusardi et al. 2018). Interestingly, there is a substantial difference in the correct response rates between older Millennials and younger Millennials at 47% and 41%, respectively, though it is important to note that Millennials as a whole trail their peers in other age groups.

The current state of Millennial financial literacy was preempted by several studies that examined financial literacy rates for young adults and those nearing adulthood from 1998

through 2020 (Chen and Volpe 1998, Mandell and Klein 2007, Jang, Hahn et al. 2014, Agnew and Cameron-Agnew 2015, Bolognesi, Hasler et al. 2020, Bottazzi and Lusardi 2020, Urban, Schmeiser et al. 2020). Samples in these studies included high school and college students in both the U.S. and foreign countries and covered virtually all sociodemographic areas typically accounted for (race, age, gender, income, education). The consistent theme throughout all of these research papers is that young people are usually ill-prepared to face the financial challenges of adulthood despite attempts at improving outcomes through high school and college financial literacy programs as well as other well-intended educational sources. Many papers discovered that financial literacy courses can improve outcomes, though other factors such as motivation (Mandell and Klein 2007, Muizzuddin, Taufik et al. 2017), socioeconomic factors (Chen and Volpe 1998, Agnew and Cameron-Agnew 2015, Bottazzi and Lusardi 2020), gender (Chen and Volpe 1998, Jang, Hahn et al. 2014, Agnew and Cameron-Agnew 2015, Bottazzi and Lusardi 2020), and culture and nationality (Chen and Volpe 1998, Jang, Hahn et al. 2014) can impact these results, oftentimes substantially. It is also important to note that while financial literacy and wellness programs can be beneficial, they are still not widely available in schools and workplaces and when they are offered, the utilization rate is poor and the results are inconsistent (Chen and Volpe 1998, Mandell and Klein 2007, Jang, Hahn et al. 2014, Urban, Schmeiser et al. 2020).

Researchers have called for additional studies in the field of financial literacy to better understand the factors that influence a person's ability to make sound financial decisions (Hogarth and Anguelov 2013, Bernheim, Ray et al. 2015, Brown 2018). The theories discussed previously in this dissertation (section 2.1) call attention to the ways that a belief in one's abilities, motivation, and the ability to set goals are psychological factors that can impact

financial outcomes. An analysis of these theories combined with the moderators discussed in sections 2.5, 2.6 and 2.7 will add to the body of research and help determine the habits and behaviors that lead to optimal financial outcomes.

With a clear state of literature linking high levels of financial literacy to positive financial behaviors, I present the following hypothesis:

H_3: Financial Literacy is positively associated with Millennial Saving behavior.

2.6 Financial Technology

Financial Technology, commonly referred to as FinTech, describes advances in technology related to financial services ranging from back-office systems used at financial companies to the mobile phone applications used by consumers. FinTech has disrupted the finance industry by providing speed, transparency, cost savings, and convenience by digitizing many aspects of doing business (Gomber, Koch et al. 2017). Consumer FinTech became mainstream post-2008/2009 after the "Great Recession" when many Millennials were just entering the workforce, and many were trying to survive during the first economic downturn in their working careers. Many consumers lost faith in the traditional banking system and blamed the economic crisis on the financial institutions (Nicoletti 2017). This led to a change in the way that people manage their money and conduct financial business and was a precursor to the boom in FinTech investing. Investments in FinTech have surged over the years with reports of over $4.05 billion being spent in 2013 to $12.21 billion in 2014 (Gomber, Koch et al. 2017). Continuing this trend, global FinTech startups received $25 billion in investments in 2016 alone representing a year-over-year increase of 30% compared to 2015 (KPMG and CB Insights 2017).

While the literature acknowledges that the use of financial technology by Millennials is positively correlated with increased debt usage, poor repayment habits, and bad money

management behaviors in general, a gap exists in the research pertaining to the impacts of financial technology on saving behavior (Lusardi, Scheresberg et al. 2018, Yakoboski, Lusardi et al. 2018). Only one study that I was able to find discusses the link between FinTech use and household saving behavior and found that FinTech users are more likely to become first-time savers and increase their saving account balances after initial FinTech activation, though customers deemed to have a low level of financial literacy are less likely to activate the FinTech at all (Becker 2017).

The urgency behind this research is linked to the fact that Millennials tend to use FinTech at a much higher rate than those in other generations, particularly older generations such as Baby Boomers. The use of FinTech combined with Millennials' emergence as the largest generation in history and their relatively low levels of financial literacy exacerbates the need for research into the impacts of FinTech on Millennial saving and investing habits (Becker 2017, Yakoboski, Lusardi et al. 2018, French, McKillop et al. 2020). Multiple studies have concluded that younger people and especially males will activate FinTech services more than other groups (Lusardi, Scheresberg et al. 2018, Yakoboski, Lusardi et al. 2018, French, McKillop et al. 2020) and utilize FinTech for both informational (researching prices, tracking spending, checking credit score) and transactional purposes (depositing checks, making purchases, sending or receiving money, trading stocks). A 2015 study by professional service network firm Ernst & Young found that the majority of FinTech use is for the purposes of money transferring and making payments (17.6%) followed closely by saving and investing transactions (16.7%) (Gulamhuseinwala, Bull et al. 2015). This claim is backed by research executed several years later stating that Millennials' most common transactional FinTech use is for the purpose of paying bills (68%) (Yakoboski, Lusardi et al. 2018). Note that the latter study categorizes "pay

bills" and "send/receive money" separately while the former study has one category for this behavior labeled as "money transfer/payments" described by Ernst & Young as "a transaction in the last six months through an online company that is not a bank" and provides an example of PayPal. Also note that the latter study pertains solely to Millennials while the former study used their entire sample consisting of respondents in all age groups.

Due to the trend of increased FinTech use, particularly by Millennials, I propose the following hypothesis concerning the moderating effects of consumer FinTech use on the relationship between financial literacy and Millennial saving behavior.

H_4: *Consumer FinTech Use positively moderates the relationship between Financial Literacy and Millennial Saving behavior such that higher instances of Consumer FinTech Use strengthen the relationship between Financial Literacy and Millennial Saving behavior and lower levels of FinTech Use weakens the relationship between Financial Literacy and Millennial Saving behavior.*

2.7 Financial Knowledge Confidence

The current state of literature surrounding confidence in financial knowledge is closely tied to financial literacy, though in general, is lacking in quantity of publishings. While financial literacy is a level of knowledge acquired through education and/or experience relating to financial concepts, financial knowledge confidence is the strength one possesses in their ability to utilize the knowledge (Hung, Parker et al. 2009, Huston 2010). This also relates in part to financial self-efficacy, the belief in one's own ability to make positive financial decisions. An important differentiation, as stated by Bandura, is that confidence is simply a term used to reference the strength of a belief, and it is not a directional term in the sense of it being good or bad, positive or negative (Bandura 1997). A person can be confident that they will fail when

attempting a task, or they can be extremely confident in their ability to perform a certain task, though they may have little-to-no knowledge of how to accomplish that task, thereby most likely resulting in failure. On the other hand, if the person had a high level of self-efficacy, they would strongly believe in their ability to learn and accomplish the task regardless of if they are confident in their ability to do so and in turn, would most likely gain confidence in their ability to accomplish the task.

The literature points out an interesting fact pertaining to financial knowledge confidence when analyzing various demographics. Multiple studies have found that women are less financially literate than men, though the gap in literacy cannot necessarily be attributed to a gap in knowledge, thereby suggesting that women may be as knowledgeable or more knowledgeable than men but suffer from a shortage of something else. The studies suggest that women have a lack of confidence in their abilities to achieve their financial goals and disproportionately choose "do not know" to survey questions when that answer is an option (Yakoboski, Lusardi et al. 2020, Bucher-Koenen, Alessie et al. 2021). However, when this option is not available, they often choose answers that suggest a lack of confidence rather than a lack of knowledge. Notably, of the functional areas studied in the Yakoboski, Lusardi et al. paper (2020), the largest gaps in financial literacy between men and women were in the areas of saving (54% men, 64% women) and investing (56% men, 43% women). The study by Bucher-Koenen, Alessie et al. (2021) backs these results as they found that approximately one-third of the financial literacy gap between men and women can be attributed to women's lower confidence levels.

A point of particular importance is the lack of research in Millennial confidence related to financial knowledge. A study by The Institute for Fiscal Studies suggests that confidence in retirement plans has increased over the years, though a lack of understanding of pension plans

along with low levels of confidence in the adequacy of retirement plans still exists (Crawford, Cribb et al. 2020). A study conducted during the COVID-19 pandemic indicates that confidence in the ability to retire has stayed the same for most workers with nearly two-thirds (64%) of workers stating that they are confident in their ability to retire comfortably, though when examined by generation, 76% of Baby Boomers are confident compared to Generation Z (64%), Generation X (62%), and Millennials (60%) (Collinson, Rowey et al. 2021). Existing literature refers to Millennials as the "instant-gratification generation" due to their high expectations and confidence regarding their professional and personal lives (Bishop 2006). Having grown up in a digital world, the first generation to do so, Millennials are experiencing adulthood in a way no previous generation has. The instantaneous nature of their day-to-day lives can instill a high level of confidence, though this confidence may be unwarranted as it does not necessarily translate to a high level of knowledge or an ideal outcome.

Based upon this knowledge and with the understanding that confidence refers to a person's belief in the strength of a conviction, I propose the following hypothesis suggesting that financial knowledge confidence moderates the relationship between financial literacy and Millennial saving behavior.

H_5: *Financial Knowledge Confidence positively moderates the relationship between Financial Literacy and Millennial Saving behavior such that higher instances of Financial Knowledge Confidence strengthen the relationship between Financial Literacy and Millennial Saving behavior and lower levels of Financial Knowledge Confidence weakens the relationship between Financial Literacy and Millennial Saving Behavior.*

2.8 Financial Self-Efficacy

Self-efficacy theory was discussed in detail in section 2.1.1 and is the underlying theory relating to the financial self-efficacy moderator of this dissertation. To reiterate the link between self-efficacy and financial behaviors provided in section 2.1.1, I will restate that a relationship has been made suggesting that self-efficacy, or a belief in one's ability to make optimal decisions, is related to financial literacy and financial management practices in that the suggested psychological processes involved in someone who has a high level of self-efficacy is linked to resilience in the face of adversity along with how well they are able to rebound from failure (Bandura 1994, Bandura 1997). This link has been noted to impact financial management and is a determining factor on whether someone will be successful in managing their personal finances as well as their ability to manage savings and other expenses (Shim and Siegel 1991, Hilgert and Hogarth 2003).

Based upon this relationship and with support from the literature, I hypothesize that financial self-efficacy moderates the relationship between financial literacy and Millennial saving behavior, as stated below.

H_6: *Financial Self-Efficacy positively moderates the relationship between Financial Literacy and Millennial Saving behavior such that higher instances of Financial Self-Efficacy strengthen the relationship between Financial Literacy and Millennial Saving behavior and lower levels of Financial Self-Efficacy weakens the relationship between Financial Literacy and Millennial Saving Behavior.*

2.9 Financial Behavior

Financial behavior is most commonly rooted in the work of Tversky and Kahneman circa 1974 when they published "Judgment under Uncertainty: Heuristics and Biases" (Tversky and

Kahneman 1974). Nobel Laureate Richard Thaler describes judgment to mean an estimate or forecast, while he describes heuristics as a fancy word for rules-of-thumb (Thaler 2018). Applying these rules to new situations allow a person to reduce the complexity of a given task by assigning some level of mental probability to the outcome they expect. The heuristics they described are 1. Representativeness 2. Availability 3. Adjustment and Anchoring (Tversky and Kahneman 1974). Though seemingly useful, they note that these heuristics can sometimes lead to "severe" and "systematic" errors. Their 1974 work was followed by another pivotal paper published in 1979 titled "Prospect Theory" (Kahneman and Tversky 1979) where they analyzed decision-making under uncertainty. The overarching concept of their work posits that people make biased judgments based upon several different heuristics that they have developed over their lifetime through education and experiences, and when faced with choices, people typically violate the principals of expected utility theory and instead, make irrational choices.

Modern research applies these theories to various areas of financial behavior such as the use of debt and investing decisions. A behavior suggests a series of consistent decisions aimed at a single focus, such as saving $50 per month regularly over the course of several years to establish an emergency savings account or to fund a retirement account. Therefore, a behavior cannot be defined as a single action, nor can the mere existence of something establish the possession of that behavior. Research suggests that having a savings account could be equated to a saving behavior, though it can be argued that saving for a goal that results in the spending of that money was merely a short-term goal that was not really intended for a long-term purpose (Hogarth and Anguelov 2013). This is further supported by research that found that 77% of consumers surveyed found it "somewhat easy" or "very easy" to spend money while 59% of the same population stated that they do not track their spending (Heart+Mind Strategies 2019).

Several studies have researched the connection between financial literacy (knowledge) and financial behavior to examine how people utilize the knowledge that they possess and apply it to life situations (Chen and Volpe 1998, Lusardi 2008, Hung, Parker et al. 2009, Lusardi and Mitchell 2011). Findings suggest that individuals often do not make optimal decisions and partake in negative financial activities such as high levels of debt usage and low levels of investing rather than positive financial activities like refraining from the use of debt and saving and investing regularly. The studies show a statistical difference in the behavior of those with high levels of financial literacy and those with low levels of financial literacy. Namely, those with lower levels of financial literacy exhibit poor saving behavior, higher levels of debt use, and engage more in high-cost borrowing activities.

As it pertains to financial behavior and decision-making, financial literacy has a clear link to saving behaviors. It would be naïve to think that someone could not obtain financial success through sheer luck and in defiance of the link that the research has shown exists. However, a solid saving and investing plan should not be dependent upon luck due to the absence of sufficient financial knowledge and instead, should be the result of sound financial decisions based upon a certain level of financial literacy that lends itself to desirable financial behaviors. Since high levels of financial literacy are positively correlated to positive financial behaviors, you can reasonably suggest that taking the time to become financial literate is in and of itself an investment (Lusardi and Mitchell 2011). Additionally, Millennials have benefited from the practice of auto-enrollment, introduced by Richard Thaler several decades ago and only recently widely adopted by employers (Thaler 2016). This concept enrolls a new employee in the company's defined contribution plan upon beginning their role at a pre-determined rate and according to Fidelity Investments, one of the world's largest 401k plan providers, participation in

defined contributions plans by Millennials has increased 46% over the last decade (Fidelity 2021). Madrian and Shea first wrote about this concept in 2001 utilizing data from a company who adopted this practice in 1999 (Madrian and Shea 2001). Rather than forcing new or existing employees to complete forms to enroll in the retirement plan, employees were default enrolled and in comparison to the prior year when only 49% of new employees enrolling during their first year, they saw that figure jump to 86%. This strategy and others like it can provide a huge advantage to Millennials in nudging them towards investing for their future.

Studies show that households who self-report low levels of saving and investing also have lower financial knowledge scores determined by their responses to financial literacy performance tests (Hilgert and Hogarth 2003, Lusardi and Mitchell 2011, Fong, Koh et al. 2021). Interestingly, some surveys also ask questions regarding the respondent's own assessment of their financial knowledge. The results are mixed, sometimes showing that people tend to grade themselves higher than they actually rate as determined by the performance test (Lusardi and Mitchell 2011), and oftentimes people grade themselves accordingly when compared to the results of the corresponding financial literacy test (Lin, Bumcrot et al. 2019, Brevoort, Canilang et al. 2021, Lush, Fontes et al. 2021). It is important to note that while those who graded their knowledge higher tended to score higher on the financial literacy test, their higher score was in relation to the other groups. When considered objectively, they performed poorly and would therefore be consistent with the 2011 study by Lusardi and Mitchell.

Saving behavior by Millennials is troublesome, as they are expected to live longer than any other generation in history, yet their saving behavior is not on par with a long life expectancy (Munnell 2016, Brown 2018, Gale, Gelfond et al. 2018, Gale, Gelfond et al. 2020). Additionally, Millennials are more racially and ethnically diverse than prior generations with

44% of Millennials identifying as a minority compared to only 25% of people in the same age group (21-36) in 1995 (Gale, Gelfond et al. 2020) which can lead to wealth and income disparities. A 2017 study noted the lack of research into the saving behavior of Millennials and, using data from the 2013 Survey of Consumer Finances, discovered that only 37.2% of Millennials had any accounts designated for retirement (Yao and Cheng 2017). Among those Millennials who did have one or more retirement savings vehicles, the mean average balance of those accounts was $21,333. Findings from a second study conducted by the National Institute on Retirement Security in 2018 found that two-thirds (66.2%) of working Millennials have nothing saved for retirement, and for working Millennial Latinos, the figure is even worse at 83% (Brown 2018). They added that although a large percentage of the Millennials studied (66%) have access to a retirement plan through their employer, only one-third (34.3%) are active participants in their employer's retirement plan and just 19.1% of Millennial Latinos are active participants (Brown 2018). This trend follows research into older generations including "Late Boomers" (age 51-56 in 2016) who also seem to be behind in retirement savings compared to the older cohorts in their generation as well as the generation that preceded them (Chen, Hou et al. 2020). Research suggests that the lack of retirement savings by this and future generations may stem in part from the transition from defined benefit plans and a reliance on social security to a more do-it-yourself approach to retirement savings that includes account types such as defined contribution and individual retirement accounts (Rutledge, Gillis et al. 2015, Munnell 2016, Chen, Hou et al. 2020, Doonan and Kenneally 2021).

Summarizing extant literature, I have found that a gap exists examining the direct relationship between financial literacy and Millennial saving behavior. Much of the existing research focuses on financial literacy and the factors that impact financial literacy rates,

however, my research into existing literature shows that the next step in the process, analyzing Millennial's saving behavior, has not been studied. To expound on this gap and identify moderating factors that may impact the relationship between financial literacy and Millennial saving behavior, I have identified a gap in that the three moderators discussed have not been studied collectively to determine what impacts they have.

CHAPTER III

METHODS & HYPOTHESES

Chapter III begins with a general overview of the methodological approach to be used in conducting the experiments proposed by the hypotheses. The second section will describe the dataset to be used and provide context and justification for its use in this dissertation. The third section will expound on the hypotheses first introduced in chapter II. Finally, I conclude this chapter by providing an expanded theoretical model that incorporates the specific survey questions from the dataset which corresponds to each variable that I will measure in chapter IV.

3.1 Overview

The methodological approach utilized in this dissertation begins with descriptive statistics to obtain data surrounding means, standard deviation, reliability, and correlations. An important factor in ensuring the validity of the survey questions selected to represent each variable is to test the internal reliability of the questions using Cronbach's Alpha. A minimum alpha score of >.70 is required for reasonable reliability (Hair, Anderson et al. 1998, Vanderstoep and Johnston 2009).

The primary tool used to analyze these data is hierarchical moderated regression. This tool was selected due to its ability to identify moderating variables and to determine what, if any, impact each moderator has on the relationship between the independent variable and the dependent variable (Anderson 1986). It allows each moderating variable to be introduced in separate steps so that each moderator can be analyzed independently. There are several assumptions made concerning the data used in a study when using regression analysis (Hair, Black et al. 2019). The dependent variable should be measured on a continuous scale, accomplished in this study by creating an index to measure the dependent variable that is

comprised of coded responses from each survey taker's answers to seven questions allowing for either a "yes" or "no" response to each. The independent variable is categorical, measured using responses to six questions, each containing categorical answer choices. Several assumptions will be tested in chapter four and the results will be interpreted and discussed in chapter five. These assumptions include independence of the observations, confirming a linear relationship exists between the dependent variable and each independent variable, the data show homoscedasticity, and the data do not show multicollinearity. Multicollinearity can occur when there is a correlation among predictor variables (Daoud 2017). To check for multicollinearity, I will utilize the variance inflation factor (VIF) where a value of 1 indicates no collinearity, a value of 1-5 indicates moderate collinearity, and a value of 5 or more indicates high collinearity (Daoud 2017, Shrestha 2020). Additionally, due to the standardized scales used in the questions (categorical, continuous, 1–5-point scale, 1–7-point scale), I expect the data to contain no significant outliers. Lastly, the data will be checked for skewness and kurtosis to measure for symmetry and extreme tails relative to a normal distribution (Doric, Nikolic-Doric et al. 2009, Wright and Herrington 2011).

The dependent variable used in this paper makes a unique contribution to the research, as it is comprised of seven categorical survey questions used to create an index that represents each respondent's saving behavior. Each question provides the respondent with four answer choices to indicate their behavior in response to the question (yes, no, don't know, prefer not to say), and will be coded as follows: 0 = no, 1 = yes. Respondents who indicated "don't know" (code 98) or "prefer not to say" (code 99) to any of the seven questions will be removed entirely from the data set.

3.2 Data Set Description

The data set being used in this paper comes from the FINRA Investor Education Foundation's 2018 "National Financial Capability Study." While there is a publicly available version posted to the organization's website (Mottola 2018), the data set I am using required the completion of a Letter Agreement authorized by the FINRA Investor Education Foundation President (refer to Appendix D for the approval). This particular data set is secondary data and captures "age" as a continuous variable in question ID A3a compared to the publicly available data set which categorizes age in question ID A3b based upon age group (18-24, 25-34, etc.) and gender (male or female). The categorized data provided in the publicly available data set is insufficient for this study, as I am only utilizing responses from those respondents who were Millennials in the year that the survey was conducted (2018), therefore utilizing a categorized age variable is not appropriate. The instrument was developed utilizing the 2015 questionnaire of the same name and was updated for 2018 based upon input from academics, policymakers, and researchers who used the data for previous studies. The exact methodology used by the FINRA Investor Education Foundation is described in Appendix B at the end of this dissertation. Additionally, the foundation's director published a paper to guide academics in understanding and using data from the study (Mottola and Kieffer 2017).

The publicly available data set referenced above has been cited by both national and local media outlets and has been cited in hundreds of scholarly articles as well as by various government agencies (Mottola and Kieffer 2017). Several specific populations from these data have been studied to include Millennials, women, service members, renters, retirees, investors, low-income households, Native Americans, and people with disabilities. The topics covered range in scope and depth and include financial knowledge, student loan debt, financial fragility,

financial advisor usage, retirement preparedness, credit card behavior, alternative financial service usage, debt, investment behavior, and investor literacy (Mottola and Kieffer 2017).

Key methods utilized in collecting the data are as follows:

- The full sample consists of 27,091 adults age 18+ in the United States of America
- Of the full sample, 7,676 were Millennials in 2018 (ages 22-37 at the time of the survey)
- These data were collected between June and October 2018 using non-probability quota sampling from established online panels
- Email invitations were not sent directly to participants from NFCS; rather, survey routers were used for efficiency purposes and to manage panel participation and to retain the data
- Due to this methodology of survey distribution, traditional response rates cannot be constructed, though participation data can be reported
- Individuals were offered incentives in exchange for participating in online surveys
- The following panels were used for this survey: Survey Sampling International (SSI), EMI Online Research Solutions, and Research Now – specific survey statistics are provided in Appendix C
- The panels used industry-standard techniques to verify both the identity of each participant and the accuracy of their demographic characteristics
- The sample contains approximately 500 respondents per state, plus D.C., with oversampling in Oregon and Washington (approximately 1,250 per each state)
- Quotas were established per state to account for age, gender, ethnicity, education level, and income based upon the Census Bureau's American Community Survey
- Figures are weighted nationally, regionally, and by state to be representative of each parameter's composition based upon age, gender, ethnicity, and education

The dataset was made available to researchers in several formats to include Microsoft Excel and Statistical Package for Social Sciences (SPSS 26). For the purpose of this dissertation, I will be importing the Excel file and manipulating it in a manner consistent with the demographic to be examined (Millennials) and the specific variables that I will measure, described in table 3.1.

The dataset provides a suitable collection of survey responses consistent with the accepted sample size calculations provided using G*Power 3.1 and will be analyzed using PLS-SEM. The dataset also provides several control variables labeled below in table 3.2.

3.3 Hypotheses

The hypotheses for this dissertation were first introduced in chapter II after each corresponding section of the literature review. Figure 3.1 illustrates each hypotheses' relationship to the model and includes the expected effect that each hypothesis will have on the model while the following paragraphs describe each variable.

Antecedents

Formal Education

Formal education is measured via one question captured in the survey: "What was the highest level of education that you completed?" The question ID is A5 and is measured categorically starting at "Did not complete high school" to "Post graduate degree" and includes "Prefer not to say" for respondents uninterested in sharing that information. Based upon previous research which indicates a correlation between education level attainment and financial literacy levels (Lusardi 2008, Lusardi and Mitchell 2011, Lusardi and Mitchell 2011), I hypothesize:

H_1: *Formal Education is positively associated with Financial Literacy.*

Financial Literacy Education

Financial literacy education is measured using five items asked of each respondent. The questions vary in response option from simple "yes/no" to a 7-point scale along with several categorical questions. The items ask respondents about their history in taking financial education courses along with when they took them, how many hours they received, and their rating of the quality of the financial education they received. Similar to formal education, financial literacy education has been documented to have a positive effect on financial literacy levels (Lusardi and Mitchell 2007, Klapper, Lusardi et al. 2015, Lusardi 2019), thus I hypothesize the following:

H_2: Financial Literacy Education is positively associated with Financial Literacy.

Independent Variable

Financial literacy has been widely accepted as the primary means to measure someone's familiarity, ability, knowledge, and level of understanding of financial concepts (Hilgert and Hogarth 2003, Lusardi and Mitchell 2007, Lusardi 2008, Hung, Parker et al. 2009). Following extant research and with the data set available to me for this study, I selected the specific items that each respondent was presented with to use as a proxy for their level of financial literacy. The six individual items are ID numbers M6, M7, M8, M9, M10, and M31, and are summarized in table 3.1. The items include the questions from "the big three" and "the big five" financial literacy questionnaire developed by Annamaria Lusardi and Olivia Mitchell in 2004 for the Health and Retirement Survey (Lusardi and Mitchell 2007, Lusardi 2008, Lusardi and Mitchell 2011) along with one additional question designed and developed by the entity who created the survey instrument. The Lusardi-Mitchell questions were recently compared to several other measures with results indicating that they remain a good first-step analysis of financial literacy (Nicolini and Haupt 2019). Two of the six questions are "true/false" questions (M9, M10) while the remaining questions are categorical (M6, M7, M8, M31).

With the support of extant literature describing the observed correlation between financial literacy and financial behavior (Chen and Volpe 1998, Bottazzi and Lusardi 2020, Urban, Schmeiser et al. 2020), I hypothesize:

H_3: Financial Literacy is positively associated with Millennial Saving behavior.

Dependent Variable

The dependent variable measures each respondent's behaviors surrounding saving and investing and is measured using seven questions from the survey (B1, B2, B14, C1, C3, C4, C5) designed to capture the behavior and not the strength of the behavior. Each question provides the respondent with four answer choices to indicate their behavior in response to the question (yes, no, don't know, prefer not to say), and will be coded as follows: 0 = no, 1 = yes. Respondents who indicated "don't know" (code 98) or "prefer not to say" (code 99) to any of the seven questions will be removed entirely from the data set.

Moderators

Consumer FinTech Use

To capture respondent information surrounding their use of FinTech, I extracted six questions pertaining to the use of various types of FinTech such as mobile phone, laptop, and desktop computer. The questions ask respondents about the frequency in which they use these tools to execute a financial transaction such as paying for a product or service, accessing bank account information, or transferring money to another person. The questions also ask respondents about their behavior related to certain financial tasks like budgeting, saving, and managing credit as well as their experience in utilizing mobile or website applications to take on a work assignment through various companies such as Uber, Task Rabbit, and Care.com.

Acknowledging that prior research has found a link between Millennials and smartphone ownership and usage for financial activities (Yakoboski, Lusardi et al. 2018), I hypothesize the following:

> H_4: *Consumer FinTech Use positively moderates the relationship between Financial Literacy and Millennial Saving behavior such that higher instances of Consumer FinTech Use strengthen the relationship between Financial Literacy and Millennial Saving behavior and lower levels of FinTech Use weakens the relationship between Financial Literacy and Millennial Saving behavior.*

Financial Knowledge Confidence

Connections have been made linking a person's financial self-confidence with employment status as well as their overall well-being and ultimately, their financial decision-making ability and behavior (Hung, Parker et al. 2009, Serido and Shim 2017, Yakoboski 2019, Yakoboski, Lusardi et al. 2020, Bucher-Koenen, Alessie et al. 2021). However, as noted in chapter II of this dissertation, this area of research is lacking in the volume of publishings, and a connection has not yet been made to determine the impact of financial knowledge confidence on the relationship between financial literacy and saving behaviors.

To measure financial knowledge confidence, five questions were used from the survey instrument that ask respondents to evaluate themselves at various skills related to financial matters. The questions are written in a way to allow respondents to judge themselves using a 7-point scale to evaluate their level of agreeance to the posed question. While four of the questions utilize the 7-point scale, the first question asks respondents to name "Who in the household is most knowledgeable about saving, investing, and debt?" Respondents can choose from

themselves, someone else, themselves and someone else equally, "Don't know," or "Prefer not to say."

To address this gap in the literature, I posit the following hypothesis:

H_5: *Financial Knowledge Confidence positively moderates the relationship between Financial Literacy and Millennial Saving behavior such that higher instances of Financial Knowledge Confidence strengthen the relationship between Financial Literacy and Millennial Saving behavior and lower levels of Financial Knowledge Confidence weakens the relationship between Financial Literacy and Millennial Saving behavior.*

Financial Self-Efficacy

To measure financial self-efficacy, I first searched for a standardized method that has been widely used and accepted as a way to measure financial self-efficacy. While I found a conference paper published in 2011 attempting to create a 6-item scale (Lown 2011), there is no evidence of its adoption or widespread use. However, it is important to note that the questions Lown developed were based upon the framework of Bandura's concept of self-efficacy, an underlying theory of this dissertation. Twelve questions from the data set used in this study were selected to measure financial self-efficacy, most of which utilize a 5-point or 7-point scale, allowing respondents to "rank" themselves as statements are presented that relate to their belief in their ability to accomplish the aforementioned statement (e.g., I am just getting by financially).

To determine the way that financial self-efficacy impacts the relationship between financial literacy and saving behaviors, I hypothesize the following:

H_6: *Financial Self-Efficacy positively moderates the relationship between Financial Literacy and Millennial Saving behavior such that higher instances of Financial*

Self-Efficacy strengthen the relationship between Financial Literacy and Millennial Saving behavior and lower levels of Financial Self-Efficacy weakens the relationship between Financial Literacy and Millennial Saving behavior.

Control Variables

Introducing control variables can help reduce potential errors that may arise when measuring significance levels of observed relationships (Hair, Black et al. 2019). The data collected as part of this survey contains a wide range of demographical information that much be controlled for and can be used to better analyze these data. All control variables are categorical except for age and number of children which are both continuous. As such, each control variable except for age and number of children will be dummy coded and a reference group will be assigned per control variable.

Gender

Gender is captured as male or female and does not contain another category such as "other" nor does it allow respondents to choose "prefer not to say" like many other questions allow. Gender will be dummy coded as follows: 1, 0 = male, 0, 1 = female, with male being used as the reference group.

Age

Respondent age is a continuous variable allowing each respondent to input their exact age. At the high-end of the range, age "101 or older" is captured as 101 followed by "Prefer not to say" for those respondents who do not want to share this information. If the respondent selected ages 13 through 17, or "Prefer not to say," the survey was terminated.

Race/Ethnicity

Each respondent's race and/or ethnic category is captured including those who may describe themselves as two or more races. Respondents are allowed to select all that apply from the following categories: White or Caucasian, Black or African American, Hispanic or Latino/a, Asian, Native Hawaiian or other Pacific Islander, American Indian or Alaska Native, Other, Prefer not to say. If the respondent selected "Prefer not to say" the survey was terminated. Race/ethnicity will be dummy coded as follows: 0, 0, 0 = white/Caucasian, 0, 1, 0 = black or African American, 0, 0, 1 = Hispanic or Latino/a, 1, 0, 0 = Asian, 1, 1, 0 = Native Hawaiian or other Pacific Islander, 1, 0, 1 = American Indian or Alaska Native, 1, 1, 1 = Other. "White or Caucasian" is used as the reference group.

Marital Status

There are five categories of marital status available followed by "Prefer not to say." Similar to the previous questions, respondents who selected "Prefer not to say" had their surveys terminated. The categories allowed are Married, Single, Separated, Divorced, and Widowed/Widower. Marital status will be dummy coded as follows: 0, 0, 0 = Married, 0, 1, 0 = Single, 0, 0, 1 = Separated, 1, 0, 0 = Divorced, 1, 1, 0 = Widowed/Widower. "Married" is used as the reference group.

Living Arrangements

Respondents have four choices regarding their living arrangements: I am the only adult in the household, I live with my spouse/partner/significant other, I live in my parents' home, I live with other family, friends, or roommates. A final option of "Prefer not to say" is available and results in termination of the survey. Living arrangements will be dummy coded as follows: 1, 0 = I am the only adult in the household, 0, 1 = I live with my spouse/partner/significant other, 0, 0

= I live in my parents' home, 1, 1 = I live with other family, friends, or roommates. I live with my spouse/partner/significant other is used as the reference group.

Number of Children

Respondents must select from 1, 2, 3, or 4 or more children to indicate the number of financially dependent children they have. They can also select No financially dependent children or Do not have any children. Those who select "Prefer not to say" will have their survey terminated.

Household Income

Household income is measured categorically and asks the respondent's annual income to include wages, tips, investing income, public assistance, income from retirement plans, and if married, spouse's income as well. The answer choices contain a wide range of income options ranging from Less than $15,000 to $150,000 or more with several options in between. The final two options are "Don't know" and "Prefer not to say" which when selected, will terminate the respondent's survey. Household income will be dummy coded as follows: 0, 0, 0 = Less than $15,000, 0, 1, 0 = At least $15,000 but less than $25,000, 0, 0, 1 = At least $25,000 but less than $35,000, 1, 0, 0 = At least $35,000 but less than $50,000, 1, 1, 0 = At least $50,000 but less than $75,000, 1, 0, 1 = At least $75,000 but less than $100,000, 1, 1, 1 = At least $100,000 but less than $150,000, 0, 1, 1 = $150,000 or more. "At least $50,000 but less than $75,000" is used as the reference group.

Employment Status

Respondents can choose from several categorical options to include self-employer, part-time employment, full-time employment, homemaker, full-time student, permanently sick/disabled/unable to work, unemployed or temporarily laid off, or retired. A final option of

"Prefer not to say" is allowed which results in the termination of the survey. Employment status will be dummy coded as follows: 0, 0, 0 = Self-employed, 0, 1, 0 = Work full-time for an employer, 0, 0, 1 = Work part-time for an employer, 1, 0, 0 = Homemaker, 1, 1, 0 = Full-time student, 1, 0, 1 = Permanently sick, disabled, or unable to work, 1, 1, 1 = Unemployed or temporarily laid off, 0, 1, 1 = Retired. "Work full-time for an employer" is used as the reference group.

Spouse's Employment Status

The same options are available for this survey question as shown above in "Employment Status" and will be dummy coded the same.

Student Status

The student status question has a dependency on several other questions and specifically asks the respondent "Are you a part-time student taking courses for credit?" This question is only presented if the respondent indicated being a HS Grad, Some College, or Associate's Degree in question A5 and indicated that they were not a full-time student in question A9. The choices for this question are yes, no, "Don't know" or "Prefer not to say." Student status will be dummy coded as follows: 1, 0 = yes, 0, 1 = no, 1, 1 = don't know, 0, 0 = prefer not to say, with "yes" being used as the reference group.

School Type

Respondents are asked to describe the type of school they are attending and can select from Four-year college or university, Two-year community college, Vocational/technical/trade school, Other, "Don't know," or "Prefer not to say." This question is dependent upon questions A5 and A9 as indicated in above in "Student Status" though it also considers the answer from question A21 (Student Status). If either A9 or A21 indicate that the respondent is a student, this

question is presented. School type will be dummy coded as follows: 0, 0, 0 = Four-year college or university, 0, 1, 0 = Two-year community college, 0, 0, 1 = Vocational/technical/trade school, 1, 0, 0 = don't know, 1, 1, 0 = prefer not to say. "Four-year college or university" is used as the reference group.

Parental Education

This question asks the respondents "What was the highest level of education completed by the person or any of the people who raised you? Answer choices range from Did not complete high school to Post graduate degree and include other education levels in between followed by "Don't know" and "Prefer not to say." Parental education will be dummy coded as follows: 0, 0, 0 = Did not complete high school, 0, 1, 0 = High school graduate/GED, 0, 0, 1 = Some college, no degree, 1, 0, 0 = Associate's degree, 1, 1, 0 = Bachelor's degree, 1, 0, 1 = Post graduate degree, 1, 1, 1 = Don't know, 0, 1, 1 = Prefer not to say. "Associate's degree" is used as the reference group.

Employer Plan(s)

Respondents are asked to indicate where they obtained the employer sponsored plan that they indicated they have in question C1. Using the answer choice from C1 as well as A7a (marital status), respondents are given several choices (your employer, your [spouse's/partner's] employer, both your employer and your [spouse's/partner's] employer, don't know, prefer not to say). Employer plan will be dummy coded as follows: 0, 0, 0 = Your employer, 0, 1, 0 = Your [spouse's/partner's] employer, 0, 0, 1 = Both your employer and your [spouse's/partner's] employer, 1, 0, 0 = Don't know, 1, 1, 0 = Prefer not to say. "Your employer" is used as the reference group.

3.4 Expanded Theoretical Model

The questions that were extracted from the survey instrument for use in this study are show in table 3.1 along with the scale used to measure respondent answers. Appendix A contains the entire survey that each respondent completed. Control variables are defined in table 3.2. The theoretical model shown below in figure 3.2 has been expanded to clearly identify the specific survey questions that will be used in conducting the proposed experiments and measure each of the variables.

Figure 3.1

Theoretical Model including Hypotheses

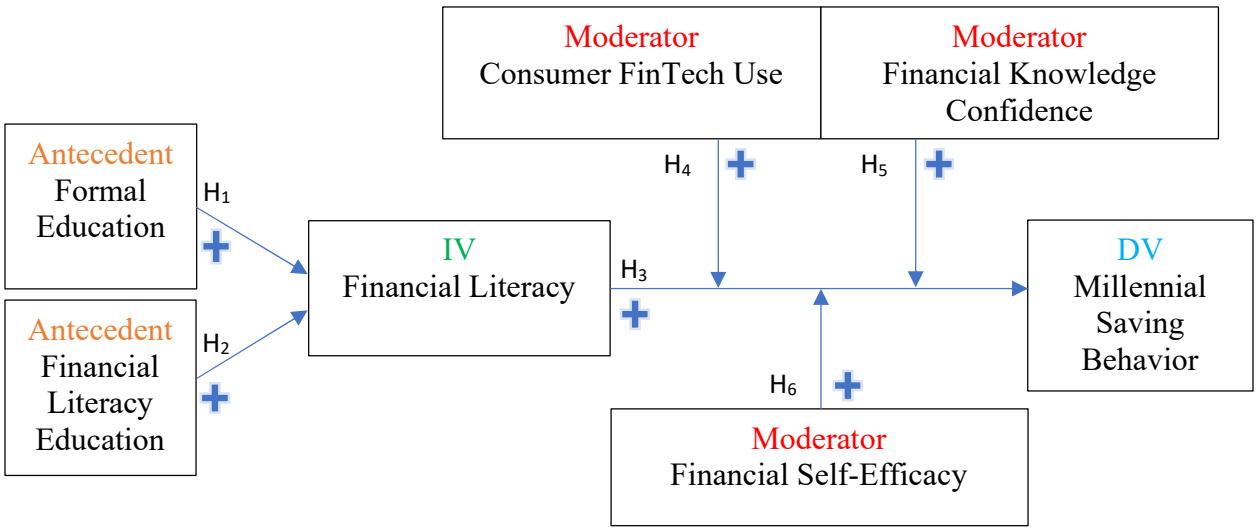


Table 3.1. Summary of Measures

Variable Type	ID	Question	Scale
Antecedents			
Formal Education	A5	What was the highest level of education that you completed?	Categorical
Fin Lit Education	M40	Were you ever required to take financial education?	Categorical

Variable Type	ID	Question	Scale
	M20	Was financial education offered by a school or college you attended, or a workplace where you were employed?	Categorical
	M21	[IF Q.M20 = 2 (PARTICIPATED), ASK, OTHERWISE SKIP TO Q.M5a] When did you receive that financial education?	Categorical
	M41	In total, about how many hours of financial education did you receive?	Categorical
	M42	Overall, how would you rate the quality of the financial education you received?	7-point scale
Independent Variable			
Financial Literacy Level	M6	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?	Categorical
	M7	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?	Categorical
	M8	If interest rates rise, what will typically happen to bond prices?	Categorical
	M31	Suppose you owe $1,000 on a loan and the interest rate you are charged is 20% per year compounded annually. If you didn't pay anything off, at this interest rate, how many years would it take for the amount you owe to double?	Categorical
	M9	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.	Categorical

Variable Type	ID	Question	Scale
	M10	Buying a single company's stock usually provides a safer return than a stock mutual fund.	Categorical
Moderators			
Financial Knowledge Confidence	A14	[IF Q.A7a = 1, 2, ASK; OTHERWISE SKIP TO Q.A41] Who in the household is most knowledgeable about saving, investing and debt?	Categorical
	B40	I would feel comfortable going to a bank or credit union branch to ask a question about a product or service	7-point scale
	M1_1	I am good at dealing with day-to-day financial matters, such as checking accounts, credit and debit cards, and tracking expenses	7-point scale
	M1_2	I am pretty good at math	7-point scale
	M4	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?	7-point scale
Consumer FinTech Use	B41_1	[IF Q.B1 OR Q.B2 = 1 (YES), ASK; OTHERWISE SKIP TO Q.B31] How often do you access your checking or savings account in the following ways? Online banking with a laptop or desktop computer	Categorical
	B41_2	[IF Q.B1 OR Q.B2 = 1 (YES), ASK; OTHERWISE SKIP TO Q.B31] How often do you access your checking or savings account in the following ways? Mobile banking with text messaging, mobile app, or Internet browser or email on a mobile phone	Categorical
	B31	How often do you use your mobile phone to pay for a product or service in person at a store, gas station, or restaurant (e.g., by waving/tapping your mobile phone over a sensor at checkout, scanning a barcode or QR code using your mobile phone, or using some other mobile app at checkout)?	Categorical

Variable Type	ID	Question	Scale
	B42	How often do you use your mobile phone to transfer money to another person?	Categorical
	B43	How often do you use websites or apps to help with financial tasks such as budgeting, saving, or credit management (e.g., GoodBudget, Mint, Credit Karma, etc.)? Please do not include websites or apps for making payments or money transfers.	Categorical
	B44	In the past 12 months, how often have you taken on a work assignment through a website or mobile app, such as Uber, Task Rabbit, Care.com, etc.?	Categorical
Financial Self-Efficacy	J1	Overall, thinking of your assets, debts and savings, how satisfied are you with your current personal financial condition?	10-point scale
	J20	How confident are you that you could come up with $2,000 if an unexpected need arose within the next month?	Categorical
	J32	How would you rate your current credit record?	Categorical
	J33_1	I worry about running out of money in retirement	7-point scale
	J33_40	Thinking about my personal finances can make me feel anxious	7-point scale
	J33_41	Discussing my finances can make my heart race or make me feel stressed	7-point scale
	J41_1	Because of my money situation, I feel like I will never have the things I want in life	5-point scale
	J41_2	I am just getting by financially	5-point scale
	J41_3	I am concerned that the money I have or will save won't last	5-point scale
	J42_1	I have money left over at the end of the month	5-point scale
	J42_2	My finances control my life	5-point scale
	J43	If you were to set a financial goal for yourself today, how confident are you in your ability to achieve it?	4-point scale

Variable Type	ID	Question	Scale
Dependent Variable			
Millennial Saving Behavior	C1	Do you [IF Q.A7a = 1 OR 2 INSERT: or your [spouse/partner]] have any retirement plans through a current or previous employer, like a pension plan [IF Q.X3 = 2 INSERT: , a Thrift Savings Plan (TSP),] or a 401(k)?	Categorical
	C3	[IF Q.C1 = 1 (YES), ASK; OTHERWISE SKIP TO Q.C4] Are any of these retirement plans the kind where you [IF Q.A7a = 1 OR 2 INSERT: or your [spouse/partner]] get to choose how the money is invested?	Categorical
	C4	Do you [IF Q.A7a = 1 OR 2 INSERT: or your [spouse/partner]] 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?	Categorical
	C5	[IF Q.C3 = 1 OR Q.C4 = 1 (YES), ASK; OTHERWISE, SKIP TO Q.B14] Do you [IF Q.A7a = 1 OR 2 INSERT: or your [spouse/partner]] regularly contribute to a retirement account like a [IF Q.X3 = 2 INSERT: Thrift Savings Plan (TSP),] 401(k) or IRA?	Categorical
	B14	[IF Q.B1 OR B2 = 1, 98, 99 (YES, DK, REF), ASK; OTHERWISE SKIP TO Q.C40] Not including retirement accounts, [IF Q.A7a = 1 OR 2 INSERT does your household/IF Q.7a = 3 INSERT: do you] have any investments in stocks, bonds, mutual funds, or other securities?	Categorical
	B1	[IF Q.A7a = 3 INSERT: Do you/ IF Q.A7a = 1 OR 2 INSERT: Does your household] have a checking account?	Categorical
	B2	[IF Q.A7a = 3 INSERT: Do you/ IF Q.A7a = 1 OR 2 INSERT: Does your household] have a savings account, money market account, or CDs?	Categorical

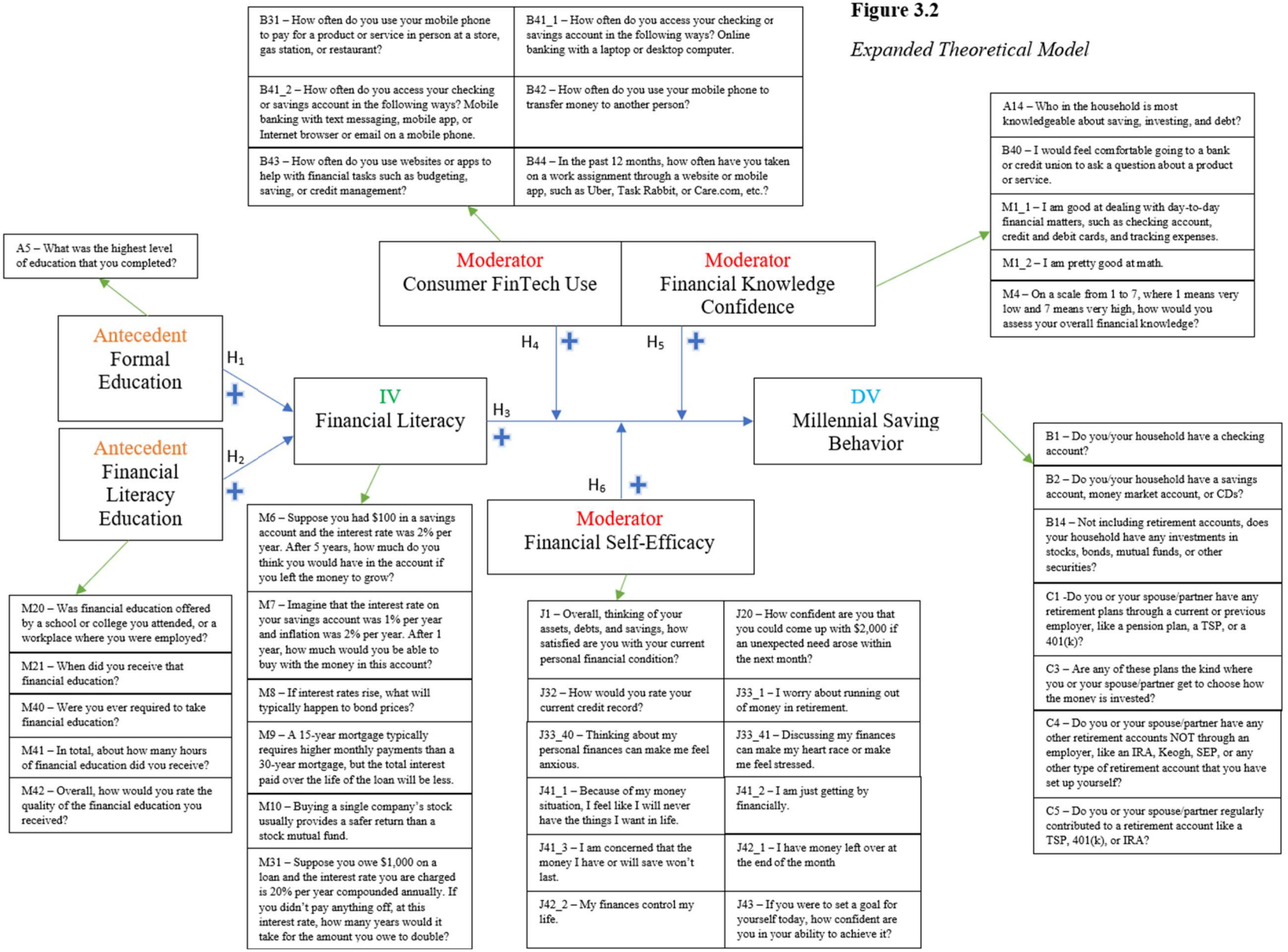
Table 3.2. Control Variables

Variable Type	ID	Question	Scale
Gender	A3	What is your gender?	Categorical
Age	A3a	What is your age?	Continuous
Race/Ethnicity	A4	Which of the following best describes your race or ethnicity?	Categorical
Marital Status	A6	What is your marital status?	Categorical
Living Arrangements	A7	Which of the following describes your current living arrangements?	Categorical
Household Income	A8	What is your [IF Q.A7a = 1 OR 2) INSERT: household's] approximate annual income, including wages, tips, investment income, public assistance, income from retirement plans, etc.? Would you say it is…	Categorical
Employment Status	A9	Which of the following best describes your current employment or work status?	Categorical
Spouse's Employment Status	A10	[IF Q.A7a = 1 OR 2, ASK; OTHERWISE SKIP TO Q.A10a] Which of the following best describes your [spouse/partner]'s current employment or work status?	Categorical
Number of Children	A11	How many children do you have who are financially dependent on you [IF Q.A7a = 1 OR 2 INSERT: or your [spouse/partner]]? Please include children not living at home, and step-children as well.	Continuous
Student Status	A21	[IF Q.A5 = 2, 3, 4, 5 (HS GRAD, SOME COLLEGE, ASSOCIATE'S DEGREE) AND Q.A9 NE 5 (NOT FT STUDENT), ASK; OTHERWISE SKIP TO Q.A22] Are you a part-time student taking courses for credit?	Categorical

Variable Type	ID	Question	Scale
School Type	A22	[IF Q.A5 = 2, 3, 4, 5 (HS GRAD, SOME COLLEGE, ASSOCIATE'S DEGREE) AND ((Q.A9 = 5 OR Q.A21 = 1) (FT OR PT STUDENT)), ASK; OTHERWISE SKIP TO Q.A14] Which of the following best describes the school you are attending?	Categorical
Parental Education	A41	What was the highest level of education completed by the person or any of the people who raised you?	Categorical
Employer Plan(s)	C2	[IF Q.C1 = 1 (YES) AND Q.A7a = 1 OR 2, ASK; OTHERWISE SKIP TO Q.C3] Were these plans provided by your employer or your [spouse/partner]'s employer, or both?	Categorical

Figure 3.2

Expanded Theoretical Model



CHAPTER IV

TESTING & RESULTS

Chapter four reports the results of the tests that were executed to analyze the data and test the hypotheses. The final sample size of the secondary data set used for this paper contains 6,624 observations. The original data set containing 27,091 observations was narrowed down to 7,676 once non-Millennial respondents (those younger than 22 or older than 37) were removed and further reduced to 6,624 once incomplete surveys were discarded. For the purpose of this dissertation, an incomplete survey refers to those where the respondent answered any of the questions from the model in an uncertain way (e.g., "don't know" or "prefer not to say").

As a reminder and as stated in chapter three, the original data set contained approximately 500 respondents per state including the District of Columbia (D.C.) with oversampling in the states of Oregon and Washington (approximately 1,250 per each state). To ensure the data was representative of the composition of the country as well as each state, quotas were established by state to account for age, gender, ethnicity, education level, and income based upon the Census Bureau's American Community Survey. Figures were weighted both nationally and regionally as well as by state to ensure that the sample was representative of each state's age, gender, ethnicity, and education level.

The data set included several demographical descriptors of the population including, but not limited to, age, education level, race/ethnicity, and household income. The distribution of these demographics is spread and follow a somewhat normal bell curve indicating a wide variation in demographical characteristics within the sample as shown in tables 4.1 through 4.4. Notably, race/ethnicity is heavily skewed towards White-Non-Hispanic compared to other race/ethnicity groups sampled.

Table 4.1. Sample Age Distribution

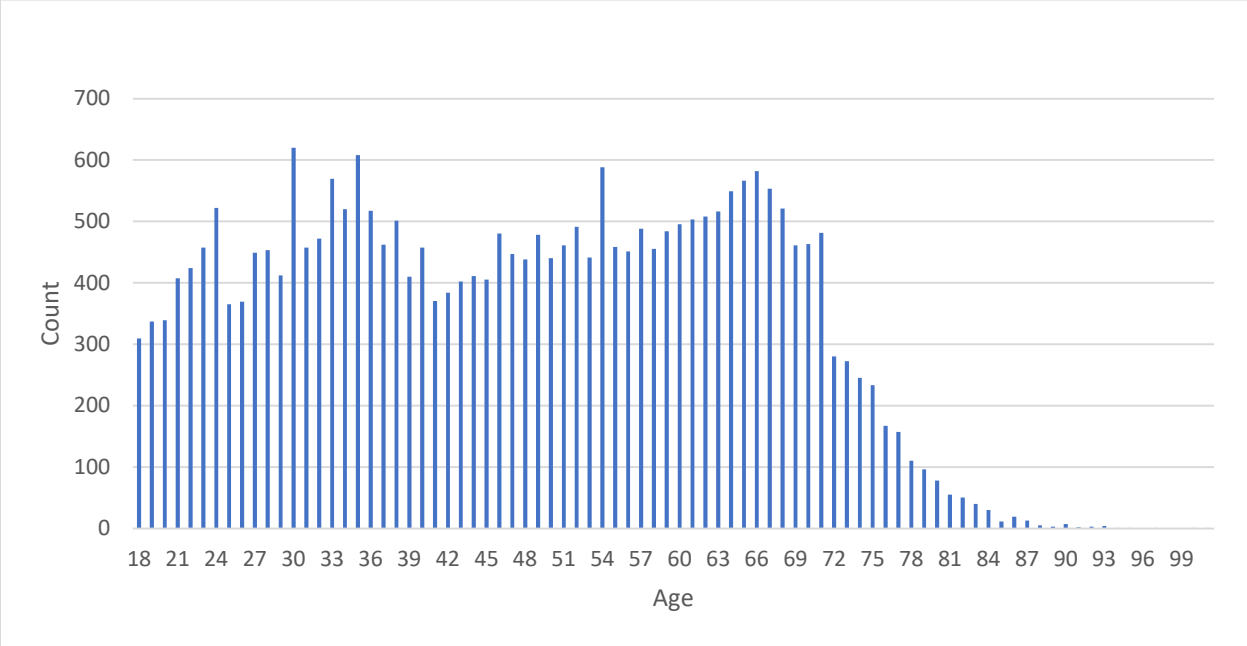


Table 4.2. Sample Education Level Distribution

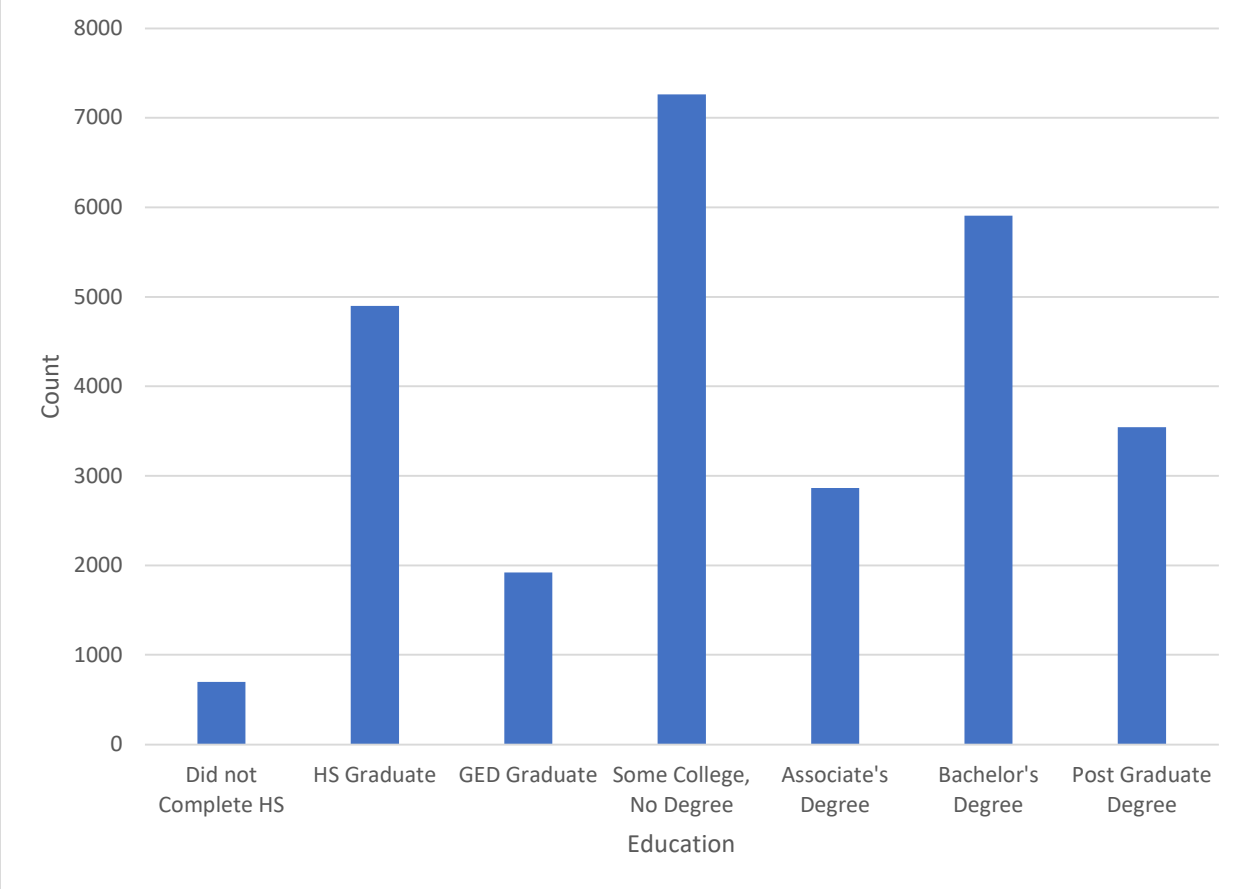


Table 4.3. Sample Race/Ethnicity Distribution

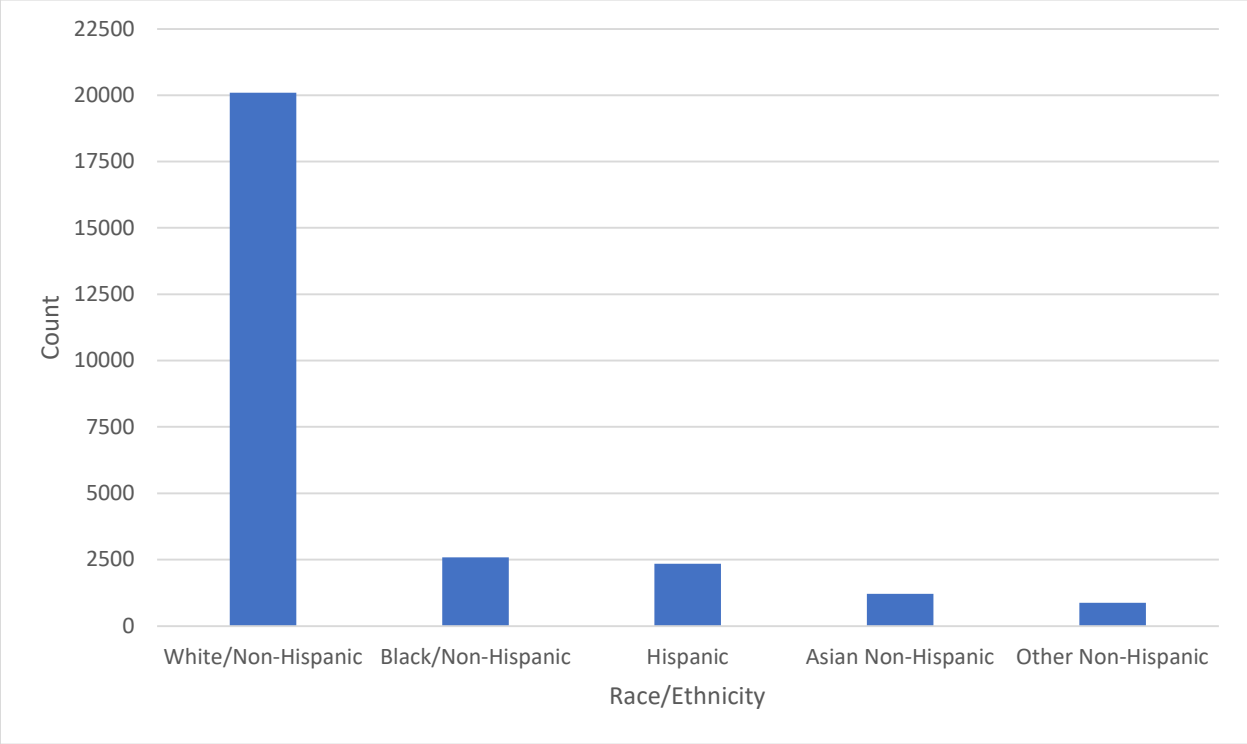
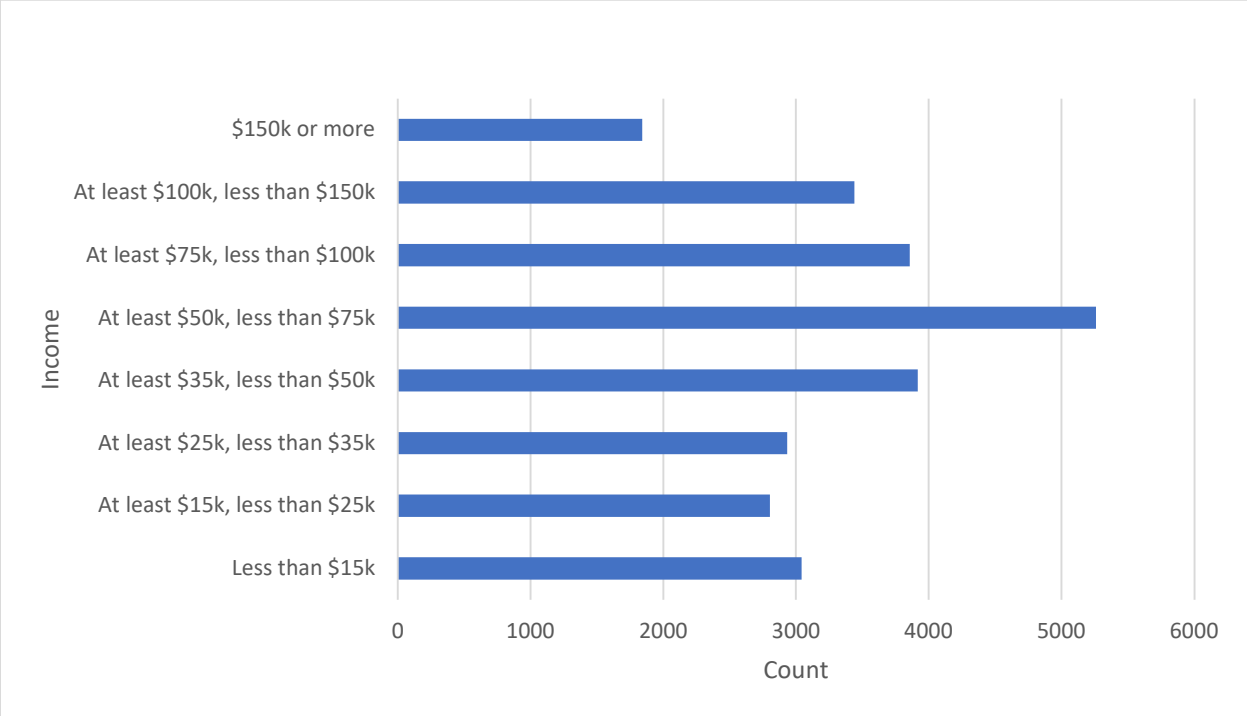


Table 4.4. Sample Income Distribution



Tests were conducted utilizing SmartPLS® and the PLS-SEM methodology to determine construct reliability (Cronbach's Alpha), discriminant validity (Fornell-Larcker Criterion & Heterotrait-Monotrait Ratio), R-square, path coefficients, t-statistics, p-values, Average Variance Extracted (AVE), collinearity statistics (VIF), means, and standard deviation. 2-way linear interactions were also tested to determine the moderating effect of each moderator on the impact of the value of financial literacy (IV) on Millennial saving behavior (DV).

Convergent validity was utilized to determine the degree to which each measure of each construct was similar with one another (Hair, Hult et al. 2017, Hair, Black et al. 2019). Average variance extracted (AVE) was used to assess convergent validity. Discriminant validity was used to ensure that each construct was unique and was not related to and did not measure the other constructs. Convergent validity and discriminant validity tests were used to determine the reliability of these data prior to analyzing the test results (Hair, Hult et al. 2017, Hair, Black et al. 2019). The Fornell-Larcker criterion was used to test the degree of shared variance among the latent variables within the model, and the Heterotrait-Monotrait ratios were evaluated to measure the degree of similarity between the latent variables (Hair, Hult et al. 2017).

4.1 Question Recoding & Aggregation

Due to the nature of secondary data and in an effort to maintain consistency among measurement scales, several items were aggregated or recoded to create a standardized 5-point scale in order to measure each variable. Figure 4.1 provides a model notating the new nomenclature for each measurement item along with what specific survey questions comprise that particular item. Appendix F contains a document used to recode the questions and aggregate specific survey questions to create new 5-point scales. It has been documented that combining

scores of Likert items is recommended for theoretical advantages as well as ease of use and comparison (Chakrabartty 2020).

To measure financial literacy education, questions M20 and M21_1 through M21_4 were combined to create a 5-point scale notated as FLE_1_1. Respondents who chose "2" for question M20 were scored a 1 and they were given an additional value of 1 per each response of "yes" to questions M21_1 through M21_4 for a possible value of 5. Respondents who chose anything other than "2" for question M20 were not asked questions M21_1 through M21_4 and were scored with a value of 1. Question M42 was recoded as follows: 1=1, 2/3=2, 4=3, 5/6=4, 7=5.

Financial literacy responses were aggregated to combine six questions (M6-M10 & M31) into one that scored respondents on a 1-5 scale with 1 indicating a low level of financial literacy and 5 indicating a high level of financial literacy. The questions asked for this variable have a single correct answer per question, therefore a correct response garnered a value of "1" and any other response garnered a value of "0." The resulting values were coded as follows: 0,1=1, 2=2, 3=3, 4=4, 5,6=5.

The moderator consumer fintech use (CFTU) was aggregated to form three questions with 5-point scales, each comprised of two original questions. Each of the six original questions allow respondents to choose the response of never, sometimes, or frequently. The coding is as follows: B41_1/B41_2 combine as "Use Online or Mobile Banking to access Checking or Savings." 1 = Both Never, 2 = One Never, One Sometimes, 3 = Two Sometimes, 4 = One Sometimes, One Frequently, 5 = Two Frequently. B31/B42 combine as "Paying for a Product or Service." 1 = Both Never, 2 = One Never, One Sometimes, 3 = Two Sometimes, 4 = One Sometimes, One Frequently, 5 = Two Frequently. B43/B44 combine to "Accomplish a Financial

Task." 1 = Both Never, 2 = One Never, One Sometimes, 3 = Two Sometimes, 4 = One Sometimes, One Frequently, 5 = Two Frequently.

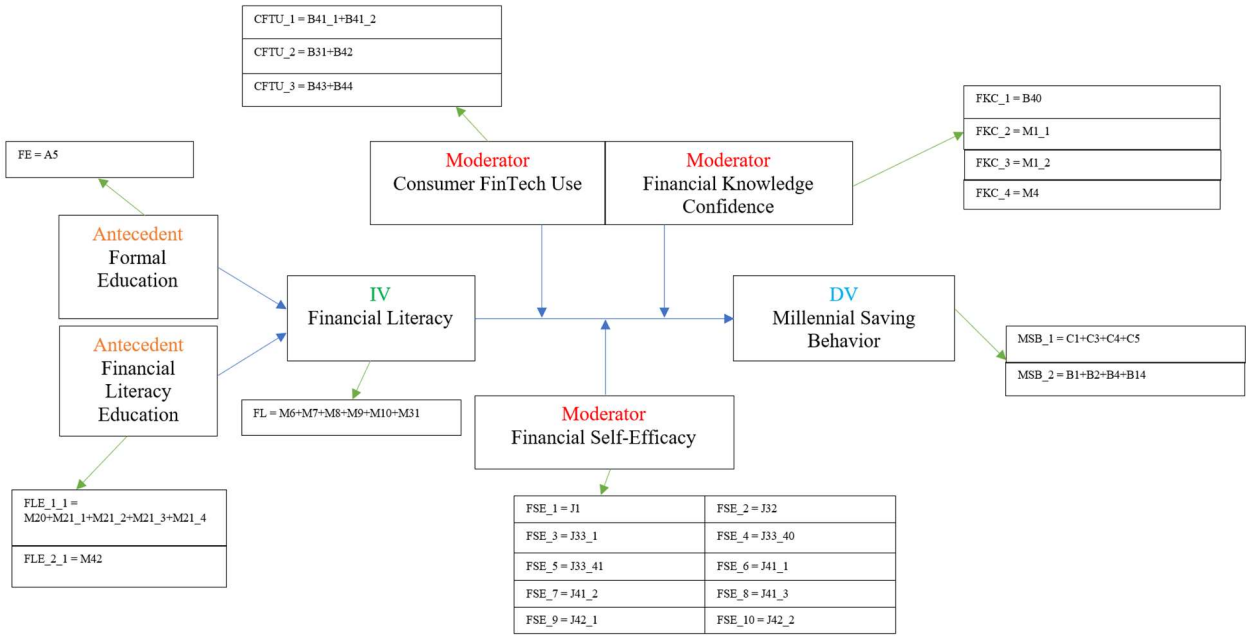
Financial knowledge confidence (FKC) did not require aggregation, though recoding was necessary to create a consistent 5-point scale. The new scale for all four questions (B40, M1_1, M1_2, M4) is as follows: 1=1, 2/3=2, 4=3, 5/6=4, 7=5.

Financial self-efficacy contained several questions already formatted as a 5-point scale, though four questions (J1, J33_1, J33_40, J33_41) required recoding as follows: for J1, 1/2=1, 3/4=2, 5/6=3, 7/8=4, 9/10=5. For J33_1, J33_40, and J33_41, 1=1, 2/3=2, 4=3, 5/6=4, 7=5. These three items were also reverse-coded. Additionally, items J41_1, J41_2, J41_3, and J42_2 were reverse-coded.

Finally, Millennial saving behavior consisted of binary questions with simple yes or no response options. To create a consistent 5-point scale, the eight questions used to measure this variable were categorized into retirement account questions and non-retirement account questions and aggregated to create two items which captured respondent data: C1, C3, C4, C5 were aggregated where 0 yes = 1, 1 yes = 2, 2 yes = 3, 3 yes = 4, 4 yes = 5. Similarly, questions B14, B1, B2, B4 (reverse-coded) were aggregated where: 0 yes = 1, 1 yes = 2, 2 yes = 3, 3 yes = 4, 4 yes = 5.

Figure 4.1

Aggregated Theoretical Model



4.2 Internal and Convergent Reliability

Construct internal reliability and validity were evaluated utilizing Cronbach's Alpha, composite reliability, and average variance extracted (AVE) as shown in table 4.5. Cronbach's Alpha values of >.70 are generally accepted as high levels of internal reliability (Hair, Black et al. 2019). The Cronbach's Alpha measurement for the moderator Consumer FinTech Use (CFTU) was .618 which is generally viewed as low, though a low Cronbach's Alpha score can occur in a homogenous sample (in this paper, all Millennial respondents) (Bernardi 1994), therefore it was accepted as moderately reliable.

The composite reliability was calculated to determine the internal consistency of the measurement items for each construct and to further support the Cronbach's Alpha reliability values. All composite reliability values were >.70 indicating a high level of composite

reliability. Average variance extracted (AVE) scores were >.50 for all constructs except for one moderator, financial self-efficacy, which had an AVE score of .405. This level of AVE is deemed acceptable since the same construct had a composite reliability value of >.60. Financial self-efficacy has a composite reliability value of .871, therefore the AVE value was deemed acceptable.

Table 4.5. Construct Reliability and Validity

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Consumer FinTech Use (CFTU)	0.618	0.797	0.568
Financial Knowledge Confidence (FKC)	0.693	0.813	0.522
Financial Literacy (FL)	1.000	1.000	1.000
Financial Literacy Education (FLE)	0.917	0.960	0.923
Financial Self Efficacy (FSE)	0.850	0.871	0.405
Formal Education (FE)	1.000	1.000	1.000

4.3 Discriminant Validity

Discriminant validity was measured to ensure that each individual construct was unique and not measuring the same phenomenon. The Fornell-Larcker criterion was previously known as the most commonly used determinant of discriminant validity when utilizing PLS-SEM, though it now provides initial evidence of discriminant validity. The Heterotrait-Monotrait ratio was calculated for the constructs resulting in all values being less than .90 indicating discriminant validity has been established between the constructs (Hair, Black et al. 2019). The Fornell-Larcker and Heterotrait-Monotrait values for these data are shown in tables 4.6 and 4.7.

Table 4.6. Fornell-Larcker Criterion

	Consumer FinTech Use (CFTU)	Financial Literacy (FL)	Financial Literacy Education	Financial Self Efficacy (FSE)	Formal Education (FE)	Millenial Saving Behavior	Moderator 2: CFTU	Moderator 3: FSE	Moderator 1: FKC
Consumer FinTech Use (CFTU)	0.754								
Financial Knowledge Confidence (FKC)	0.297								
Financial Literacy (FL)	0.000	1.000							
Financial Literacy Education (FLE)	0.224	0.116	0.961						
Financial Self Efficacy (FSE)	0.074	0.203	0.111	0.636					
Formal Education (FE)	0.111	0.292	0.097	0.239	1.000				
Millennial Saving Behavior (MSB)	0.240	0.286	0.198	0.463	0.310				
Moderator 2: CFTU	-0.170	-0.069	-0.072	-0.052	-0.063	-0.116			
Moderator 3: FSE	-0.049	0.118	0.007	0.100	0.069	0.117	0.069		
Moderator1: FKC	-0.145	-0.004	-0.048	0.009	-0.013	-0.052	0.262	0.380	

Table 4.7. Heterotrait-Monotrait Ratio (HTMT)

	Consumer FinTech Use (CFTU)	Financial Knowledge Confidence (FKC)	Financial Literacy (FL)	Financial Literacy Education (FLE)	Financial Self Efficacy (FSE)	Formal Education (FE)	Moderator 2: CFTU	Moderator 3: FSE	Moderator 1: FKC
Consumer FinTech Use (CFTU)									
Financial Knowledge Confidence (FKC)	0.444								
Financial Literacy (FL)	0.146	0.283							
Financial Literacy Education (FLE)	0.306	0.324	0.119						
Financial Self Efficacy (FSE)	0.288	0.375	0.220	0.109					
Formal Education (FE)	0.135	0.201	0.292	0.102	0.210				
Moderator 2: CFTU	0.217	0.180	0.069	0.077	0.110	0.063			
Moderator 3: FSE	0.066	0.029	0.118	0.008	0.121	0.069	0.069		
Moderator 1: FKC	0.185	0.362	0.004	0.052	0.157	0.013	0.262	0.380	

4.4 Collinearity Assessment

To ensure there is no correlation between predictor variables, tests were conducted to check for multicollinearity. Correlation between predictor variables can increase the standard error of the coefficients which may cause the independent variable(s) to be insignificant when they should be significant (Daoud 2017). According to Dauod (2017) and Shrestha (2020), VIF values of 1 or less indicate no correlation, more than 1 but less than or equal to 5 indicate moderate correlation, and VIF values over 5 indicate high correlation. All variance inflation factor (VIF) values are within the generally acceptable range and under 10 as shown in table 4.8.

Table 4.8. Collinearity Statistics (VIF) Outer VIF Values

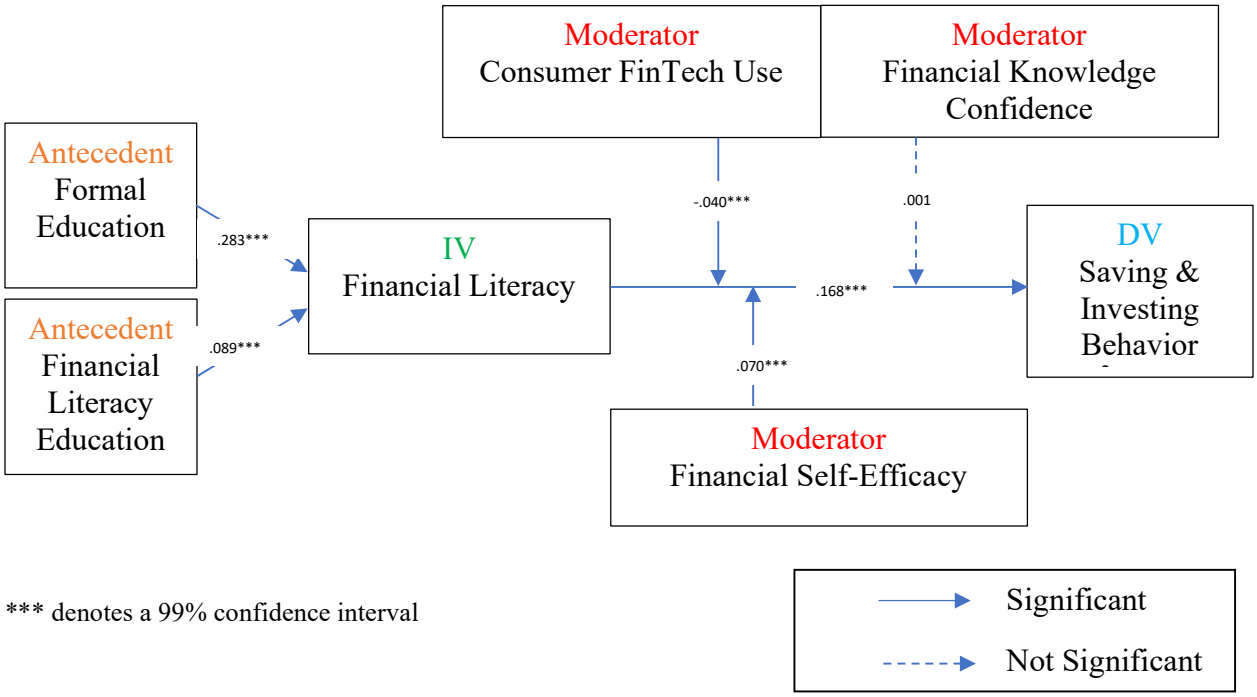
	VIF
CFTU_1	1.099
CFTU_2	1.487
CFTU_3	1.425
FE_1	1.000
FKC_1	1.177
FKC_2	1.427
FKC_3	1.324
FKC_4	1.391
FL	1.000
FLE_1_1	3.550
FLE_2_1	3.550
FSE_1	1.537
FSE_10	1.617
FSE_2	1.266
FSE_3	1.614
FSE_4	2.575
FSE_5	2.539
FSE_6	2.143
FSE_7	1.717
FSE_8	2.180
FSE_9	1.557
Financial Literacy (FL) * Consumer FinTech Use (CFTU)	1.000
Financial Literacy (FL) * Financial Knowledge Confidence (FKC)	1.000
Financial Literacy (FL) * Financial Self Efficacy (FSE)	1.000
MSB_1	1.168
MSB_2	1.168

4.5 Path Coefficients and P Values

The path coefficient values are displayed below in figure 4.2 while p-values are displayed in table 4.9. All path coefficients are statistically significant at the 99% confidence interval other than the moderator financial knowledge confidence (FKC) with a path coefficient of .001 and a p-value of .926.

Figure 4.2

Path Coefficients



*** denotes a 99% confidence interval

Table 4.9. Path Coefficients, T-Statistics, P Values (Bootstrapped)

	Original Sample (O)	T Statistics (|O/STDEV|)	P Values
Consumer FinTech Use (CFTU) -> Millennial Saving Behavior (MSB)	0.163	14.047	0.000
Financial Knowledge Confidence (FKC) -> Millennial Saving Behavior (MSB)	0.161	12.514	0.000
Financial Literacy (FL) -> Millennial Saving Behavior (MSB)	0.168	15.822	0.000
Financial Literacy Education (FLE) -> Financial Literacy (FL)	0.089	8.056	0.000
Financial Self Efficacy (FSE) -> Millennial Saving Behavior (MSB)	0.348	34.375	0.000
Formal Education (FE) -> Financial Literacy (FL)	0.283	24.326	0.000
Moderator 2: CFTU -> Millennial Saving Behavior (MSB)	-0.040	3.285	0.001
Moderator 3: FSE -> Millennial Saving Behavior (MSB)	0.070	6.363	0.000
Moderator1: FKC -> Millennial Saving Behavior (MSB)	0.001	0.093	0.926

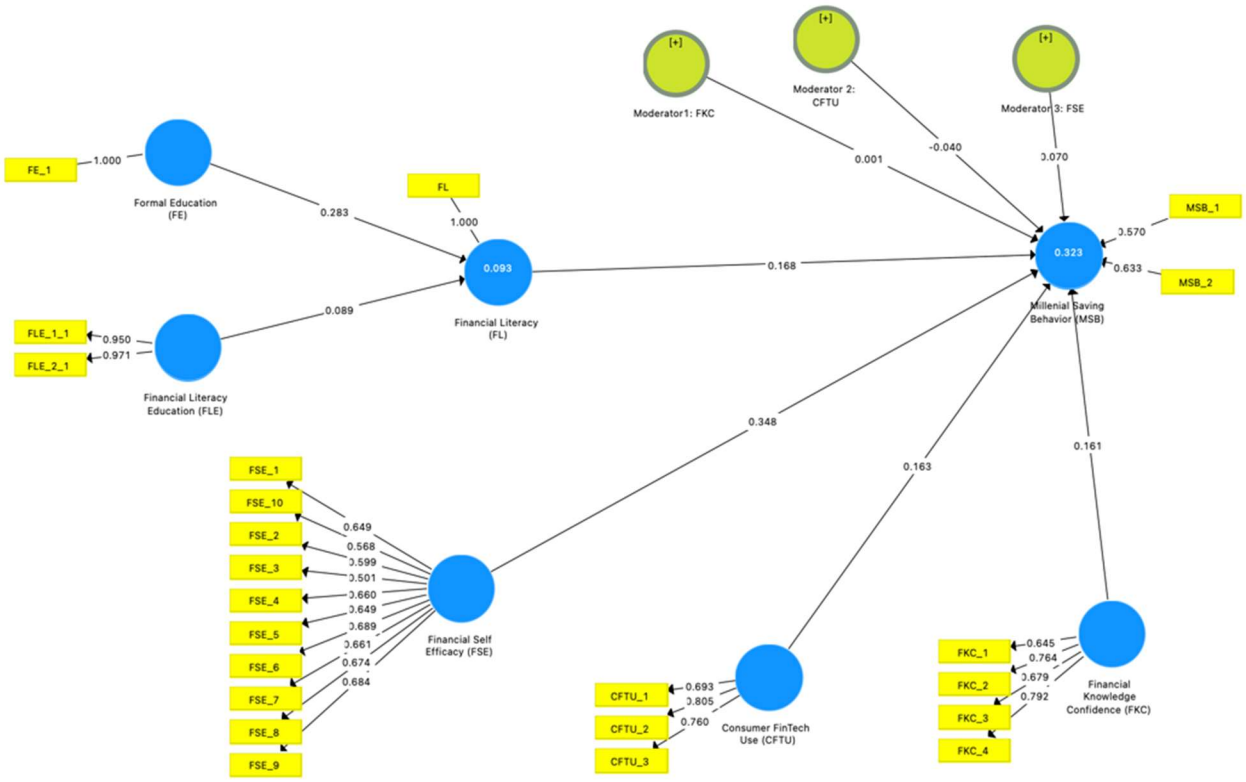
4.6 R Square

The overall R^2 value is .323 as shown in figures 4.2, 4.3 and table 4.10. This indicates that 32.3% of the variance in the dependent variable (Millennial Saving Behavior) can be explained by the model. Additionally, table 4.11 displays the means and standard deviation

values of the variables. The mean values range from 1.051 to 3.987 showing a large amount of variance between the variables. Standard deviation is also varied.

Figure 4.3

Smart PLS Constructs and Observed Indicators



Note: Smart PLS Software (Ringle, C.M., Wende, S., and Becker, J.-M. 2015. "SmartPLS 3." Boenningstedt: SmartPLS GmbH, http://www.smartpls.com.

Table 4.10. R Square

	R Square	R Square Adjusted
Financial Literacy (FL)	0.093	0.093
Millennial Saving Behavior (MSB)	0.323	0.322

Table 4.11. Mean/Standard Deviation

	Mean	Standard Deviation	Number of Observations Used
CFTU_1	3.987	1.061	6624
CFTU_2	2.584	1.303	6624
CFTU_3	2.272	1.248	6624
FE_1	3.407	0.999	6624
FKC_1	3.881	1.185	6624
FKC_2	3.979	1.051	6624
FKC_3	3.892	1.145	6624
FKC_4	3.656	1.033	6624
FL	2.774	1.361	6624
FLE_1_1	1.463	0.919	6624
FLE_2_1	1.051	1.806	6624
FSE_1	2.966	1.397	6624
FSE_10	2.742	1.247	6624
FSE_2	3.532	1.438	6624
FSE_3	2.356	1.301	6624
FSE_4	2.210	1.206	6624
FSE_5	2.463	1.310	6624
FSE_6	2.937	1.403	6624
FSE_7	2.753	1.343	6624
FSE_8	2.629	1.333	6624
FSE_9	3.202	1.287	6624
MSB_1	2.623	1.561	6624
MSB_2	3.732	0.847	6624

4.7 2-Way Linear Interactions

The final test performed on these data was to chart the 2-way linear interactions of each moderating variable. Figures 4.4 through 4.6 display the results. When the moderator FSE is higher (figure 4.4), the impact on the relationship between the independent variable, financial literacy, is great on the value of the dependent variable, Millennial saving behavior. When the moderator FKC is higher (figure 4.5), there is no impact on the relationship between the independent variable and the dependent variable. When the moderator CFTU is higher (figure 4.6), the impact of the independent variable on the dependent variable is lower.

Figure 4.4

2-Way Linear Interactions – Financial Self-Efficacy (FSE)

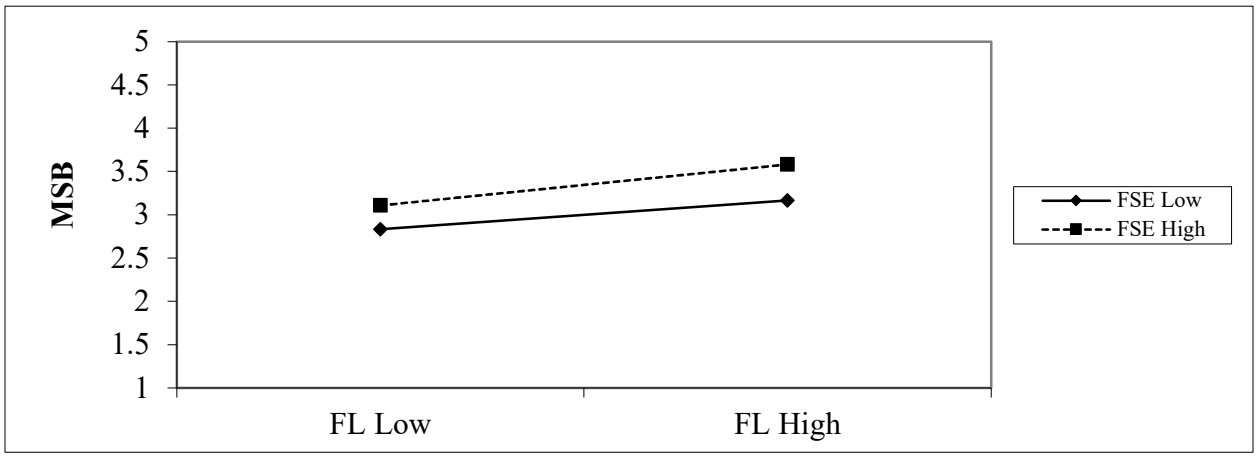


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Figure 4.5

2-Way Linear Interactions – Financial Knowledge Confidence (FKC)

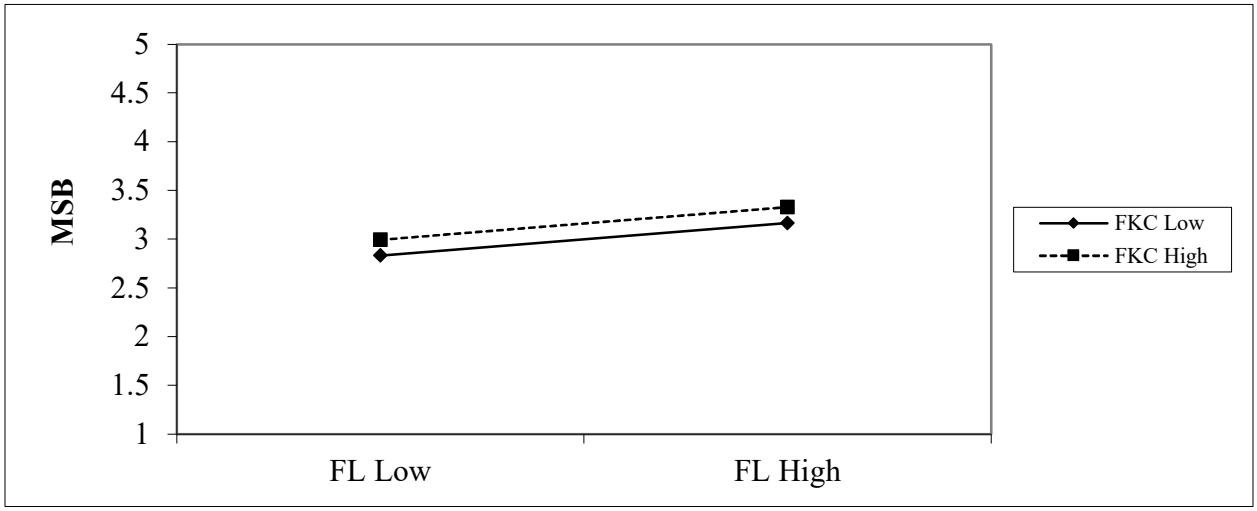

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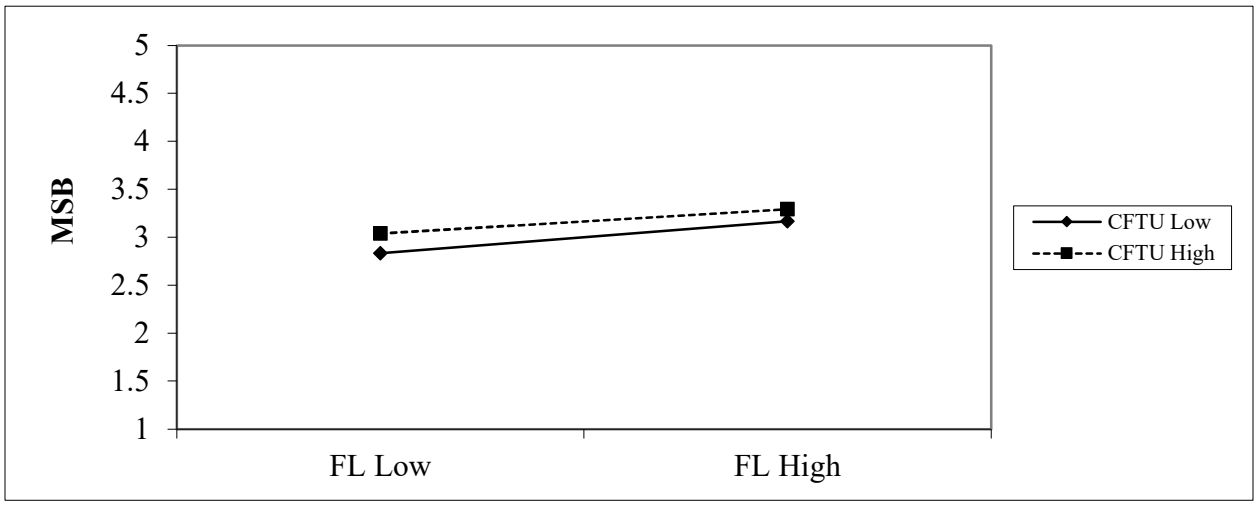
Figure 4.6

2-Way Linear Interactions – Consumer FinTech Use (CFTU)



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4.8 Summary

The hypothesized relationships are displayed below in table 4.12. Of the six hypotheses, four were supported while two were not. The next and final chapter includes a discussion of the results and this paper's theoretical and practical contributions along with limitations, areas for future research, and concluding remarks.

Table 4.12. Hypotheses Results

Hypothesis	Path	Path Coefficient	T-Statistic	P-Value	Supported
H_1	FE->FL	.283	24.326	.000	Yes
H_2	FLE->FL	.089	8.056	.000	Yes
H_3	FL->MSB	.168	15.822	.000	Yes
H_4	CFTU->FL/MSB	-.040	3.285	.001	No
H_5	FKC->FL/MSB	.001	.093	.926	No
H_6	FSE->FL/MSB	.070	6.363	.000	Yes

CHAPTER V

DISCUSSION

Chapter five consists of five sections: (1) an overview of the study linking prior research to this study and its results along with both academic and practical implications; (2) a description of the findings of this study (3) limitations of this study; (4) areas for future research related to this study; (5) summary and conclusions.

5.1 Overview

Financial literacy research and its implications should hold significant value to both researchers and practitioners along with the general public as a whole. There are little-to-no aspects of life that do not involve some element of financial literacy and decision-making ability, and the recognition of the various factors that determine a person's behavior and ability to make sound financial decisions is an area that deserves attention. Millennials in particular have a great opportunity to break the cycle of generational financial illiteracy that has been so prevalent as they are the largest adult generation in history (Dimock 2019, Fry 2020) and will make a significant impact on the economy for decades.

The results of this study supported four of the six hypotheses with five of the six hypotheses showing statistical significance. With that, it must be acknowledged that the sample size used in this study was comparatively large which may have contributed to the statistical significance. This statistical significance and the unexpected correlation between the CFTU moderator and the independent and dependent variables should be interpreted carefully.

Academic Contributions

The primary academic contribution of this dissertation is the addition of a unique set of moderators and their impact on the relationship between financial literacy and Millennial saving

behavior. Through the exhaustive literature review discussed in chapter two, I found several papers that analyzed these moderators either independently or with other variables, though I was unable to find any literature that analyzed these three moderators collectively. The literature review shows evidence that existing literature suggests that these moderators do impact saving behavior and outcomes. Further, the extant literature did not analyze the impacts of these moderators on Millennials in particular but instead analyzed their impacts on the population as a whole or by generation without a primary focus on Millennials, as this paper does.

Another unique aspect of this paper is that the data set, while comprised of publicly available secondary data, was utilized in a novel way that has not been done before. Aggregating various questions while creating a standardized set of 5-point scales represents a contribution to the field of financial literacy research and results in a new data set that has been properly tested and validated and can also now be used for future research. The findings of this paper are specific to Millennials, but the methods of testing and analysis are generalizable in that they can be used on other generations as well as populations outside of the U.S.

Practical Contributions

The findings of this paper can be used to continue the analysis and testing of various methods of improving the financial wellness of Millennials and other generations. Practitioners from various industries can utilize the information contained in this paper to further refine and adjust the way in which they reach their Millennial customers as well as tailor their financial recommendations and advice in ways that better fit the habits that impact their saving behavior.

5.2 Findings

The findings of this study were generally supportive of the hypotheses posed in chapter three as shown in table 5.1 excluding H_4 and H_5. Extant research suggests that there should be a

relationship between formal education and financial literacy education on a person's level of financial literacy (Lusardi 2008, Lusardi and Mitchell 2011, Lusardi and Mitchell 2011, Kaiser and Menkhoff 2018, Frisancho 2019, Rothwell and Wu 2019, Urban, Schmeiser et al. 2020) in that the more general education a person has, the greater their level of financial literacy, and the greater their level of financial literacy education, the greater their level of financial literacy. H_1 and H_2 hypothesized that formal education is positively associated with financial literacy (H_1) and that financial literacy education is positively associated with financial literacy (H_2). Both hypotheses were supported with path coefficients of .283 and .089 respectively, and both had p-values of <.001 indicating statistical significance at the 99% confidence interval.

H_3 hypothesized that financial literacy is positively associated with Millennial saving behavior and was supported as well with a path coefficient of .168 and a p-value of .000 indicating statistical significance at the 99% confidence interval. This finding is in support of existing literature cited in section 2.6 of this dissertation which concludes that financial literacy is directly related to financial behavior and outcomes.

Moderators H_4 and H_6 were both statistically significant at the 99% confidence interval with p-values of <.001 and path coefficients of -.040 and .070 respectively, however, moderator H_5 was statistically insignificant with a p-value of .926 and a path coefficient of .001. This is further supported by the 2-way linear interaction figures 4.4 through 4.6 previously shown in chapter four. H_4 hypothesized that consumer fintech use positively moderates the relationship between financial literacy and Millennial saving behavior in that higher instances of consumer fintech use would strengthen the relationship and lower instances would weaken it. Figure 4.6 shows that the opposite holds true; higher levels of consumer fintech use is associated with a weaker impact of financial literacy on Millennial saving behavior. H_5 hypothesized that

financial knowledge confidence positively moderates that relationship between financial literacy and Millennial saving behavior in that higher instances of financial knowledge confidence would strengthen the relationship and lower instances would weaken it. Figure 4.5 indicates that there is no support for this in that the varying levels of financial knowledge confidence have no bearing on the impact of financial literacy on Millennial saving behavior. H_6 hypothesized that financial self-efficacy positively moderates that relationship between financial literacy and Millennial saving behavior in that higher instances of financial self-efficacy would strengthen the relationship and lower instances would weaken it. Figure 4.4 indicates that there is support for this in that higher levels of financial self-efficacy are related to a stronger relationship between financial literacy and Millennial saving behavior.

Table 5.1. Hypotheses Support

Hypothesis		Supported
H_1	Formal Education is positively associated with Financial Literacy.	Yes
H_2	Financial Literacy Education is positively associated with Financial Literacy.	Yes
H_3	Financial Literacy is positively associated with Millennial Saving behavior.	Yes
H_4	Consumer FinTech Use positively moderates the relationship between Financial Literacy and Millennial Saving behavior such that higher instances of Consumer FinTech Use strengthen the relationship between Financial Literacy and Millennial Saving behavior and lower levels of FinTech Use weakens the relationship between Financial Literacy and Millennial Saving behavior.	No
H_5	Financial Knowledge Confidence positively moderates the relationship between Financial Literacy and Millennial Saving behavior such that higher instances of Financial Knowledge Confidence strengthen the relationship between Financial Literacy and Millennial Saving behavior and lower levels of Financial Knowledge Confidence weakens the relationship between Financial Literacy and Millennial Saving behavior.	No
H_6	Financial Self-Efficacy positively moderates the relationship between Financial Literacy and Millennial Saving behavior such that higher instances of Financial Self-Efficacy strengthen the relationship between Financial Literacy and Millennial Saving behavior and lower levels of Financial Self-Efficacy weakens the relationship between Financial Literacy and Millennial Saving behavior.	Yes

5.3 Limitations

This dissertation contains several limitations that were intentionally made in order to ensure an in-depth analysis of the specific topic was performed. The limitations of note include: (1) the research was conducted on only one particular demographic – Millennial generation; (2) the data utilized in this study only contained behavioral information and no financial figures; (3) the data utilized in this study was comprised of self-reported survey responses and not actual behavior of the participants; and (4) the data set used in this study was relatively large.

Limitation 1: Age Demographic

To ensure this study focused on a specific segment of the population and adequate research was executed, this study was limited to a single age generation—Millennials. As noted in the introduction, Millennials represent the largest living adult generation in history (Dimock 2019, Fry 2020) and as such, may potentially have a large impact on the economy. Focusing on Millennial respondents allowed me to take a deep dive into extant literature surrounding their financial habits and behaviors while uncovering an untapped set of moderators that were tested in this dissertation. Including other generations would have likely skewed the results and not provided an accurate representation of the moderating factors that influence Millennial saving behavior as it relates to the varying levels of financial literacy they possess.

Limitation 2: Behavioral Data

The survey used in this study collected behavioral-based data that was self-reported by each respondent as opposed to collecting actual financial figures. The distinction is that, while behavioral-based data was sufficient for this study and was able to be used to measure and evaluate behaviors, it does not capture actual account balances to adequately measure financial wellness and measure the actual actions performed by each respondent. In other words, these

data provide directional information regarding behaviors but do not capture actual outcomes which are more indicative of Millennial financial health and wellness.

Limitation 3: Self-Reported Survey Data

The data used in this study was secondary data collected by survey and using each individual respondent's attempt at answering each question to the best of their ability. While useful in this study, it may not have captured accurate behavioral habits. Respondents may have lied, exaggerated, or provided frivolous answers rather than reporting the actual behavior, or they may have answered in a way that they thought represented their behavior when in reality, their answers may not match their habits and actions. Recall from chapter two that some surveys used in prior research asked respondents to grade their financial knowledge, then answer financial literacy questions. The results were mixed showing that some respondents tend to grade themselves higher than their financial literacy level actually is (Lusardi and Mitchell 2011). To alleviate this issue, recall that these data met validity and reliability testing standards and were normalized by conversion to a standardized 5-point scale.

Limitation 4: Sample Size

As noted in section 5.1, this paper utilized a large sample that was atypical compared to existing literature. Due to the nature of large sample sizes, the results of this study and their statistical significance could have been impacted. Future studies should consider this and pay close attention to the interpretation of the results.

5.4 Future Research Areas

An area for future research would involve a continuation of this study that analyzes all 27,091 observations from the original data set as well as each generation individually, similar to the way that this study focused on Millennials. In doing so, researchers can compare and

contrast each generation to determine the direction of their behavior and to discover how the moderators discussed in this paper impact the relationship between financial literacy and saving behavior for each of those generations along with the entire sample as a whole. Additionally, the next iteration of this data set is expected to be made available in early 2022 containing data collected in late 2021. That data set can be tested and compared against the one utilized in this study to determine what has changed and how, particularly given the impact of the Covid-19 pandemic on the U.S. economy beginning in early 2020 and continuing today.

As research continues to expand, a focus must be made on the various factors that impact behavior and not just those that impact a person's level of financial literacy. As mentioned in chapter two, much of the extant literature focuses on increasing financial literacy levels and access to financial literacy programs and other educational material. However, financial literacy is just one step in achieving financial success and must be combined with access to resources as well as a meaningful effort to measure outcomes, commonly referred to as financial wellness.

5.5 Conclusion

This dissertation examined antecedents to financial literacy, the direct relationship between financial literacy and Millennial saving behavior, and a unique set of three moderators and their impact on the direct relationship between financial literacy and Millennial saving behavior. A thorough literature review was conducted to ensure that any prior research relating to this study was examined, cited, and its contributions were noted and considered in performing this study. Four of the six hypotheses were supported while two were not. Of note is that the two unsupported hypotheses were moderating effects that were expected to positively affect the relationship between the independent variable and dependent variable, yet one influenced the relationship in the opposite way while one did not influence the relationship at all. As noted in

section 5.1, these findings can help researchers and practitioners while conducting future studies and enacting regulatory and procedural changes to better understand what factors impact Millennial saving behavior.

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APPENDIX A: SURVEY

2018 National Financial Capability Study
State-by-State Survey Instrument

Note:

- Changes to the NFCS State-by-State survey are footnoted in this document. Footnotes are labeled with the year that the change was implemented (2018, 2015 or 2012).

Sample Characteristics:

- N ≈ 500 respondents per state (plus D.C.)
  - Oversamples in Oregon and Washington (total N ≈ 1,250 in each of these two states)[1]
- Quotas within each state by:
  - Age
  - Gender
  - Income
  - Ethnicity
  - Education

Coding Notes:

- For all questions in the survey except A3a:
  - Code 98 = Don't know
  - Code 99 = Prefer not to say
- For A3a:
  - Code 999 = Prefer not to say
- For questions that have been modified, 2018, 2015, 2012 and 2009 codes may differ from each other.

[1] 2018: Added oversamples of two states.

Z) Thank you very much for participating in this research.

- Please be assured that **all of your answers will be completely ANONYMOUS and CONFIDENTIAL**. Therefore, please try to answer these questions as openly and honestly as possible.

A1a) [SECTION A: DEMOGRAPHICS & CLASSIFICATION QUESTIONS]

A2) Please enter your 5 digit home zip code.

[_____]
[EDIT: 00001-99998]

[LOAD ALL GEO INFORMATION TO DATA]

[CHECK TOTAL STATE QUOTA, IF FULL, TERMINATE & SKIP TO QTERM]

A3) What is your gender?

Male 1
Female..... 2

A3a)[2] What is your age?

[DROP DOWN MENU; PUNCH MATCHES AGE]

[13.....13
14.....14
15.....15
16.....16
17.....17
18.....18
19.....19
20.....20
…etc. *…etc.*
97.....97
98.....98
99.....99
100.....100
101 or older..... 101
Prefer not to say .....999]

[IF Q.A3a = 13-17, 999 (REF), TERMINATE & SKIP TO QTERM]

[2] 2012: Changed from age ranges in 2009 to continuous years in 2012. Tracking comparisons can be made by coding individual years into the age ranges used in 2009.

A3b) [BUILDER: CREATE GENDER/AGE NET FROM Q's A3 & A3a:

Male 18-24 1
Male 25-34 2
Male 35-44 3
Male 45-54 4
Male 55-64 5
Male 65+ 6
Female 18-24 7
Female 25-34 8
Female 35-44 9
Female 45-54 10
Female 55-64 11
Female 65+ 12

CHECK GENDER/AGE QUOTA BY STATE, IF FULL, TERMINATE & SKIP TO QTERM]

A4)[3] Which of the following best describes your race or ethnicity?

Select all that apply.

[M]
White or Caucasian 1
Black or African-American 2
Hispanic or Latino/a 3
Asian 4
Native Hawaiian or other Pacific Islander 7
American Indian or Alaska Native 5
Other 6
Prefer not to say 99
[IF Q.A4 = 99 (REF), TERMINATE & SKIP TO QTERM][CODE 99 EXCLUSIVE]

[3] 2015: Changed "Asian/Pacific Islander" into two separate categories. Tracking comparisons can be made by coding into 2012 categories. Minor wording changes (from "Native American" in 2012 to "American Indian" in 2015).

A4a)[4] [BUILDER: PUNCH ETHNICITY

IF SINGLE RESPONSE:
IF Q.A4 = 1, PUNCH 1
IF Q.A4 = 2, PUNCH 2
IF Q.A4 = 3, PUNCH 3
IF Q.A4 = 4, PUNCH 4
IF Q.A4 = 7, PUNCH 4
IF Q.A4 = 5 or 6, PUNCH 5
IF MULTIPLE RESPONSES:
IF Q.A4 = 3, PUNCH 3
IF Q.A4 = 4 AND 7 ONLY, PUNCH 4
IF Q.A4 NE 3 OR (NE 4 AND 7 ONLY), PUNCH 5

White non-Hispanic 1
Black non-Hispanic 2
Hispanic (any race) 3
Asian non-Hispanic 4
Other non-Hispanic (American Indian, Other, 2+ ethnicities) 5

CHECK ETHNICITY QUOTA BY STATE, IF FULL, TERMINATE & SKIP TO QTERM]

A5)[5,6] What was the highest level of education that you completed?

Did not complete high school 1
High school graduate – regular high school diploma 2
High school graduate – GED or alternative credential 3
Some college, no degree 4
Associate's degree 5
Bachelor's degree 6
Post graduate degree 7
Prefer not to say 99

[IF Q.A5 = 99 (REF), TERMINATE & SKIP TO QTERM]
[CHECK EDUCATION QUOTA BY STATE, IF FULL, TERMINATE & SKIP TO QTERM]

[4] 2015: Programming logic updated to correspond to changes to A4 (ethnicity).
[5] 2012: Changed "high school graduate" into two separate categories (regular diploma and GED). Tracking comparisons between 2012 and 2009 can be made by coding into 2009 categories.
[6] 2015: Changed "some college" and "college graduate" into three separate categories ("some college, no degree," "associate's degree," and "bachelor's degree"). Minor wording changes (from "last year of education" and "post graduate education" in 2012 to "highest level of education" and "post graduate degree" in 2015).

A6) What is your marital status?

Married..... 1
Single 2
Separated..... 3
Divorced..... 4
Widowed/widower..... 5
Prefer not to say 99

[IF Q.A6 = 99 (REF), TERMINATE & SKIP TO QTERM]

A7) Which of the following describes your current living arrangements?

I am the only adult in the household 1
I live with my spouse/partner/significant other..... 2
I live in my parents' home..... 3
I live with other family, friends, or roommates..... 4
Prefer not to say 99

[IF Q.A7 = 99 (REF), TERMINATE & SKIP TO QTERM]

A7a) [BUILDER: PUNCH MARITAL STATUS VARIABLE:

If Q.A6 = 1, PUNCH MARRIED
If Q.A6 = 2 – 5 AND Q.A7 = 2, PUNCH LIVING WITH PARTNER
If Q.A6 = 2 – 5 AND Q.A7 = 1, 3, or 4, PUNCH SINGLE

Married..... 1
Living with partner..... 2
Single 3

If Q.A7a = 1, CVAR "spouse"
If Q.A7a = 2, CVAR "partner"
IF Q.A7a = 1 OR 2, CVAR "Does your household"
IF Q.A7a = 3, CVAR "Do you"]

A11)[7] How many children do you have who are financially dependent on you [IF Q.A7a = 1 OR 2 INSERT: or your [spouse/partner]]? Please include children not living at home, and step-children as well.

1.....1
2.....2
3.....3
4 or more..... 4
No financially dependent children 5
Do not have any children 6
Prefer not to say 99

[IF Q.A11 = 99, TERMINATE & SKIP TO QTERM]

[7] 2012: Changed question order (appears earlier in the survey than in 2009).

A8) What is your [IF Q.A7a = 1 OR 2) INSERT: household's] approximate annual income, including wages, tips, investment income, public assistance, income from retirement plans, etc.? Would you say it is…

Less than $15,000 1
At least $15,000 but less than $25,000 2
At least $25,000 but less than $35,000 3
At least $35,000 but less than $50,000 4
At least $50,000 but less than $75,000 5
At least $75,000 but less than $100,000 6
At least $100,000 but less than $150,000 7
$150,000 or more 8
Don't know 98
Prefer not to say 99

[IF Q.A8 = 98 (DK) OR 99 (REF), TERMINATE & SKIP TO QTERM]
[CHECK INCOME QUOTA BY STATE, IF FULL, TERMINATE & SKIP TO QTERM]

AM21)[8] Have you ever been a member of the U.S. Armed Services, either in the active or reserve component?

Currently a member of the U.S. Armed Services 1
Previously a member of the U.S. Armed Services 2
Never a member of the U.S. Armed Services 3
Prefer not to say 99

[IF Q.AM21 = 2 (PREVIOUSLY), ASK; OTHERWISE SKIP TO Q.AM22]

AM30)[9] When did you complete your service in the military?

Within the past year 1
1 to 3 years ago 2
4 to 10 years ago 3
More than 10 years ago 4
Prefer not to say 99

AM31)[10] Did you retire from the military?

Yes 1
No 2
Don't know 98
Prefer not to say 99

[8] 2012: Military question added to State-by-State survey. See note that follows question X3.
[9] 2015: New question.
[10] 2015: New question.

AM32)[11] What was your most recent military service branch and component?

[DISPLAY WITH BREAKS ON THE LIST]

Army 1
Army National Guard (full-time, activated, or non-activated)..... 2
Army Reserve (full-time, activated, or non-activated) 3

Navy..... 4
Navy Reserve (full-time, activated, or non-activated) 5

Air Force 6
Air National Guard (full-time, activated, or non-activated)..... 7
Air Force Reserve (full-time, activated, or non-activated) 8

Marine Corps 9
Marine Corps Reserve (full-time, activated, or non-activated)..... 10

Coast Guard 11
Coast Guard Reserve (full-time, activated, or non-activated)..... 12

Don't know 98
Prefer not to say 99

[IF Q.A6 = 1 (MARRIED), ASK; OTHERWISE SKIP TO Q.X3]

AM22)[12] Has your spouse ever been a member of the U.S. Armed Services, either in the active or reserve component?

Currently a member of the U.S. Armed Services..... 1
Previously a member of the U.S. Armed Services 2
Never a member of the U.S. Armed Services 3
Prefer not to say 99

X3) [BUILDER: PUNCH QUESTIONNAIRE VERSION:

If Q.AM21 = 1 OR Q.AM22 = 1, PUNCH 2 (MILITARY)
ALL OTHERS, PUNCH 1 (CORE)

Core questions..... 1
Military ..... 2]

Note on Military Questions:

- Depending on their military status, respondents were also shown military-specific wording for several questions, as indicated in the programming instructions in this document.

[11] 2015: New question.
[12] 2012: Military question added to State-by-State survey.

[IF Q.X3 = 2 (MILITARY), ASK; OTHERWISE SKIP TO Q.A9]

X4) [BUILDER: PUNCH MILITARY STATUS VARIABLE:

If Q.AM21 = 1 (CURRENT MEMBER), PUNCH RESPONDENT IN SERVICE
If Q.AM21 = 2, 3, 99 (PREV, NEVER, REF) AND Q.AM22 = 1 (SPOUSE CURRENT MEMBER), PUNCH SPOUSE IN SERVICE

Respondent in service 1
Spouse in service..... 2]

A9) Which of the following best describes your current employment or work status?

Self-employed..... 1
Work full-time for an employer [IF Q.AM21 = 1 INSERT: or the military]..... 2
Work part-time for an employer [IF Q.AM21 = 1 INSERT: or the military]..... 3
Homemaker..... 4
Full-time student 5
Permanently sick, disabled, or unable to work..... 6
Unemployed or temporarily laid off 7
Retired..... 8
Prefer not to say 99

[IF Q.A9 = 99, TERMINATE & SKIP TO QTERM]

A40)[13] [IF Q.A9 = 1-3 (EMPLOYED), INSERT: In addition to your main employment, did you also do other work for pay in the <u>past 12 months</u>?]

[IF Q.A9 = 4-8 (NOT EMPLOYED), INSERT: Did you do any work for pay in the <u>past 12 months</u>?]

Yes..... 1
No..... 2
Don't know 98
Prefer not to say 99

[IF Q.A7a = 1 OR 2, ASK; OTHERWISE SKIP TO Q.A10a]

A10) Which of the following best describes your [spouse/partner]'s current employment or work status?

Self-employed..... 1
Work full-time for an employer [IF Q.AM22 = 1 INSERT: or the military]..... 2
Work part-time for an employer [IF Q.AM22 = 1 INSERT: or the military]..... 3
Homemaker..... 4
Full-time student 5
Permanently sick, disabled, or unable to work..... 6
Unemployed or temporarily laid off 7
Retired..... 8
Prefer not to say 99

[IF Q.A10 = 99, TERMINATE & SKIP TO QTERM]

A10a) [BUILDER: HOUSEHOLD RETIREMENT STATUS:

IF Q.A9 = 1 – 3, PUNCH NON-RETIRED HOUSEHOLD
IF ((Q.A7a = 3 AND Q.A9 = 4 – 7) OR (Q.A7a = 1, 2 AND Q.A9 = 4 – 7 AND Q.A10 = 1 – 7)), PUNCH NON-RETIRED HOUSEHOLD
IF Q.A9 = 8, PUNCH RETIRED-HOUSEHOLD – RESPONDENT RETIRED
IF Q.A7a = 1, 2 AND Q.A9 = 4 – 7 AND Q.A10 = 8, PUNCH RETIRED HOUSEHOLD – RESPONDENT NOT WORKING AND SPOUSE RETIRED

Non-retired household..... 1
Retired household--Respondent retired..... 2
Retired household--Respondent not working and spouse retired.....3]

[IF Q.X3 = 2 (MILITARY), ASK; OTHERWISE SKIP TO Q.A21]

AM7) What is your [IF Q.X4 = 2 INSERT: spouse's] military service branch and component?

[DISPLAY WITH BREAKS ON THE LIST]

Army 1
Army National Guard (full-time, activated, or non-activated)..... 2
Army Reserve (full-time, activated, or non-activated) 3

Navy..... 4
Navy Reserve (full-time, activated, or non-activated) 5

Air Force 6
Air National Guard (full-time, activated, or non-activated)..... 7
Air Force Reserve (full-time, activated, or non-activated) 8

Marine Corps 9
Marine Corps Reserve (full-time, activated, or non-activated)..... 10

Coast Guard 11
Coast Guard Reserve (full-time, activated, or non-activated)..... 12

Don't know 98
Prefer not to say 99

[13] 2018: New question.

[IF Q.A5 = 2, 3, 4, 5 (HS GRAD, SOME COLLEGE, ASSOCIATE'S DEGREE) AND Q.A9 NE 5 (NOT FT STUDENT), ASK; OTHERWISE SKIP TO Q.A22]

A21)[14,15] Are you a part-time student taking courses for credit?

Yes....1
No....2
Don't know....98
Prefer not to say....99

[IF Q.A5 = 2, 3, 4, 5 (HS GRAD, SOME COLLEGE, ASSOCIATE'S DEGREE) AND ((Q.A9 = 5 OR Q.A21 = 1) (FT OR PT STUDENT)), ASK; OTHERWISE SKIP TO Q.A14]

A22)[16,17] Which of the following best describes the school you are attending?

Four-year college or university....1
Two-year community college....2
Vocational, technical, or trade school....3
Other....4
Don't know....98
Prefer not to say....99

[IF Q.A7a = 1, 2, ASK; OTHERWISE SKIP TO Q.A41]

A14) Who in the household is most knowledgeable about saving, investing and debt?

You....1
Someone else....2
You and someone else are equally knowledgeable....3
Don't know....98
Prefer not to say....99

A41)[18] What was the highest level of education completed by the person or any of the people who raised you?

Did not complete high school....1
High school graduate/GED....2
Some college, no degree....3
Associate's degree....4
Bachelor's degree....5
Post graduate degree....6
Don't know....98
Prefer not to say....99

A16) [END OF SCREENER]

[14] 2012: New question.
[15] 2015: Question base updated to correspond to changes to A5 (education).
[16] 2012: New question.
[17] 2015: Question base updated to correspond to changes to A5 (education).
[18] 2018: New question

J) [SECTION J: FINANCIAL ATTITUDES & BEHAVIORS]

Ja) These days, a lot of people are thinking about financial issues. We are interested in your opinions on
some of these issues.

J1) Overall, thinking of your assets, debts and savings, how satisfied are you with your current personal financial condition?

Please use a 10-point scale, where 1 means "Not At All Satisfied" and 10 means "Extremely Satisfied."

Not At All Satisfied 1	2	3	4	5	6	7	8	9	Extremely Satisfied 10	Don't know	Prefer not to say
1	2	3	4	5	6	7	8	9	10	98	99

J2) When thinking of your financial investments, how willing are you to take risks?

Please use a 10-point scale, where 1 means "Not At All Willing" and 10 means "Very Willing."

Not At All Willing 1	2	3	4	5	6	7	8	9	Very Willing 10	Don't know	Prefer not to say
1	2	3	4	5	6	7	8	9	10	98	99

J3) Over the <u>past year</u>, would you say your [IF Q.A7a = 1 OR 2 INSERT: household's] spending was less than, more than, or about equal to your [IF Q.A7a = 1 OR 2 INSERT: household's] income? Please do not include the purchase of a new house or car, or other big investments you may have made.

Spending **less** than income 1
Spending **more** than income 2
Spending about **equal** to income 3
Don't know 98
Prefer not to say 99

J4) In a <u>typical month</u>, how difficult is it for you to cover your expenses and pay all your bills?

Very difficult 1
Somewhat difficult 2
Not at all difficult 3
Don't know 98
Prefer not to say 99

J40)[19] In the past 12 months, which one of the following best describes your [IF Q.A7a = 1 OR 2 INSERT: and your [spouse/partner]'s] income?

Roughly the same amount each month 1
Occasionally varies from month to month 2
Varies quite often from month to month 3
Don't know 98
Prefer not to say 99

J5) 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?

Yes 1
No 2
Don't know 98
Prefer not to say 99

[IF Q.A11 = 1, 2, 3, 4 (FINANCIALLY DEPENDENT CHILD), ASK; OTHERWISE SKIP TO Q.J8]

J6) Are you setting aside any money for your children's college education?

Yes 1
No 2
Don't know 98
Prefer not to say 99

[IF Q.A10a = 1 (NOT RETIRED), ASK; OTHERWISE SKIP TO Q.J9]

J8) Have you ever tried to figure out how much you need to save for retirement?

Yes 1
No 2
Don't know 98
Prefer not to say 99

[IF Q.A10a = 2, 3 (RETIRED), ASK; OTHERWISE SKIP TO Q.J10]

J9) [IF Q.A10a = 2 INSERT: Before you retired, did you try to figure out how much you needed to save for retirement?]

[IF Q.A10a = 3 INSERT: Before your [spouse/partner] retired, did you try to figure out how much you needed to save for retirement?]

Yes 1
No 2
Don't know 98
Prefer not to say 99

[19] 2018: New question.

J10) In the past 12 months, [IF Q.A7a = 3 INSERT: have you/ IF Q.A7a = 1 OR 2 INSERT: has your household] experienced a large drop in income which you did not expect?

Yes 1
No 2
Don't know 98
Prefer not to say 99

J20)[20] How confident are you that you could come up with $2,000 if an unexpected need arose within the next month?

I am certain I could come up with the full $2,000 1
I could probably come up with $2,000 2
I could probably not come up with $2,000 3
I am certain I could not come up with $2,000 4
Don't know 98
Prefer not to say 99

J32)[21] How would you rate your current credit record?

Very bad 1
Bad 2
About average 3
Good 4
Very good 5
Don't know 98
Prefer not to say 99

[20] 2012: New question.
[21] 2015: New question.

J33)[22] How strongly do you agree or disagree with the following statements?

Please give your answer on a scale of 1 to 7, where 1 = "Strongly Disagree," 7 = "Strongly Agree," and 4 = "Neither Agree Nor Disagree". You can use any number from 1 to 7. (Select an answer for each)

[RANDOMIZE]

		Strongly Disagree 1	2	3	Neither Agree nor Disagree 4	5	6	Strongly Agree 7	Don't Know	Prefer not to Say
J33_1)	I worry about running out of money in retirement	1	2	3	4	5	6	7	98	99
J33_40)[23]	Thinking about my personal finances can make me feel anxious	1	2	3	4	5	6	7	98	99
J33_41)[24]	Discussing my finances can make my heart race or make me feel stressed	1	2	3	4	5	6	7	98	99

J41)[25] How well do these statements describe you or your situation?

[RANDOMIZE]

		Does not describe me at all	Describes me very little	Describes me somewhat	Describes me very well	Describes me completely	Don't know	Prefer not to say
J41_1)	Because of my money situation, I feel like I will never have the things I want in life	1	2	3	4	5	98	99
J41_2)	I am just getting by financially	1	2	3	4	5	98	99
J41_3)	I am concerned that the money I have or will save won't last	1	2	3	4	5	98	99

J42)[26] How often do these statements apply to you?

[RANDOMIZE]

		Never	Rarely	Sometimes	Often	Always	Don't know	Prefer not to say
J42_1)	I have money left over at the end of the month	1	2	3	4	5	98	99
J42_2)	My finances control my life	1	2	3	4	5	98	99

[22] 2015: New question.
[23] 2018: New question.
[24] 2018: New question.
[25] 2018: New questions.
[26] 2018: New questions.

J43)[27] If you were to set a financial goal for yourself today, how confident are you in your ability to achieve it?

Not at all confident 1
Not very confident 2
Somewhat confident 3
Very confident 4
Don't know 98
Prefer not to say 99

J14) [END OF SECTION J]

[27] 2018: New question.

B) [SECTION B: BANKING]

[DISPLAY Q'S B1 AND B2 ON SAME SCREEN]

B1) [IF Q.A7a = 3 INSERT: Do you/ IF Q.A7a = 1 OR 2 INSERT: Does your household] have a checking account?

Yes.....1
No.....2
Don't know 98
Prefer not to say 99

B2) [IF Q.A7a = 3 INSERT: Do you/ IF Q.A7a = 1 OR 2 INSERT: Does your household] have a savings account, money market account, or CDs?

Yes.....1
No.....2
Don't know 98
Prefer not to say 99

[IF Q.B1 = 1 (YES), ASK; OTHERWISE SKIP TO Q.B40]

B4) Do you [IF Q.A7a = 1 OR 2 INSERT: or your [spouse/partner]] overdraw your checking account occasionally?

Yes.....1
No.....2
Don't know 98
Prefer not to say 99

B40)[28] How strongly do you agree or disagree with the following statement?

Please give your answer on a scale of 1 to 7, where 1 = "Strongly Disagree," 7 = "Strongly Agree," and 4 = "Neither Agree Nor Disagree". You can use any number from 1 to 7.

	Strongly Disagree 1	2	3	Neither Agree nor Disagree 4	5	6	Strongly Agree 7	Don't know	Prefer not to say
I would feel comfortable going to a bank or credit union branch to ask a question about a product or service	1	2	3	4	5	6	7	98	99

[28] 2018: New question.

[IF Q.B1 OR Q.B2 = 1 (YES), ASK; OTHERWISE SKIP TO Q.B31]

B41)[29] How often do you access your checking or savings account in the following ways?

		Never	Sometimes	Frequently	Don't know	Prefer not to say
B41_1)	Online banking with a laptop or desktop computer	1	2	3	98	99
B41_2)	Mobile banking with text messaging, mobile app, or Internet browser or email on a mobile phone	1	2	3	98	99

B14) [MOVED TO END OF SECTION C]

B31)[30] How often do you use your mobile phone to pay for a product or service <u>in person</u> at a store, gas station, or restaurant (e.g., by waving/tapping your mobile phone over a sensor at checkout, scanning a barcode or QR code using your mobile phone, or using some other mobile app at checkout)?

Frequently 1
Sometimes 2
Never 3
Don't know 98
Prefer not to say 99

B42)[31] How often do you use your mobile phone to transfer money to another person?

Frequently 1
Sometimes 2
Never 3
Don't know 98
Prefer not to say 99

B43)[32] How often do you use websites or apps to help with financial tasks such as budgeting, saving, or credit management (e.g., GoodBudget, Mint, Credit Karma, etc.)? Please do not include websites or apps for making payments or money transfers.

Frequently 1
Sometimes 2
Never 3
Don't know 98
Prefer not to say 99

[29] 2018: New questions.
[30] 2015: New question. Replaces B22_8 from 2012.
[31] 2018: New question.
[32] 2018: New question.

B44)[33] In the past 12 months, how often have you taken on a work assignment through a website or mobile app, such as Uber, Task Rabbit, Care.com, etc.?

Frequently 1
Sometimes 2
Never 3
Don't know 98
Prefer not to say 99

B16) [END OF SECTION B]

[33] 2018: New question.

C) [SECTION C: RETIREMENT ACCOUNTS]

Ca) The following are questions about retirement accounts and pensions. Please answer to the best of your knowledge. If you really do not know the answer, please select "don't know."

C1)[34] Do you [IF Q.A7a = 1 OR 2 INSERT: or your [spouse/partner]] have any retirement plans through a current or previous employer, like a pension plan [IF Q.X3 = 2 INSERT: , a Thrift Savings Plan (TSP),] or a 401(k)?

Yes 1
No 2
Don't know 98
Prefer not to say 99

[IF Q.C1 = 1 (YES) AND Q.A7a = 1 OR 2, ASK; OTHERWISE SKIP TO Q.C3]

C2) Were these plans provided by your employer or your [spouse/partner]'s employer, or both?

Your employer 1
Your [spouse's/partner's] employer 2
Both your employer and your [spouse's/partner's] employer 3
Don't know 98
Prefer not to say 99

[IF Q.C1 = 1 (YES), ASK; OTHERWISE SKIP TO Q.C4]

C3) Are any of these retirement plans the kind where you [IF Q.A7a = 1 OR 2 INSERT: or your [spouse/partner]] get to choose how the money is invested?

Yes 1
No 2
Don't know 98
Prefer not to say 99

C4)[35,36] Do you [IF Q.A7a = 1 OR 2 INSERT: or your [spouse/partner]] 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?

Yes 1
No 2
Don't know 98
Prefer not to say 99

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[34] 2012: The base for all questions in this section (C1 through C11) changed from *non-retired households* in 2009 to *all respondents* in 2012. Tracking comparisons to 2009 can be made by looking at the responses of only non-retired households (A10a = 1) in 2012 and 2015.
[35] 2015: Minor wording changes (added "myRA" to list of examples).
[36] 2018: Minor wording changes (removed "myRA" from list of examples).

[IF Q.C3 = 1 OR Q.C4 = 1 (YES), ASK; OTHERWISE, SKIP TO Q.B14]

C5) Do you [IF Q.A7a = 1 OR 2 INSERT: or your [spouse/partner]] regularly contribute to a retirement account like a [IF Q.X3 = 2 INSERT: Thrift Savings Plan (TSP),] 401(k) or IRA?

Yes 1
No 2
Don't know 98
Prefer not to say 99

[DISPLAY Q'S C10 & C11 ON SAME SCREEN]

C10) In the last 12 months, have you [IF Q.A7a = 1 OR 2 INSERT: or your [spouse/partner]] taken a loan from your retirement account(s)?

Yes 1
No 2
Don't know 98
Prefer not to say 99

C11) In the last 12 months, have you [IF Q.A7a = 1 OR 2 INSERT: or your [spouse/partner]] taken a hardship withdrawal from your retirement account(s)?

Yes 1
No 2
Don't know 98
Prefer not to say 99

[IF Q.B1 OR B2 = 1, 98, 99 (YES, DK, REF), ASK; OTHERWISE SKIP TO Q.C40]

B14)[37] Not including retirement accounts, [IF Q.A7a = 1 OR 2 INSERT does your household/IF Q.7a = 3 INSERT: do you] have any investments in stocks, bonds, mutual funds, or other securities?

Yes 1
No 2
Don't know 98
Prefer not to say 99

C40)[38] Over the past 12 months, approximately how often did you buy a lottery ticket?

Almost every day 1
A few times a week 2
About once a week 3
About once a month 4
Less than once a month 5
Never 6
Don't know 98
Prefer not to say 99

[37] 2015: Changed question order (appears later in the survey than in 2012).
[38] 2018: New question.

C41)[39] Do you currently have a will?

Yes..... 1
No..... 2
Don't know 98
Prefer not to say 99

C16) [END OF SECTION C]

[39] 2018: New question.

D) [SECTION D: GOVERNMENT BENEFITS]

D40)[40] Do you receive either Medicaid benefits or food stamps/SNAP?

Yes.....1
No.....2
Don't know 98
Prefer not to say 99

D17) [END OF SECTION D]

[40] 2018: New question.

E) [SECTION E: HOME & MORTGAGES]

Ea_1)[41] Do you [IF Q.A7a = 1 OR 2 INSERT: or your [spouse/partner]] currently own your home?

Yes..... 1
No..... 2
Don't know 98
Prefer not to say 99

[IF Q.Ea_1 = 1 (YES OWN HOME), ASK; OTHERWISE SKIP TO Q.E17]

E3a) Following are some questions about your home. If you own more than one home, please refer to your primary residence.

[DISPLAY Q'S E7 & E8 ON SAME SCREEN]

E7)[42] Do you currently have any mortgages on your home?

Yes..... 1
No..... 2
Don't know 98
Prefer not to say 99

E8)[43] Do you have any home equity loans?

Yes..... 1
No..... 2
Don't know 98
Prefer not to say 99

[IF Q.E7 = 1 OR Q.E8 = 1 (YES), ASK; OTHERWISE SKIP TO Q.E15]

E20)[44] Do you currently owe more on your home than you think you could sell it for today?

Yes, owe more..... 1
No..... 2
Don't know 98
Prefer not to say 99

[41] 2015: Changed format of question from a grid ("Do you currently own any of the following? – Your home") in 2012 to a single question in 2015. Minor wording changes to accommodate new question format.
[42] 2012: Minor wording changes (from "a mortgage" in 2009 to "any mortgages" in 2012).
[43] 2012: Minor wording changes (from "a home equity loan" in 2009 to "any home equity loans" in 2012).
[44] 2012: New question.

[IF Q.E7 = 1 (YES), ASK; OTHERWISE SKIP TO Q.E17]

E15)[45] How many times have you been late with your mortgage payments in the past 12 months? (If you have more than one mortgage on your home(s), please consider them all.)

Never	1
Once	2
More than once	3
Don't know	98
Prefer not to say	99

E17) [END OF SECTION E]

[45] 2015: Changed time frame of question (from *2 years* in 2012 to *12 months* in 2015). Tracking comparisons are not possible.

F) [SECTION F: CREDIT CARDS]

F1) How many credit cards do you have? Please include store and gas station credit cards but NOT debit cards.

1.....1
2-3.....2
4-8 3
9-12 4
13-20 5
More than 20 6
No credit cards 7
Don't know 98
Prefer not to say 99

[IF Q.F1 = 7 (None), 98 (DK), 99 (REF), SKIP TO F12]

F2) In the past 12 months, which of the following describes your experience with credit cards? (Select an answer for each)

[DO NOT RANDOMIZE]

		Yes	No	Don't Know	Prefer not to Say
F2_1)	I always paid my credit cards in full	1	2	98	99
F2_2)	In some months, I carried over a balance and was charged interest	1	2	98	99
F2_3)	In some months, I paid the minimum payment only	1	2	98	99
F2_4)	In some months, I was charged a late fee for late payment	1	2	98	99
F2_5)	In some months, I was charged an over the limit fee for exceeding my credit line	1	2	98	99
F2_6)	In some months, I used the cards for a cash advance	1	2	98	99

F10) Thinking about when you obtained your most recent credit card, did you collect information about different cards from more than one company in order to compare them?

Yes..... 1
No..... 2
Don't know 98
Prefer not to say 99

F12) [END OF SECTION F]

G) [SECTION G: OTHER DEBT]

G1) [IF Q.A7a = 3 INSERT: Do you/ IF Q.A7a = 1 OR 2 INSERT: Does your household] currently have an auto loan? (This does not refer to an auto lease).

Yes....1
No....2
Don't know....98
Prefer not to say....99

G20)[46] Do you currently have any unpaid bills from a health care or medical service provider (e.g., a hospital, a doctor's office, or a testing lab) that are past due?

Yes....1
No....2
Don't know....98
Prefer not to say....99

G30)[47] Do you currently have any student loans? If so, for whose education was this/were these loan(s) taken out?

Select all that apply.
[CODES 97, 98, 99 EXCLUSIVE]
[DISPLAY WITH BREAK ON THE LIST]

Yes, have student loan(s) for:

	[M]
Yourself	1
Your spouse/partner	2
Your child(ren)	3
Your grandchild(ren)	4
Other person	5

No, do not currently have any student loans....97
Don't know....98
Prefer not to say....99

[IF Q.G30 = 1-5 (HAVE STUDENT LOAN), ASK; OTHERWISE SKIP TO Q.G40]

G33)[48] Before you got your most recent student loan, did you try to figure out how much your monthly payments would be?

Yes....1
No....2
Don't know....98
Prefer not to say....99

[46] 2012: New question.

[47] 2015: New question. Replaces G21 from 2012.

[48] 2015: New question.

G35)[49] How many times have you been late with a student loan payment in the past 12 months? (If you have more than one student loan, please consider them all.)

Never, payments are not due on my loans at this time 1
Never, I have been repaying on time each month 2
Once 3
More than once 4
Don't know 98
Prefer not to say 99

G22)[50,51] Are you concerned that you might not be able to pay off your student loans?

Yes 1
No 2
Don't know 98
Prefer not to say 99

[[IF Q.A5 = 4, 5, 6, 7 (SOME COLLEGE OR MORE), ASK; OTHERWISE SKIP TO Q.G25]

G40)[52] Do you wish you had chosen to go to a less expensive college?

Yes 1
No 2
Don't know 98
Prefer not to say 99

[49] 2015: New question.
[50] 2012: New question.
[51] 2015: Question base changed to correspond to G30 (new student loan question).
[52] 2018: New question.

G25)[53] In the past 5 years, how many times have you… (Select an answer for each)

[RANDOMIZE]

		Never	1 time	2 times	3 times	4 or more times	Don't Know	Prefer not to Say
G25_1)[54]	Taken out an auto title loan? Auto title loans are loans where a car title is used to borrow money for a short period of time. They are NOT loans used to purchase an automobile.	1	2	3	4	5	98	99
G25_2)	Taken out a short term "payday" loan?	1	2	3	4	5	98	99
G25_3)[55, 56]	Gotten an advance on your tax refund? This is sometimes called a "refund anticipation check" or "Rapid Refund" (Not the same as e-filing)	1	2	3	4	5	98	99
G25_4)	Used a pawn shop?	1	2	3	4	5	98	99
G25_5)	Used a rent-to-own store?	1	2	3	4	5	98	99

G38)[57] Have you been contacted by a debt collection agency in the past 12 months?

Yes..... 1
No..... 2
Don't know 98
Prefer not to say 99

G23)[58] How strongly do you agree or disagree with the following statement?

Please give your answer on a scale of 1 to 7, where 1 = "Strongly Disagree," 7 = "Strongly Agree," and 4 = "Neither Agree Nor Disagree". You can use any number from 1 to 7.

	Strongly Disagree 1	2	3	Neither Agree nor Disagree 4	5	6	Strongly Agree 7	Don't Know	Prefer not to Say
I have too much debt right now	1	2	3	4	5	6	7	98	99

G10) [END OF SECTION G]

[53] 2012: New questions. The "Yes/No" scale in 2009 was replaced by a frequency scale ("How many times") in 2012, therefore tracking comparisons to 2009 are not possible. Minor wording changes to individual items (not documented here) to accommodate the new scale.
[54] 2012: Description of auto title loans added in 2012.
[55] 2012: Minor wording changes (from refund anticipation "loan" in 2009 to refund anticipation "check" in 2012).
[56] 2018: Question was removed in 2015 and reinstated in 2018.
[57] 2015: New question.
[58] 2012: New question.

H) [SECTION H: INSURANCE]

H1) Are you covered by health insurance?

Yes..... 1
No..... 2
Don't know 98
Prefer not to say 99

H30)[59] In the last 12 months, was there any time when you…

[RANDOMIZE]

		Yes	No	Don't Know	Prefer not to Say
H30_1)	Did NOT fill a prescription for medicine because of the cost	1	2	98	99
H30_2)	SKIPPED a medical test, treatment or follow-up recommended by a doctor because of the cost	1	2	98	99
H30_3)	Had a medical problem but DID NOT go to a doctor or clinic because of the cost	1	2	98	99

H8) [END OF SECTION H]

[59] 2015: New questions.

M) [SECTION M: SELF-ASSESSMENT & LITERACY]

M1) How strongly do you agree or disagree with the following statements?

Please give your answer on a scale of 1 to 7, where 1 = "Strongly Disagree," 7 = "Strongly Agree," and 4 = "Neither Agree Nor Disagree". You can use any number from 1 to 7. (Select an answer for each)

[RANDOMIZE]

		Strongly Disagree 1	2	3	Neither Agree nor Disagree 4	5	6	Strongly Agree 7	Don't Know	Prefer not to Say
M1_1)	I am good at dealing with day-to-day financial matters, such as checking accounts, credit and debit cards, and tracking expenses	1	2	3	4	5	6	7	98	99
M1_2)	I am pretty good at math	1	2	3	4	5	6	7	98	99

M4) 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?

Very Low 1	2	3	4	5	6	Very High 7	Don't know	Prefer not to say
1	2	3	4	5	6	7	98	99

M40)[60] Were you ever required to take financial education?

Yes..... 1
No..... 2
Don't know 98
Prefer not to say 99

M20)[61] Was financial education offered by a school or college you attended, or a workplace where you were employed?

Yes, but I <u>did not</u> participate in the financial education offered..... 1
Yes, and I <u>did</u> participate in the financial education..... 2
No..... 3
Don't know 98
Prefer not to say 99

[60] 2018: New question.
[61] 2012: New question.

[IF Q.M20 = 2 (PARTICIPATED), ASK, OTHERWISE SKIP TO Q.M5a]

M21)[62] When did you receive that financial education?

[DO NOT RANDOMIZE]

		Yes	No	Don't Know	Prefer not to Say
M21_1)	In high school	1	2	98	99
M21_2)[63]	[IF Q.A5 = 4, 5, 6, 7] In college	1	2	98	99
M21_3)	From an employer	1	2	98	99
M21_4)	[IF Q.AM21 = 1 or 2] From the military	1	2	98	99

M41)[64] In total, about how many hours of financial education did you receive?

1-2 hours 1
3-10 hours 2
More than 10 hours 3
Don't know 98
Prefer not to say 99

M42)[65] Overall, how would you rate the quality of the financial education you received?

Please give your answer on a scale of 1 to 7, where 1 means "very low" and 7 means "very high."

Very Low 1	2	3	4	5	6	Very High 7	Don't know	Prefer not to say
1	2	3	4	5	6	7	98	99

M5a) Following are some multiple choice questions. If you don't know the answer, just select "don't know."

M6) 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 1
Exactly $102 2
Less than $102 3
Don't know 98
Prefer not to say 99

[62] 2012: New questions.
[63] 2015: Question base updated to correspond to changes to A5 (education).
[64] 2018: New question.
[65] 2018: New question.

M7) 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 1
Exactly the same 2
Less than today 3
Don't know 98
Prefer not to say 99

M8) If interest rates rise, what will typically happen to bond prices?

They will rise 1
They will fall 2
They will stay the same 3
There is no relationship between bond prices and the interest rate 4
Don't know 98
Prefer not to say 99

M31)[66] Suppose you owe $1,000 on a loan and the interest rate you are charged is 20% per year compounded annually. If you didn't pay anything off, at this interest rate, how many years would it take for the amount you owe to double?

Less than 2 years 1
At least 2 years but less than 5 years 2
At least 5 years but less than 10 years 3
At least 10 years 4
Don't know 98
Prefer not to say 99

M9a)[67] There are a few questions left, and the survey will be complete.

Following are two statements. Please indicate whether each statement is true or false. If you don't know, just select "don't know."

[RANDOMIZE Q.M9 AND Q.M10]

M9) 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 1
False 2
Don't know 98
Prefer not to say 99

[66] 2015: New question.
[67] 2015: Minor wording changes (from "two questions" in 2012 to "a few questions" in 2015).

M10) Buying a single company's stock usually provides a safer return than a stock mutual fund.

True 1
False 2
Don't know 98
Prefer not to say 99

M11) [END OF SECTION M]

999) [POINT OF COMPLETE]

APPENDIX B: STATE-BY-STATE SURVEY METHODOLOGY

2018 NATIONAL FINANCIAL CAPABILITY STUDY

STATE-BY-STATE SURVEY METHODOLOGY

The 2018 National Financial Capability Study (NFCS) was funded by the FINRA Investor Education Foundation and conducted by ARC Research (formerly known as Applied Research & Consulting).

Survey Instrument

The survey instrument used in the 2018 NFCS was based on the 2015 questionnaire, which was updated and modified to include input from academics, policy-makers, and researchers who have used the NFCS data from previous years.

Sample

The sample consisted of 27,091 adults (18+) across the U.S., with approximately 500 respondents per state, plus the District of Columbia. To provide additional utility for researchers working with the data, the 2018 NFCS included oversamples in two states, for a total of 1,250 respondents each in OR and WA.

- Respondents were drawn using non-probability quota sampling from established online panels consisting of millions of individuals who have been recruited to join, and who are offered incentives in exchange for participating in online surveys. Specifically, the panels used for this survey were provided by SSI (Survey Sampling International), EMI Online Research Solutions, & Research Now. These panels use industry-standard techniques to verify the identities of their panel members and to ensure that their demographic characteristics are valid and up-to-date. For additional details on sample and response statistics, click here.

- Within each state, quotas were set to approximate Census distributions for age by gender, ethnicity, education level, and income based on data from the Census Bureau's American Community Survey.

- A pure probability sample of over 25,000 observations would have an estimated margin of error of half a percentage point (i.e., plus or minus 0.5 percent), and the margin of error would increase somewhat for sub-groupings of the sample. As in all survey

research, there are possible sources of error—such as coverage, nonresponse and measurement error—that could affect the results.

- Note: As with previous NFCS State-by-State surveys, we did not specifically target heads of households or primary financial decision-makers.

Fielding

The survey was self-administered by respondents on a website. Fielding was conducted from June – October 2018.

Weighting

Findings from the survey are weighted to be representative of Census distributions, based on data from the American Community Survey.

- National figures are weighted to be representative of the national population in terms of age, gender, ethnicity, education and Census Division (with adjustments for the oversampled states for comparability with previous years).

- Regional (Census Division) figures are weighted to be representative of each Census Division in terms of age, gender, ethnicity, education and state.

- State figures are weighted to be representative of each state in terms of age, gender, ethnicity and education.

Note that each weight is intended to produce a reliable representation of the population as a whole for that level of analysis (i.e., national, census division or state). However, breakdowns of sub-populations within these geographic levels will not necessarily be representative.

No additional weighting was used to account for non-response bias.

APPENDIX C: SURVEY SAMPLES AND RESPONSE STATISTICS

2018 NATIONAL FINANCIAL CAPABILITY STUDY

SURVEY SAMPLES AND RESPONSE STATISTICS

State-by-State Survey

Because it is difficult to obtain the large number of completed interviews required for the State-by-State Survey from a single online panel, sample was drawn from three different panels: SSI, EMI, and Research Now. Across the three sample providers, a total of 1,410,923 email invitations[1] were sent to potential respondents, out of which 100,611 individuals reached the survey (i.e., clicked on the link to begin taking the survey). Of those that began the survey, 59,207 were terminated due to quotas or because they did not qualify (by refusing to provide required demographic information in the survey). An additional 14,313 dropped out of the survey before finishing, yielding 27,091 completed surveys.

	SSI	EMI	Research Now	Total Count	% of Invitations	% of Survey Starts
Invitations sent	676,620	449,966	284,337	1,410,923	--	--
Survey starts	33,831	26,998	39,782	100,611	7.13%	--
Terminates	19,676	13,957	25,574	59,207	4.20%	58.85%
Incompletes	4,140	4,900	5,273	14,313	1.01%	14.23%
Qualified completes	10,015	8,141	8,935	27,091	1.92%	26.93%

[1] For the State-by-State Survey, all three sample providers used survey router techniques whereby a potential respondent was directed to one of a number of open surveys depending on sample needs and qualification criteria, thus the email invitations sent were not direct invitations to the NFCS survey. As the online research panel industry continues to evolve, survey routers have become a commonly used method to distribute sample more efficiently, and to manage panel participation and retention.

Investor Survey

The sample for the NFCS Investor Survey consisted of a subset of individuals who completed the State-by-State Survey and were recontacted for the Investor Survey. Across the three sample providers, a total of 3,750 email invitations were sent to potential respondents, out of which 2,763 individuals reached the survey (i.e., clicked on the link to begin taking the survey). Of those that began the survey, 598 were terminated due to quotas or because they did not qualify (by indicating that they did not have non-retirement investments or that they were not involved in investment decisions for their household). An additional 162 dropped out of the survey before finishing, yielding 2,003 completed surveys.

	SSI	**EMI**	**Research Now**	**Total Count**	**% of Invitations**	**% of Survey Starts**
Invitations sent	1,500	1,000	1,250	3,750	--	--
Survey starts	1,187	821	755	2,763	73.68%	--
Terminates	314	149	135	598	15.95%	21.64%
Incompletes	72	35	55	162	4.32%	5.86%
Qualified completes	801	637	565	2,003	53.41%	72.49%

APPENDIX D: FINRA DATA SET LETTER AGREEMENT

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FINRA Investor Education FOUNDATION

August 31, 2021

Joseph D. Mulla
The University of North Carolina at Charlotte
520 W. 5th Street, Apt. 908
Charlotte, NC 28202

Dear Joseph D. Mulla:

The purpose of this Letter Agreement is to set forth the terms and conditions of your access to and use of customized data from the National, Military, and State-by-State Survey of the FINRA Investor Education Foundation's National Financial Capability Study ("Data").

You acknowledge and agree that the Foundation is the owner of the Data and is hereby granting you a limited right to use the Data for the purpose of academic research and publication. Additionally, you agree that you will not use, disclose, market, release, show, sell, rent, lease, loan, or otherwise grant access to the Data, except as expressly permitted by this Letter Agreement or as otherwise required by law.

You further acknowledge and agree that no one having access to the Data will attempt to learn the identity of the any survey respondents. In the event that you discover or are able to deduce the identity of a specific survey respondent, you agree that you will not attempt to contact the respondent.

Finally, you acknowledge and agree that this Letter Agreement applies to all past, current and future sets of the Data.

If this Letter Agreement is satisfactory to you, please sign and return it to me at 1735 K Street NW, Washington, DC 20006.

Sincerely,

Geraldine Walsh, President
FINRA Investor Education Foundation

ACKNOWLEDGED AND AGREED BY:
Name: Joseph D. Mulla

Signature: Joseph Mulla

Title: Doctoral Student
Date: September 2, 2021
cc: Corporate Transactions Group, OGC

APPENDIX E: SUMMARY OF THE LITERATURE

Author(s)	Year	Title	Journal
G. Mottola	2018	2018 State-by-State Survey - Respondent Level Data	N/A
J. Serido and S. Shim	2017	Adult Financial Capability, Stability and Well-Being	Take Charge America Institute
H. Chen and R. Volpe	1998	An Analysis of Personal Financial Literacy Among College Students	Financial Services Review
G. Nicolini and M. Haupt	2019	The Assessment of Financial Literacy: New Evidence from Europe	International Journal of Financial Studies
A. Lusardi and O. Mitchell	2007	Baby Boomer Retirement Security: The Roles of Planning, Financial Literacy, and Housing Wealth	Journal of Monetary Economics
R. Thaler	2016	Behavioral Economics: Past, Present, and Future	The American Economic Review
Fidelity	2021	Building Financial Futures - Trends and Insights of those Saving for Retirement across America	Fidelity Investments Workplace Thought Leadership
J. Hogarth and C. Anguelov	2013	Can the Poor Save?	Association for Financial Counseling and Planning Education
N. Bhutta, K. Bricker, A. Chang, L. Dettling, S. Goodman, J. Hsu, K. Moore, S. Reber, A. Volz and R. Windle	2020	Changes in U.S. Family Finances from 2016 to 2019: Evidence from the Survey of Consumer Finances	Federal Reserve Bulletin
D. Kahneman and A. Tversky	1984	Choices, Values, and Frames	American Psychologist
S. Chakrabartty	2020	Combining Likert Items with Different Response Categories	Proceedings on Engineering Sciences

Author(s)	Year	Title	Journal
K. Jang, J. Hahn and H. Park	2014	Comparison of Financial Literacy between Korean and U.S. High School Students	International Review of Economics Education
M. Schuhen and S. Schurkmann	2014	Construct validity of financial literacy	International Review of Economics Education
Heart+Mind Strategies	2019	Consumer Views on Personal Cash Flow Planning - Consumer Point-of-View	Certified Financial Planner Board of Standards
A. Hung, A. Parker and J. Yoong	2009	Defining and Measuring Financial Literacy	RAND Corporation
M. Dimock	2019	Defining Generations: Where Millennials end and Generation Z Begins	Pew Research Center
N. Shrestha	2020	Detecting Multicollinearity in Regression Analysis	American Journal of Applied Mathematics and Statistics
J. Lown	2011	Development and Validation of a Financial Self-Efficacy Scale	Association for Financial Counseling and Planning Education
P. Gomber, J.-A. Koch and M. Siering	2017	Digital Finance and FinTech: current research and future research directions	Journal of Business Economics
G. Becker	2017	Does FinTech Affect Household Saving Behavior?	N/A
A. Lusardi and O. S. Mitchell	2014	The Economic Importance of Financial Literacy: Theory and Evidence	J Econ Lit.
K. Brevoort, S. Canilang, K. Jones, J. Larrimore, A. Lloro, E. Merry, A. Tranfaglia, E. Troland and M. Zabek	2021	Economic Well-Being of U.S. Households in 2020	Board of Governors of the Federal Reserve System

Author(s)	Year	Title	Journal
D. French, D. McKillop and E. Stewart	2020	The effectiveness of smartphone apps in improving financial capability	The European Journal of Finance: Financial Literacy and Responsible Finance in the FinTech Era: Capabilities and Challenges
C. Urban, M. Schmeiser, J. Collins and A. Brown	2020	The Effects of High School Personal Financial Education Policies on Financial Behavior	Economics of Education Review
A. Munnell	2016	Expanding Retirement Saving	Center for Retirement Research at Boston College
D. Rothwell and S. Wu	2019	Exploring the Relationship between Financial Education and Financial Knowledge and Efficacy: Evidence from the Canadian Financial Capability Survey	The Journal of Consumer Affairs
T. Bucher-Koenen, R. Alessie, A. Lusardi and M. Rooij	2021	Fearless Women: Financial Literacy and Stock Market Participation	Global Financial Literacy Excellence Center
A. Hasler, A. Lusardi and O. Valdes	2021	Financial Anxiety and Stress among U.S. Households: New Evidence from the National Financial Capability Study and Focus Groups	FINRA Investor Education Foundation
T. Kaiser and L. Menkhoff	2018	Financial Education in Schools: A Meta-Analysis of Experimental Studies	CESIFO Working Papers
M. Knoll and C. Houts	2012	The Financial Knowledge Scale: An Application of Item Response Theory to the Assessment of Financial Literacy	The Journal of Consumer Affairs
J. Fong, B. Koh, O. Mitchell and S. Rohwedder	2021	Financial Literacy and Financial Decision-Making at Older Ages	Pacific-Basin Finance Journal

Author(s)	Year	Title	Journal
A. Lusardi and O. Mitchell	2011	Financial Literacy and Planning: Implications for Retirement Wellbeing	National Bureau of Economic Research
A. Lusardi and O. Mitchell	2011	Financial Literacy and Retirement Planning in the United States	National Bureau of Economic Research
A. Lusardi and O. Mitchell	2007	Financial Literacy and Retirement Preparedness: Evidence and Implications for Financial Education	Bus Econ
A. Lusardi	2019	Financial literacy and the need for financial education: evidence and implications	Swiss Journal of Economics and Statistics
K. Skagerlund, T. Lind, C. Stromback, G. Tinghog and D. Vastfjall	2018	Financial literacy and the role of numeracy–How individuals' attitude and affinity with numbers influence financial literacy	Journal of Behavioral and Experimental Economics
P. J. Yakoboski, Lusardi, A., Hasler, A.	2019	Financial Literacy and Wellness among African-Americans	TIAA Institute
P. Yakoboski, A. Lusardi and A. Hasler	2020	Financial Literacy and Wellness Among U.S. Women	TIAA Institute
L. Klapper, A. Lusardi and P. v. Oudheusden	2015	Financial Literacy Around the World: Insights from the Standard & Poor's Ratings Services Global Financial Literacy Survey	Standard & Poor
Muizzuddin, Taufik, R. Ghasarma, L. Putri and M. Adam	2017	Financial Literacy; Strategies and Concept in Understanding the Financial Planning With Self-Efficacy Theory and Goal Setting Theory of Motivation Approach	International Journal of Economics and Financial Issues
M. Deevy, J. Streeter, A. Hasler and A. Lusardi	2021	Financial Resilience in America	Stanford Center on Longevity

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I. Gulamhuseinwala, T. Bull and S. Lewis	2015	FinTech is gaining traction and young, high-income users are the early adopters	The Journal of Financial Perspectives: FinTech
R. Thaler	2018	From Cashews to Nudges: The Evolution of Behavioral Economics	The American Economic Review
B. Nicoletti	2017	The Future of FinTech	N/A
K. Glenn	2010	The Future Status of the Social Security Program	Social Security Office of Retirement and Disability Policy
C. Buchmann, T. DiPrete and A. McDaniel	2008	Gender Inequalities in Education	Annual Review of Sociology
D. Doonan and K. Kenneally	2021	Generational Views of Retirement in the United States	National Institute on Retirement Security
G. Latham	2003	Goal Setting: A Five-Step Approach to Behavior Change	Organizational Dynamics
F. Lunenburg	2011	Goal-Setting Theory of Motivation	International Journal of Management, Business and Administration
C. Anderson	1986	Hierarchical Moderated Regression Analysis: A useful tool for retail management decisions	Journal of Retailing
D. Doonan	2021	High Retirement Anxiety For Millennials and Generation X	Forbes
I. Bishop	2006	Hill Scolds Lazy Gen. Y - 'They have To Do Their Part'	New York Post
D. Schneider, P. Tufano and A. Lusardi	2020	Household Financial Fragility during COVID-19: Rising Inequality and Unemployment Insurance Benefit Reductions	Global Financial Literacy Excellence Center
M. Hilgert and J. Hogarth	2003	Household Financial Management: The Connection between Knowledge and Behavior	Federal Reserve Bulletin

Author(s)	Year	Title	Journal
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W. Gale, H. Gelfond and J. Fichtner	2018	How Will Retirement Saving Change by 2050? Prospects for the Millennial Generation	SSRN: https://ssrn.com/abstract=3385522
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V. Frisancho	2019	The Impact of Financial Education for Youth	Inter-American Development Bank
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A. Lusardi	1999	Information, Expectations, and Savings for Retirement	Behavioral Dimensions of Retirement Economics
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A. Tversky and D. Kahneman	1974	Judgment under Uncertainty: Heuristics and Biases	Science (New York, N.Y.)
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T. R. Mitchel	1997	Matching motivational strategies with organizational contexts	Research in Organizational Behavior
S. Huston	2010	Measuring Financial Literacy	The Journal of Consumer Affairs

Author(s)	Year	Title	Journal
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A. Bolognesi, A. Hasler and A. Lusardi	2020	Millennials and Money: Financial preparedness and money management practices before COVID-19	TIAA Institute Research Dialogue
J. Brown	2018	Millennials and Retirement: Already Falling Short	National Institute on Retirement Security
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R. Yao and G. Cheng	2017	Millennials' Retirement Saving Behavior: Account Ownership and Balance	Family and Consumer Sciences Research Journal
P. J. Yakoboski, A. Lusardi and A. Hasler	2018	Milliennial Financial Literacy and Fin-tech Use: Who Knows What in the Digital Era	TIAA Institute
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D. Doric, E. Nikolic-Doric, V. Jevremovic and J. Malisic	2009	On measuring skewness and kurtosis	Quality and Quantity
F. D'Acunto, T. Rauter, C. Scheuch and M. Weber	2020	Perceived Precautionary Savings Motives: Evidence from Fintech	National Bureau of Economic Research
S. Nidar and S. Bestari	2012	Personal Financial Literacy Among University Students	World Journal of Social Sciences
B. D. Bernheim, D. Ray and Ş. Yeltekin	2015	POVERTY AND SELF-CONTROL	Econometrica
B. Madrian and D. Shea	2001	The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior	The Quarterly Journal of Economics
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S. Prince-Embury and D. Saklofske	2013	Resilience in Children, Adolescents, and Adults	N/A
R. Crawford, J. Cribb, C. Emmerson and P. Simpson	2020	Retirement expectations, attitudes and saving behaviour: how have these changed during a decade of pension reforms?	The Institute for Fiscal Studies
T. Bond, D. Doonan and K. Kenneally	2021	Retirement Insecurity 2021 - Americans' Views of Retirement	National Institute on Retirement Security
R. Wilkinson and K. Pickett	2009	Review of The Spirit Level: Why More Equal Societies Almost Always Do Better	N/A
M. Schippers, A. Scheepers and J. Peterson	2015	A Scalable Goal-Setting Intervention Closes both the Gender and Ethnic Minority Achievement Gap	Palgrave Communications
J. K. Shim and J. G. Siegel	1991	Schaum's Outline of Theory and Problems of Personal Finance	N/A
A. Bandura	1994	Self-efficacy	Encyclopedia of human behavior
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A. Bandura	1977	Self-Efficacy: Toward a Unifying Theory of Behavioral Change	Psychological Review
L. Farrell, T. Fry and L. Risse	2016	The significance of financial self-efficacy in explaining women's personal finance behaviour	Journal of Economic Psychology
C. M. Kuhnen and A. C. Miu	2017	Socioeconomic status and learning from financial information	Journal of Financial Economics

Author(s)	Year	Title	Journal
J. Lin, G. Mottola and A. Lusardi	2019	The State of U.S. Financial Capability: The 2018 National Financial Capability Study	FINRA Investor Education Foundation
L. Bottazzi and A. Lusardi	2020	Stereotypes in Financial Literacy: Evidence from PISA	NBER Working Paper Series
American Psychological Association	2020	Stress in America 2020: A National Mental Health Crisis	American Psychological Association
Greenwald	2020	TIAA Financial Resiliency Survey	TIAA Institute
W. Gale, H. Gelfond, J. Fichtner and B. Harris	2020	The Wealth of Generations, with Special Attention to the Millennials	National Bureau of Economic Research
G. Mottola, C. N. Kieffer	2017	Understanding and Using Data From the National Financial Capability Study	Family and Consumer Sciences Research Journal
Bernardi, Richard A.	1994	Validating Research Results When Cronbach's Alpha is Below .70: A Methodological Procedure	Educational and Psychological Measurement
D. Conger and M. Long	2010	What Are Men Falling Behind? Gender Gaps in College Performance and Persistence	The ANNALS of the American Academy of Political and Social Science
A. Chen, W. Hou and A. Munnell	2020	Why Do Late Boomers Have So Little Retirement Wealth?	Center for Retirement Research at Boston College
M. Rutledge, C. Gillis and A. Webb	2015	Will the Average Retirement Age Continue to Increase?	Center for Retirement Research at Boston College
V. Vroom	1964	Work and Motivation	N/A
J. Topoleski and E. Myers	2020	Worker Participation in Employer-Sponsored Pensions: Data in Brief	Congressional Research Service

APPENDIX F: 5-POINT SCALE CODING

Antecedents

FE (Formal Education)

A5 1 = Did Not Complete High School
2 = HS (graduate regular or graduate GED)
3 = Some College, No Degree
4 = Associate's/Bachelor's Degree
5 = Post Graduate Degree

FLE (Financial Literacy Education)

M40 Drop
M20 If value = 2, aggregate with M21_1 through M21_4, if anything else, score = 1
M21_1
M21_2
M21_3
M21_4
M41 Drop
M42 1=1, 2/3=2, 4=3, 5/6=4, 7=5

Independent Variable

FL (Financial Literacy)	**# of items answered correctly**
Aggregating M6-M10 & M31	0,1 = 1
	2 = 2
	3 = 3
	4 = 4
	5,6 = 5

Moderators

CFTU (Consumer Financial Technology Use)

B41_1/B41_2 Combine as "Use Online or Mobile Banking to access Checking or Savings"
1 = Both Never
2 = One Never, One Sometimes
3 = Two Sometimes
4 = One Sometimes, One Frequently
5 = Two Frequently

B31/B42 Combine as "Paying for a Product or Service"
1 = Both Never
2 = One Never, One Sometimes
3 = Two Sometimes
4 = One Sometimes, One Frequently
5 = Two Frequently

B43/B44 Combine to "Accomplish a Financial Task"
1 = Both Never
2 = One Never, One Sometimes
3 = Two Sometimes
4 = One Sometimes, One Frequently
5 = Two Frequently

FKC (Financial Knowledge Confidence)

A14 "Who in the household is most knowledgeable about saving, investing and debt?" - DROP
1 = You
2 = Someone else
3 = You and someone else are equally knowledgeable
98 = Don't know
99 = Prefer not to say

B40 1=1, 2/3=2, 4=3, 5/6=4, 7=5
M1_1 1=1, 2/3=2, 4=3, 5/6=4, 7=5
M1_2 1=1, 2/3=2, 4=3, 5/6=4, 7=5
M4 1=1, 2/3=2, 4=3, 5/6=4, 7=5

FSE (Financial Self-Efficacy) – some are reverse coded

J1 1/2=1, 3/4=2, 5/6=3, 7/8=4, 9/10=5
J20 4-point scale currently – Drop
J32 Already 5-point scale
J33_1 1=1, 2/3=2, 4=3, 5/6=4, 7=5
J33_40 1=1, 2/3=2, 4=3, 5/6=4, 7=5
J33_41 1=1, 2/3=2, 4=3, 5/6=4, 7=5
J41_1 Already 5-point scale
J41_2 Already 5-point scale
J41_3 Already 5-point scale
J42_1 Already 5-point scale
J42_2 Already 5-point scale
J43 4-point scale currently – Drop

Dependent Variable

MSB (Millennial Saving Behavior) Brief Description of what the question asks

C1 Binary (yes/no) Retirement accounts through employer
C3 Binary (yes/no) Are they (C1 accounts) where <u>you</u> choose investments
C4 Binary (yes/no) Retirement accounts not through employer
C5 Binary (yes/no) Do you regularly contribute to a retirement account
B14 Binary (yes/no) Do you have non-retirement account investments
B1 Binary (yes/no) Do you have checking account
B2 Binary (yes/no) Do you have savings/MMS/CDs
B4(R) Binary (yes/no) Do you overdraw your checking account occasionally

Aggregate these 4 items for a 1-5 scale where: 0 yes = 1, 1 yes = 2, 2 yes = 3, 3 yes = 4, 4 yes = 5

Aggregate these 4 items for a 1-5 scale where: 0 yes = 1, 1 yes = 2, 2 yes = 3, 3 yes = 4, 4 yes = 5

C1, C3, C4, and C5 are related to behavior with retirement accounts
B14, B1, B2, and B4 are related to behavior with non-retirement accounts