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Abstract

Are low-income individuals trapped because they are unable to make good financial decisions? We use a randomized controlled survey experiment to examine how prompting individuals to think about their personal economic condition (priming) affects their scores on a financial literacy quiz. We find that the marginal effect of poverty on financial literacy scores is 3.7 times higher for primed (treated) respondents compared to nonprimed ones. Priming not only worsens the financial literacy scores of low-income individuals, but also improves the scores of high-income individuals. Anxiety and shame are key explanations for our baseline results. Our findings shed light on how economic condition affects financial cognition, especially with regard to cognitive impediments resulting from negative emotions.

JEL classification: G40; D90; D91; C83

Keywords: Financial effects of poverty; Financial literacy; Priming; Cognitive impediment; Financial anxiety; Shame of poverty; Survey experiment.

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Abstract

Are low-income individuals trapped because they are unable to make good financial decisions? We use a randomized controlled survey experiment to examine how prompting individuals to think about their personal economic condition (priming) affects their scores on a financial literacy quiz. We find that the marginal effect of poverty on financial literacy scores is 3.7 times higher for primed (treated) respondents compared to nonprimed ones. Priming not only worsens the financial literacy scores of low-income individuals, but also improves the scores of high-income individuals. Anxiety and shame are key explanations for our baseline results. Our findings shed light on how economic condition affects financial cognition, especially with regard to cognitive impediments resulting from negative emotions.

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1. Introduction

A person's success in assimilating finance-related information and tackling economic problems relies on cognitive ability. We refer to this as the individual's financial cognition. Learning finance-related concepts and applying that knowledge to make wise financial decisions are key to growing income and wealth at the individual level, as well as to improving society's general cohesion and welfare.

In this research, we hypothesize and empirically examine whether financial insecurity of low-income people overwhelms mental processes when completing tasks that require financial cognition. Specifically, a difficult financial situation may impair individuals' cognitive abilities and interfere with the performance of financial duties. In other words, a poor financial condition might be linked to poor financial management. In this situation, negative emotions driven by poverty-related concerns grow when low-income people perform a financial task, impeding cognitive function. An examination of this hypothesis is important because people experiencing poverty have, by definition, smaller safety margins. By extension, poverty and inferior financial decision-making may create a vicious cycle that threatens financial market participation, future income, and societal outcome.

The extant literature focuses on establishing a causal link between poverty and difficulty to perform general cognitive tasks, with mixed results (e.g., Carvalho et al., 2016; Mani et al., 2013). The general premise in those studies is that poverty hampers individuals' cognitive abilities in performing several economic and noneconomic tasks. Impoverished people allocate a large share of their cognitive abilities to managing financial scarcity and are distracted from other tasks that require cognitive abilities.

In contrast to the existing literature, our objective is to analyze whether poverty-related concerns affect financial cognition, especially through the experience of negative emotion. We make two key contributions. First, we apply a financial perspective to the

welfare-related economic psychology literature. Second, we place negative emotion at the center of the underlying mechanisms that link poor economic condition with individuals' cognitive abilities in finance-related tasks.

We measure financial cognition and the related quality of financial decision-making using a financial literacy test that includes standard questions on risk and return, calculation of interest rates and credit card debt, portfolio diversification, and inflation. The financial literacy test is a good proxy for the quality of financial decision-making because financial literacy is linked to various positive financial outcomes, such as efficient day-to-day financial management, portfolio management and retirement planning, wealth accumulation, competent debt management, and stock market participation (e.g., Hilgert et al., 2003; Hsu, 2016; Bianchi, 2018; Guiso and Viviano, 2014; Klapper et al., 2012; Van Rooij et al., 2011). Phrased differently, financial cognition, as financial literacy test performance reflects, is a vital element of household finance. Accordingly, it is important to analyze whether and how poverty affects financial cognition.

Testing our hypotheses implies establishing a causal link between income-related concerns and financial literacy. To this end, we conduct a randomized controlled survey experiment (e.g., Alesina et al., 2018; Brown et al. 2019; Karadja et al., 2017; Kuziemko et al., 2015) involving 1,001 respondents who are representative of the French population. The treatment consists of priming half the respondents by asking questions about their financial situations before administering a financial literacy test and surveying their emotions about their financial situations. Priming aims to make poverty-related financial concerns top of mind among low-income respondents, similarly to what it will presumably be in a real-life situations when they are faced with a financial decision. In contrast, we do not prime the control group, which therefore is in a neutral environment. Members of that group answer questions on their financial situations after taking the financial literacy quiz and survey of

their emotions about their financial situations. Thus, our baseline model compares financial literacy test scores for the treated and control groups based on income level.

Many studies use priming in experimental protocols and show that subtle changes in the decisional context, despite not affecting the level of information, trigger effective behavioral changes in economic or financial decision-making. For example, priming influences investment behaviors, and particularly the perception of risk (Bateman et al., 2015; Carr and Steele, 2010; Gilad and Kliger, 2008; Glaser et al., 2019); the search of professional financial advice (Lee et al., 2011); and cognitive biases related to economic decisions (Liu et al., 2012; Mani et al., 2013).[1] Our priming strategy is close to that of Mani et al. (2013) who examine the impact of poverty-related concerns on general cognitive functions.

The main interest of running a survey experiment on a representative sample of the population is to combine the experiment's causal power with the generalizability of a population-based sample (Mullinix et al. 2015, Mutz 2011). It is particularly suitable for our study because it enables us to examine how the treatment effect varies over poverty (as measured by the effective income). In the field of financial cognition, a survey experiment based on a representative U.S. sample is by Brown et al. (2019) to explore the effect of manipulating the frame of an annuity choice on the value given to the annuity.

Our results show that priming negatively affects financial literacy scores among low-income respondents, and the magnitude of the effect increases when income decreases. Put another way, when primed, the poorer respondents are, the lower their financial literacy scores are, compared to nonprimed respondents. Economically, the marginal effect of income on financial literacy test scores is 3.7 times higher for primed respondents.

[1] For a review on the increasing use and importance of priming strategy in the field of economics see Cohn and Maréchal (2016)

We further hypothesize that negative emotions such as anxiety, shame, and/or guilt associated with economic condition play an important role in impairing individuals' financial abilities. Poverty conditions may trigger these emotions (e.g., Hall et al., 2013; Haushofer and Fehr, 2014; Walker et al., 2013) and may in turn impede cognition (e.g., Brooks and Schweitzer, 2011; Eysenck, 2013, 1985; Hall et al., 2013; Shapiro and Burchell, 2012), especially because the origin of these emotions (i.e., economic distress), is linked with the stakes of the financial task to be performed (e.g., Anderson, 2003; Gino et al., 2012; Hall et al., 2013; Willis, 2011, 2008). Therefore, such negative emotions can be vehicles through which poverty affects financial cognition. These negative emotions and associated financial cognition impediments may be particularly likely to persist while taking a financial literacy test, precisely because the financial questions exacerbate the negative emotions.

We indeed show that feelings of anxiety and shame mediate the significant effect that poverty-related concerns have on financial cognition. We find that priming respondents exacerbates these emotions and in turn explains a significant part of the baseline effect of priming among those experiencing poor economic conditions. In contrast, we do not find a significant role for guilt.

These results on the mediation effect of negative emotions are quite important in the context of the general literature on cognitive impediment. We provide an explanation for why previous literature on general cognitive tasks (not related to financial cognition) finds that poverty has a limited effect (e.g., Carvalho et al., 2016). Indeed, we also observe no effect when performing the same analysis on a general cognitive test (i.e., the Cognitive Reflection Test) that is unrelated to financial management tasks (e.g., Carvalho et al., 2016; Frederick, 2005). Along these lines, our findings imply that poverty-related concerns specifically affect financial cognition rather than general cognition.

Section 2 places our paper within three strands of relevant literature: the first highlights the use of financial literacy tests as measures of the quality of financial decision-making and financial cognition, the second shows the nexus between financial literacy and individuals' cognitive abilities, and the third suggests that poverty-related concerns affect general cognitive skills (unrelated to financial decision-making). We then develop our testable hypotheses. Section 3 discusses our survey experiment and how we draw causal inferences about how income affects financial cognition. Section 4 presents the empirical results, analyzing the implications for our hypotheses and their economic significance. Section 5 concludes the paper and details how our results contribute to the literature on cognitive impediment.

2. Theoretical background and testable hypotheses

Our study examines the relationships among poverty, financial cognition, and financial literacy. As such, it relates to at least three growing strands of interrelated literature. The first measures individuals' financial decision-making ability (Klapper et al., 2012; Lusardi and Tufano, 2009; Van Rooij et al., 2011; 2012; Guiso and Viviano, 2014; Lusardi and Mitchell, 2014; and Bianchi, 2018). This literature shows the importance of skills, measured by quizzes, in explaining respondents' portfolio management, retirement planning, wealth accumulation, debt management, and stock market participation (see Lusardi and Mitchell, 2014).[2]

A second strand of literature suggests that cognitive abilities are important parts of financial literacy in predicting optimal financial decision-making (Cole et al., 2016; Hilgert et al., 2003; Hsu, 2016; Fernandes et al., 2014; Jappelli and Padula, 2013; Lusardi and Mitchell,

[2] More generally, several studies in household finance examine how education and human capital affect financial decision-making (e.g., Calvet et al., 2009; Haliassos and Bertaut, 1995). Other studies examine how financial advisors alleviate the harmful effects of financial illiteracy (e.g., Calcagno and Monticone, 2015; Hackethal et al., 2012; Von Gaudecker, 2015).

2014; Willis, 2009). Similar to financial literacy, a direct link between cognitive abilities and the efficiency of financial decision-making is widely studied in household finance (e.g., Cole et al., 2016; Grinblatt et al., 2012; 2011; Korniotis and Kumar, 2011; 2010). Specifically, the cognitive skills necessary to make good financial decisions include the ability to perform numerical operations (numeracy), the ability to recall relevant knowledge (memory), and the ability to use both numeracy and memory in a proper way (fluency) (Christelis et al., 2010; McArdle et al., 2009).

An essential issue in our context, linking the first two strands of literature, is that the results of the financial literacy test (as a measure of efficient financial decision-making) are strongly related to financial cognition. The efficient use of cognitive resources, including those used for financial decision-making, is subject to behavioral biases linked to attention and emotions.[3] Such cognitive biases are highly context-dependent and, as a result, financial cognition and the resulting financial literacy scores are likely to vary with the frameworks in which individuals make financial decisions. For instance, two individuals with similar intrinsic levels of financial fluency may equally understand how credit card repayment works. In practice, however, if one of these individuals is stressed in ways that divert his/her attention, such fluency could be hampered. The two individuals may make different decisions about how much to borrow, when to repay the money, and how they support those debt burdens.

A third strand of literature focuses on how poverty affects general economic and noneconomic outcomes. This literature examines whether poor economic conditions affect risk aversion, time preferences, and self-control, leading to increased chances of trapping people in poverty (Banerjee and Mullainathan, 2010; Bernheim et al., 2015; Carvalho et al.,

[3] This relates to the behavioral household finance literature (e.g., Beshears et al., 2018; Lerner et al., 2015; Guiso and Sodini, 2013), as well as more general emotions in the decision-making literature (e.g., Lerner et al., 2015).

2016; Gloede et al., 2015; Haushofer et al., 2013; Liu et al., 2012; Spears, 2011; Tanaka et al., 2010). A key finding is that poverty hampers cognitive abilities, with a direct explanation emerging from the role of scarcity (Shah et al., 2012; Mullainathan and Shafir, 2013). The literature finds that people experiencing poverty tend to allocate a large share of their cognitive abilities to managing financial scarcity, and this occurs at the expense of other tasks that also require cognitive abilities.

For instance, Mani et al. (2013) show in an experiment that the cognitive processes of the poorest individuals (in IQ points) is impeded when they are exposed to a consumption shock (the respondents were mentally primed with a fictitious expensive car repair). Similarly, they observe a cognitive impediment among farmers before their harvests but not afterward. The authors argue that before the harvest, farmers tend to focus more on poverty-related concerns that disappear after the harvest. In contrast, Carvalho et al. (2016), using changes in financial resources at payday, find limited evidence of changes in the cognitive abilities of affected individuals.

In our study, we prime individuals' economic condition and examine how doing so affects financial literacy scores. In line with Mani et al. (2013), priming implies increasing the salience of financial vulnerability. However, there are two important and interrelated differences. First, we ask a subject to deal with a task showing financial cognition, not general cognition. Second, the mechanism is different, as it relies on the role of negative emotions triggered by priming. Also, this mechanism persists during the financial literacy test.

More specifically, priming creates a mental environment that affects the decision-making on finance-related issues. In this environment, anticipated difficulties in dealing with the financial literacy test by the relatively poor are psychologically linked to difficulties in dealing with their poor economic condition. Thus, the relatively poor generate vivid negative

emotions via priming, perceiving the test's outcome (i.e., success or failure) as more critical. Persistent negative emotions, in turn, cause cognitive impediment that specifically applies to financial cognition and leads to poor performance in the test. In the words of Willis (2008, p. 234; further developed in Willis, 2011) "thinking about unpleasant facts can bias decision-making by inducing fear or anxiety, similar to the negative feelings that can be triggered by high-stakes decision-making. Because the negative feelings occupy attention, a person has a reduced capacity for decision-making." This view is backed by psychology research, which shows that negative emotions yield cognitive impairment (Eysenck, 2013, 1985) that is particularly strong if the task to perform relates to the source of these negative emotions (Anderson, 2003).

Examining this proposition would complement the findings of Mani et al. (2013) because we identify a specific emotional channel affecting financial cognition rather than general cognition. Such negative emotions may be less persistent and hence little overwhelming if primed subjects had to perform a neutral IQ test. This is because the succeeding in such a test is not directly associated by subjects with their difficulty in dealing with financial issues. Individuals should thus feel less pressurized by negative emotions when performing it. Therefore, the financial literacy test may play a key role in measuring the financial cognition impediments some people may experience while living in poverty.

The mechanism occurring for the poor, should also consistently work when priming the rich. Haushofer and Fehr (2014) review many studies demonstrating a link between high income and positive affects (e.g. happiness, life-satisfaction) or stress alleviation. Thus, whereas priming low-income people with their poor economic condition should increase negative emotions, priming relatively rich individuals should remind them of their financial security, triggering rather positive emotions or at least alleviating any stress related to their

finances. In turn, these enhance their financial cognition (Anderson, 2003; Eysenck, 2013, 1985, Willis, 2011).

Taking an opposite view, a few studies suggest that the awareness or the salience of financial difficulties can trigger positive behavioral responses (Stango and Zinman, 2014; Shah et al., 2018). Stango and Zinman (2014) provide evidence that increasing the salience of overdraft fees results in less overdrafting by the same individuals in subsequent surveys. These are behavioral changes led by more effort towards solving the problems. In our setting, this would imply the poor placing more effort in the financial literacy test. However, the mechanism here is not clear, given that priming is unlikely to bring forward positive emotions to poorer respondents and yield a better outcome in the test.

We thus hypothesize that poverty impedes financial cognition more among primed poor individuals compared to nonprimed poor individuals and individuals who are not poor. In turn, given that financial literacy is tightly linked to financial cognition, we formulate our main hypothesis as follows:

Hypothesis 1: As poverty increases (decreases), priming people with their financial situation reduces (raises) financial literacy test scores.

We next examine how negative emotions affect poor people who perform financial management tasks. Poverty naturally implies higher economic uncertainty and is thus strongly associated with anxiety or stress (Haushofer and Fehr, 2014), which in turn may hinder cognitive capabilities (Brooks and Schweitzer, 2011; Eysenck, 2013, 1985). As aforementioned, the psychology literature notes that cognitive impediment due to anxiety or stress is particularly severe in situations where people must deal with the issue that originates this negative emotion (Anderson, 2003). Experimental work by Gino et al. (2012) suggests

that individuals anxious about important decisions are more likely to experience cognitive impediment in the form of reduced ability to discern good from bad advice.[4] On this basis, we further argue that priming poverty has a specific effect on cognitive tasks related to financial literacy compared to "neutral" cognitive tasks, as those in Carvalho et al. (2016) and Mani et al. (2013). Further, if priming indeed impairs cognition of poorer respondents, an important channel is anxiety. Symmetrically, priming rich people with their positive financial situation could emphasize that they have little to worry about their financial situation and could thus put them in a more positive attitude when faced with the financial literacy test. We thus formulate a second hypothesis as follows:

Hypothesis 2: As poverty increases (decreases), priming people with their financial situation reduces (raises) financial literacy test scores due to increases (decreases) in respondents' feelings of anxiety about their financial situations.

Poverty is also associated with shame, which is another potential source of cognitive impediment. Poverty is often regarded socially as personal failure (Reutter et al., 2009). Indeed, people living in poverty might be stereotyped as lazy, incompetent, irrational, or lacking self-control, which could lead many people who are experiencing poverty to feel shamed (Hall et al., 2013; Reutter et al., 2009; Vogel et al., 2007; Walker et al., 2013). Hall et al. (2013) provide evidence that this shame can decrease cognition; they also find that a simple self-affirmation (i.e., remembering something that one can be proud of) significantly increases the fluid intelligence among the poorest individuals. As is the case for anxiety, we

[4] Shapiro and Burchell (2012) suggest that individuals can exhibit anxiety related to difficulties in managing their finances. They find that those reporting such financial anxiety display reaction latencies in processing financial information. However, unlike us, their work addresses *trait* financial anxiety, that is a feeling that is intrinsic to individuals and unrelated to the context. In this paper we examine *state* anxiety that is a feeling which can vary with external stimuli (i.e., poor economic condition or its salience).

expect that dealing with a financial task (here, the financial literacy quiz) is more difficult than dealing with a neutral cognitive task. This should further impair self-esteem and exacerbate financial cognition impairment when taking the test.[5] By symmetry, for the rich, priming should elicit some feelings of social self-satisfaction (i.e. the opposite of social shame) about their own financial situation. As a result, their fluid intelligence could be enhanced (Hall et al., 2013) while performing the financial literacy test. Thus, we formulate our third hypothesis as follows:

Hypothesis 3: As poverty increases (decreases), priming people with their financial situation reduces (raises) financial literacy test scores due to increases (decreases) in respondents' feelings of shame about their financial situations.

Poverty can also trigger feelings of guilt about consumption. In this way, guilt is related to anxiety because it might originate in difficulty to effectively handling finances (Shapiro and Burchell, 2012). Similarly, guilt might relate to shame as part of the process of self-stigmatization, where individuals begin to believe negative stereotypes associated with poverty and feel responsible for their difficulties (Corrigan et al. 2009; Vogel et al. 2007). Thus, guilt can be an additional channel through which priming the financial situation affects cognitive abilities and in turn financial literacy. Thus, we formulate our fourth hypothesis as follows:

[5] Social psychology widely studies self-stereotype (or self-stigma) as a mechanism for decreasing cognitive abilities when dealing with a stereotyped task. See, for instance, Steele and Aronson (1995) on the role of race in a math test; Kray et al. (2001) on women's performance in a negotiation task; Carr and Steele (2010) on women's performance in a risk attitude test.

Hypothesis 4: As poverty increases (decreases), priming people with their financial situation reduces (raises) financial literacy test scores due to increases (decreases) in respondents' feelings of guilt about their financial situations.

3. Data and methodology

3.1. The survey experiment

We collect our data from the 2015 Audencia Barometer – Banque Populaire survey on French Financial Vulnerability that we co-constructed. The survey was conducted online on our behalf by the market research firm Brulé, Ville et Associés group (BVA) between April 28 and May 6, 2015. It involves 1,001 respondents, above 18 years old, who are representative of the French population. The sampling method is the quota sampling method based on respondents' gender, age, occupation, and geographical area. The treatment group includes 500 randomly drawn respondents, and the control group contains 501 respondents.[6]

Treatment entails priming in order to make poverty-related financial concerns top of mind among low-income respondents. Priming entails asking four questions about the frequency of debit rejection, exceeding overdraft limits, the ability to save money, and vulnerability to income shocks. Table 1 shows the questions.[7] The treatment group answers the four priming questions first and then answers a set of 24 questions, which include the financial literacy test, as well as questions about anxiety, shame, and guilt about their personal financial situations. We also include other questions.[8] We report the 24 questions in

[6] A growing number of studies uses randomized survey experiment designs in economics and finance (e.g., Alesina et al., 2018; Brown et al., 2019; Karadja et al., 2017; Kuziemko et al., 2015).

[7] The four priming questions follow several other questions on topics related to respondents' management of their finances.

[8] Beyond the financial literacy quiz and questions about anxiety, guilt, and shame, the rest of the 24 questions address self-confidence in financial capability (six questions), the use of heuristics (two questions), the respondents' perception of bank officers (four questions), and budget behavioral intentions (three questions).

section A1 of the Appendix. The control group, on the other hand, answers the four priming questions at the end of the survey (after the 24 questions); thus, the control group is not affected by priming.

Previous studies analyze the effects of priming in a similar way. Papers in finance, examine the effect on investment behavior by priming risk attitudes or just changing the way that assets' past performance and risk are presented (Bateman et al., 2015; Gilad and Kliger, 2008; Glaser et al., 2019). Inspired by social psychology literature, other finance papers find significant effects of priming in the form of simply asking people to record their gender before executing an investment experimental task (Carr and Steele, 2010) or rating financial preferences (Lee et al., 2011). Related to our work, Mani et al. (2013) primed poverty-related concerns with the thought of an expensive car repair and then analyzed the respondents' performance on a test. For the poor, stakes of a typical financial management decision are high since they are more financially vulnerable. Therefore, the objective of priming vulnerability is to recreate a high-stake environment where the quality of financial decision-making (reflected here in the financial literacy score) is critical to individuals (see also Liu et al., 2012). In contrast, the absence of priming leaves individuals in an environment that is freer of any mental threat related to their financial situation. This environment is evidently less likely to exist in a real financial decision-making situation, but it has the advantage for researchers to analyze the real cognitive potential of individuals when dealing with their finance outside a threatening environment.

[Insert Table 1 about here]

We remove from our sample individuals who did not report their incomes (116 observations), because this information is crucial for our analysis. In addition, we drop 197 individuals who answered "I do not know" or "not concerned" to any of the four priming questions. Thus, our end sample includes 688 respondents, of which 335 belong to the control

group and 353 to the (primed) treatment group. A *t*-test of differences in the means indicates that the frequency of dropped observations does not differ across the treatment and control groups (p-value = 0.203).

We first test the random assignment of the treatment by checking that the homogeneity of the treatment and control groups with respect to observed characteristics (Imbens and Wooldridge, 2009). We compare the respondents' characteristics, including gender, age, occupation, geographic area, education, marital status, and dwelling type. We define these variables in Table 2 and report summary statistics in Table 3. We estimate a *t*-test of the equality of means, and the results in Table 4 essentially show that the two samples are homogeneous. The only exceptions are people who are separated (significant at the 10% level) or surviving spouses (significant at the 5% level). Even in these two cases, however, the normalized differences across treatment (equal to 0.10 and 0.13, respectively) are well below the rule of thumb value of 0.25, suggesting no particular statistical problem from these differences when inferring the average treatment effect (Imbens and Wooldridge, 2009).[9]

[Insert Tables 2, 3, & 4 about here]

Our main measure of financial literacy is based on correct answers to a six-question quiz related to basic skills in household finance (questions 7-12 in section A1 of the Appendix). Specifically, we use questions about the calculation of interest (question 7), compounded interest (question 8), credit card debt and settlement (question 9), basic risk-return concepts (question 10), portfolio diversification (question 11), and inflation (question 12). In general, these questions are similar to those in the related literature (e.g., Guiso and Viviano, 2014; Van Rooij et al., 2011; Bianchi, 2018). We take questions 7, 8, 10, 11, and 12 directly from the measure of financial literacy the OECD uses to conduct international

[9] The formula is $normalized\ difference = \Delta X = \frac{\bar{X}_{treatment} - \bar{X}_{control}}{\sqrt{\sigma^2_{treatment} + \sigma^2_{control}}}$, where $\bar{X}$ is the mean and σ^2 is the variance of each sample (treatment and control).

comparisons (Atkinson and Messy, 2012). These questions are very close to the so-called big three questions of financial literacy (e.g., Lusardi and Mitchell, 2014). Also, we obtain question 9 from Lusardi and Tufano (2009) to include a relatively more difficult question on debt repayment. For each of the six questions, we create a binary variable that equals 1 if the respondent answers correctly and 0 otherwise. We measure *Financial literacy* by adding 1 for every correct answer to the six questions (see also Table 2). A noticeable figure is that only 7 respondents (1.02% of the sample) answered "I do not know" to all financial literacy questions. This signals that very few individuals shirk performing the test.

3.2. Baseline specification

We first examine whether the effect of priming on financial literacy varies with poverty level (hypothesis 1). We use the following specification:[10]

$$Financial\ literacy = \alpha_0 + \alpha_1\, Priming + \alpha_2\, Income + \alpha_3\, Priming \times Income + \alpha_4\, Controls + \varepsilon. \quad (1)$$

We thoroughly define all variables in Table 2. High *Income* implies low poverty, and low *Income* implies high poverty. We define *Income* as the "effective income" which divides the household income by the squared root of the household size (Mani et al., 2013); we use its natural logarithm. The calculation of effective income follows the calculation of the *standard of living* by the French National Institute for Statistics (INSEE), which employs this variable to define people living in poverty. Comparing the two, we observe a mean effective income of €1,984 and a median of €1,750 in our sample, which are very close to the equivalent by the

[10] For similar specifications, see Mani et al. (2013) and Wicherts and Scholten (2013).

INSEE: €1,953 and € 1,692, respectively in 2015.[11] Due to randomization, including control variables should have a limited effect on the coefficient of the interaction term (Angrist and Pischke, 2008). A correlation matrix with all variables of interest in this study is in the Appendix (Table A1).

In Equation (1), α_3 reflects the differential effect of priming on financial literacy for unitary increases in *Income*. If α_3 is statistically and economically significant, then priming has different effects on the outcome variable for individuals with lower incomes compared to primed individuals with higher incomes and nonprimed respondents with lower incomes. If α_3 is not statistically different from zero, then priming does not yield a heterogeneous effect of poor financial condition on the outcome variable.

Given that we are interested in the interaction effect of priming with *Income*, we check the homogeneity of the observable characteristics in the two groups (treatment and control), this time for the three subsamples reflecting income distribution (bottom, middle, and top tercile per our definition in Table A2 of the Appendix). Following the rule of thumb that the normalized difference should not exceed 0.25 (Imbens and Wooldridge, 2009), we conclude that there is a limited heterogeneity of groups across treatment status for these income levels.

3.3. Mediation analysis: Introducing anxiety, guilt, and social shame

As suggested by hypotheses 2-4, negative emotions such as anxiety, guilt, and shame about personal finances might affect the relation between anxiety and financial literacy. We measure anxiety about financial situations using question 18, which asks whether "thinking about my personal finances makes me anxious." We generate a binary variable (*Anxiety*) that

[11] We provide information on the calculation of the standard of living and its similarities with the effective income in Table 2.

equals 1 if the response is "Strongly agree" or "Somewhat agree" (0 otherwise). In turn, we measure guilt about consumption using respondents' answers to question 19 ("I feel guilty and I should have better controlled my spending."). *Guilt* equals 1 if the respondent answers "Strongly agree" or "Somewhat agree" and 0 otherwise. Similarly, we define *Shame* using question 20, which states, "When I have financial problems, I prefer not sharing them with anyone, not even my relatives."

Subsequently, we estimate the following equation:

$$Financial\ literacy = \alpha_0 + \alpha_1\ Priming + \alpha_2\ Income + \alpha_3\ Priming \times Income + \alpha_4\ Controls + \alpha_5\ Negative\ emotions + \varepsilon, \quad (3)$$

where *Negative emotions* is *Anxiety, Guilt, or Shame*. Our objective is to perform a mediation analysis, to observe how sensitive the coefficient α_3 is to changes in the emotions-related variables in the model (i.e., comparing α_3 in equation 3 and α_3 in equation 1). If the coefficient on the interaction term is significantly lower when including negative emotions variables, then we can argue that *Priming* × *Income* has an indirect effect on *Financial literacy* via the corresponding *Negative emotion* (Baron and Kenny, 1986; Breen et al., 2013; Carpena and Zia, 2018; Sobel, 1982). The weight of this indirect path in the total effect of the interaction terms is provided by the downward percentage change between α_3 in equation 1 (total effect) and α_3 in equation 3 (direct effect).

Working within this framework, we also show that the interaction term (*Priming* × *Income*) significantly affects *Negative emotions*. This is a necessary condition for identifying such indirect effects. As the outcome variables are binary, we use a logit model of the form

$$P(Neg.emotions = 1) = \alpha_0 + \alpha_1\, Priming + \alpha_2\, Income + \alpha_3\, Priming \times Income + \alpha_4\, controls + \varepsilon. \quad (4)$$

4. Results

4.1. Baseline results

In Table 5, we report tests of the differences in the mean of *Financial literacy*, and the three negative emotions for the primed and nonprimed respondents. The results indeed show no significant differences across the treatment and control groups (irrespective of income levels), which is an important first result for the validity of our approach.

[Insert Table 5 about here]

Column 1 of Table 6 reports the results from the estimation of equation (1). The estimation method is OLS (as in Finke et al., 2017; Guiso and Jappelli, 2008; Jappelli, 2010; Lusardi et al., 2014), and all specifications include the demographic control variables defined in Table 2. The coefficient on *Priming* × *Income* is positive and significant at the 5% level. Among primed respondents, a 1% rise in income increases financial literacy scores by 0.0042 points (0.311/100+0.113/100); among nonprimed respondents, the equivalent increase is 0.00113 points (statistically insignificant). Therefore, the marginal effect of income on financial literacy is 3.7 times higher among primed individuals than among nonprimed individuals (0.0042/0.00113 = 3.71).

More informative is Figure 1, which illustrates the change in *Financial literacy* due to priming for 20 different levels of income (i.e., the linear coefficient of the upward fitted line in this figure equals the estimate of the interaction term in Table 6). Our estimate shows that as *Income* decreases, the effect of *Priming* on financial literacy becomes increasingly negative. In fact, *Priming* has a negative effect on *Financial literacy* among the relatively poor, whereas it has a positive effect among the relatively rich. In other words, when people

are forced to think about their financial situations, those experiencing poverty may find it hard to perform tasks related to financial management. Thus, our baseline results are consistent with hypothesis 1.[12]

[Insert Table 6 and Figure 1 about here]

We further illustrate this result by comparing individuals above and below the median income. Results of specification 2 in Table 6 show the estimation of Equation 1 when replacing *Income* by a dummy variable that takes the value 1 if individuals have an effective income above or equal to the median; and 0 otherwise (*Above median income*). The priming effect on the score of financial literacy is -0.26 points amongst the poor (i.e., those below the median) (α_1) and +0.20 points ($\alpha_3 - \alpha_2$) amongst the rich. Figure 2 illustrates the financial literacy scores obtained for each subsample (*Priming* × *Above median income*). Thus, our results suggest not only that priming decreases financial literacy scores amongst poorer individuals but also that priming improves the score amongst wealthy individuals. This validates the theoretical prior that priming the economic condition has symmetric effects depending on the level of *Income*: a negative one for low-income people having bad feelings about their financial situation and a positive one for high-income people who are reinsured and self-satisfied by their financial situation. This is consistent with our theoretical arguments dealing with finance-related cognitive questions triggers the positive effect of emotions (e.g., stress relief, social self-satisfaction) on the cognitive functioning (Anderson, 2003).

[Insert Figure 2 about here]

We perform a final estimation, interacting *Priming* with a variable constructed based on the quintile of the *Income* distribution to which respondents belong. We plot the marginal effect of priming for each quintile in Figure 3. In line with our baseline findings, results show

[12] The estimation of an ordered logit model confirms these results, showing that the coefficient of the interaction term (estimating the average marginal effect for each of the seven outcomes of the variables; for example, *Financial literacy =0,…, 6*) is negative and significant when *Financial literacy* is low (≤ 3), whereas it is positive and significant when *Financial literacy* is high (> 3). Results are available on request.

a reversal in the priming effect, from negative among the two low-income categories to positive among the two high-income ones. An interesting finding is that the negative effect of priming is mostly driven by the second lowest-income group (individuals with monthly effective income between 1,061 and 1,500 euros). Symmetrically, the positive effect is mainly driven by the second highest-income category (effective monthly income between 1,768 and 2,475 euros).[13] An explanation for this finding is that the priming mechanism is less potent for individuals at the margins of the income distribution. Low-income individuals are used to have their poor economic condition at the forefront, and priming may not have a strong additional impact. Similarly, super high-income individuals are used to abundance and pointing out their comfortable economic situation with priming may hardly affect their emotional state.

[Insert Figure 3 about here]

Our results validate the view developed in the theoretical section that having poverty-related concerns at the forefront could make financial decision-making more complicated at the cognitive level for relatively poor individuals. In the context of financial decision-making, thinking of their financial vulnerability, the poor might incur difficulties to perform the basic calculations needed to manage savings and debts. This effect can prevail even if financially vulnerable individuals have the potential to do better, as is suggested by the performance of nonprimed poor. Our results further suggest that poverty harms the poor's ability to analyze basic financial issues, related for instance to the effect of inflation on their savings and investments. Thus, poverty contributes to a higher probability of erroneous financial decisions

[13] The change in the priming effect across these two categories (2nd quintile and 3rd quintile) is significant at the 1% level.

and the discouragement of affected individuals to undertake positive financial actions and use financial products (e.g., opening a remunerated savings account).

We test the sensitivity of our baseline results to a bad controls problem by sequentially adding demographic variables. We report these results in Table A3 of the Appendix. The estimate of the interaction term and our general inferences are not significantly affected. Formally comparing differences in the coefficients (e.g., using suest in Stata) favors the null of no significant differences (results available on request).[14]

We further use a placebo test to check that our results are not spuriously led by selection bias due to unobservables (Athey and Imbens, 2017). Specifically, we estimate our baseline model using as outcome variables the responses to questions asked before priming the treatment group. If there is no sample selection bias, the treatment should have no effect on these outcome variables.

We first use a score from questions addressing respondents' propensity to plan for the use of money (*Propensity to plan)*. Several studies link this trait to financial literacy (e.g., Van Rooij et al., 2012; Fernandes et al., 2014). Second, we use a score of the respondents' time preferences for spending money (*Present preference*). We thoroughly define these variables in Table 2, provide summary statistics in Table 3, and report *t*-tests of the difference in means across treatment status (not rejecting the null) in Table 7. Results from these placebo tests in Table 8 show that *Priming* × *Income* produces insignificant effects on the two outcome variables, providing additional validation that our baseline results do not suffer from endogeneity bias.

[14] Income per se should not influence financial literacy when including proper control variables in the model, except via the psychological effect put forward in the paper. The drop of the effect of Income when introducing Age (specification 2 of Table A3), is due to the fact that older people are both richer and have more financial literacy (since they have more experience in financial decision-making). We can make similar arguments for the decline in the effect of income observed when including the gender dummy variable (specification 3), the education dummy variables (specification 4), the occupation dummy variables (specification 5), and the housing dummy variables (specification 8). We note that introducing Occupation (specification 5) has the strongest downward effect on the coefficient of Income. However, the addition of all the relevant controls is what makes Income insignificant.

[Insert Table 7 and 8 about here]

We perform additional sensitivity tests using variables constructed from answers to the remaining 24 questions (other than those about financial literacy and emotions), as priming may affect those answers too. We aim to show that controlling for variables that capture self-confidence in financial management (*Self-confidence financial management*), loss aversion (*Loss aversion*), and positive perceptions of bank advisors (*Positive perception bank advisor*) do not affect our main results. We define these variables in Table A4 of the Appendix and provide summary statistics in Table A5. In Table A6, we show that differences across the treatment and control groups are statistically insignificant for these variables. Adding these variables in equation (1) suggests that our baseline estimate on *Priming* × *Income* remains largely unaffected (see Table A7 of the Appendix).

4.2. Heterogeneity due to self-confidence

Existing literature also shows that self-confidence is a strong determinant of financial literacy and financial behavior (Barber and Odean, 2001; Bucher-Koenen et al., 2017; Fernandes et al., 2014; Kramer, 2016).[15] In our setting, an interesting extension is whether loss in self-confidence due to priming affects our baseline result (the estimate on the interaction term *Priming* × *Income*). The fact that the inclusion of *Self-confidence financial management* enters with a highly significant coefficient but does not affect the coefficient on the interaction term is thus an important result (Table A7): it limits the view that the effect of priming on the poor's (rich's) financial literacy occurs through a loss (gain) in self-confidence triggered by priming. This is further confirmed by a lack of effect of our key interaction

[15]Self-confidence in financial management should be distinguished from the above-mentioned feeling of reinsurance (or stress relief) that relates to someone's more general perception that there is no specific reason to be stressed when it comes to think about financial perspectives. It also differs from social self-satisfaction that refers to individuals' increased self-esteem when thinking that their own economic condition is consistent with the social standards of a successful life.

variable on *Self-confidence financial management* used as a dependent variable in the regression shown in Table A8 of the Appendix (specification 1).

To further check that self-confidence does not affect our baseline result we construct a new dependent variable, adding 1 for each answer "I do not know" in the financial literacy quiz. We name this variable *IDK score* (exact definition in Appendix Table A4 and summary statistics in Table A5). Following Bucher-Koenen et al. (2017), we posit that answering "I do not know" may reflect individuals' lack of self-confidence rather than pure ignorance or cognitive difficulties.[16] However, estimating our baseline equation (1) using *IDK score* as the dependent variable shows that *Priming* × *Income* has no effect on this variable (results in specification 2 of Appendix Table A8). This finding implies that our baseline result is not driven by primed poor individuals being more likely to answer "I do not know". The same insignificant result is obtained when conducting the same analysis but using a different dependent variable that takes the value 1 if respondents answered "I do not know" to at least one of the financial literacy questions, and 0 otherwise (the variable is named *At least 1 IDK*, and its definition is in Appendix Table A4, while summary are in Table A5). This results are in specification 3 of Appendix Table A8. All these results hold when using the above/below median income approach.

We include two more tests regarding the role of self-confidence. First, we examine the effect of *Priming* interacted with *Self-confidence financial management* and find an insignificant effect (column 4 of Table A8). This result implies that the effect of priming is independent of the level of self-confidence of respondents. Second, we include the triple interaction term *Priming* × *Income* × *Self-confidence financial management* and again find an insignificant effect (results in column 5 of Table A8). This finding suggests that the

[16] Bucher-Koenen et al. (2017) show that women are more likely than men to answer "I do not know" to financial literacy questions even if they know the correct answers. The results imply that women tend to be less self-confident than men in financial decision-making.

individuals' level of self-confidence does not interact with our baseline result to affect *Financial literacy*.[17]

4.3. Interaction of Priming with acute financial difficulty

We deepen our analysis by looking at the interplay of priming with acute financial difficulty. We construct *Extreme financial difficulties* by adding one when individuals give extreme negative answers to each of the four priming questions (a score of 4 means extreme negative answers to all four questions). We provide an exact definition in Table 2 and summary statistics in Table 3. The results, reported in specification 2 of Table 9, show that primed individuals with acute financial difficulties indeed have more negative financial literacy scores compared to their non-primed peers.

[Insert Table 9 about here]

We next examine the extent to which this result underlays our baseline result. In specification 3, we include both *Priming* × *Income* and *Priming* × *Extreme financial difficulties*. Both terms remain statistically significant, but lose part of their economic significance compared to their separate inclusion in the model (specifications 1 and 2).[18] We thus conclude that two priming effects coexist, one based on structural low-income conditions (*Income*) and the other based on acute financial distress.[19] Whereas the latter effect is intuitive, the former implies that the hampered financial cognition of primed low-income

[17] We conduct similar tests with the variables capturing gender and education (Woman and Low educ), as these are often associated to low self-confidence in financial decisions, mathematics, etc. (Barber and Odean, 2001; Bucher-Koenen et al., 2017, Lusardi and Mitchell, 2011). We find that the interaction of these variables with priming yields insignificant coefficients. This further suggests that priming affects financial literacy of individuals depending on their level of income but not depending on the lack of self-confidence that women and low-educated individuals are more likely to exhibit. We also find insignificant coefficients when interacting these two variables with *Priming* × *Income* (i.e., three-way interactions), suggesting that the specific harmful effect of priming on financial literacy among low-income respondents is not influenced by gender and education.

[18] Wald tests confirm the significance of the drop in the value of coefficients (both at the 5% level).

[19] A triple interaction term (i.e., *Priming* × *Income* × *Extreme financial difficulties*) has no impact on financial literacy scores.

people is not solely based on current acute difficulties but also based on the fear of experiencing such difficulties. In other words, for low-income individuals, the thought of poor economic condition is a mental threat even if their financial situation is not dramatic.[20]

4.4. Mediation analysis: The role of negative emotions

Turning to hypotheses 2-4, we estimate equation (3) by sequentially adding *Anxiety*, *Guilt*, and *Shame* (the results are in columns 3-5 of Table 6). With these estimations, we identify whether controlling for emotions decreases *Priming* × *Income*, essentially suggesting that the differential effect of priming poor economic condition for different income levels on the financial literacy score is at least partially due to negative emotions.

The results of the mediation analysis show that whereas the coefficients on the three negative emotions are statistically significant at the 1% level, the coefficient on *Priming* × *Income* is only affected by including *Anxiety* and *Shame* (columns 3 and 4, respectively). In these specifications, the estimate on *Priming* × *Income* is both statistically and economically weaker compared to the baseline result in column 1. This implies an indirect effect of *Priming* × *Income* on *Financial literacy* through *Anxiety* and *Shame*. In contrast, our baseline estimate remains unaffected when including *Guilt* (column 5). In fact, including both *Anxiety* and *Shame* in the same equation (column 6) further decreases the coefficient on *Priming* × *Income*.

In Table 10, we report formal mediation analyses in the form of testing the significance of the differences between column 1 and columns 3-6 in Table 6 (i.e., the table showing baseline results). The drop in the coefficient on *Priming* × *Income* is statistically significant between columns 1 and 3 (at the 10% level), between columns 1 and 4 (at the 10%

[20] We draw consistent conclusions when performing similar analyses using dummies based on the most negative answer to each of the four priming questions.

level), and between columns 1 and 6 (at the 5% level). We conclude that there is a significant indirect effect of *Priming* × *Income* on financial literacy through *Anxiety* and *Shame*. Economically, the differences in the estimates are substantial. The drop in the coefficient of the interaction term after introducing *Anxiety* and *Shame* equals 0.061 (from 0.0311 to 0.025), which represents a 20% decrease. In other words, 20% of the total effect of *Priming* × *Income* on financial literacy is mediated via the effect of *Anxiety* and *Shame*.

[Insert Table 10 about here]

So far, our findings are consistent with hypotheses 2 and 3. However, following our discussion on the estimation of equation (4), the picture is incomplete unless we also show that *Priming* × *Income* directly affects *Anxiety* and *Shame* and does not significantly affect *Guilt*. Given that the outcome variables are binary, we use a logit model. Table 11 shows average marginal effects from the interaction term *Priming* × *Income*.[21] The results are fully consistent with those in Tables 6 and 8: *Anxiety* and *Shame* significantly respond to priming (at the 10% level), but *Guilt* does not respond significantly. In line with hypotheses 2 and 3, we conclude that among those with relatively low effective income, priming hinders financial literacy test performance by increasing respondents' anxiety and shame about their financial situations.

[Insert Table 11 about here]

The role played by emotions in impeding/enhancing the financial literacy score of the poor/rich distinguishes our findings from those of Mani et al. (2013), who analyze general cognition using an IQ test. We complement the findings by Mani et al. (2013) by providing

[21] To obtain a linear probability metric of the interaction effect between a discrete and a continuous variable in a logit regression, we should take into account that this metric can vary over the different values of the continuous variable, here Income (Ai and Norton, 2003). Therefore, the coefficient on the interaction term reported in Table 11 is an average of the interaction effects estimated for different levels of Income. Following Ai and Norton (2003), we examine if this negative and significant average estimation is consistent across different values of Income. For specification 1 (*Anxiety*), we find that it is the case for 85% of the distribution of Income and insignificant for only 15% of the distribution reflecting extreme values of Income. For specification 3 (*Shame*), we also find that the average estimation is consistent across different values of Income.

evidence that priming impedes cognitive functions when dealing with a finance-related cognitive task.

5. Discussion and conclusions

Our analysis provides the first evidence that poverty-related concerns affect the cognitive abilities needed for financial literacy (i.e., financial cognition). We show that priming hampers financial literacy scores of the poor (people who are below the median effective income) but also improves scores of the rich. Our results point out a "cognitive inequality" between the rich and the poor when it comes to optimal financial decision-making. We find that this effect is only partially related to the level of financial difficulties experienced by primed individuals. This suggests that for low-income individuals, the thought of poor economic condition is a mental threat even if their financial situation is not dramatic. We show that such cognitive impediment for relatively poor individuals is related to increased anxiety and shame when these individuals' financial difficulties are primed. The loss of financial cognition, as evident by the drop in financial literacy scores, implies that concerned individuals have higher probability to incorrectly perform the basic calculations needed to manage savings and debts. It also means that individuals can be confused when trying to recollect the functioning of basic mechanisms linked to personal financial management (e.g. inflation, exponential growth of interests, diversifications, etc.). Therefore, these results shed light on the existence of a vicious behavioral cycle, whereby those that are more vulnerable to negative economic shocks are also more likely to make mistakes in their financial decisions. Ultimately, this may trap people in poverty.

The external validity of our analysis is important because priming arguably replicates a ubiquitous situation, whereby individuals are mechanically led to think of their own financial situation and associated consequences. In contrast, nonpriming is a neutral

environment that might scarcely be existent. This environment gives researchers a benchmark on the real cognitive potential of the poor if the thought of poverty was not so threatening. Debt-related decisions and potential mistakes are those for which negative emotions should have large effects for the poor. In fact, even more positive financial decisions, like saving or investing, require poor individuals to think about their financial capacity and this triggers emotions. In contrast, richer individuals might view these activities as constructive and even exciting, triggering a cognitive ease when thinking of the settings of the decision and the potential for significant financial benefits.

These considerations are not just semantics because they imply that poor individuals might make mistakes on selecting between basic financial products. Using financial advice (e.g., debt counselling or consulting with the bank advisor) could be a way to overcome the financial cognition problems (Gennaioli et al., 2015). However, these are costly services that also require extra attention to avoid any stigmatization linked to individuals' economic condition. As we show, social shame can amplify the impediment of financial cognition, making the advising process difficult.

The paper's conclusion is part of an ongoing discussion in the literature. Especially, the significant role that negative emotions play is a key difference of our findings compared to previous work on the link between poverty and general cognition. Mani et al. (2013) show that stress plays no role in their findings on general cognitive abilities, whereas we show that specific negative emotions (shame and anxiety) are important when studying financial cognition. This is because the nature of the tasks in the financial literacy test directly relates to the source (i.e., poor economic condition) of anxiety and shame. Thus, these poverty-related negative emotions are vivid when performing the test, impeding a normal cognitive process. Regarding the role of shame, our results echo the literature analyzing the harmful effects of negative self-stereotyping on self-esteem and in turn on cognitive ability (e.g., Carr

and Steele, 2010; Steele and Aronson, 1995). Our findings on the role of emotions are consistent with Fernandes et al. (2014) and Willis (2008, 2011) in that policies aiming to increase financial literacy through education programs might not be as efficient. At the very moment of financial decision-making, negative emotions of those most in need of good judgement prevail, lowering financial cognition and the quality of decision-making.

Overall, our paper contributes to the growing literature on household finances and how households make financial decisions. Our results particularly relate to literature exploring why individuals tend to deviate from rational financial behavior (e.g., Beshears et al., 2018). From a policy-making perspective, increasing individuals' responsibility for their financial security might pose a serious behavioral issue for the most economically vulnerable citizens. Our results imply that the economically vulnerable should receive extra advice to help them make sound financial decisions and allow them to escape the vicious cycle of poverty. Spreading the access and the use of web or mobile applications designed to make financial decisions simpler may also represent an interesting avenue to explore (e.g., Abiona and Koppensteiner, 2020).

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Table 1. Priming questions

Question number	Question text
1.	In the last two years, how frequently have you have experienced a direct debit rejection? Never / rarely / from time to time / often / N/A (no bank account)
2.	In the last two years, how frequently have you have experienced a bypassing of your overdraft authorization? Never / rarely / from time to time / often / N/A (no bank account)
3.	Over the last 12 months, did you: • Save money from your income • Meet your current expenses with nothing to spare • Tap into your savings to meet current expenses • Tap into your savings and borrow money to meet current expenses. • I do not know
4.	If you lost your main source of income, how long would you be able to cover your current expenses without borrowing money or being evicted? • Less than a week • Between one week and one month • Between one month and three months • Between three months and six months • More than six months • I do not know

Table 2. Variable definitions

Variable	Definition
A. Dependent variable	
Financial literacy	The sum of correct answers to the six financial literacy questions (questions 7 to 12 in Appendix 1). It equals 0, 1,…, 6, corresponding to the number of correct answers.
B. Main explanatory variables	
Priming	A dummy variable indicating whether the respondent answers questions about his/her economic condition early in the questionnaire (priming) or later in the questionnaire. It equals 1 for primed (treated) respondents and 0 for nonprimed (nontreated) respondents.
Income	The natural logarithm of the effective income, where Effective income = household income / squared root (household size). The respondents report the range of their monthly disposable income (below €1,000; between €1,000 and €2,000; between €1,000 and €2,000; between €2,000 and €3,000; between €3,000 and €4,000; between €4,000 and €5,000; and above €5,000). For the calculation, we use the middle ranges (e.g., €1,500 for the range "between €1,000 and €2,000"). For the upper range, which has no upper bound, we assign a virtual income of €10,000. The calculation of the standard of living by INSEE is *household income/# of units of consumption (uc)* where the first adult counts for 1 uc, another person above 14 counts for 0.5, and children below 14 counts for 0.3 uc. Our data does not allow calculating the standard of living because the age of the children in the household was not asked in the survey. However, the premise is fairly the same than that of calculating the effective income. In both measures, the idea is to reduce a household's income by the size of the household and to decrease the weight of an additional member.
Above median income	A dummy variable based on the level of *Income*. It takes the value 1 if *Income* is above or equal the median, and 0 otherwise.
Extreme financial difficulties	Score variable adding one when respondents report the worst financial outcome (extreme negative answer) for each of the four priming questions.
C. Mediating variables: Negative emotions about personal finances	
Anxiety	A dummy variable based on answer to question 18 (see Appendix 1). It equals 1 if outcome = "1. Strongly agree" or "2. Somewhat agree," and 0 otherwise.
Guilt	A dummy variable based on answer to question 19 (see Appendix 1). It equals 1 if outcome = "1. Strongly agree" or "2. Somewhat agree," and 0 otherwise.
Shame	A dummy variable based on answer to question 20 (see Appendix 1). It equals 1 if outcome = "1. Strongly agree" or "2. Somewhat agree," and 0 otherwise.
D. Other variables	
Age	A continuous variable equal to the respondent's age.
Woman	A dummy variable equal to 1 for female respondents and 0 for male respondents.
Education	This is a vector of 4 dummy variables (*Low education, Intermediate education*, *High education*, *Don't know*) that equal 1 if the respondent reports a level of education and 0 otherwise.
Occupation	This is a vector of 9 dummy variables (*Agriculture*; *Artisan, merchant, firm director*; *Inactive*; *Executive or intellectual profession*; *Student; Employee; Factory worker; Intermediate profession; Retiree*) that equal 1 if the respondent reports this type of occupation, and 0 otherwise.

Area	This is a vector of 9 dummy variables (*Ile de France, North, East, East of Parisian Basin, West of Parisian Basin, West, Southwest, Southeast, Mediterranea*) that equal value 1 if the respondent reports this living area, and 0 otherwise.
Marital status	This is a vector of 5 dummy variables (*Single, Divorced, Married or civil union, Separated, Widow(er))* that equal 1 if the respondent reports this marital status, and 0 otherwise.
Dwelling situation	This is a vector of 7 dummy variables (*House owner (with mortgage), House owner (no mortgage), Hosted, Tenant, Tenant (low-cost housing), Other (dwelling), Don't know (dwelling))* that equal 1 if the respondent reported this dwelling situation, and 0 otherwise.

E. Outcome variable for the placebo test

Propensity to plan	This is a score derived from the following five-item scale. Respondents were asked to rate whether they strongly agree, somewhat agree, somewhat disagree, strongly disagree, or are not concerned with the following statements: 1. I decide beforehand how my money will be used in the next one to two months. 2. I have considered future expenses (taxes, school fees, etc.) beforehand in order to stick to my budget in the next one to two months. 3. I like to review my budget for the next one to two months in order to get a better picture of my spending in the future. 4. I consult my budget to see how much money I have for the next one to two months. 5. It makes me feel better to have my finances planned out for the next one to two months. *Propensity to plan* equals the arithmetic average of the rating for each item (coding of ratings were reversed). It takes a missing value if the respondent answers "*Not concerned.*"
Present preference	This is a score derived from the following three-item scale. Respondents were asked to rate whether they strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, or strongly disagree with the following statements: 1. I find it more satisfying to spend money than to save it. 2. I tend to live for today and let tomorrow take care of itself. 3. Money is there to be spent. *Present preference* equals the arithmetic average of the rating for each item (coding of ratings were reversed).

Table 3. Summary statistics

The table reports the number of observations, mean, standard deviation, minimum, and maximum for the variables used in our empirical analysis. All variables are defined in Table 2.

	Obs.	Mean	Std. Dev.	Min.	Max.
Financial literacy	688	3.47	1.54	0	6
Anxiety	688	0.59	0.49	0	1
Guilt	688	0.58	0.49	0	1
Shame	688	0.47	0.50	0	1
Propensity to plan	665	3.09	0.68	1	4
Present preference	688	2.84	0.87	1	5
Effective income (original variable)	688	€1,983.60	€1,422.80	€204.12	€10,000
Income	688	7.38	0.67	5.32	9.21
Above median income	688	0.54	0.5	0	1
Extreme financial difficulties	688	0.21	0.53	0	4
Age	688	47.50	16.35	18	88
Woman	688	0.50	0.50	0	1
Low education	688	0.30	0.46	0	1
Intermediate education	688	0.18	0.39	0	1
High education	688	0.51	0.50	0	1
Don’t know (education)	688	0.00	0.054	0	1
Agriculteur	688	0.02	0.14	0	1
Artisan, merchant, company director	688	0.03	0.18	0	1
Inactive	688	0.07	0.26	0	1
Executive or intellectual profession	688	0.11	0.31	0	1
Student	688	0.04	0.20	0	1
Employee	688	0.17	0.37	0	1
Factory worker	688	0.12	0.33	0	1
Intermediate profession	688	0.14	0.35	0	1
Retiree	688	0.29	0.46	0	1
Ile de France	688	0.19	0.39	0	1
North	688	0.06	0.23	0	1
Est	688	0.08	0.27	0	1
East of Parisian Basin	688	0.08	0.27	0	1
West of Parisian Basin	688	0.09	0.29	0	1
West	688	0.14	0.34	0	1
Southwest	688	0.11	0.31	0	1
Southeast	688	0.13	0.34	0	1
Mediterranean	688	0.13	0.34	0	1
Single	688	0.27	0.44	0	1
Divorced	688	0.07	0.25	0	1
Married or civil union	688	0.60	0.49	0	1
Separated	688	0.02	0.15	0	1
Widow(er)	688	0.04	0.19	0	1
House owner (with mortgage)	688	0.20	0.40	0	1
House owner (no mortgage)	688	0.40	0.49	0	1
Hosted	688	0.06	0.23	0	1
Tenant	688	0.24	0.43	0	1
Tenant (low-cost housing)	688	0.08	0.27	0	1
Other (dwelling)	688	0.01	0.12	0	1
Don’t know (dwelling)	688	0.00	0.04	0	1

Table 4. Randomization checks on demographics

The table reports the results from *t*-tests of the difference in means, as well as the normalized difference of the demographic variables. All variables are defined in Table 2.

	Control group N= 335		Treatment group N= 353			
	Mean	Std. Dev.	Mean	Std. Dev.	*t*-test *p*-value	Normalized difference
Income	7.36	0.68	7.40	0.67	0.45	-0.04
Above median income	0.53	0.5	0.54	0.5	0.8	-0.01
Age	47.47	16.46	47.54	16.28	0.95	0.00
Woman	0.51	0.50	0.49	0.50	0.54	0.03
Low education	0.30	0.46	0.30	0.46	0.90	0.01
Intermediate education	0.21	0.41	0.16	0.37	0.13	0.08
High education	0.48	0.50	0.54	0.50	0.15	-0.08
Don't know (education)	0.01	0.08	0.00	0.00	0.15	0.08
Agriculteur	0.02	0.13	0.02	0.15	0.66	-0.02
Artisan, merchant, company director	0.03	0.17	0.04	0.19	0.61	-0.03
Inactive	0.07	0.25	0.08	0.27	0.58	-0.03
Executive or intellectual profession	0.10	0.29	0.12	0.32	0.38	-0.05
Student	0.04	0.19	0.05	0.21	0.55	-0.03
Employee	0.17	0.38	0.16	0.37	0.68	0.02
Factory worker	0.14	0.35	0.11	0.31	0.19	0.07
Intermediate profession	0.13	0.34	0.15	0.36	0.55	-0.03
Retiree	0.30	0.46	0.28	0.45	0.49	0.04
Ile de France	0.17	0.38	0.20	0.40	0.40	-0.05
North	0.06	0.23	0.06	0.24	0.88	-0.01
Est	0.08	0.27	0.08	0.27	0.83	-0.01
East of Parisian Basin	0.07	0.26	0.08	0.28	0.52	-0.04
West of Parisian Basin	0.10	0.30	0.08	0.27	0.31	0.05
West	0.15	0.36	0.12	0.33	0.35	0.05
Southwest	0.13	0.33	0.09	0.29	0.18	0.07
Southeast	0.12	0.32	0.14	0.35	0.28	-0.06
Mediterranean	0.13	0.33	0.13	0.34	0.85	-0.01
Single	0.27	0.45	0.27	0.44	0.94	0.00
Divorced	0.06	0.23	0.08	0.27	0.24	-0.06
Married or civil union	0.61	0.49	0.60	0.49	0.83	0.01
Separated	0.01	0.11	0.03	0.18	0.06	-0.10
Widow(er)	0.05	0.23	0.02	0.14	0.02	0.13
House owner (with mortgage)	0.20	0.40	0.21	0.41	0.75	-0.02
House owner (no mortgage)	0.39	0.49	0.42	0.49	0.50	-0.04
Hosted	0.06	0.24	0.05	0.22	0.51	0.04
Tenant	0.25	0.43	0.24	0.43	0.76	0.02
Tenant (low-cost housing)	0.08	0.27	0.08	0.27	0.84	0.01
Other (dwelling)	0.02	0.13	0.01	0.11	0.47	0.04
Don't know (dwelling)	0.00	0.05	0.00	0.00	0.30	0.05

Table 5. Effect of priming in the full sample

The table reports the results from a *t*-test of the difference in means for *Financial literacy* among primed and nonprimed respondents (irrespective of respondents' income level). It also reports *t*-tests for the emotion variables. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

Variable	Priming = 0 N= 335		Priming = 1 N= 353		
	Mean	Std. Dev.	Mean	Std. Dev.	*t*-test *p*-value
Financial literacy	3.43	1.51	3.50	1.57	0.56
Anxiety	0.61	0.49	0.58	0.50	0.41
Guilt	0.57	0.50	0.59	0.49	0.67
Shame	0.46	0.50	0.47	0.50	0.73

Table 6. Baseline results

The table reports the results (coefficient estimates and *t*-statistics in brackets) from the estimation of equation 1 in specification 1 and 2, and equation 3 in specifications 3-6. Specification 2 replicates specification 1 but replaces *Income* by the dummy variable *Above median income*. The estimation method is OLS with robust standard errors (clustered by individual). The dependent variable is *Financial literacy*. *Income* and all demographic variables are mean centered for easier interpretation of the intercept and main term. All variables are defined in Table 2. The regression includes the demographic variables defined in Table 2 (*Controls)*. The lower part of the table reports the number of observations (N), the R-squared and the pseudo R-squared. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	1 Financial literacy	2 Financial literacy	3 Financial literacy	4 Financial literacy	5 Financial literacy	6 Financial literacy
Priming	-0.016	-0.261*	-0.019	-0.006	-0.006	-0.010
	[-0.16]	[-1.68]	[-0.19]	[-0.06]	[-0.06]	[-0.10]
Income	0.113		0.0656	0.100	0.0672	0.0661
	[1.02]		[0.60]	[0.92]	[0.60]	[0.60]
Priming × Income	0.311**		0.278*	0.269*	0.316**	0.250*
	[2.12]		[1.91]	[1.86]	[2.16]	[1.74]
Above median income		-0.0208				
		[-0.13]				
Priming × Above median inc.		0.469**				
		[2.26]				
Anxiety			-0.347***			-0.263**
			[-3.04]			[-2.27]
Shame				-0.404***		-0.350***
				[-3.88]		[-3.30]
Guilt					-0.410***	
					[-3.73]	
Constant	3.470***	3.480***	3.677***	3.654***	3.704***	3.786***
	[47.78]	[31.24]	[36.86]	[41.04]	[36.81]	[35.39]
Controls	YES	YES	YES	YES	YES	YES
N	688	688	688	688	688	688
R^2	0.32	0.31	0.33	0.33	0.33	0.34

Table 7. Effect of priming in the full sample -Placebo variables

The table reports the results from a *t*-test of the difference in means for the outcome variable used for the placebo test (*Propensity to plan*, *Present preference*) among primed and nonprimed respondents (irrespective of respondents' income level). The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

Variable	Priming = 0 N= 335		Priming = 1 N= 353		
	Mean	Std. Dev.	Mean	Std. Dev.	*t*-test *p*-value
Propensity to plan	3.11	0.69	3.07	0.67	0.46
Present preference	2.84	0.88	2.84	0.86	0.97

Table 8. Placebo test

The table reports the results (coefficient estimates and *t*-statistics in brackets) from the placebo test. Estimation method is OLS with robust standards errors (clustered by individual). Dependent variables are *Propensity to plan* and *Present preference*. *Income* and all demographic variables are mean centered for easier interpretation of the intercept and main term. All variables are defined in Table 2. The regression includes the demographic variables defined in Table 2 (*Controls)*. The lower part of the table reports the number of observations (N) and the R-squared. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	1	2
	Propensity to plan	Present preference
Priming	-0.0384	-0.00307
	[-0.72]	[-0.05]
Income	-0.0737	-0.0500
	[-1.03]	[-0.62]
Priming × Income	0.0674	0.0727
	[0.76]	[0.69]
Constant	3.106***	2.844***
	[81.32]	[61.19]
Controls	YES	YES
N	665	688
R^2	0.05	0.09

Table 9 – The influence of extreme financial difficulties

The table reports the results (coefficient estimates and *t*-statistics in brackets) from OLS estimations with robust standards errors (clustered by individual). The dependent variable is *Financial literacy* (definition in Table 2). All demographic variables are mean centered for easier interpretation of the intercept and main term. The regression includes the demographic variables defined in Table 2 (*Controls*). The lower part of the table reports the number of observations (N) and the R-squared. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	1 (*Baseline*)	2	3
Priming	-0.0158	0.0816	0.0534
	[-0.16]	[0.76]	[0.49]
Income	0.113		0.127
	[1.02]		[1.15]
Priming × Income	0.311**		0.246*
	[2.12]		[1.65]
Extreme financial difficulties		-0.0486	-0.0786
		[-0.40]	[-0.63]
Priming × Extreme financial difficulties		-0.426**	-0.330*
		[-2.25]	[-1.72]
Constant	3.470***	3.479***	3.487***
	[47.78]	[43.69]	[43.75]
Controls	YES	YES	YES
Observations	688	688	688
R^2	0.32	0.32	0.33

Table 10. Mediation analysis - The statistical significance of introducing emotions

The table reports the results of Wald tests of significance of the difference between the coefficient of the interaction term (*Priming* × *Income*) in equation 1 and the respective in equation 3 (after introducing *Negative emotions*). All variables are defined in Table 2. Coefficients in columns 1, 4, 7, and 10 refer to the estimates of the interaction term in specification 1 of Table 6. Coefficients in columns 2, 5, 8, and 11 respectively refer to the estimation of the interaction term in specifications 3, 4, 5 and 6 of Table 6. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	Control for Anxiety			Control for Shame			Control for Guilt			Control for Anxiety & Shame		
	1	2	3	4	5	6	7	8	9	10	11	12
	No control	Control	**Diff. in coefficient**	No control	Control	**Diff. in coefficient**	No control	Control	**Diff. in coefficient**	No control	Control	**Diff. in coefficient**
Priming × Income	0.311**	0.278*	**0.033***	0.311**	0.269*	**0.042***	0.311**	0.316**	**-0.005**	0.311**	0.25*	**0.061****
	[0.146]	[0.146]	**[0.019]**	[0.145]	[0.145]	**[0.024]**	[0.146]	[0.146]	**[0.021]**	[0.144]	[0.144]	**[0.027]**

Table 11. The effect of the interaction term on negative emotions

The table reports the results (coefficient estimates and *t*-statistics in brackets) from the estimation of equation 4. The estimation method is logit with robust standard errors (clustered by individual). The header of each specification indicates the dependent variables used (*Anxiety*, *Guilt*, and *Shame*). Coefficient estimates are average marginal effects. *Income* and demographic variables are mean centered for easier interpretation of the intercept and main term. All variables are defined in Table 2. The regression includes the demographic variables defined in Table 2 (*Controls)*. The lower part of the table reports the number of observations (N), the pseudo R-squared. Two observations are dropped due to perfect prediction. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	1 Anxiety	2 Guilt	3 Shame
Priming	-0.011	0.0214	0.0223
	[-0.32]	[0.62]	[0.61]
Income	-0.196***	-0.109***	-0.0858**
	[-5.90]	[-3.32]	[-2.61]
Priming × Income	-0.102*	0.0166	-0.105*
	[-1.88]	[0.30]	[-1.95]
Constant	0.590***	0.583***	0.465***
	[35.55]	[34.12]	[25.88]
Controls	YES	YES	YES
N	686	686	686
Pseudo R^2	0.08	0.13	0.17

Figure 1. Priming effect on the financial literacy score

This figure illustrates the change in *Financial literacy* (y-axis) due to priming for 20 different levels of *Income* (x-axis). The figure is obtained after the estimation of specification 1 in Table 6 (i.e., equation 1). The bars indicate 95% confidence intervals, and the black vertical line reflects the median value of *Income*.

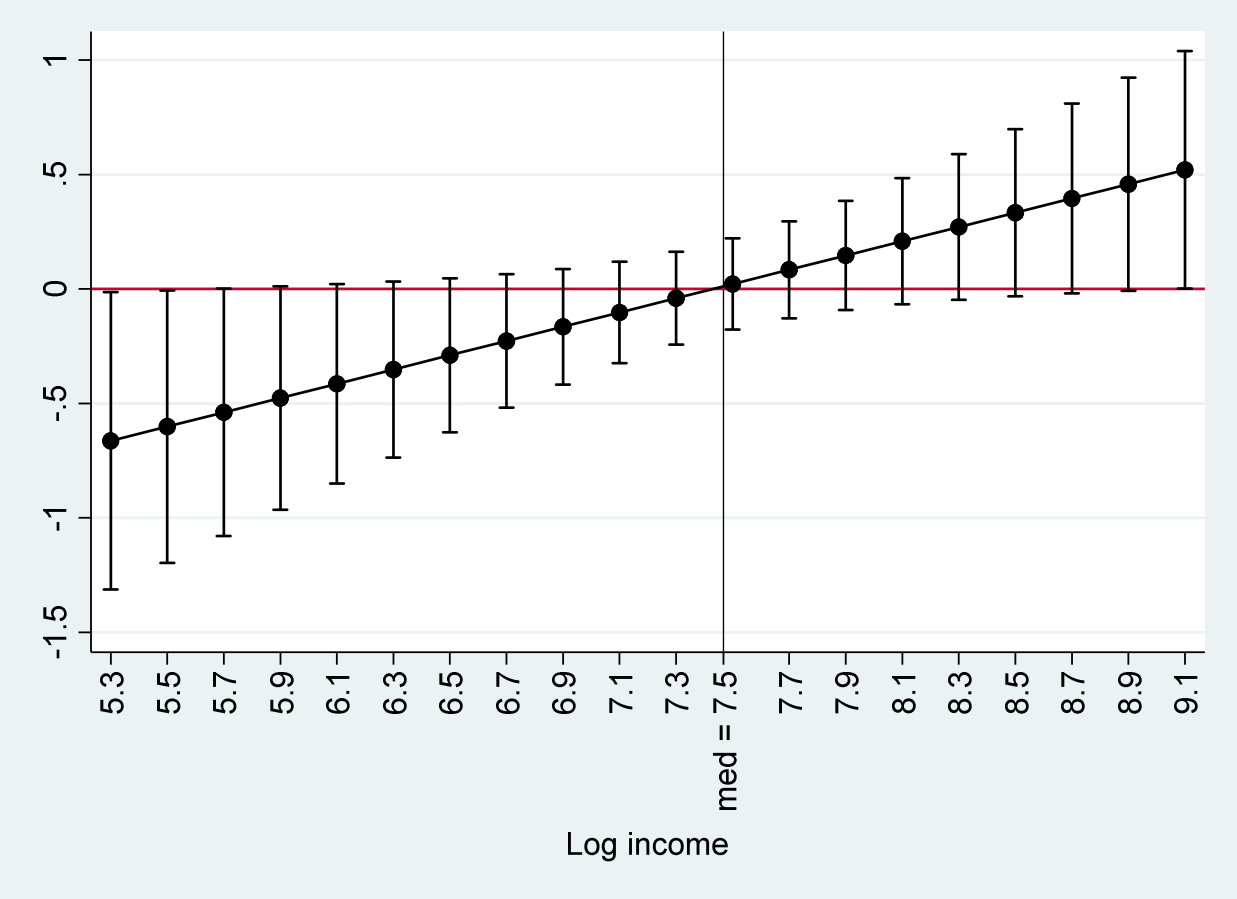


Figure 2. Priming effect below and above the median *Income*

This figure illustrates the score of *Financial literacy* (y-axis) depending on the priming status for individuals having an effective income (*Income*) below/above the median (x-axis). The figure is obtained from the estimation of specification 2 in Table 6. The bars indicate 95% confidence intervals.

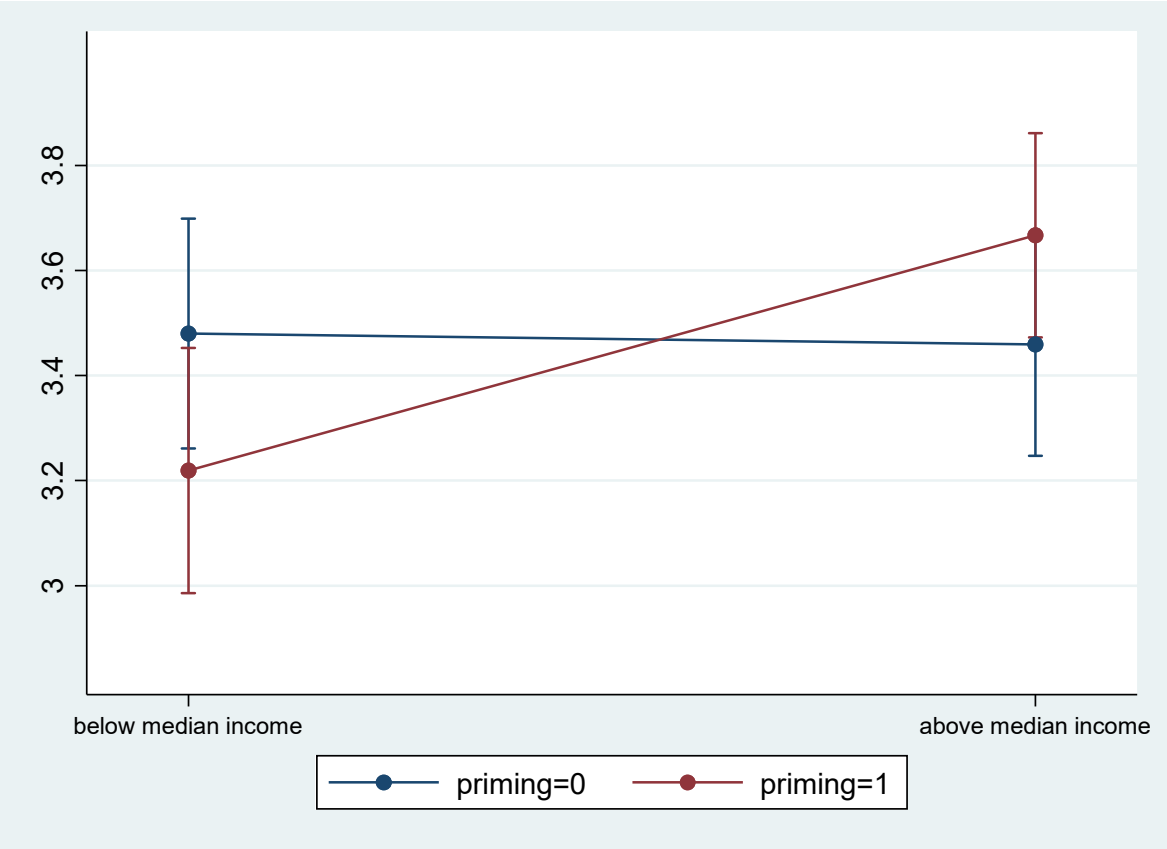
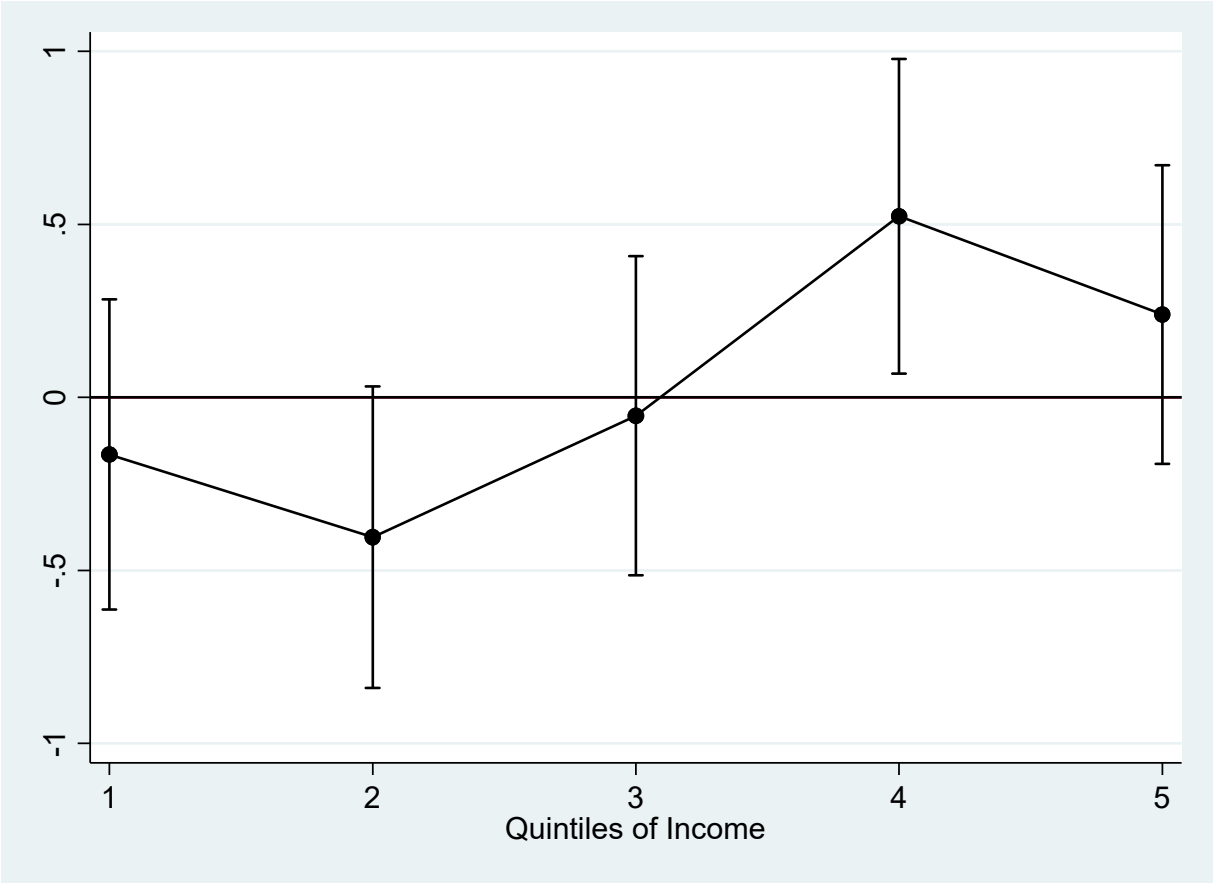


Figure 3. Priming effect by quintiles of *Income*

This figure illustrates the change in *Financial literacy* (y-axis) due to priming for 5 quintiles of the distribution of *Income* (x-axis). For instance, on the x-axis, 1 refers to respondents at the bottom 20% of *Income* distribution. The bars indicate 95% confidence intervals, and the black vertical line reflects the median value of *Income*.



Online Appendix

Economic condition and financial cognition

This Appendix, intended for internet use only, reports the following:

1. The 24 questions that include the six questions of the financial literacy quiz, the cognitive reflective test and the questions on emotions.
2. The correlation matrix of variables of interest in this study.
3. The test that treatment and control groups are homogeneous as regards the observable characteristics in the three subsamples reflecting terciles of the distribution of *Income*.
4. The results from sensitivity tests on the use of demographic control variables.
5. Definitions and summary statistics of additional variables used for analyses reported in the Appendix.
6. Test of the main effect of priming for additional dependent variables used for analyses reported in the Appendix
7. Tables of results corresponding to additional empirical developments in section 4.2

The 24 questions

We report here the 24 questions that follow the priming questions for the treatment group and are followed by the priming questions for the control group. The order of the questions appears as in the actual survey (headers are not included in the questionnaire).

Self-confidence in financial management (six questions)

Overall, would say that you are comfortable in doing calculations? (**question 1**)

1. Strongly agree

2. Somewhat agree

3. Somewhat disagree

4. Strongly disagree

On a scale of 1 to 5, where 1 is "not at all" and 5 is "yes, exactly", assess whether your financial knowledge is sufficient to deal with each of the following situations.

2. Assess the return and the risk associated with financial investments. (**question 2**)

3. Discuss with your financial advisor to optimize your financial management. (**question 3**)

4. Read your account statement. (**question 4**)

5. Subscribe a credit. (**question 5**)

6. Buy a house. (**question 6**)

Financial literacy quiz (six questions)

1. Suppose you put $100 into a savings account with a guaranteed interest rate of 2% per year. You don't make any further payments into this account and you don't withdraw any money. How much would be in the account at the end of the first year? [Open response: $102] (**question 7**)

2. and how much would be in the account at the end of five years? (**question 8**)

Would it be;

*a) More than €110**

b) Exactly €110

c) Less than €110

d) It is impossible to tell from the information given

e) other response (open)

f) do not know

3. You owe $3,000 on your credit card. You pay a minimum payment of $30 each month. At an Annual Percentage Rate of 12% (or 1% per month), how many years would it take to eliminate your credit card debt if you made no additional new charges? (**question 9**)

a) Less than 5 years

b) Between 5 and 10 years

c) Between 10 and 15 years

*d) Never, you will continue to be in debt**

e) Do not know

4. An investment with a high return is likely to be high risk. [True/False] (**question 10**)

5. It is usually possible to reduce the risk of investing in the stock market by buying a wide range of stocks and shares. [True/False] (**question 11**)

6. High inflation means that the cost of living is increasing slowly. [True/False] (**question 12**)

Cognitive reflection test (CRT)

A bat and a ball cost €1.10 in total. The bat costs €1 more than the ball. How much does the ball cost? [5cts] (**question 13**)

Loss aversion

*Let's imagine that you are endowed with 10€, would you accept to participate in the following lottery (***question 14***):*

1. Earning 10€ more if the coin shows head, and losing 10€ if it shows tail? (Yes/No);

2. If respondents answered no: would you accept to participate if the loss pass to 8€? (Yes/No)

3. If respondents answered no: would you accept to participate if the loss pass to 5€? (Yes/No)

4. If respondents answered no: for which amount of money would you accept to participate? (open response)

Perception of bank advisor (four questions)

Would you say that you "totally agree", "rather agree", "rather disagree", or "totally disagree" with the following statements?

1. I worry that the bank advisor would think I'm ignorant if I come into their office with a minor financial concern. (**question 15**)

2. Describing to my bank advisor how I spend money on frivolous or unnecessary items is not embarrassing for me. (**question 16**)

3. The bank advisor is the right person to talk about financial distress. (**question 17**)

4. When I have to take an important decision, I do not hesitate to take some advice from by bank officer. (**question 18**)

Negative emotions about the financial situation (three questions)

Would you say that you "totally agree", "rather agree", "rather disagree", or "totally disagree" with the following statements?

*1. Thinking about my personal finance makes me anxious. (***question 19**)

2. I can feel guilty by thinking that I should have better controlled my spending. (**question 20**)

3. When I have financial problems I prefer not evoking them with anyone, not even my relatives. (**question 21**)

Budget behavioral intentions (three questions)

Would you say that you "totally agree", "rather agree", "rather disagree", or "totally disagree" with the following statements?

4. When I subscribe a loan, I usually choose to repay the highest monthly settlements, even though it requires an important budget effort. (**question 22**)

5. I would accept to implement a standing orders towards a blocked savings account that would constraint me to save more (**question 23**)

*6. I take measures to save energy in order to improve my budget situation (***question 24***)*

Table A1. Correlation matrix

The table shows the pairwise correlation coefficients between the variable of interest used in this study. The * mark indicates statistical significance at the 5% level

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Financial literacy	1.000												
(2) Anxiety	-0.201*	1.000											
(3) Guilt	-0.180*	0.437*	1.000										
(4) Shame	-0.172*	0.256*	0.234*	1.000									
(5) Propensity to plan	0.032	0.039	0.023	0.011	1.000								
(6) Present preference	-0.110*	0.129*	0.199*	0.190*	-0.153*	1.000							
(7) Priming	0.040	0.001	0.009	-0.005	0.013	-0.012	1.000						
(8) Income	0.320*	-0.327*	-0.189*	-0.133*	0.053	-0.082*	0.053	1.000					
(9) Above median income	0.310*	-0.307*	-0.210*	-0.106*	0.038	-0.165*	0.010	0.733*	1.000				
(10) Extreme financial diff.	-0.158*	0.218*	0.176*	0.124*	-0.062	0.193*	-0.013	-0.157*	-0.177*	1.000			
Appendix variables													
(11) Self-confidence fin. man.	0.339*	-0.201*	-0.184*	-0.087*	0.202*	-0.126*	-0.007	0.289*	0.239*	-0.129*	1.000		
(12) Pos. perc. bank advis.	0.083*	0.005	0.063*	-0.071*	0.041	0.058	-0.028	0.020	0.019	-0.032	0.169*	1.000	
(13) Loss aversion	0.020	-0.056	-0.067*	-0.036	0.017	-0.180*	0.010	-0.015	0.010	-0.079*	0.013	-0.031	1.000

Table A2. Randomization checks on demographics – Breakdown by tercile of *Income* distribution

The table reports the results from *t*-tests (*p*-value) of the difference in means and the normalized difference of the demographic variables across treatment statuses, for the bottom, middle and top tercile of *Income* distribution. All variables are defined in Table 2. *t*-tests and normalized differences are not reported when the mean of the variable is 0 across treatment statuses.

	Bottom tercile of Income				Middle tercile of Income				Top tercile of Income			
	Mean control group	Mean treatment group	*t*-test *p*-value	Normalized difference	Mean control group	Mean treatment group	*t*-test *p*-value	Normalized difference	Mean control group	Mean treatment group	*t*-test *p*-value	Normalized difference
Income	6.69	6.74	0.51	-0.06	7.45	7.44	0.54	0.06	8.05	8.10	0.42	-0.08
Age	39.60	40.01	0.82	-0.02	46.41	48.83	0.25	-0.11	57.82	54.61	0.13	0.15
Woman	0.58	0.59	0.84	-0.02	0.53	0.47	0.39	0.08	0.41	0.39	0.72	0.03
Low education	0.36	0.39	0.66	-0.04	0.32	0.33	0.88	-0.01	0.22	0.17	0.32	0.10
Intermediate education	0.21	0.19	0.66	0.04	0.24	0.16	0.14	0.14	0.17	0.14	0.50	0.07
High education	0.41	0.42	0.86	-0.02	0.44	0.51	0.30	-0.10	0.61	0.70	0.18	-0.13
Don't know (Education)	0.02	0.00	0.16	0.13	0.00	0.00	.	.	0.00	0.00	.	.
Farmer	0.02	0.05	0.15	-0.13	0.03	0.01	0.25	0.11	0.01	0.01	0.98	0.00
craftsman, merchant, company director	0.04	0.05	0.75	-0.03	0.01	0.04	0.14	-0.14	0.04	0.02	0.38	0.08
Inactive	0.14	0.16	0.58	-0.05	0.02	0.05	0.21	-0.12	0.03	0.01	0.30	0.10
Executive or intellectual profession	0.05	0.07	0.57	-0.05	0.07	0.08	0.64	-0.04	0.18	0.21	0.58	-0.05
Student	0.09	0.11	0.65	-0.04	0.02	0.02	0.76	-0.03	0.00	0.01	0.33	-0.10
Employee	0.27	0.21	0.31	0.09	0.23	0.19	0.50	0.06	0.01	0.07	0.02	-0.23
Factory worker	0.16	0.16	0.98	0.00	0.23	0.10	0.01	0.25	0.03	0.06	0.34	-0.09
Intermediate profession	0.14	0.12	0.72	0.03	0.16	0.18	0.67	-0.04	0.10	0.15	0.36	-0.09
Retiree	0.10	0.07	0.38	0.08	0.25	0.32	0.20	-0.12	0.60	0.47	0.05	0.19
Ile de France	0.14	0.17	0.47	-0.07	0.15	0.18	0.54	-0.06	0.24	0.25	0.87	-0.02
North	0.06	0.07	0.99	0.00	0.07	0.09	0.49	-0.07	0.04	0.02	0.38	0.08
Est	0.09	0.10	0.81	-0.02	0.07	0.08	0.64	-0.04	0.08	0.06	0.73	0.03
East of Parisian Basin	0.06	0.07	0.99	0.00	0.11	0.12	0.95	-0.01	0.04	0.07	0.26	-0.11
West of Parisian Basin	0.07	0.10	0.48	-0.06	0.15	0.07	0.04	0.19	0.09	0.07	0.74	0.03
West	0.17	0.14	0.50	0.06	0.12	0.11	0.72	0.03	0.15	0.13	0.62	0.05
South-West	0.16	0.06	0.01	0.24	0.09	0.13	0.37	-0.08	0.11	0.09	0.59	0.05
South-East	0.13	0.13	0.98	0.00	0.13	0.14	0.85	-0.02	0.09	0.17	0.08	-0.17
Mediterranean	0.11	0.18	0.14	-0.13	0.10	0.08	0.59	0.05	0.17	0.14	0.50	0.07

Single	0.36	0.29	0.24	0.11	0.34	0.31	0.59	0.05	0.10	0.20	0.03	-0.21
Divorced	0.06	0.06	0.80	0.02	0.06	0.10	0.24	-0.11	0.05	0.08	0.30	-0.10
Married or civil union	0.52	0.59	0.28	-0.10	0.57	0.52	0.50	0.06	0.75	0.70	0.37	0.09
Separated	0.02	0.07	0.12	-0.14	0.00	0.03	0.06	-0.18	0.01	0.00	0.31	0.10
Widow(er)	0.03	0.00	0.04	0.18	0.04	0.04	0.89	-0.01	0.10	0.02	0.01	0.24
House owner (with mortgage)	0.22	0.15	0.20	0.11	0.18	0.22	0.41	-0.08	0.19	0.25	0.31	-0.10
House owner (no mortgage)	0.19	0.28	0.13	-0.14	0.39	0.43	0.51	-0.06	0.63	0.56	0.31	0.10
Hosted	0.11	0.07	0.19	0.12	0.05	0.03	0.59	0.05	0.02	0.06	0.17	-0.13
Tenant	0.31	0.34	0.56	-0.05	0.30	0.22	0.18	0.13	0.12	0.14	0.77	-0.03
Tenant (Low cost housing)	0.14	0.14	0.98	0.00	0.08	0.08	0.84	-0.02	0.02	0.00	0.15	0.14
Other (dwelling)	0.02	0.02	0.99	0.00	0.01	0.01	0.93	0.01	0.02	0.00	0.15	0.14
Don’t know (dwelling)	0.01	0.00	0.32	0.09	0.00	0.00	.	.	0.00	0.00	.	.

Table A3. Sensitivity to demographic variables

This table reports coefficient estimates and standard errors (in brackets) for specifications that differ based on the control variables. Estimation method is OLS with robust standards errors (clustered by individual). Dependent variable is the *Financial literacy* score. *Income* and all demographic variables are mean centered for easier interpretation of the intercept and main term. All variables are defined in Table 2. Specification 9 is the specification with the full set of controls, used as the baseline specification 1 of Table 6. The lower part of the table reports the number of observations (N) and the R-squared. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	1	2	3	4	5	6	7	8	9
Priming	0.0383	0.0368	0.0209	-0.00950	0.0290	0.0312	0.0269	0.0190	-0.0158
	[0.35]	[0.34]	[0.19]	[-0.09]	[0.27]	[0.28]	[0.24]	[0.17]	[-0.16]
Income	0.631***	0.484***	0.575***	0.536***	0.307**	0.613***	0.606***	0.467***	0.113
	[5.60]	[4.12]	[5.26]	[5.01]	[2.58]	[5.44]	[5.20]	[4.11]	[1.02]
Priming × Income	0.318**	0.341**	0.298**	0.305**	0.370**	0.333**	0.308**	0.307**	0.311**
	[2.04]	[2.19]	[1.97]	[2.00]	[2.43]	[2.14]	[1.97]	[2.03]	[2.12]
Age		0.0147***							0.00506
		[4.22]							[0.81]
Woman			-0.643***						-0.706***
			[-5.88]						[-6.69]
Low education				-0.773***					-0.828***
				[-6.11]					[-6.25]
Intermediate education				-0.633***					-0.520***
				[-4.32]					[-3.50]
I don't know (education)				-2.546***					-1.867***
				[-21.91]					[-6.22]
Farmer					-0.460				-0.467
					[-1.30]				[-1.00]
Craftsman, merchant, firm director					-0.670**				-0.672**
					[-2.31]				[-2.08]
Inactive					-0.904***				-0.525**
					[-3.46]				[-2.00]
Executive, intellectual prof.					-0.130				-0.305
					[-0.74]				[-1.40]
Student					-0.694**				-0.550
					[-2.49]				[-1.49]
Employee					-1.243***				-0.937***
					[-6.71]				[-3.79]
Factory worker					-1.013***				-0.660***
					[-5.42]				[-2.77]
Intermediate profession					-0.448***				-0.433*
					[-2.78]				[-1.95]
Ile de France						-0.155			-0.0157
						[-0.79]			[-0.09]

North						-0.646**			-0.379
						[-2.16]			[-1.40]
East						0.0213			0.109
						[0.09]			[0.50]
East of Parisian Basin						-0.000721			-0.0560
						[-0.00]			[-0.23]
West of Parisian Basin						-0.124			-0.0185
						[-0.57]			[-0.09]
West						-0.173			-0.0391
						[-0.81]			[-0.20]
South-West						-0.129			-0.0685
						[-0.56]			[-0.34]
South-East						-0.126			-0.0839
						[-0.60]			[-0.45]
Single							0.179		0.335
							[0.53]		[1.02]
Divorced							0.390		0.433
							[1.02]		[1.23]
Married or in civil union							0.360		0.347
							[1.11]		[1.15]
Separated							0.0891		0.0820
							[0.16]		[0.16]
House owner (with mortgage)								-0.0690	0.0652
								[-0.47]	[0.43]
Hosted								-0.279	-0.0706
								[-1.22]	[-0.28]
Tenant								-0.529***	-0.344**
								[-3.65]	[-2.23]
Tenant (low cost housing)								-0.923***	-0.475**
								[-3.60]	[-2.06]
Other (dwelling)								-0.302	-0.116
								[-0.51]	[-0.24]
Don’t know (dwelling)								-2.401***	-1.089***
								[-17.92]	[-2.78]
Constant	3.442***	2.732***	3.760***	3.813***	3.975***	3.563***	3.142***	3.680***	3.470***
	[43.52]	[14.65]	[40.73]	[40.63]	[35.58]	[22.63]	[9.84]	[36.63]	[47.78]
N	688	688	688	688	688	688	688	688	688
R^2	0.12	0.15	0.17	0.18	0.20	0.13	0.13	0.16	0.32

Table A4. Definitions of additional variables

Variable	Definition
Self-confidence financial management	The average rating in questions on self-confidence in financial management (questions 2 to 6 in Appendix 1).
Loss aversion	A binary variable equal to 1 if respondents answered "No" to items 1 and 2 of question 14 in Appendix 1 (Loss aversion question), and 0 otherwise.
Positive perception bank advisor	The average rating in questions on the perception of the respondents' bank advisor (questions 15 to 18 of Appendix 1, coding of questions 16-18 were reversed in order to obtain a coherent score).
IDK	Score measuring the number of answers "I do not know" to questions from the financial literacy tests. It is obtained by adding one for each answer "I do not know" to financial literacy questions.
At least 1 IDK	Binary variable taking the value 1 if respondents answered "I do not know" to at least 1 question from the financial literacy test, and 0 otherwise.

Table A5. Summary statistics for additional variables

The table reports the number of observations, mean, standard deviation, minimum, and maximum for the variables used in additional empirical tests reported in the Appendix. The variables are defined in Table A4.

Variable	N	Mean	Std. Dev.	Min.	Max.
Self-confidence financial management	688	3.68	0.90	1	5
Loss aversion	688	0.61	0.49	0	1
Positive perception the bank advisor	688	2.90	0.47	1.75	4
IDK	688	0.77	1.25	0	6
At least 1 IDK	688	0.38	0.49	0	1

Table A6. Effect of priming on the whole sample for additional dependent variables

The table reports the results from *t*-tests (*p*-value) of the difference in means for the additional variables used in additional empirical tests reported in the Appendix (defined in Table A4) among the primed and nonprimed respondents (irrespective of the respondents' income level). The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

Variable	Priming = 0 N= 335		Priming = 1 N= 353		
	Mean	Std. Dev.	Mean	Std. Dev.	*t*-test *p*-value
Self-confidence financial management	3.68	0.92	3.68	0.88	0.98
Loss aversion	0.61	0.49	0.61	0.49	0.935
Positive perception bank advisor	2.92	0.47	2.89	0.47	0.415
IDK	0.81	1.28	0.73	1.22	0.38
At least 1 IDK	0.39	0.49	0.38	0.49	0.70

Table A7. Controlling for additional traits

The table reports the results (coefficient estimates and *t*-statistics in brackets) from the estimation of equation 1, further adding the additional traits defined in Table A4. Estimation method is OLS with robust standards errors (clustered by individual). Dependent variable is the *Financial literacy* score. *Income* and all demographic variables are mean centered for easier interpretation of the intercept and main term. The regression includes the demographic variables defined in Table 2 (*Controls)*. The lower part of the table reports the number of observations (N) and the R-squared. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	1	2	3	4
Priming	-0.0158	-0.00924	-0.0142	-0.0137
	[-0.16]	[-0.09]	[-0.14]	[-0.13]
Income	0.113	0.0500	0.119	0.116
	[1.02]	[0.45]	[1.08]	[1.04]
Priming × Income	0.311**	0.304**	0.311**	0.306**
	[2.12]	[2.10]	[2.11]	[2.06]
Self-confidence financial management		0.358***		
		[5.62]		
Loss aversion			0.118	
			[1.12]	
Positive perception bank advisor				0.0660
				[0.61]
Constant	3.470***	2.149***	3.397***	3.277***
	[47.78]	[8.65]	[34.08]	[10.21]
Controls	YES	YES	YES	YES
N	688	688	688	688
R^2	0.32	0.35	0.32	0.32

Table A8 – The influence of Self-confidence.

The table reports the results (coefficient estimates and *t*-statistics in brackets) from OLS estimations with robust standards errors (clustered by individual). The dependent variable of specification 1 is *Self-confidence financial management*; in specification 2, *IDK*; in specification 3, *At least 1 IDK* (definition in Table A4); and in specifications 4 and 5, *Financial literacy* (definition in Table 2). *Income*, *Self-confidence financial management*, and all demographic variables are mean centered for easier interpretation of the intercept and main term. The regression includes the demographic variables defined in Table 2 (*Controls*). The lower part of the table reports the number of observations (N) and the R-squared. The *, **, and *** marks denote statistical significance at the 10%, 5%, and 1% level, respectively.

	1 Self-confidence	2 IDK	3 At least 1 IDK	4 Financial literacy	5 Financial literacy
Priming	-0.0183	-0.0564	-0.000576	-0.00916	-0.0304
	[-0.28]	[-0.65]	[-0.02]	[-0.09]	[-0.29]
Income	0.175*	-0.111	-0.0444	0.0695	0.0661
	[1.91]	[-0.97]	[-1.01]	[0.62]	[0.60]
Priming × Income	0.0211	-0.0145	-0.0591	0.261*	0.271*
	[0.20]	[-0.11]	[-1.14]	[1.69]	[1.77]
Self-confidence financial man.				0.308***	0.304***
				[3.74]	[3.56]
Priming × Self-confidence financial man.				0.103	0.105
				[0.86]	[0.85]
Income × Self-confidence financial man.					-0.0321
					[-0.32]
Priming × Income × Self-confidence financial man.					0.116
					[0.71]
Constant	0.00918	0.795***	0.385***	3.467***	3.473***
	[0.19]	[12.61]	[15.30]	[48.54]	[46.79]
Controls	YES	YES	YES	YES	YES
N	688	688	688	688	688
R^2	0.17	0.21	0.18	0.36	0.36