

# **Financial Decision Making and Retirement Security in an Aging World**

EDITED BY

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## Chapter 3

# **Challenges for Financial Decision Making at Older Ages**

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*Keith Jacks Gamble*

Recent research studies reveal that seniors exhibit worse financial decision making. For example, in an analysis of transaction records from a discount brokerage, Korniotis and Kumar (2011) showed that older investors' investment selections were less skillful. Similarly, Agarwal et al. (2009) found that the prevalence of suboptimal credit decisions increased past age 53, and Pottow (2012) revealed that bankruptcy filings among those age 65 and older constituted the fastest-growing demographic group. Each of these existing studies indirectly examined the effects of cognitive aging on financial ability by comparing across individuals of different ages. Such comparisons confound the effect of cognitive decline with other differences among people of different ages. For example, Malmendier and Nagel (2011) found the cohort effect of early-life economic conditions on risk-taking decisions made decades later. Direct measures of cognition collected repeatedly from the same individuals are needed to identify the effect of a decrease in cognition on financial capabilities.

This chapter describes research results from analyses of longitudinal data developed at the Rush University Alzheimer's Disease Center's Memory and Aging Project (MAP), a large cohort study of aging (Bennett et al. 2012). The fact that participants in the project are tested yearly provides the data needed to identify, within individuals, the impact of decreases in cognition on financial literacy, financial confidence, and financial decisions. Here I focus on analyses restricted to participants in the project without dementia, as determined by detailed clinical evaluations. These individuals may experience declines in cognitive ability considered part of normal aging and have at most what are considered to be mild cognitive impairments. Even these mild declines in cognitive performance reveal evidence of diminished financial capabilities.

In what follows, I first provide an overview of research results made possible by the Rush Memory and Aging Project. The following section provides more detailed descriptions of the data collected and the methods used. A final section concludes.

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### **Overview of Research Findings**

Overall my research shows that a decrease in cognition is a significant predictor of a decrease in financial literacy among seniors. Drops in cognition are associated with decreases in each of the components of financial literacy measured, both numeracy and financial knowledge. Moreover, analysis finds that a decrease in cognition predicts a drop in self-confidence in general, but importantly, it does not predict a decrease in confidence in managing one's own finances. Participants may not recognize or may be reluctant to admit to this decline in their financial capability. The detrimental effects of cognitive aging on the financial choices of older people can potentially be mitigated with help for financial decisions provided within or outside of the household. Our analysis finds that individuals who experience a decrease in cognition are more likely to stop managing their own finances and pass on this responsibility to a spouse, and they are more likely to get financial help from outside their household. Yet there are still many participants who experience cognitive decreases who do not get help with their financial decisions. Even among the participants experiencing statistically significant decreases in cognition, about half get no help with their financial decisions. While these participants are likely to benefit from trustworthy, knowledgeable advice, knowing whom to trust regarding financial matters can be problematic for seniors.

Trusting untrustworthy solicitors with financial matters is a growing problem, as illustrated by recent surveys. Anderson (2013) noted that fraud complaints have increased fivefold in the past decade in the United States according to the Federal Trade Commission; over a million complaints were filed in 2010. The FINRA Foundation conducted a fraud survey in 2012 using a representative sample of Americans age 40+, and the results showed that people age 65+ were targeted more often and were more likely to lose money when targeted, compared to respondents in their 40s (FINRA Investor Education Foundation 2013). The types of financial fraud revealed in that study included '419' frauds (Nigerian email fraud), lottery scams, penny stock scams, boiler room calls, pyramid schemes, and free lunch seminars that were actually sales pitches. In addition, the 2012 Senior Financial Exploitation Study found that 56 percent of Certified Financial Planner (CFP) professionals had an older client who had been financially exploited, with an average estimated loss of about \$50,000 per victim (CFP Board of Standards 2012).

Little is known about why many seniors are susceptible to financial fraud and what factors contribute to this vulnerability. One reason is a lack of data that include the required information about fraud victimization along with personal characteristics of victims and those not victimized. The MAP provides a notable exception: it includes yearly self-reports of fraud victimization

along with demographic characteristics and measures of cognition, financial literacy, and decision making. A little more than one in ten participants reported being recently victimized by financial fraud.

We use this rich dataset to test two hypotheses concerning the causes of fraud victimization and one concerning the consequences. We hypothesize that decreases in cognition predict an increased likelihood of being victimized by fraud. Results show that a one standard deviation decrease in cognitive slope is estimated to increase the odds of fraud victimization by one-third. This increase in the likelihood of fraud victimization could be due to scammers targeting those with larger decreases in cognition more often, and it could also be due to those people with greater decreases in cognition becoming more vulnerable to financial scams. While we cannot address the former explanation with our data, we can address the latter one. For this test we use a 'susceptibility to scam' score, which employs a set of six survey questions designed to capture actions and beliefs consistent with providing an opportunity for scammers. For example, participants are asked if they have difficulty ending a phone call and if they believe persons over the age of 65 are often targeted by con artists. We do find that a decrease in cognitive slope predicts a higher scam susceptibility score.

Our second fraud-related hypothesis is that over-confidence in one's financial knowledge is a significant predictor of the odds of becoming a victim of financial fraud. Over-confidence is known to be a significant factor in explaining the poor investment decision making of households. For example, Barber and Odean (2000) showed that households lost money by frequently trading stocks, and Barber and Odean (2001) explained this behavior by investor over-confidence. Goetzmann and Kumar (2008) found that investors who were over-confident diversified their investment portfolio less, thus taking on more risk than was necessary to achieve the same level of expected return. Our measure of over-confidence in the Rush data combines participants' answers to a set of standard financial literacy questions with their confidence in each answer. Over-confidence is defined as getting the literacy questions wrong while thinking that they are right. We find that over-confidence is a significant risk factor for becoming a victim of financial fraud. A one standard deviation increase in over-confidence increases the odds of falling victim to fraud by 26 percent. Financial knowledge, not just general knowledge, protects against fraud: years of education is not a significant predictor of the likelihood of being victimized by fraud.

Our third fraud-related hypothesis concerns the impact of financial fraud on victims' willingness to take on financial risk. Thaler and Johnson (1990) demonstrated that, after taking losses, many decision makers showed an increased willingness to take on risk in an effort to break even. We also find that financial fraud victims exhibit an increased willingness to take risk relative to those not victimized.

### **Data Description and Methods**

We employ two measures of willingness to take financial risk. First, fraud victims report an increased assessment of their lifetime willingness to take on financial risk, relative to the decline in non-victims' assessment of their lifetime willingness. Second, fraud victims become increasingly willing to accept a gamble with an equally likely chance of doubling their annual incomes as cutting them by one-tenth. Taken at face value, this gamble is highly attractive due to the large potential gain and limited loss. Yet, such promises of large gains with ostensibly limited downside risk are characteristic of sales pitches by those peddling fraudulent investments. Thus we interpret this result that fraud victims become more attracted to such a gamble as particularly concerning for the risk of repeated fraud victimization. Both results regarding the increased willingness of fraud victims to take on risk are robust to comparisons of fraud victims to otherwise similar non-victims (see Gamble et al. 2014, 2015).

### **Data Collection and Construction of Measures**

The dataset we use is collected by the Rush MAP. Since beginning in 1997, the survey has enrolled older participants from the Chicago metropolitan area. Participants undergo yearly interviews and detailed clinical evaluation, including medical history, as well as neurological and neuropsychological examinations. The MAP data include demographic information for all participants including sex and education. Participants are mostly female (only one-quarter are male), well-educated older Americans; the average age is a little over 80 years old. The participants average three years of higher education. In 2010, a financial decision making assessment was added to MAP.

In our analysis we exclude data from participants diagnosed with dementia at the time of their financial decision making assessment. Dementia was diagnosed in accordance with the standards set by the National Institute of Neurologic and Communicative Disorders and Stroke and the Alzheimer's Disease and Related Disorders Association (Bennett et al. 2005). At the time of these analyses, over 500 participants without dementia at the initial decision making assessment had completed at least two decision making assessments, needed to observe changes in decision making measures over time. To analyze the risk factors for financial fraud victimization, we also examined over 700 participants without dementia who had completed at least one decision making assessment.

Yearly cognitive test scores for each participant are measured with nineteen tests divided into five cognitive domains: episodic memory, perceptual speed, semantic memory, visuo-spatial ability, and working memory. Episodic



memory captures the memory of specific events, whereas semantic memory captures the knowledge of concepts. Working memory captures the ability to store and process transitory information. Perceptual speed involves the ability to process information quickly and make mental comparisons. Visuo-spatial ability involves understanding visual representations and the spatial relationships among objects. Raw scores of each of the nineteen cognitive tests are converted to z-scores using the baseline mean and standard deviation of the entire MAP cohort on that test. These nineteen z-scores are averaged to compute the global cognitive function score, and the z-scores within each domain are averaged to compute each cognitive domain score. About two-thirds of participants experienced a decrease in their global cognition z-score from their first decision making assessment to their most recent.

The decision making questionnaire also included eighteen standard financial literacy questions, half to test numeracy and half to test financial knowledge. We measure financial literacy, numeracy, and knowledge by adding the number of correct answers in each category of questions. Participants were made aware that they could respond that they did not know the answer, and they could refuse to answer any question. These responses are treated as incorrect answers in this analysis. The first two financial knowledge questions concerned the Federal Deposit Insurance Corporation and its role in the financial system. Then participants were asked what investments mutual funds hold and how bond prices react to interest rates. The final five financial knowledge questions were in true–false format. The first two asked about the benefits of diversification and whether an older person should hold riskier investments compared to a younger person. The final three asked about paying off credit card debt, the value of frequent stock trading, and the average historical return of stocks relative to bonds.

Each financial knowledge question also included a follow-up question asking for the participant's confidence in her answer to the previous knowledge question. Confidence may be assessed on a four-point scale from 'extremely confident' to 'not at all confident'. We measure financial knowledge by counting the number of correct answers given to the nine financial literacy questions. Confidence in financial knowledge is measured by summing the scores to each confidence question (extremely confident scored as a three, fairly confident as a two, a little confident as a one, and not at all confident as a zero). Overall participants indicate they were fairly confident for each question. We measure over-confidence in financial knowledge by summing the scores to the confidence questions for which the participant got the associated financial knowledge question wrong. Thus, over-confidence is measured as a combination of poor financial knowledge plus a lack of awareness of poor knowledge. A participant who scored low on financial knowledge would not be counted over-confident if she reported being not at all confident in her answers.

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Two additional measures of confidence are also included. We assess self-confidence using a single question that asked participants to report their general level of confidence on a ten-point scale, with 1 indicating that they were not at all confident, and 10 indicating that they were completely confident. Participants displayed a high level of self-confidence, as their self-confidence score averaged just over 7 on the ten-point scale. We assess financial confidence with a single question that asked participants to report to what extent they agreed with the statement: 'I am good at managing day-to-day financial matters such as keeping up with checking accounts, credit cards, payments, and budgeting.' Responses are reported on a seven-point scale from 'strongly agree' indicating the highest level of financial confidence (6), to 'strongly disagree' indicating the lowest level of financial confidence (0). Participant confidence in managing their own finances was similarly high on average (about five out of six), meaning that most participants agreed with the statement that they were good at managing their day-to-day financial matters.

Participants were also asked who was primarily responsible for making their financial decisions. They were asked explicitly if they, their spouse, their child, or someone else was responsible, and they were asked to specify the relationship for a response that included someone else. Accordingly, we can identify participants who made their own financial decisions, households who made their own financial decisions (participant or spouse), participants that got help with financial decisions (spouse or other person specified, possibly in addition to self), and participants that got help from outside (someone other than the participant or spouse was included as primarily responsible). Consistent with their high confidence in their ability to manage finances and their high confidence in their financial knowledge, the vast majority of participants were primarily or jointly responsible for their financial decisions at the time of their first decision making assessment. Just under one-half got help with financial decisions, including from a spouse, child, or outside advisor. Just one-quarter got help with financial decisions from someone other than a spouse. Over time, fewer participants made their own financial decisions and more got help.

The decision making questionnaire included a question asking participants if, in the past year, they have been a victim of financial fraud or had been told they were a victim of financial fraud. We use this self-report to identify those participants who answered this question affirmatively during any of their yearly evaluations as fraud victims. We use the data from each participant's first decision making questionnaire to predict which participants would report being recently victimized by financial fraud at the first or any subsequent yearly evaluation.

The decision making questionnaire included six questions to measure each participant's susceptibility to scams. The first five questions asked

participants to what extent they agreed with five statements on a seven-point scale from 'strongly agree' to 'strongly disagree'. Three statements concerned the participant's vulnerability to phone calls from a scammer. One stated that if 'something sounds too good to be true, then it probably is'. Another stated that persons over the age of 65 'are often targeted by con-artists'. The sixth and final item in the susceptibility to scams measure asked whether the participant was enrolled in the national do-not-call registry. The first five responses are each scored from one to seven, to match the strength of the response to the question. For example, a response of 'strongly agree' to a statement indicating vulnerability scores a seven, while a response of 'strongly disagree' to the statement scores a one. Not being enrolled in the do-not-call registry scores a seven, while being enrolled scores a one. The susceptibility to scams measure is calculated as the sum of scores for the six questions. The average scam susceptibility score is 21 out of a maximum 42.

We use two types of questions for assessing participant inclination to take on financial risk. The first asked participants to report their lifetime willingness to take financial risks on a ten-point scale, from not at all willing (1) to completely willing (10). The second assessment of risk preferences asked participants if they would be willing to take on an investment opportunity that would double their annual income with a 50 percent probability, and cut it by 10 percent with a 50 percent probability.

### *Cognitive Changes*

We use linear regression analysis to identify the effect of a change in cognition on several financial decision making variables. Since the focus of this chapter is on understanding the impact of decreases in cognition on financial decision making, we also conduct robustness checks to ensure that the results provided hold true when applied to only the subset of participants who experienced a decrease in cognition. Changes in cognition are associated with changes in financial literacy and its components. We find that a one-unit change in cognition is associated with a literacy score change of about one, which comes from a 0.65 change in numeracy and a 0.44 change in financial knowledge. The size of these effects of cognitive changes on financial literacy is modest, but it is important to consider that the changes in cognition measured occurred over just two to three years. Individuals experiencing cognitive decreases will also likely experience further decreases over time. Accordingly, the impact of decreases in cognition on financial literacy is expected to accumulate with age.

We next examine how changes in global cognition are linked to a variety of confidence measures. First, we examine the effect of a decrease in cognition on general self-confidence, and we find that a one-unit decrease in cognition is associated with about a one-point decrease in self-confidence.

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Yet, we find a very different result for the effect of a decrease in cognition on one's confidence for managing financial matters, as these are not statistically associated with changes in confidence in managing one's finances. Participants do not appear to recognize fully the detrimental effect of decreased cognition on their financial ability, despite their decrease in self-confidence in general.

We now examine to what extent those participants who experienced a decrease in their cognitive score got help with their financial decision making. A one-unit decrease in cognition results in triple the odds that a participant stopped making her own financial decisions. Participants who experienced a decrease in their cognition were more likely to obtain help with making financial decisions. A one-unit decrease in measured cognition resulted in more than double the odds that a participant obtained help with her financial decisions. This result includes obtaining help from a spouse as well as anyone outside the household. Typically, help from outside the household was provided by a son, a daughter, or a professional financial advisor.

Despite the strong association between decreases in cognition and seeking help with financial decisions, there were still many participants who experienced significant declines in their cognition who were not getting help. We use each participant's complete history of cognitive scores, including those prior to the start of the decision making assessment, to determine each person's long-term cognitive trajectory. The number of annual cognition scores for participants in our sample ranged from two for the most recent enrollees, to fifteen for long-time participants; on average participants had about seven. For each participant we determined the slope of cognitive ability by running a simple linear regression of cognition scores on age and a constant. There were about 150 participants who experienced both decreased cognition during the decision making assessment and a statistically significant cognitive decline during their entire participation in MAP. Of these participants, only about half got help with their financial decision making.

### *Financial Fraud*

Next we examine whether declining cognition is predictive of fraud incidence. To test this hypothesis, we use the panel of participants who began participating in MAP prior to the decision making sub-study and subsequently completed at least one decision making questionnaire. For each participant with more than one cognition score, we run a linear regression of cognition scores on age at the time of testing, and we use the estimated slope coefficient as our measure of cognitive slope. Data are available on about 400 participants having an average of about six cognition scores (with

a minimum of two and a maximum of fifteen scores). There are many participants who have positive cognitive slopes due to the practice effect of taking the same cognitive tests each year. Because our focus is on those participants with decreasing cognitive ability, we conduct further analysis on this subset of participants whom we term the cognitive slope sample.

Results weakly support our hypothesis: a one standard deviation decrease in cognitive slope is estimated to increase odds of fraud victimization by about one-third. The unconditional odds of recent fraud victimization in this cognitive change sample are 11 percent; a one standard deviation increase in over-confidence increases these odds to 15 percent. The result is robust to including age, sex, and education in the regression as control variables. Age is the only demographic control variable of the three found to have a statistically significant effect. Surprisingly, the coefficient on age is negative, indicating that older participants are less likely to report being victimized by fraud. This is surprising since older participants have higher scam susceptibility scores. A potential explanation for these findings is that older participants may be less likely to admit having been a victim of fraud, or they may be less likely to be aware of their victimization.

We also test whether steeper decreases in cognition are predictive of higher susceptibility to scams using a regression of each participant's scam susceptibility score on her cognitive slope measure, again computed using only scores prior to the first decision making questionnaire. The scam susceptibility score used in this test is the one collected in each participant's first decision making questionnaire. We predict a negative coefficient on cognitive slope, and results support this conjecture. A one standard deviation decrease in cognitive slope is estimated to increase scam susceptibility by about 21 percent of a one standard deviation change in scam susceptibility.

We also hypothesize that over-confidence regarding financial knowledge is associated with fraud victimization. To test this, we use data on all participants in the decision making sub-study with at least one survey conducted when the participant was not diagnosed with dementia. There were over 700 such participants, termed the over-confidence sample. We test the hypothesis using a logistic regression of fraud victimization on participant over-confidence scores from their first decision making questionnaires. Our results support the hypothesis: over-confidence in financial knowledge is a significant predictor of being victimized by financial fraud, and a standard deviation increase in over-confidence increases the estimated odds of fraud victimization by about 26 percent. The unconditional odds of recent fraud victimization in this subsample are 13 percent; a one standard deviation increase in over-confidence increases these odds to 17 percent. Among the demographic control variables, only age is statistically significant. This result corresponds with the small, but statistically significant difference in mean ages between fraud victims and those not victimized. Our results also show

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that the age difference does not drive the significant difference in over-confidence between the two groups. We also test whether either of the two components of over-confidence is, by itself, associated with fraud victimization, but neither one is. Accordingly our prior result for over-confidence is driven by the unique mix of its component parts.

The last fraud-related hypothesis is that being victimized by financial fraud increases people's propensity to take on financial risk. To calculate the before and after change from victimization, the fraud victim must not have reported being victimized at the time of the first decision making survey, a restriction that excluded thirty-one fraud victims from the previous subsample. We compare the changes for fraud victims to those of non-victims, and we calculate changes from their first decision making survey. To test the hypothesis, we compare victims' changes and non-victims' changes, and we also find a fraud propensity-matched non-victim for each victim. This is how we test the difference in changes for significance, to better isolate the impact of fraud victimization from the selection effect of being a fraud victim.

There are fifty-nine fraud victims in this subsample, and they report a lifetime willingness to take financial risk that increases, on average, after the fraud. By comparison, those not victimized exhibit a slight decrease in lifetime willingness to take on financial risk. Correspondingly, the proportion of fraud victims willing to accept the 50–50 gamble with the chance to double annual income or cut it by 10 percent increases from 12 percent before the fraud, to 29 percent afterwards, a seventeen percentage point increase. By contrast, the percentage of non-victims willing to accept the gamble remained unchanged over the same period.

Because being a victim of fraud is not random, this difference includes both the impact of fraud on risk taking, and a selection effect of the difference in characteristics of fraud victims and those not victimized. To better isolate the impact of fraud from the selection effect, we employ propensity matching of fraud victims to non-victims. Fraud propensity scores are calculated for each participant in the after fraud subsample, using the model previously developed with over-confidence and age as statistically significant predictors of fraud victimization. Each fraud victim was matched to the non-victim with the closest fraud propensity score, effectively finding the non-victim most similar in over-confidence and age. Then we compute the propensity-match difference in financial risk-taking changes, by subtracting the change of the propensity-matched non-victim from the change in each fraud victim. The average difference of these propensity-matched changes is statistically significant, and it implies that one impact of fraud is to increase victims' willingness to take on financial risk.

Further evidence of the impact of fraud on victim risk behavior is evident in changes in victim willingness to risk some of their annual income for a chance to double it. About 17 percent more fraud victims are willing to risk

10 percent of their annual incomes afterwards than before being victimized. By contrast, there is virtually no change in the willingness of non-fraud victims to accept this 10 percent income gamble over the same period. We again use propensity matching to better isolate the impact of fraud victimization from the selection effect of being prone to fraud. The propensity-matched difference in fraud victim and matched non-victim changes in willingness to accept the 10 percent income gamble is 22 percent. This result provides further evidence that the impact of fraud victimization is an increased propensity to take on risk.

## **Conclusion**

This chapter identifies challenges for financial decision making at older ages using data collected by the Rush MAP. Seniors are vulnerable to declines in cognitive ability, and diminished cognition coincides with impaired financial decision making. Our analysis reveals that declines in cognition are associated with decreases in financial literacy, yet many participants do not recognize this change. Although participants experiencing declines in their cognitive performance did show significant drops in their general self-confidence, their confidence in their ability to manage their finances as well as their confidence in their financial knowledge did not fall despite drops in measured cognition. Whether help was sought or not, participants who experienced a decrease in their cognitive score were more likely to obtain help with their financial decisions, though perhaps not as many received assistance as needed.

We have also identified two risk factors for senior financial fraud and one consequence for victims' future financial decision making. We find that decreasing cognition is predictive of higher susceptibility to scam and future fraud incidence. Cognitive changes may be evident to those spending time with and caring for affected seniors, and our results show these changes provide a warning sign for fraud vulnerability. In addition, we find that over-confidence in financial knowledge is a significant risk factor for seniors becoming a victim of financial fraud. Increasing the financial knowledge of older adults is likely to help protect them from becoming financial fraud victims. In cases where raising financial knowledge is impossible, increasing awareness of one's limitations may help protect against the harmful effects of over-confidence. Finally, our analysis identifies increased willingness to take financial risk as a consequence of fraud victimization. This increase in risk acceptance may make victims vulnerable to subsequent exploitation.

Protecting finances from abuse should be an important part of seniors' late life planning. Unfortunately, money is often kept out of the conversation with caregivers, as noted. One recent study found that only 2 percent of

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seniors reported being asked about their ability to manage money by their health care providers (Investor Protection Trust 2010). While 19 percent of adult children of senior parents who were in touch with their parent's health care provider had raised concerns about mental comprehension, only 5 percent had raised concerns about the handling of money.

Additional research is needed to further inform these conversations and enhance planning. Financial victimization of seniors is a large and growing problem, yet the availability of data to study this problem is very limited. New data sources help us understand the factors that predict fraud victimization and its consequences, as well as to design effective solutions to limit the harmful consequences of cognitive decline and the impact of senior financial fraud.

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