Imagine a Better Financial Future:

Harnessing the Power of the Human Mind

2013 iOme Challenge

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Executive Summary

Nearly 75% of the Baby Boomer Generation has less than one year's worth of income saved for retirement. Our own measure of retirement adequacy indicates that, if the current savings pattern continues, over 50% of Baby Boomer households will not have adequate retirement funds necessary to maintain their standard of living in retirement. Our analysis shows that even a dramatic increase in savings rates among this generation will only have a small effect on retirement adequacy. This extreme lack of personal preparation for retirement is not only affecting the standard of living for retired Baby Boomers, but it is also creating a large financial burden within the United States.

This lack of retirement savings appears to have three primary causes. The first is the overall transition from defined benefit to defined contribution plans. Baby Boomers are the first generation to bear primary responsibility for funding their own retirement. Previous generations relied almost exclusively on defined benefit plans, which require little or no effort on the part of the participant. The Baby Boomers have also spent a great deal of their money supporting their children. Nearly a third of all student loan debts in the United States are currently held by individuals over the age of 40, suggesting that it is the Baby Boomer generation that is paying for the educations of many of their children. Baby Boomers have also spent a great deal more on housing and used credit cards to a much larger extent than previous generations. Lastly, the Great Recession destroyed a sizeable portion of what little retirement savings the Baby Boomers had amassed to that point.

It is concerning that the Millennial Generation also does not appear to be on track for an adequate level of retirement preparation. Overall levels of financial literacy for Millennials are not substantially different from any previous generation, and savings rates for Millennials remain low. Unless effective action can be taken by both policymakers and interested parties in the private sector, there seems to be little hope that Millennials will be able to approach their retirement in any better condition than their Baby Boomer forebears.

Recent advances in the fields of neuroscience enable us to develop a new array of tools and techniques which may be effective at promoting higher savings rates. We utilize the dual-self theory of behavior to identify the three major barriers to retirement plan participation. We then propose simplified enrollment options, a mandatory automatic enrollment policy, and the creation of immediate reward programs that can be expected to increase both the rate and the level of participation in retirement plans for current workers.

No effort to increase savings rates for Millennials is likely to be effective without at least some improvement in the financial literacy levels of this generation. For this reason, we propose the "Imagine It" financial literacy program. This program is based upon the theory of imagination capital and our own Educate-Practice-Internalize model of financial literacy development. It is intended to motivate students to become more financially literate through the development of their imagination capital. The program accomplishes this by using a combination of age-progressed renderings, a competitive financial life cycle game called "My Financial Life", a highly accessible financial literacy curriculum, and a peer-based financial coaching program.

Part One: A Snapshot of the American Retirement Condition

Will the Boomer's retirement years be golden? In this section, we consider the current status of Boomer's preparation for their own retirement, and explore the implications for the retirement conditions of Boomers and the impact on the overall American economy.

The overall picture is not very encouraging. A recent analysis, conducted by the National Institute on Retirement Security, found that 40% of working Baby Boomers have no retirement savings whatsoever, and another third have less than one year's worth of income held for retirement (Rhee, 2013).   A typical approach to assessing retirement adequacy is to compare retirement account balances to annual income to get a clearer picture of retirement readiness. Fidelity Investments estimates that a 55-year old individual needs to have at least five times his/her annual salary in their retirement account in order to ensure a comfortable retirement (Rhee, 2013). The income multiple increases to 6 for people of age 60 and then to 7 for individuals that are near-retirement. Another independent estimate created by Aon estimates that the income multiple should be as high as 11 for a 65-year-old (Rhee, 2013). These estimates make it clear that the Baby Boomer generation is very ill-prepared for retirement. The only good news is that data from the 2010 Survey of Consumer Finance indicate that the majority of households age 55 to 64 are covered by an employer sponsored defined benefit pension plan. These pension plans are the only source of personal retirement income outside of social welfare that most Baby Boomer households can currently expect to have.

Causes of Retirement Inadequacy among Baby Boomers

Why are the Baby Boomers not saving adequately for their own retirement? An analysis on how Baby Boomers are spending their money can partially help us put the pieces together. Pamela Villareal (2013) used data from the Consumer Expenditure Survey to compare the expenditures of middle-aged workers (45-to-54-year-old) to those of older workers (54-64 years old), who both belong to the Baby Boomer cohort, with middle-age and older workers 20 years ago. She found that Baby Boomers have dramatically

increased education debt, credit card debt, and housing expenditures when compared to the previous generation.

According to an analysis of the New York Federal Reserve Bank, individuals over 40 carry about one-third of the nation's student loan debt (Villarreal, 2013). Even though it is not unheard of for individuals to pursue higher education after the age of 40, the sheer magnitude of student loan debt held by this age demographic suggests that the majority of these loans were probably used to pay for their children's college expenses. According to a survey conducted by the National Endowment for Financial Education, around 60% Baby Boomers are providing, or have provided, financial support for their adult-children - even when they are no longer pursuing higher education (Golden, 2011). Baby Boomer parents provide financial assistance to their children for their living expenses, insurance premiums, medical bills and even spending money. This spending pattern has made it difficult for Baby Boomers to save for their own retirement.

The situation gets even worse when we consider those in the so-called "Sandwich Generation." This is a term that is used to classify people who are simultaneously supporting a parent age 65 or older and a financially dependent child. In 2012, 33% of Baby Boomers were part of the "Sandwich Generation" (Parker & Patten, 2013). The financial challenge of simultaneously supporting two other generations makes it extremely difficult for this segment of the Baby Boomer generation to prepare for its own retirement.

Credit usage is also problematic for the Baby Boomer generation. Evidence suggests that 15 percent of all Baby Boomers household are unlikely to become debt-free during their lifetime (Thompson, 2013). The revolving credit debt balance of the Baby Boomers is about 45% more than the balance of people at the same age 20 years ago after adjusting for inflation (Villarreal, 2013). The expenditure that took the biggest toll on Baby Boomers' income is housing. In 2010, the total amount of housing expenditures was 25% higher than the 1990s amount for both middle-aged and old-aged household (Villarreal, 2013). Three

quarters of all Baby Boomer household debt came from mortgages. More than 50% of older boomers (55 to 64 year olds) are still carrying mortgage debt to this day, and it appears likely that they will carry that mortgage into retirement (Villarreal, 2013). This troubling trend was caused by higher average age of first time buyers, reduced down payment requirements, increases in home values, and ease of access to home equity. The presence of these debts in retirement will make it more difficult for boomers to maintain their standard of living in retirement.

The Great Recession has been no help to the Baby Boomers either. Two-thirds of Baby Boomer households experienced losses in investment or retirement accounts during the recession, more than any other age group (Morin & Taylor, 2009). The Insured Retirement Institute finds that about half of retirees had to leave the workforce prematurely and seek alternative sources of retirement income (Gladych, 2012). These late-life investment losses are even more damaging to those who are not able to postpone their retirement.

Implications for Government and Society

The inadequate savings of Baby Boomers has placed a large financial burden upon the government and social welfare system. Current estimates predict that the reserve of social security will be completely depleted in around 30 years. The rising numbers of unprepared retirees will also increase the burden on the Supplementary Security Income (SSI) system. The Federal Housing Agency (FHA) is already experiencing the consequences of the lack of retirement savings. The FHA allows retirees to fund their retirement through the use of reverse mortgages. The FHA holds the houses as collateral and can only seize the houses after both the homeowners pass away. This subjects FHA to a large amount of housing price volatility. The program is still suffering from $5 billion loss incurred in the 2008 housing market crash (Miga, 2013). These losses have caused the agency to recently request a $1.7 billion bailout from the Treasury. There are many other federal agencies, bureaus, non-profit organizations that are struggling with similar issues. Unless something is done to correct the situation, the constantly rising demand for social welfare payments will pose ever increasing strains of the federal budget.

Measuring the Retirement Adequacy of Baby Boomers

Using the 7 times salary and 11 times salary estimates created by Fidelty and Aon gives us a general idea that Baby Boomers have not saved adequately for their retirement, but it does not give us a measure of how many households exactly are at risk for a financially inadequate retirement. We here use the Survey of Consumer Finance (SCF) to fill this gap.

The SCF is a survey conducted by the Federal Board of Reserve every three years. This analysis is performed on the 6,482 families who were interviewed in the 2010 round of the survey. The survey provides the current financial status and demographic information of respondents. Based on this information, we calculate a post-retirement wage replacement ratio as a gauge of savings adequacy. Following the methodology of Munnell et al (2009), we define a household's post-retirement wage replacement ratio as

Project annual retirement income Annual income before retirement

This analysis assumes that the household will retire at its full retirement age, as specified by the Social Security Administration. We define retirement income as the sum of projected defined benefit pension income, Social Security retirement income, and income produced by full annuitizing all household wealth. For homeowners, the market rent value of their house is also included in their income, because holding a house avoids the need to pay an equivalent rent each year. Pre-retirement income includes household wages and salary income, other income from business or investments, and the imputed rent income.

The wage replacement ratio will tell us how much the household can spend after retirement relative to their pre-retirement spending. Households usually need less income in retirement to maintain their lifestyle from before retirement because they no longer have to save, can avoid work-related expenses, have no children at home, and have the mortgage paid off. This is because they don't have to save for retirement and don't have to incur work-related expenses any longer. Generally speaking, the post-

retirement equivalency replacement ratio ranges from 75% to 95%, depending on factors like income level and marital status (Aon, 2008).

By estimating each household's current replacement ratio and comparing it to its target replacement ratio provided by Aon (2008), we project whether each household in the SCF survey could maintain their pre-retirement standard of living in retirement. Consistent with prior studies, we define a household whose projected replacement ratio is 10 percentage points lower than the target ratio as a household at risk of being unable to maintain their life style (Munnell, Webb, & Golub-Sass, 2009; VanDerhei, 2011).

Current status of Baby Boomers: Our projection

Our estimation based on the SCF dataset suggests that 54% of Baby Boomers are at risk of having insufficient retirement income. That is to say, about half of the Baby Boomers are likely to need to significantly reduce their discretionary spending during retirement. This result is consistent with prior empirical findings (Munnell et al., 2009). This reduction in consumption is likely to cause significant dissatisfaction to families, many of whom have dreamed of a golden retirement for decades. Research has shown that retirees are at an increased risk of depression and low self-esteem because of a loss of their sense of purpose associated with their lack of employment (Consedine, Magai, & King, 2004). The stress of cutting their spending is almost certain to exacerbate this problem.

We also find that nearly 37% of households surveyed are projected to receive less than half of their pre-retirement income every year during their retirement. These households find themselves in the unpleasant situation of needing to reduce their basic living expenses as well as their discretionary spending. The number of households facing this highly undesirable situation is problematic for policy makers.

The national trend of increasing lifespan and escalating health care costs makes this situation even worse. According to U.S. Department of Health and Human Services (2013), between 2000 and 2010, the average life expectancy age of 65 years old increased by 1.5 years. This suggests that Baby Boomers need to fund 1.5 more years of retirement than their parents. Reports also show that the health care costs

are increasing at a rate of 7-9% each year and this trend will persist for many years. All these factors contribute to the challenge that Baby Boomers must face in order to fund their retirement.

Our findings suggest that certain households are more likely to face retirement insufficiency. Early boomers are at risk because they are more likely to have reached their full retirement age. The Great Recession of 2009 has done the most damage to the wealth of many of these households. Interestingly, Caucasian households and households with higher education, income, and net worth are more likely to experience a decline in their standard of living at retirement. Despite having higher wealth than other households, it is still not enough to maintain their same lifestyle in retirement. For single person families, men are more likely to have insufficient retirement income than women.

Effectiveness of Potential Remedies

There are two primary ways to remedy the savings inadequacy issue. The first is for workers to increase their present savings rate. The second is for workers to delay their retirement or continue part-time employment after retirement.

Workers can increase their annual savings rate by reducing their spending during working years so that sufficient income remains to be saved for retirement. According to our projection, if households saved an additional 3% of their annual income, the percentage of household at risk of insufficient saving will drop from 54% to 50%. If households save an additional 5% of their annual income, the percentage of households at risk will drop to 48%. If households save an additional 10% of their annual income, the percentage of households at risk will drop to 45%. It is clear from our analysis that increasing savings rates of Baby Boomers will help them to achieve retirement adequacy, but cannot solve the problem in full. The largest reason for this is because many Baby Boomers are too close to their retirement date to allow for investment growth. In short, it may simply be too late for most Baby Boomers to change course.

The other solution that Baby Boomers could consider is to delay their retirement or work part-time after retirement. This would allow them to simultaneously increase their total amount of retirement savings and shorten the retirement period they need to fund. This, too, is not a complete solution. For example, many households are forced to exit the labor force early because of health conditions. While neither solution is perfect for every household, the combination of the two can reduce the number of households at risk for not having sufficient retirement savings.
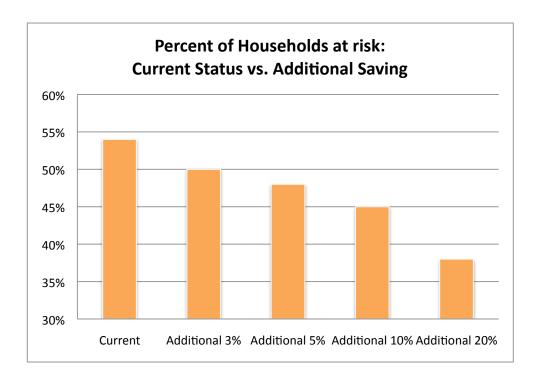
Figure 1: Percent of Households at risk: Current Status vs. Additional Saving

Retirement Outlook for Millennials

Is the coming Millennial Generation better prepared to make retirement savings decisions than the Baby Boomer Generation? We use data from the Financial Literacy Assessment test in the Consumer Financial Monthly survey to assess financial literacy levels across and within generations. We use this data to determine if Millennials are at risk of facing the same retirement savings problems as Baby Boomers.

Financial Literacy Across Generations

Generation	Literate	In-Between	Illiterate
Great Gen.	8	17	78
Silent Gen.	9	28	63
Baby Boomer	16	32	51
Gen. X	14	34	52
Millenials	5	22	73

■ Literate   ■ In-Between   ■ Illiterate

Figure 2: Financial Literacy across Generations

Figure 2 suggests that the Baby Boomer Generation and Generation X have the highest levels of financial literacy of any modern generation. This is calculated based on the financial literacy assessment test (Huston, 2010) that is administered as part of the Consumer Financial Monthly survey. These results are understandable when one considers the situation of each generation. The Greatest Generation and the Silent Generation lived in a time when retirement planning meant collecting a pension. Thus there was little need for these generations to acquire high levels of financial literacy. These generations are also currently nearing the last years of their life. This means that any financial literacy they once might have had is likely either outdated or forgotten, and their cognitive abilities are in decline (Finke, Howe, & Huston, 2011).

The Baby Boomer Generation and Generation X were the first generations to experience the transition from defined benefit to defined contribution plans. This required these generations to acquire higher levels of financial literacy than prior generations if they wanted to be prepared for retirement. We also note that members of these generations were primarily in their 40's and 50's when surveyed. Figure 3 shows that there is a correlation between age and financial literacy among Millennials. It is not

unreasonable to assume that this trend continues among other generations as well. Thus it is not surprising to find that older generations have higher levels of financial literacy than the younger Millennial Generation.
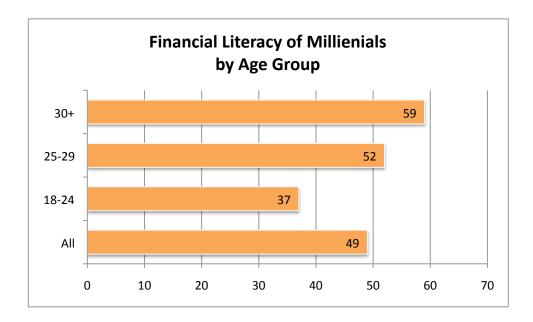

Figure 3: Financial Literacy of Millennials by Age Group

Figure 3 demonstrates that financial literacy among Millennials increases with age. This is because people become exposed to more diverse types of financial instruments as their life progresses. This upward trend in financial literacy levels is encouraging, but may be insufficient to assure adequate retirement for Millennials. Because of the importance of time in the retirement planning process, Millennials are likely to need higher levels of financial literacy in their younger years. Based upon our analysis, it seems clear that Millennials do not currently have sufficiently higher levels of financial literacy than Baby Boomers, and are therefore likely to face similar retirement difficulties unless something is done to help.

Part Two - Beyond Logic: Using Neurofinance to Boost Savings Rates

As discussed in the previous section, majority of boomers do not have adequate retirement savings. It's very likely that the trend will continue with the Millenial generation. So how can we change this trend? Nearly 80% households between the age of 25 and 62 have a defined contribution plan available through their current job (Rhee, 2013), but, as noted in the previous section, retirement savings in general are nearly nonexistent for the majority of Baby Boomers. Based on this information, we suggest that one of the most efficient ways to increase retirement savings is to improve participation rates in defined contribution plans and, more importantly, encourage households to fully take advantage of their employer matching program. It has been noted that the presence of the matching program should be enough to guarantee high participation rates in 401(k) plans (Previtero, 2010). The lack of 401(k) participation therefore represents a genuine economic mystery.   Fortunately, the field of neurofinance can assist in unlocking this mystery and provide solutions to help employers encourage Millennials to save at a higher rate than their Boomer forebears.

Introduction to Neurofinance

To gain insight into savings behaviors that don't always appear economically rational, we first must understand how the human brain works. The emerging field of neurofinance has developed a number of highly effective theories and insights into the operations of the human brain. The dual-self theory of behavior helps explain ideas first introduced by Adam Smith in his 1758 book The Theory of Moral Sentiments that characterize the struggle between the rational and emotional spirits. This conflict has since been validated by neurological scans and experimental data.

The theory has been explained through the analogy of a man riding on the back of an elephant. The rider holds the reins and makes plans about where he wants to go. He can use the reins to steer and direct the elephant. The rider only has power, however, when the elephant is accepting instructions. If the elephant gets its own ideas about what it wants to do, then the rider is helpless against the raw power of the elephant (Haidt, 2006).

The human brain works in a similar manner. Brain functions occur in two primary regions. The home of conscious thought and logical calculations is the "rider." The center of unconscious thought, emotions, and instinct is the "elephant." Understanding the different characteristics of these two regions of the brain can help explain the human decision making process.

The Dual-Self Theory of Behavior

The elephant system shows much faster reaction speeds than the rider (Bechara, Damasio, Tranel, & Damasio, 1997; Damasio et al., 1996). It has also been shown that the elephant system becomes active when considering short-term decisions, but remains dormant when decisions become long-term. Thus, the elephant system does not understand, appreciate, or value long-term benefits (McClure, Laibson, Loewenstein, & Cohen, 2004). This system also shows no ability to differentiate between financial rewards and primary (i.e. tangible) rewards (McClure, Ericson, Laibson, Loewenstein, & Cohen, 2007). The elephant system also struggles to process abstract ideas, such as credit (Bechara & Damasio, 2005). This region of the brain experiences emotions and relies on those emotions to help it to process information (Damasio et al., 1996).

The rider system is that part of the brain that performs rational computations (James, 2011). This system does not use, experience, or rely on emotions. This characteristic makes the rider the source of human deliberation and logic, but it also makes it operate very slowly (Damasio et al., 1996). The difference in processing speed between the rider and the elephant is so great that the elephant can have prepared a response to a question before the rider even recognizes that there is a question to be answered (Bechara et al., 1997). The rider engages equally in decisions regardless of whether they are long-term decisions or short-term decisions (McClure et al., 2004).

The rider system also regulates and monitors our emotions and appetites and our reaction to these drives (Banfield, Wyland, Macrae, Munte, & Heatherton, 2004). This process of self-regulation requires energy, and can exhaust the rider very quickly (Roberts, Hager, & Heron, 1994). Performing complex logical

functions or solving complex problems also drains the rider system of its energies (Ward & Mann, 2000). When the rider becomes exhausted (through the combination of rational thinking and emotional regulation) the elephant is free to roam where it wishes (Shiv & Fedorikhin, 1999). The result is that people become moody, emotional, irrational, and prone to indulge impulsive appetites and desires at the expense of long-term goals and plans (S.S. Iyengar & Lepper, 2000).

Rider	Elephant
Center of logic	Center of intuition
Calculates and strategizes	Operates automatically
Makes long-term plans	Sees only the short-term
Regulates emotional reactions	Creates emotional reactions
Slow	Very fast
Easily exhausted	High cognitive power and endurance
Follows rules	Follows what "feels best"

Figure 4: Summary of Brain Systems

The Willpower Model

In order to operationalize the dual-self theory of behavior, we will employ a willpower model of decision making (G. Loewenstein & O'Donoghue, 2004). In this model, willpower is considered to be the limited, self-replenishing energy that a person consciously and subconsciously seeks to conserve. Willpower is energy that is consumed by the rider system in order to perform calculations, think logically, make decisions, and to enforce those decisions against the desires of the elephant system if necessary (G. Loewenstein & O'Donoghue, 2004). Retirement savings decisions require the individual to make a sacrifice in the present for a future benefit. This means that the rider system and the elephant system will be in conflict on such decisions. The presence of this conflict allows us to use the willpower model of behavior to discover ways to help the rider make beneficial long-term savings decisions in the presence of opposition from the elephant system of the brain.

The model indicates that a person will only engage in retirement savings behaviors when two criteria are satisfied: first, the individual must have the willpower and human capital necessary to determine their

optimal savings plan. Second, the individual must have sufficient willpower remaining after the decision making process to enforce the plan against the short-term interests of the elephant system.

These two criteria manifest themselves in the form of three barriers to retirement plan participation. First, the lack of financial literacy among individuals makes the prospect of facing the decision making process daunting. Thus the individual must overcome their aversion to willpower expenditure long enough to consider the decision of whether or not to participate. Once an employee decides to participate in a retirement plan, they then find themselves ill-equipped to decide how, where, and how much to invest. Lastly, after having expended a great deal of mental willpower to face and make their retirement decision, the employee must enforce the decision. In other words, the employee must actually begin making retirement contributions. The elephant system opposes such behaviors because these contributions reduce current consumption. Thus the already exhausted rider system must find yet more willpower to overcome the myopic desires of the elephant system. When viewed from this perspective, it is no surprise that retirement plan contribution rates are so low.

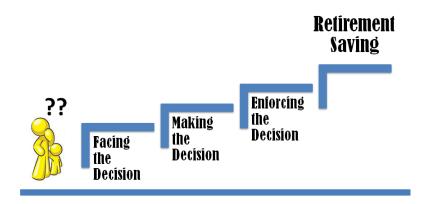**Figure 5: Barriers to Retirement Plan Participation**

Recommendations for Increase Retirement Plan Participation Rates

Our understanding of these three barriers is crucial to our ability to overcome them. This section of the paper will outline simple steps that employers and policy-makers can implement to reduce the overall willpower requirements of either creating a savings plan or of enforcing the decision.

Recommendation 1: Simplify Enrollment Options

Given the general lack of financial literacy among Millennials, it should come as no surprise that they might feel intimidated by the complexity of the questions surrounding retirement planning. This complexity serves as a substantial deterrent to their willingness to even face the participation decision. Studies have found that problem complexity and willingness to participate in the problem solving process are negatively related (S.S. Iyengar & Lepper, 2000).

Plan providers have often assumed that greater choice and flexibility within the plan is helpful to plan participants. While there may be some merit to this argument for those who are already participating, our recommendation is to reduce the number of investment options within the plan. There is evidence that plans that offer large numbers of investment options have decreased participation rates (Sheena S Iyengar, Huberman, & Jiang, 2004) and that simplified enrollment practices increase participation rates (Beshears, Choi, Laibson, & Madrian, 2009a; Carroll, Choi, Laibson, Madrian, & Metrick, 2009). Simplifying the investment decision process makes retirement planning a much more approachable subject, and therefore will have a positive effect on participation rates. A simplified plan will also have the added benefit of allowing employees to make these decisions with minimal consumption of willpower.

Recommendation 2: Default Automatic Enrollment

Having a policy of automatic enrollment has multiple behavioral benefits. First, employees can participate without having to face the choice. Second, by having a default investment option, employees do not have to determine the amount to invest and select investment vehicles. Finally, enforcement of the decision is easy because enforcement begins without any direct involvement from the employee. Thus, no elephant system objections need to be overcome if automatic enrollment is used. In essence, the limits of human willpower become irrelevant to the savings process when automatic enrollment is employed.

Automatic enrollment policies must be used with caution, however. Studies have found that when automatic enrollment policies are used, participants overwhelmingly participate at exactly the default rate

(Choi, Laibson, Madrian, & Metrick, 2002). This may be problematic because not every savings rate is ideal for every individual. When combined with an immediate reward program (such as the one described in the next section), an automatic enrollment policy can be very effective at motivating retirement plan participation independent of the rate at which individuals participate. Use of mandatory enrollment plans has been shown to dramatically increase participation rates, often to over 90% eligible employees (Beshears, Choi, Laibson, & Madrian, 2009b; Carroll et al., 2009; Choi et al., 2002; Madrian & Shea, 2001).

Recommendation 3: Create an Immediate Reward Program

Enforcing a retirement savings decision requires that the rider system be able to overcome the objections of the elephant system through the consumption of willpower. Recommendation 3 is aimed at easing the challenge of enforcing the decision by attracting the interests of the elephant system. Since the elephant system is only interested in short-term benefits (McClure et al., 2004), attracting its interest will necessarily involve providing immediate rewards to retirement plan participants. This recommendation, keeping with our neural analogy, is essentially an attempt to entice the elephant system into cooperation by offering it a small treat.

We propose that employers institute a reward system for those who participate in the retirement plan at a specified level. This reward system could take many different forms, as long as the reward is available within one year of the enrollment decision date and plan participants can get excited about the reward.

Our specific recommendation is that a raffle system be instituted for all qualifying plan participants. The company announces that all employees who participate at specified minimum rate in the plan are entered to win a certain prize at the end of the year. All employees who participated at any rate in the retirement plan should be recognized, and plan participation should be framed as an accomplishment to be applauded. All eligible employees have their names entered into the raffle, and winners are drawn. The event should be designed to generate excitement for participating in the retirement plan.

This event would also be an ideal opportunity to provide all employees the chance to sign up to participate in the company retirement plan. If the raffle for the prior year is held during open enrollment periods, the employees can enroll during the raffle event. This allows to employee to overcome all three barriers to retirement plan participation in a single moment of action. The employee can make and enforce plan participation decisions while their elephant system is actively interested in participation. By so doing, employers can minimize the effort required for their employees to make and enforce their savings decision.

Part Three – Financial Literacy Development

The question of how to increase levels of financial literacy and encourage saving and investing behaviors among the general populace has been a topic of great interest to policy makers and researchers for some time. Research on financial literacy has indicated that the process of acquiring financial literacy has three requirements. First, it requires education and the general accumulation of knowledge (Huston, 2010). Second, it requires practice and practical application (Huston, 2010). Finally, human behavioral theories indicate that personal application and the formation of positive habits are essential for financial literacy development (Way & Wong, 2010)
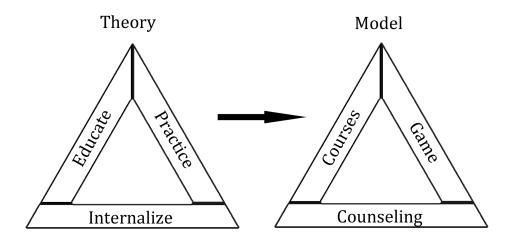

Figure 6: The Educate-Practice-Internalize (EPI) Model of Financial Literacy Development

The EPI Model of Financial Literacy Development

These three requirements are used as the basis for our model of financial literacy development. We call this model the Educate-Practice-Internalize (EPI) Model of Financial Literacy Development. This model is illustrated in figure 6. The three requirements for financial literacy development will be met in three ways. The education requirement will be met by the creation of financial literacy coursework. The practical application requirement will be met by the creation of a web game/app that allows students to compete against each other using their financial skills. Finally, the personal application and positive habit formation requirement will be fulfilled by the creation of a student financial coaching program.

Theory, Tools, and Techniques

We utilize the theory of imagination capital to propose tools and techniques to meet the EPI model of financial literacy development. This theory holds that individuals neglect to care for their future selves because of a failure of imagination (Parfit, 1971). Without sufficient imagination capital, individuals cannot picture their own future clearly enough to make that future seem relevant today. In addition, vivid visual imagery is believed to be able to improve memory (Standing, 1973) and preferences (George Loewenstein, 1996).

The theory of imagination capital integrates with the dual-self theory of behavior because it is a lack of imagination that causes the elephant system to disregard future choices. Those with sufficient imagination capital can transform the distant future from a vague potentiality into a tangible and sometimes emotionally charged concern in the present. Imagination capital therefore becomes a useful tool for causing the elephant system to become the ally of the rider system instead of its enemy when it comes to retirement decisions.

It is possible to invest in imagination capital just as one might invest in human or financial capital. The tools and techniques used in our proposed financial literacy program have been theorized or empirically demonstrated to increase imagination capital and to subsequently improve savings behavior.

Age-Progressed Rendering: It has been demonstrated that seeing one's future self at retirement age increases the likelihood that a person will save for the future (Hershfield et al., 2011). This technique is effective because allows a person to better envision their future. This finding also fits with our dual-self model of behavior because it makes the distant future much more concrete. This makes retirement decisions more relevant to the elephant system of the brain. This technique has the capacity to align the interests of both brain systems, and thus improve the chances that the student will choose to prepare for their retirement.

The "My Financial Life" Video Game: The role of technology in the learning process has not yet been clearly defined (Way & Wong, 2010). Our recommendation is to create a financial planning game that allows students to practice making financial decisions before they face the real world of financial decision making.

Can a game truly help students to become more financially literate? In 2006, Wagner argued that video games ought to properly be defined as a sport. He cites a traditional scientific definition of "sport" as follows:

> *"'Sport' is a cultural field of activity in which people voluntarily engage*
> *with other people with the conscious intention to <u>develop and train</u>*
> *<u>abilities of cultural importance</u> and to compare themselves with these*
> *other people in these abilities according to generally accepted rules and*
> *without deliberately harming anybody."*

Sports have traditionally tested and developed physical skills and abilities. The advent of the digital age and improvements in technology have changed modern culture such that physical abilities are commanding decreasing levels of cultural importance while communicative and intellectual skills have been increasing in their cultural and social desirability. Any activity which develops or trains culturally desirable abilities in a competitive environment fits the definition of a sport. It is believed that this is the reason we see video game tournaments, competitions, and even leagues (consider, for example, www.MajorLeagueGaming.com) receiving increasingly larger shares of the world's attention. Based on this premise, we argue that a video game may reasonably be used to develop, train, and compare a player's financial abilities just as a physical sport might be used to develop, train, and compare a player's physical strength, speed, coordination, etc.

In order to be effective, we submit that the game must have a method of evaluating how well the student is playing and comparing their performance to some standard. Players are more motivated to succeed

when they are given positive competitive feedback of this nature (Vansteenkiste & Deci, 2003). Another critical attribute of a competitive game is that there is some form of recognition for success (Wagner, 2006). This recognition could be of either financial nature or an intangible nature. It may actually be best to provide both types of reward. There is evidence that some people are more likely to respond to social comparisons than to financial incentives (Ferraro & Price, 2013). This suggests that the game will appeal to the widest group of students possible when both tangible and social rewards are offered.

The literature suggests that there are two types of competitive rewards. The first type is called competitively contingent awards. These are awards given based on who "wins", relative to other players. The second type is called performance-contingent awards. These awards are given based upon a person's performance relative to a benchmark. We suggest that both types of reward systems be in place within the game to maximize the number of students who will be interested in competing (Ryan, Koestner, & Deci, 1991).

Peer-Based Financial Coaching: A peer-based financial coaching model is considered to be the most suitable framework for our suggested program. We anticipate that the presence on this type of coaching program will help students to execute in real life the financial knowledge they are acquiring in class and the financial skills they are practicing in the video game. There is evidence that the largest benefit a professional financial planner provides to clients is helping them actually follow-through on their financial plans (Lusardi & Mitchell, 2011). It is reasonable to assume that this relation extends to financial coaching. Particularly, financial coaches encourage students to be more confident in their ability to commit to a financial plan. An individual is more likely to develop positive financial habits if they are more confident about their ability to follow through a financial plan (Shim, Xiao, Barber, & Lyons, 2009). Establishing positive financial habits in one's youth will greatly improve one's financial well-being in the future.

Competent students within the personal financial planning program, or similar disciplines at the university, are encouraged to join the financial literacy program as peer-educators, under the guidance of the faculty of that discipline. Empirical evidence shows that students learn the most from role models that are similar to them (Fabiano, 1994; Sloane & Zimmer, 1993). Students who serve as coaches come from the same generation as those being coached, and are likely have had similar financial experiences. Hence, we expect that the targeted students will retain more useful information through the coaching process. This program also enhances the learning experience for the peer-financial coaches since they have the chance to apply theory to real situations.

The "Imagine It" Financial Literacy Development Program

We apply the EPI model by creating five integrated parts. These parts are outlined in figure 7 and together comprise our proposed "Imagine It" Financial Literacy Development Program.

Part 1: College Entry

Part 2: Financial Literacy Curriculum

Part 3: The "My Financial Life" Game

Part 4: Peer Coaching Program

Part 5: College Exit

Figure 7: Proposed Financial Literacy Program

Part 1: College Entry

The program begins with a requirement that all entering freshmen attend a financial literacy seminar in their first semester at the university. This seminar has two objectives. First, students need to be made aware of their financial illiteracy. In our analysis financial literacy, we find that incoming students exhibit a strong overestimation of their own financial literacy. Thus a major goal of this initial seminar is to make students aware of their need for financial literacy education.

At this seminar, students will be introduced to the financial literacy curriculum that is available and be given a financial literacy assessment. This assessment provides the program with an initial benchmark of the student's initial financial literacy. This will be compared to an exit assessment given when the student nears graduation. This double assessment provides program directors with a way to measure the effectiveness of the program. The seminar will also introduce students to the "My Financial Life" game and gives instructions on how to access, play, and receive rewards from the game.

Finally, students will meet with a student financial coach for an initial money personality assessment and discussion of potential financial and behavioral pitfalls the student may encounter while in school. As part of this coaching session, the student will be shown an age-progressed rendering of themselves. This rendering serves to help students to better envision their future. Thus, the assessment helps students realize their lack of financial literacy, while the age-progressed rendering helps them to feel a greater desire to become financially literate. The coach serves in a role to point out the other components of the program that can help them in this goal, as well as to give advice on how to manage their present finances over the duration of their college years.

Part 2: Financial Literacy Curriculum

Once the students have been introduced to the program, the next component of the model specifies that the program provides financial literacy education. This is accomplished by establishing personal financial literacy curriculum that is available to all the students on campus.

The curriculum should cater to students at all grade levels and within all colleges of the universityWe propose a curriculum of 8 undergraduate level classes and 1 master level class for graduate students to take. Coursework covers every aspect of financial matters that college students will experience during their college life and after they graduate. All these courses complement to each other and aim to enhance students' decision making capability throughout their life.
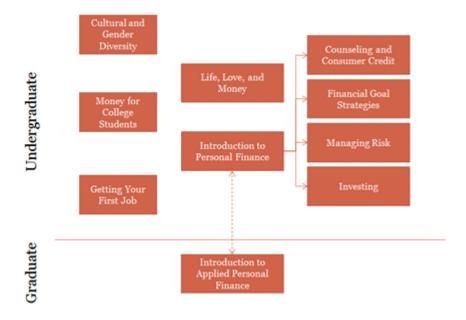
Figure 8: Proposed Personal Financial Literacy Curriculum

Figure 8 above shows the structure of our proposed personal literacy curriculum. Four courses are aimed to provide general financial literacy education to either new students or senior students. There are four other courses providing financial literacy education in a specific area. The final course is the "Life, Love, and Money" course that provides a unique opportunity for the students to learn how to apply financial skills to their marriages and other relationships. We suggest that students who complete the complete coursework receive a minor in personal finance.

A brief description of each course is listed below:

- **Money for college students** is a 1-credit course and introduces basic financial choices that freshman and sophomore students usually face.

- **Getting your first job** is a 1-credit course and introduces practical financial choices when starting a career regarding employee benefits, tax planning, investment options, and risk management.

- **Cultural and gender diversity** is an introductory course of financial attitudes and behaviors affected by culture and gender, including financial issues related to career choice, debt accumulation, and expenditure patterns of affected groups in the United States.

- **Introduction to personal finance** introduce student to various personal finance topics, including goal setting, cash management, credit, insurance, taxes, housing, investment alternatives, and retirement plans.

- **Life, Love and Money** is a course introducing the interconnected behaviors among various human relationships and money to improve decision-making abilities in the areas of money, relationships, time and values.

- **Counseling and consumer credit** introduce students to the financial counseling process and provides a detailed examination of various types of consumer credit, including credit cards, consumer loans, mortgages, student loans, an overview of consumer credit laws, and strategies to manage debt.

- **Financial goal strategies** provides a detailed examination of the process related to planning, managing, and achieving major financial goals such as emergency fund planning, purchasing/leasing automobiles, buying/renting housing, and funding education and retirement.

- **Managing risk** is a course focusing on the concepts of risk management and how to plan for managing risk, including building cash reserves, investing in human capital, and purchasing insurance. Also covers employee benefits, government entitlements, and estate planning.

- **Investing** is a course focuses on the fundamentals of personal investing to meet financial goals, including cash management, investing terminology, risk and return, tax implications of investments, stocks and bonds, mutual funds and exchange traded funds, portfolio management, and retirement income management.

- **Introduction to applied personal finance** is a graduate-level course introducing students to financial topics in their personal and professional lives.

The curriculum is designed to maximize its accessibility to the entire student body. Courses should be available in both an online and face-to-face format, so that students can choose the format that best fits their class schedule and personal preferences. Extensive efforts should be made to ensure that the content remains the same regardless of the format of the class.

Part 3: The "My Financial Life" Game

The role of the "My Financial Life" game is to provide Millennials with an opportunity to practice and apply the knowledge they are learning in the classroom. The game has been designed to be highly effective at building imagination capital as well. All of this occurs in a digital environment that Millennials are familiar with, and where it is possible to learn lessons from past mistakes. We envision "My Financial Life" as a web-based game and/or an app for smartphones to maximize the accessibility of the game to all students. The game would be primarily categorized within the life simulation and time and resource management genres of gaming.

At the beginning of each semester, the student is given a new character in the game. The student will have the ability to customize their character's virtual appearance (or avatar), name their character, and to select from a number of possible financial goals they want their character to achieve. This customization process plays an important role in the development of imagination capital because it allows the player to feel a personal connection to the character. This enables them to subconsciously imagine themselves as the character, and experience a degree of empathy with the joys and struggles of the character (Lanier, 1992). The character will live its entire working life over the course of a single semester. It will experience a typical earnings growth curve and human capital curve. It will age over time as well, just as a normal human would. At the end of the semester, the player is shown how their financial behaviors have affected their character's lifestyle in retirement. For example, if the student selected "travel the world" as a goal at the beginning of the game, then if they have saved enough they will be shown their character enjoying a cruise around the world. This is a form of emotional reward that appeals to the

elephant system and causes the player to feel a deeper connection to the character and a stronger desire to succeed in the game.

The objective of the game is for the player to maximize the character's total lifetime utility or happiness by consuming, borrowing, and investing over the character's lifetime. Random events will occur to the character throughout the semester. Some random events might affect all players in the university's system (such as a sudden decline in the overall stock market) and others would affect just the individual character (such as unexpected medical expenses or disability). At the end of the semester, the character retires, and the character's total utility is the player's score for the game. This score will determine if the player "wins" and how they rank within the universe of their fellow students. The character is then archived, and the student is issued a new character at the beginning of the next semester. Information about decisions and events that occurred for all previous characters the player has controlled will be made available so that the player can reference past activities and try new techniques.

There are several reasons why players are given new characters every semester. Primary among these is the fact that no two students will face the exact same circumstances in their real lives. Therefore, it will be beneficial for students to have the opportunity to experiment with several different life scenarios. This structure for the game also allows for the player to have the opportunity to learn from past mistakes and to make adjustments in the next semester. This also gives players who may have done poorly early in one semester the chance to "win" in later semesters. Without this feature, many students would be likely to give up on the game after a couple of bad decisions and not return to play the game to its conclusion. This structure also gives the financial literacy program directors the opportunity to provide frequent positive feedback to players and to measure improvement in player's as they move through their college years. This arrangement also allows rewards and recognitions to be doled out with sufficient regularity to keep students actively interested in improving their performance in the game.

The game will also be integrated into course materials presented in the financial literacy courses. For example, an instructor in the investments class might give tips to students specifically designed to help them perform better in the game. Thus the game and the classes become mutually supportive in their mission. Those students who are interested in the game will be incentivized to take the courses, and those who are in the courses might become interested to compete in the game if they are not already.

A number of plausible reward systems suggest themselves for this game. We propose to include a combination of financial and social rewards on both competitive and performance based criteria. Social rewards can be offered at no cost to the institution. Social rewards can be created by providing leaderboards and student rankings within the institution's game environment. More competitive students will likely require no more incentive than the satisfaction of a high ranking to seek to improve their game play. It is for this reason that we suggest that institutions with limited resources give preference to performance-contingent awards. Other examples of social rewards might include public recognition at a school event (such as a football game), or the opportunity to have a meet-and-greet with distinguished alumni. Financial rewards might include vouchers for reduction of student loan amounts, gift cards to the bookstore or other local vendors, etc.

We only propose one specific reward for the game at this time. Students performing past a certain benchmark can be given vouchers that are redeemable upon graduation for an initial deposit to the personal retirement plan of their choice. This reward is only given to students who also complete the exit coaching process (see part 5 of the program). We specifically suggest this reward for two reasons. First, by requiring the student to meet with a peer-coach to receive the funds and set up the retirement account, the student will, on graduation, already have a personal retirement account created and asset allocation decisions made. Second, by already having money in an IRA upon graduation, the first two barriers to retirement savings are instantly remedied. The only barrier the student will need to overcome going forward is actually making the decision to invest. It is believed that by the time they have completed their college years, they will have had time to acquire sufficient imagination capital and to have internalized

positive financial principles and behaviors such that this decision will not be beyond their capacity to enforce in the future.

Part 4: Peer-Based Financial Coaching Program

The program won't be complete without the presence of a peer-based financial coaching program. Student's first interaction with the peer- financial coaching program happens as part of the financial literacy seminar in their first semester. In that meeting, students will be asked to complete a money personality assessment and a financial literacy assessment. This will provide program administrators with the student's current level of financial literacy. This is a crucial stage in shaping students' future financial behaviors. The coach will discuss potential behavioral pitfalls the student is likely to face and then show the student an age-progressed rendering of themselves. This technique will improve the student's ability to visualize their future reality and enhance their imagination capital. This results in an increased likelihood that the student will save for the future.

The curriculum and the peer-coaching part of the program can also support each other. Instructors should be encouraged to provide academic incentives for students to visit the financial coaching center as part of the course. In return, the peer-coaches can provide valuable additional insights to students about the topics they are studying in class. The coaching session will be able to be completely personalized to the student. Information about the student's money personality and financial literacy levels can be made available to the coaches to help them in the personalization process. It will create an opportunity for students to apply what they've learned in the classroom to improve their real-life financial situation.

Part 5: College Exit

The peer-base financial coaching program provides one last service to the program when the student prepares to leave college. If a student has won a voucher for a retirement plan deposit as a result of successfully playing "My Financial Life", they will be required to meet with a financial coach` in order to claim their prize.   At this meeting, the coaches will perform several functions. First, they will administer

another financial literacy assessment. This assessment can be compared to the assessment the student

completed at the entry seminar to give program directors a sense of the effectiveness of the program.

Next, the coach will help the student to create their personal retirement account and deposit their game

winnings. Finally, the coach may provide final feedback and advice to the student in regards to the next

financial steps the student will be taking as they leave college.

Conclusion

The Baby Boomer Generation finds itself facing an indisputably pessimistic retirement situation and the Millennial Generation appears on track to repeat this situation in its own future if effective action is not taken. Helping Millennials to correct their financial course has proven a substantial challenge. We propose that scientific theories and evidence of human behavior can give us reason to look forward with optimism on the financial future of the Millennial Generation.

The dual-self theory of behavior is based on the latest neuroscientific discoveries. It suggests a model for willpower control that leads us to propose the use of simplified enrollment options, mandatory automatic enrollment in retirement plans, and the implementation of immediate reward programs for retirement plan participants could strongly affect the rate of retirement plan participation. These recommendations are designed to align the interests and powers of two major brain systems so that planning and executing future-oriented decisions can be facilitated.

The theory of imagination capital is based upon the concept that if we can imagine our own future, we become more interested in preparing for it. Using this theory and past empirical research into financial literacy development, we propose the Educate-Practice-Internalize model of financial literacy program development. This model is based on the premise that education alone cannot bring financial literacy. Rather, a person must first learn principles of good personal finance and then practice applying those principles before they can be internalized to create positive financial habits which will persist. We suggest that a financial literacy program that does not accomplish these three tasks cannot permanently increase the level of financial literacy of this generation.

Based on our model, we propose the "Imagine It" Financial Literacy Development Program. This program utilizes age-progressed renderings, a peer-based financial coaching program, an established financial literacy curriculum, and the "My Financial Life" video game to enhance student's imagination

capital and teach them principles of personal finance. The combination of curriculum, coaching, and practice within "My Financial Life" is designed to not only teach correct principles of personal finance, but to also help the student to create positive financial habits. It is also designed to develop students' imagination capital. There is evidence that this investment in imagination capital can help individuals become more future oriented when it comes to their finances. Thus the accumulation of imagination capital may play a crucial role in the ability of these students to establish and execute a retirement savings plan in the future.

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