

Noncognitive Determinants of Retirement Saving Behavior

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Abstract

This chapter explores how noncognitive skills like conscientiousness, stress resistance, and grit impact retirement readiness. Illustrated using survey data from Dutch households, we argue that traits like conscientiousness influence financial decisions related to savings, investments, and retirement. Individuals that possess these noncognitive skills show distinct financial behaviors, such as increased savings and financial wealth buffers. Furthermore, noncognitive abilities relate positively to the propensity to participate in the stock market. Finally, conscientious individuals are more likely to plan for retirement and desire more flexibility in their savings and investment decisions. This link between noncognitive skills and the desire is further supported by the finding that noncognitive ability relates positively with the propensity to opt out of the default pension plan.

Keywords:

JEL Codes:

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Introduction

Traditionally, research has centered on understanding how cognitive abilities such as financial literacy impact an individual's preparedness for retirement. The primary emphasis has been on gauging how well people grasp financial concepts and information, linking these cognitive skills to their readiness for the retirement phase. However, a recent shift in research focus acknowledges that factors beyond cognitive capabilities also play a crucial role in determining effective savings habits and successful retirement planning.

Noncognitive skills can directly and indirectly impact retirement preparedness via different channels. Recent research has shown that income differences are driven, in part, by noncognitive abilities (Heckman et al. 2006, Lindqvist and Vestman 2011). Using household survey data from the Netherlands, we find that these 'character' skills influence the financial wellbeing of households beyond the income differences they cause (Parise and Peijnenburg 2019). In this chapter, we focus on the direct causes of limited readiness for the retirement phase. This emerging focus on noncognitive abilities offers a more detailed examination of the complexities involved in retirement decisions. The interaction between cognitive and noncognitive factors provides an opportunity to refine and rethink existing interventions, paving the way for a more comprehensive approach to fostering financial preparedness for retirement. In this chapter, we first review different types and measurements of noncognitive abilities. After that, we explore the relation between noncognitive traits and decisions important for retirement preparedness, in particular, savings, investments, and retirement planning. We conclude this work with a discussion of the policy implications.

Noncognitive abilities

Noncognitive abilities refer to a set of characteristics and skills that are distinct from cognitive skills, focusing on aspects of an individual's psychological and emotional makeup. These abilities encompass a broad array of traits and attributes, often labeled as "soft skills," that contribute to an individual's overall adaptability and effectiveness in various contexts. Unlike cognitive skills, which involve intellectual capabilities such as iq, knowledge, and financial literacy, noncognitive abilities encompass the interpersonal, emotional, and motivational aspects of an individual's functioning.

Noncognitive abilities, also labelled personality traits or soft skills, are enduring characteristics that shape an individual's responses and behaviors across diverse situations. These traits often include conscientiousness, emotional intelligence, resilience, locus of control. The importance of noncognitive abilities lies in their role in influencing how individuals approach challenges, interact with others, and make decisions, ultimately contributing to their overall success and well-being. While cognitive skills are instrumental for tasks requiring logical reasoning and problem-solving, noncognitive abilities play a complementary role by facilitating effective interpersonal relationships and adaptive responses to dynamic environments.

Measurement Challenges of Noncognitive Abilities. The measurement of noncognitive abilities presents a formidable challenge due to the inherent complexity and subtlety of these traits. Unlike cognitive abilities, which can be quantified through standardized tests, noncognitive traits are inherently subjective and multifaceted. Several measurement methods have been devised, each with its own strengths and limitations. These methods often include self-report surveys, peer evaluations, and situational judgment tests. The reliance on self-reporting introduces potential biases, as individuals may not accurately assess or may intentionally modify their noncognitive

attributes. Moreover, the contextual nature of noncognitive abilities complicates the development of universally applicable measurement tools.

Among the various models used to conceptualize noncognitive abilities, the Big Five personality traits stand out as a widely accepted framework. These traits include openness, conscientiousness, extraversion, agreeableness, and emotional stability. Each trait encompasses a broad range of behaviors, tendencies, and dispositions that collectively contribute to an individual's noncognitive profile. The challenge lies not only in defining and operationalizing these traits but also in accurately measuring them to gain meaningful insights into an individual's noncognitive capacity.

In this chapter, we illustrate the impact of noncognitive skills using the most consistently important trait for financial decisions: Conscientiousness. To assess conscientiousness, researchers often employ self-report questionnaires. For instance, respondents may be asked to rate the extent to which they agree or disagree with statements like "I am careful and thorough in my work" or "I always meet deadlines." However, reliance on self-reported conscientiousness introduces the risk of social desirability bias, as individuals may provide responses they perceive as socially acceptable rather than reflecting their true behavioral tendencies.

In seeking alternative measures for noncognitive abilities, grit has gained prominence. Grit describes the tendency to persevere and having a passion for long-term goals. This noncognitive skill is regarded as a valuable predictor of success. Measurement tools for grit often include scales with items assessing an individual's commitment to long-term goals and their perseverance in the face of setbacks. For instance, respondents may be asked to rate statements like "Setbacks don't discourage me. I don't give up easily." or "I finish whatever I begin." Grit's focus on sustained

effort and resilience offers a distinct perspective on noncognitive traits beyond the Big Five framework.

Beyond personality traits and grit, locus of control is another relevant measure of noncognitive abilities. Locus of control refers to an individual's belief about the extent to which they can control events in their life. Internal locus of control indicates a belief in personal agency, while external locus of control suggests attributing events to external forces. Measurement often involves Likert-scale items gauging agreement with statements like "I feel I am in control of my life" or "Luck plays a significant role in determining life outcomes." Other measures, such as self-efficacy and emotional intelligence assessments, add further dimensions to the challenging task of comprehensively capturing noncognitive abilities in empirical research.

Conscientiousness. In this chapter, we measure cognitive abilities using the Big Five Personality traits. We will focus on the personality trait conscientiousness as previous work consistently shows that this trait is a major determinant of financial choices. For instance, Parise and Peijnenburg (2019) show that conscientiousness is an important determinant of financial distress. Figure 1 illustrates that those in the bottom quintiles of conscientiousness and emotional stability have an almost tenfold higher probability to be in financial distress compared with people in the top quintiles of these two noncognitive traits.

Figure 1 here

Conscientiousness describes the tendency to be organized, practical, persistent, self-disciplined, and achievement oriented (e.g., McAdams 2013). We measure conscientiousness using 10 questions specifically designed to measure this Big Five personality trait in the seminal paper by Goldberg (1992). Examples of questions are, "I am always prepared," "I pay attention to details," and "I like order." Importantly, these questions are asked without reference to any context,

which limits the risk of mechanical correlations. For example, a respondent would be more likely to answer that she gets stressed easily about her retirement preparedness if her financial situation is bad, thereby inducing a mechanical correlation in the data. Respondents receive the following instruction: Please use the rating scale below to describe how accurately each statement describes you: (1) very inaccurate, (2) moderately inaccurate, (3) neither inaccurate nor accurate, (4) moderately accurate, (5) very accurate." The subjects are not informed what the questions are intended to measure, and the ordering of the questions is random. We summarize the 10 questions related to conscientiousness into one measure by using factor analysis.

Data from the Netherlands.

The study utilizes data from the Longitudinal Internet Study for the Social Sciences (LISS) panel, a representative household survey conducted by CentERdata at Tilburg University in the Netherlands. This panel, operational since October 2007, spans the years 2008 to 2017 and includes 13,145 individuals randomly drawn from the population register by Statistics Netherlands. Despite attrition and the addition of new individuals, each cross-section comprises around 7,000 individuals at any given point.

The survey is computer-based, enabling subjects to participate from home, and efforts are made to mitigate selection bias by providing computers and internet connections to individuals who cannot otherwise participate. To incentivize participation and retention, subjects receive compensation for each completed survey. This dataset is particularly well-suited for the research, given that one of the annual survey modules includes standard questions measuring noncognitive abilities following the Big Five personality framework. Additionally, the dataset encompasses

various measures of financial distress, along with an extensive array of demographic controls, preferences, and cognitive ability variables.

Noncognitive abilities and savings

In this section, we discuss the relation between noncognitive abilities and savings. We provide evidence using own calculations and existing work. Figure 2 provides a visual summary of the relation between noncognitive abilities and savings. For ease of interpretation, we standardize the noncognitive ability variable to have a mean of zero and a standard deviation of one. The y-axis shows financial wealth buffer, deposit accounts plus savings plus investments, and the x-axis shows the standardized noncognitive ability measure. The curve is fitted using kernel-weighted polynomial smoothing, and the gray shading represents the 95 percent confidence interval. We clearly see that people with higher noncognitive abilities have a higher savings buffer. In particular, the magnitudes are sizeable: People with noncognitive abilities two standard deviations below the mean have financial wealth levels of approximately 43,000 euros compared to 70,000 euros for those with noncognitive abilities two standard deviations above the mean.

Figure 2 here

We test this relation more formally in Table 1. In particular, we show the link between conscientiousness and several financial choices: Financial wealth buffer, savings, and unsecured debt. Controls are included for risk aversion (lottery and self-reported), ambiguity aversion, numeracy, trust, optimism, financial literacy, agreeableness, openness, extraversion, male, children living at home, age, age squared, home ownership, education, partner, residence in a rural area, missing data dummies, and year dummies when indicated. The results are from OLS and probit

regressions. We find that people with lower conscientiousness have a lower financial wealth buffer, are less likely to save, and are more likely to have unsecured debt.

Table 1 here

Several studies have investigated the relationship between savings behavior and specific noncognitive abilities. Cobb-Clark et al. (2016) show that those with an internal locus of control save more. Those people feel that much of what happens in life stems from their own actions. Similarly, Hurd et al. (2012) find that conscientiousness relates to higher levels of wealth accumulation. Duckworth and Weir (2010) explored the impact of grit—a noncognitive trait associated with perseverance and passion for long-term goals—on savings habits. Their findings suggested that individuals with higher levels of grit tend to exhibit more consistent and disciplined saving practices. Letkiewicz and Fox (2014) delved into the role of financial self-efficacy, a noncognitive factor reflecting an individual's belief in their ability to manage financial matters. Their research indicated a positive correlation between higher financial self-efficacy and increased savings behaviors. Nyhus and Webley's (2001) study examined the influence of future time perspective—a noncognitive factor reflecting an individual's orientation toward the future—on savings behavior. Their results suggested that individuals with a longer-term perspective are more likely to adopt prudent saving habits.

These outcomes underscore the pivotal role of noncognitive skills in shaping financial behaviors that directly impact one's readiness for retirement and retirees welfare during the retirement phase.

Noncognitive abilities and investments

Several papers have posited that noncognitive abilities might impact investment decisions. Akin to cognitive abilities, those with lower noncognitive abilities might make classic portfolio choice mistakes. These errors include non-participation in the stock market, low fraction of financial wealth allocated to equity, home bias, and under-diversification. The mechanism here is that people with low conscientiousness are potentially less able to collect information about stock investments, process this information, and make optimal portfolio choices.

Figure 3 provides an illustration of the relation between conscientiousness and individual's fraction of financial wealth allocated to equity, offering a first insight in the relation between noncognitive abilities and investment decisions. As expected, we find a negative relation between noncognitive skills and the fraction of financial wealth allocated to equity. This is further confirmed by Jiang et al. (2023) who show that noncognitive traits relates to participation in the stock market. Their research, focusing on the measurement of noncognitive abilities through the Big Five personality traits, effectively reinforces the notion that these traits play a pivotal role in influencing individuals' decisions regarding stock market participation.

Figure 3 here

Lindqvist et al. (2018) show similar findings. Leveraging data incorporating test scores derived from the Swedish military enlistment, their findings mirror a similar relationship, affirming the pervasive impact of noncognitive abilities on portfolio choices. These collective insights emphasize the robustness of the identified negative correlation, substantiating its relevance across diverse datasets and methodologies. These portfolio choice mistakes can have large welfare consequences due to the sizeable equity premium left on the table.

Noncognitive abilities and retirement planning

Properly planning for retirement is important to ensure a sufficient retirement income, reduce uncertainty, and avoid negative surprises. It is therefore helpful that at regular intervals, people take stock of their savings, their expected income needs during retirement, and when they expect to be able to retire. These calculations are complicated for many people as it requires them to examine their pension statements, aggregate this information, and find out what the impact of retiring early or later would be on their pension income. Conscientious people are arguably better equipped to plan for their retirement.

We show the relation between conscientiousness and retirement planning using our own calculations. To generate a measure for retirement planning, the respondents were given the following preamble: ‘The following questions are about the financial needs of you [and your partner/spouse] during retirement. Please assume for all the questions that prices of the things you spend your money on remain the same in the future as today; that is, please answer the questions as if there will be (no inflation).’ The question on retirement planning is posed afterwards: ‘How much have you thought about retirement: 1. hardly at all, 2. a little, 3. some, 4. a lot’.

Figure 4 shows the retirement planning variable for below and above average level of conscientiousness. We see that 20 percent of those with below median conscientious have thought hardly at all about retirement, compared to 16 percent of those with above median conscientiousness. A lack of planning can have a large impact on pension preparedness as it allows people to adjust their savings and investments well before retirement.

Figure 5 demonstrates the relation between the conscientious and the desire for flexibility in pension savings and investments. In particular, respondents answer: I would like to take some responsibility for my old-age provision – for example, to decide how much to save and how to invest my savings. Answers range from 1. definitely not, to, 4. yes, definitely. The increased

flexibility in savings and investment decisions is valued particularly by conscientious people. 44 percent of people with above median conscientiousness would like to have more flexibility, compared to 36 percent of people with below median conscientiousness. Increased flexibility and responsibility could be welfare improving, particularly given that the people that value increased responsibility are also those that are more likely able to handle the responsibility.

Figures 4 and 5 here

Noncognitive abilities and default pension fund

The default pension fund often serves as the default choice for individuals entering government-mandated defined contribution pension plans. Understanding the factors that influence the decision to deviate from this default option is crucial for policymakers, financial analysts, and researchers alike.

Lindqvist et al. (2018) investigate the relationship between cognitive and non-cognitive skills and the decision to opt out of the default pension system in Sweden. The research investigates individuals' choices within the government-mandated defined contribution (DC) pension plan launched in 2000. Surprisingly, the results reveal that at the time of the plan's inception, non-cognitive skills, rather than cognitive skills, were influential in predicting the decision to opt out of the default fund. Cognitive skills, on the other hand, were associated with increased activity in terms of reallocating investments between funds, conditional on opting out.

The correlation between non-cognitive skills and opting out at the launch is attributed to the intense information and advertising campaigns during that period, reflecting what Cronqvist and Thaler (2004) term a "pro-choice" culture. Within this context, the term refers to an environment marked by intense information and advertising campaigns that strongly encouraged

individuals to actively make choices regarding their pension fund allocations. The persuasive nature of these campaigns likely influenced individuals with higher non-cognitive skills, who, in response to the proactively presented alternatives, demonstrated a greater propensity to opt out of the default fund.

What are the origins of noncognitive abilities and why do these abilities matter for financial choices?

Empirical evidence suggests that noncognitive abilities exhibit a certain degree of permanence, influenced by early life experiences and genetic endowments. Several studies indicate that over 50 percent of noncognitive abilities may be heritable, with a limited impact of the external environment on these traits after childhood (e.g., Bouchard and Loehlin 2001; Bouchard and McGue 2003). To what extent noncognitive abilities are influenced by genetics remains an active area of research. A comprehensive review of over 150 longitudinal studies by Roberts and DelVecchio (2000) underscores that noncognitive abilities tend to exhibit increasing stability with age. Notably, abilities measured for the same individuals from six to 30 years later demonstrate correlations ranging between 60 percent and 80 percent with the original measurements (Costa Jr and McCrae 1994). In adulthood, these skills are hard to change.

Via which mechanisms do noncognitive abilities influence financial choices? An answer would suggest how to incorporate noncognitive skills in economic models, and would provide insight for policymakers on if, and how, noncognitive abilities could be improved. Parise and Peijnenburg (2019) find evidence that character skills influence the productivity of effort, and the cost of effort of financial decision making. For example, a more conscientious person is better at gathering and processing information on different investment opportunities, and at making an

informed decision. A more emotionally stable person can calmly decide how to invest pension wealth. This evidence suggests that noncognitive abilities could potentially be incorporated in an economic framework as factors influencing the cost of effort and the productivity of effort.

Conclusion

In summary, this research investigates the association between noncognitive skills, particularly conscientiousness, and retirement preparedness using data from Dutch households. The study reveals that individuals with higher noncognitive skills tend to display specific financial behaviors, including increased savings and larger financial buffers. Notably, conscientiousness positively correlates with participation in the stock market, enhancing the likelihood of accumulating sufficient retirement savings.

Furthermore, individuals with better noncognitive skills exhibit a greater tendency toward comprehensive retirement planning and a preference for flexibility in their savings and investment decisions. These findings contribute to the understanding of retirement readiness by emphasizing the role of noncognitive factors, beyond cognitive abilities, in shaping financial decisions.

The identified relationships between conscientiousness and various financial choices underscore the importance of considering noncognitive aspects when designing interventions to enhance retirement preparedness. This insight has implications for policymakers, financial analysts, and researchers, emphasizing the need for a comprehensive understanding of how cognitive and noncognitive factors interact in influencing individuals' financial trajectories as they approach retirement.

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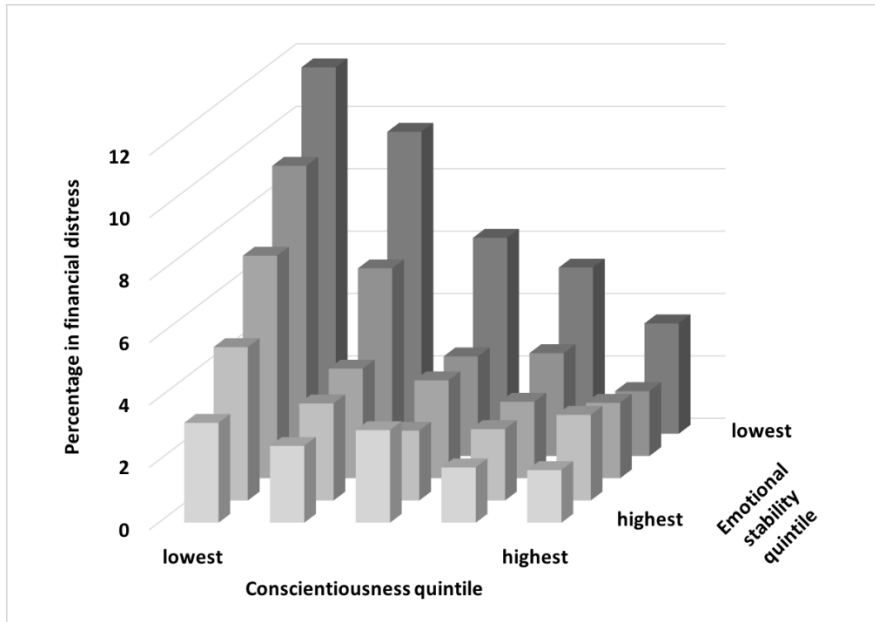


Figure 1. Noncognitive abilities and financial distress.

Note: This figure displays the percentage of households in financial distress by quintile of emotional stability and conscientiousness. Financial distress is measured as being delinquent on mortgage payments, rent payments, utility bills, or other bills.

Source: Parise and Peijnenburg (2019)

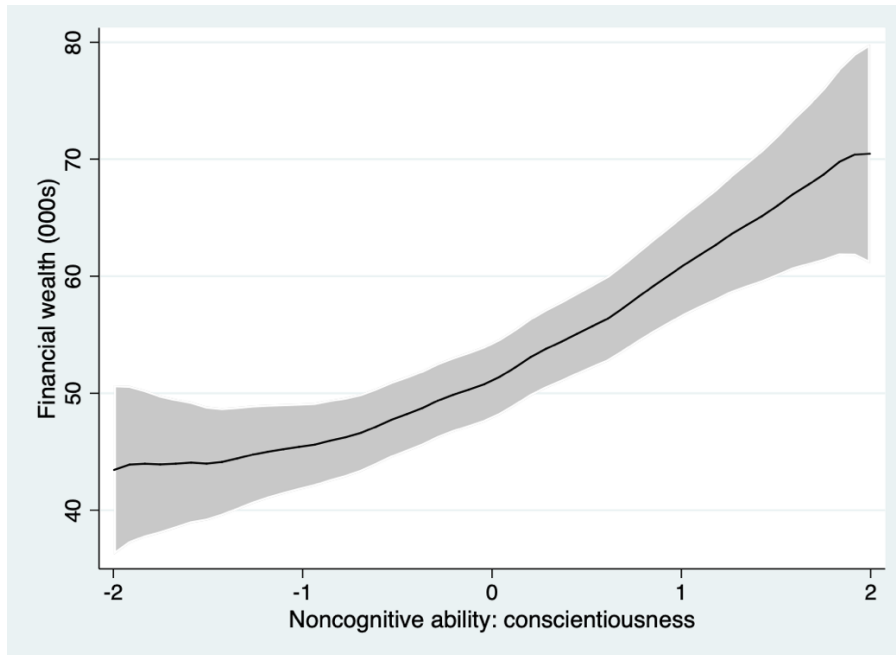


Figure 2. Noncognitive abilities and financial wealth buffer.

Note: This figure displays the fitted curve from a local polynomial regression. The dependent variable is *Financial Wealth* and the independent variable is *Conscientiousness*. *Conscientiousness* is standardized to have a mean of zero and a standard deviation of one. *Conscientiousness* is restricted from -2 standard deviations to +2 standard deviations around the mean. The shaded area represents the 95% confidence interval. The data are sourced from the LISS panel spanning the

Source: 'Author's Calculations'

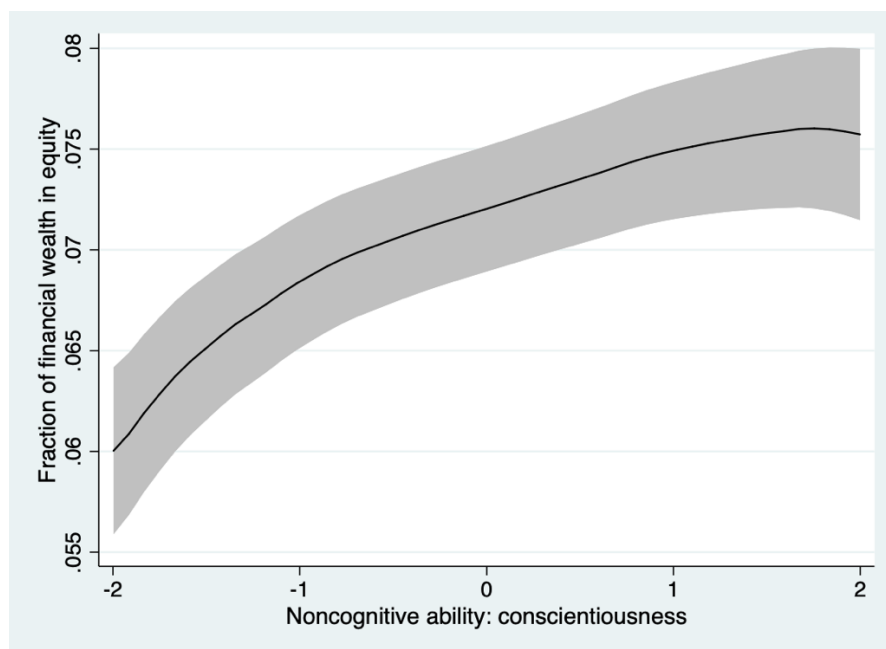


Figure 3. Noncognitive abilities and the fraction allocated to equity.

Note: This figure displays the fitted curve from a local polynomial regression. The dependent variable is *Fraction in Equity* and the independent variable is *Conscientiousness*. *Conscientiousness* is standardized to have a mean of zero and a standard deviation of one. *Conscientiousness* is restricted from -2 standard deviations to +2 standard deviations around the mean. *The Fraction in Equity* is calculated as the fraction of total financial wealth invested in equity. The shaded area represents the 95% confidence interval. The data are sourced from the LISS panel spanning the.

Source: ‘Author’s Calculations’

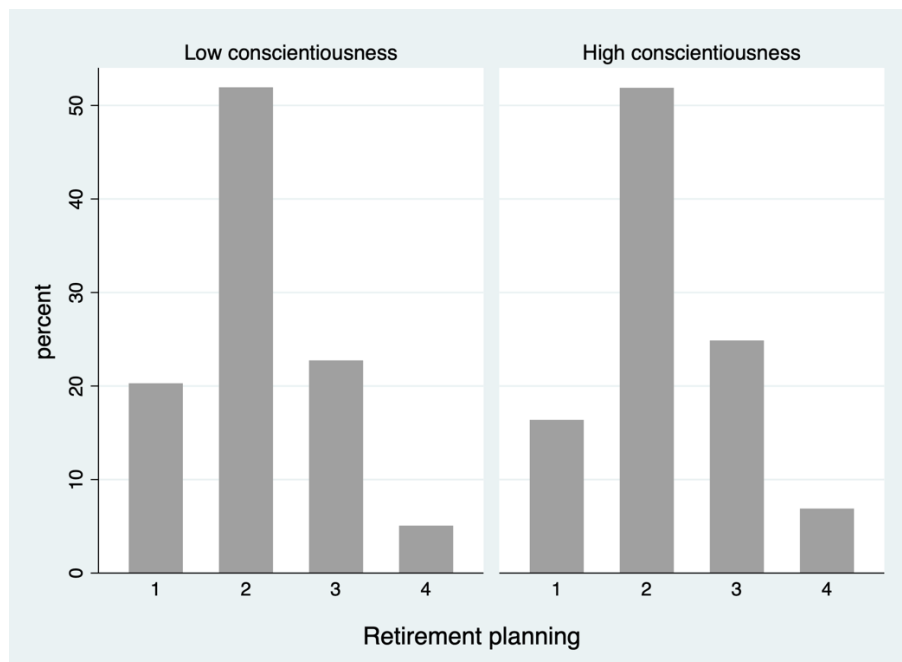


Figure 4. Noncognitive abilities and retirement planning.

Note: This figure illustrates the percentage of individuals indicating various levels of retirement planning, ranging from minimal planning (level 1) to extensive planning (level 4). The left panel presents retirement planning for individuals with below-median conscientiousness scores, while the right panel depicts retirement planning for those with above-median conscientiousness scores. The data are sourced from the LISS panel spanning the period 2008-2015.

Source: ‘Author’s Calculations’

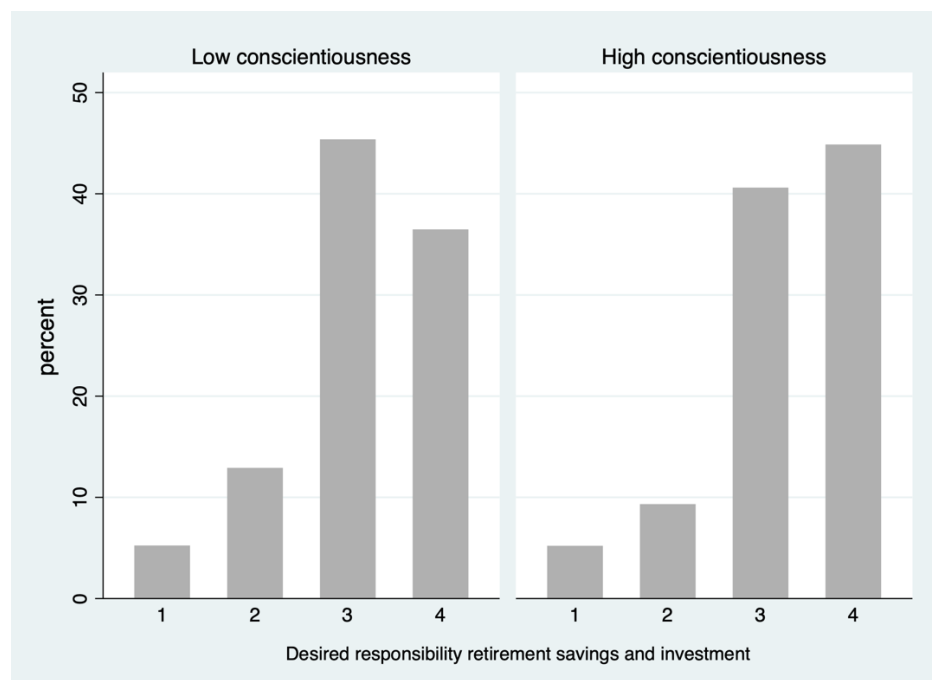


Figure 5. Noncognitive abilities and desired retirement responsibility.

Note: This figure illustrates the percentage of individuals indicating various levels of desired retirement responsibility, ranging from minimal planning (level 1) to extensive planning (level 4). The left panel presents desired retirement responsibility for individuals with below-median conscientiousness scores, while the right panel depicts retirement desired retirement responsibility for those with above-median conscientiousness scores. The data are sourced from the LISS panel spanning the period 2008-2017.

Source: ‘Author’s Calculations’

Table 1. Noncognitive abilities and financial choices.

| | Financial wealth buffer | Savings | Unsecured debt |
|--------------------------|-------------------------|---------------------|----------------------|
| | (1) | (2) | (3) |
| <i>Conscientiousness</i> | 0.217*** (0.037) | 0.045*** (0.004) | -0.035*** (0.005) |
| Controls | Yes | Yes | Yes |
| N | 24,306 | 47,918 | 10,695 |

Note: This table shows the results of an OLS regression (Column 1) and probit regressions (Columns 2 and 3). In Column 1, the dependent variable is the log of financial wealth. In Column 2, the dependent variable is equal to 1 if the respondent consumes less than her income. In Column 3, the dependent variable is equal to 1 if the respondent has one or more of the following: a loan from a family member, debit card debt, credit card debt, a personal loan, a student loan, or some other unsecured loan. All models include a constant term and controls for risk aversion (lottery and self-reported), ambiguity aversion, numeracy, trust, optimism, financial literacy, agreeableness, openness, extraversion, male, children living at home, age, age squared, home ownership, education, partner, residence in a rural area, missing data dummies, and year dummies when indicated. The controls are suppressed for brevity. The table reports marginal effects. Standard errors are clustered by household and appear in parentheses. The data are sourced from the LISS panel spanning the period 2008-2017. * $p < .1$; ** $p < .05$; *** $p < .01$.

Source: ‘Author’s Calculations’