Gender gaps in financial literacy: a multi-arm RCT to break the response bias in surveys[*]

Laura Hospido
Banco de España, CEMFI and IZA

Nagore Iriberri
University of the Basque Country, UPV/EHU and IKERBASQUE, Basque Foundation for Science

Margarita Machelett
Banco de España

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Abstract

Gender gaps in financial literacy are pervasive and persistent. They are partly explained because women choose "I do not know" more frequently. We test for the effectiveness of three interventions to shift this behavior. The control survey includes the possibility of "I do not know". The three treatments either exclude this possibility, offer incentives for correct answers, or inform survey takers of the existing gender gap in choosing this answer option. While all interventions are very effective in reducing this answer option, only the information significantly reduces the gender gap in "I do not know" and in financial literacy.

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1   Introduction

Financial literacy, the understanding of basic financial concepts such as inflation and risk diversification, impacts important economic decisions, for example, retirement and saving plans, stock market participation, and, ultimately, households' wealth levels and well-being (IOSCO, 2018; Lusardi and Mitchell, 2014, 2023). Improving the general population's financial literacy, especially for the most vulnerable, has become a major policy goal in many countries (OECD, 2013). In the U.S., many states now require students to take a personal finance course before graduating from high school. In fact, financial literacy was recently declared an essential skill by the G20 with increasing support towards efforts to design, implement and evaluate financial literacy policies (G20, 2021). An appropriate policy response should consider that financial knowledge is not evenly distributed in the population. In particular, women perform more poorly in financial literacy surveys, a fact that is persistent across countries and over time (OECD, 2016; Klapper and Lusardi, 2020). This gender gap is partly explained by differences in observable characteristics such as education, experience in financial decisions and interest in financial topics.[1] However, a considerable part of this gap remains unexplained.

In this paper, we study gender gaps in financial literacy, switching the focus to *how* participants behave in surveys, thus affecting financial literacy measurement. Ideally, we would like to have an elicitation method that captures each individual's knowledge about financial concepts. In reality, however, individuals' knowledge is measured by the percentage of correct answers in financial literacy surveys that allow for "I do not know" as a valid answer. As a result, we cannot observe the knowledge of the individuals who choose to answer "I do not know"; we can only observe the percent of correct and incorrect answers for those individuals who do not choose "I do not know". This may be problematic if we want to compare the financial literacy of different groups with different propensities to choose "I do

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[1]See, among others, Chen and Volpe (2002); Fonseca et al. (2012); Driva et al. (2016); Hsu (2016); Bucher-Koenen et al. (2017); Zaccaria and Guiso (2020); Bottazzi and Lusardi (2021).

not know" - for example, men's and women's. Although only a few papers have focused on this finding, women are indeed found to choose the "I do not know" answer option more frequently than men, which is partly explaining the gender gap in financial literacy (Lusardi and Mitchell, 2014; Bucher-Koenen et al., 2021; Hospido et al., 2023). If men and women have different likelihoods of choosing "I do not know", to which we will refer to as response bias in surveys, then typical measures of financial literacy can be biased and inaccurate.

To better understand the underlying problem, we should consider that there can be several reasons for choosing the "I do not know" answer option. Lack of knowledge would be the first candidate. Lack of confidence is an alternative and equally reasonable motivation, too. Independent of the level of knowledge, the higher the uncertainty attached to the probability of knowing the answer, the more likely to answer "I do not know". Lack of effort or lack of willingness to put in effort, as well as risk aversion could be other motivations. As long as multiple motivations - apart from genuine lack of knowledge - exist behind the choice of the "I do not know" option, and men and women may differ in characteristics that lead to particular motivations, then financial literacy measure comparisons should be taken with caution. Simple, extreme examples can illustrate the problem. Assume a population of men and women who are equally and fully knowledgeable of all basic financial concepts. Moreover, assume women are fully underconfident and always choose the "I do not know" option, while men are fully confident and always choose to respond. In this particular example, where men and women were equally knowledgeable, we would conclude that men's financial literacy is perfect while women have none and therefore, policy efforts could be mistargeted.

In this paper, we measure how *malleable* the propensity to choose "I do not know" is and how this affects financial literacy measures by gender. In particular, we evaluate three interventions to potentially reduce the response bias in the propensity to choose "I do not know". We circumvent measurement challenges with a multi-arm randomized control trial (RCT) where 6,000 participants from Spain complete an online survey that *only* varies the financial literacy section design. This section builds on the OECD International Network of

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Financial Education (INFE) questionnaire (OECD, 2022) and the Spanish Survey of Financial Competences (Hospido et al., 2023). The INFE questionnaire is the globally recognised toolkit used by around 40 countries and economies, including 20 OECD member countries and 8 G20 members, to measure adult financial literacy competencies in an internationally comparable way.[2] Importantly, we include our main outcome, the *Big Five* foundational survey questions (Hastings et al., 2013). The *Big Five* questions, developed by Anamaria Lusardi and Olivia Mitchell, measure basic understanding of inflation, compound interest rate, risk diversification, mortgages, and bond pricing. They are either multiple choice or true or false questions that allow for "I do not know" as a valid answer.

First, participants in the control group complete the financial literacy section where the "I do not know" (IDK) answer is allowed, as is standard in these surveys. The remaining participants are assigned to one of the three treatment arms. The first treatment, "without IDK", presents the same financial literacy section without the "I do not know" answer option. This forces participants to choose an answer, allowing us to measure the extent in which choosing "I do not know" reflects effective knowledge gaps or different response biases due to, for example, lack of confidence or lack of willingness to put in effort. The second treatment, "incentives", provides explicit and immediate monetary incentives for each correct answer and no credit for incorrect and IDK answers. This should induce profit-maximizing participants to strictly prefer selecting an option over IDK, and provide a quantifiable measure to the extent in which participants prefer to forego a chance of receiving credit. Finally, the "information" treatment presents, to both male and female survey takers in this treatment group, a sentence with statistics based on the gender gap in financial literacy and women's propensity to choose "I do not know" relative to men's. This treatment aims to raise awareness of potential deterrents from women's success, as measured by the percent of correct answers, prompting participants to provide educated guesses when uncertain.[3]

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[2] See (OECD, 2023) for results on the third coordinates measurement exercise.

[3] The use of information as a nudge has been widely used in different settings, as shown by Gabaix (2019), both in non-financial settings (Boring and Philippe, 2021) and in financial settings, for example, to increase loan repayment or savings (Karlan et al., 2015; Haran Rosen and Sade, 2022).

In addition to measuring financial literacy, the survey gathers standard and novel individual characteristics, which allow us to test how those can help explain gender differences in financial literacy. It gathers characteristics such as households' and their parents' sociodemographics, interest in financial topics, and experience with financial products, as well as personal traits and experiences, such as risk preferences, confidence and competitiveness, which have been found relevant in explaining other relevant economic decisions (see, for example, Buser et al. 2014). Additionally, the survey keeps track of whether and where participants abandon the survey, their perceived difficulty, and completion time, offering the unique possibility to study relevant outcomes often unavailable from surveys.

Overall, we confirm the two key patterns observed in the literature in our control group. First, women are less financially literate than men, as measured by the percent of correct answers. This gap reaches almost a 9 percentage point difference as women have an average of 49 percent of correct answers, while men have 58 percent. Second, women are more likely to choose "I do not know" answer option than men. This gap is over 6 percentage points as women choose IDK 18 percent of the time while men do this 12 percent. Finally, the gap in percent incorrect is small but positive, of 2 percentage points, women having 31 percent incorrect and men having 29 percent incorrect. The gaps, on financial literacy and IDK, remain significant but are reduced to 6 and 4 percentage points, respectively, when adding control variables, while the gender gap in incorrect answers is no longer significantly different from zero. Either way, the response bias accounts for at least two-thirds of the gender gap in financial literacy.

Interestingly, and the main innovation of this paper, we find that the propensity to provide an answer is malleable, as all three interventions effectively reduce the percent of "I do not know" answers. In the control group, 15 percent of survey takers choose this answer. By design, the treatment without IDK reduces this percent to zero. The incentives reduce this answer choice to 9 percent, and the provision of information to 7 percent. Although the knowledge of each group should be the same as the interventions were randomly assigned,

these reductions translate into significant increases in observed financial literacy but also in the percentage of incorrect answers. With respect to financial literacy measures, the increase goes from 53 percent correct in the control group to 60, 56, and 57 percent correct in the without IDK, incentives, and information, respectively. With respect to percent incorrect, the increase goes from 30 percent incorrect in the control group to 38, 33 and 34 percent incorrect in the without IDK, incentives, and information, respectively. Overall, this confirms that the choice of "I do not know" does not only reflect lack of knowledge.

Importantly, we observe different impacts by treatment and gender. Again, by design, the without IDK reduces this gap to zero. More interestingly, introducing incentives does not significantly reduce the gender gap in "I do not know" answers, whereas the information treatment shows effective in reducing the gap in response bias, reducing it to half, from over 6 to close to 3 percentage points, and closing it in the specifications with controls.

In turn, this has implications for the gender gap in financial literacy and percent incorrect measures. Eliminating the "I do not know" answer seems to go in the direction of reducing the gender gap in financial literacy, but the effect is not significant. In addition, it increases the percent incorrect significantly more for women. If we consider this treatment as the cleanest to provide an observable measure of individual's knowledge, we conclude that at most women know 57 percent of the questions, while men know 63 percent, again confirming that the choice of "I do not know" does not only reflect lack of knowledge. For the remaining two treatments, as the answer "IDK" is available, the results will inform us about whether relatively more knowledgeable male and female participants are attracted into answering. The introduction of incentives, if anything, can only increase the gender gap in correct answers but the effect is not significant, while the effect is significant and detrimental for women if we consider the percent incorrect. This suggests that monetary incentives attract the relatively more knowledgeable men into providing an answer. By contrast, and consistent with the results on reducing, and even closing, the gender gap in the choice of "I do not know", the information treatment is the only one that reduces significantly (at the 10% significance level)

the gender gap in financial literacy. This gap is reduced by half, from close to 6 to less than 3 percentage points. In addition, it is the only treatment that does not significantly increase the percent incorrect gender gap. This suggests that the information nudge is equalizing men and women's response bias behavior and attracting relatively more knowledgeable women into providing their preferred answer than men.

We provide an additional evaluation of the three interventions using a random guessing benchmark and studying their effect on alternative outcomes, such as the probability of abandoning the survey, perceived difficulty and completion time. Regarding the random guessing benchmark, we find most support for the information treatment. Interestingly, the three interventions do not impact differently the probability of exiting the survey or perceived difficulty. Only the without IDK treatment increases the completion time significantly more for women than men.

All in all, we conclude that an important part of the observed gender gap in standard financial literacy questions is due to response bias in choosing "I do not know", and therefore, financial literacy surveys typically overstate the gender gap in financial knowledge. Moreover, as the choice of "I do not know" option is malleable by simple interventions, the size of the gender gaps in financial literacy can also vary considerably. According to our estimates, the gender gap in financial literacy can be higher or lower than measured by standard financial literacy surveys. The cleanest benchmark for measuring the gender gap in financial literacy, deleting the option of "IDK", leads to a gender gap measurement of 6 percentage points (4 percentage points with controls), which is lower (but not significantly) than the gender gap in financial literacy gap when measured standard financial literacy surveys (9 pp in raw and 6 pp with controls). However, this setting is unrealistic in the sense that it is unlikely to be adopted in standard surveys in which participants respond voluntarily. Also, introducing monetary incentives would yield a higher gender gap in financial literacy (but not significantly so). Most importantly, we provide evidence of the effectiveness of a simple design tool, the provision of information on the existing gender gap in choosing "I do not know", that can

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potentially eliminate the gender gap in the choice of "I do not know" answers and significantly reduce the gender gap in financial literacy in half, from 6 percentage points to 3 percentage points.

This paper contributes to the literature exploring gender differences in financial literacy. While most of the literature has focused on which observable contributing factors are associated with gender gaps in financial literacy (see, for example, the reviews from Lusardi and Mitchell 2014 and Bucher-Koenen et al. 2017), this paper contributes to the scarce literature that explores a relatively new channel, shifting the focus to *how* financial literacy is measured and differences in participant's behavior. Bucher-Koenen et al. (2021) provide a first and significant step in this direction. Their study shows that the gender gaps in financial literacy considerably shrink in a panel, where participants first answer financial literacy questions with the "I do not know" option, and then, six weeks later, they answer the same questions without this option and with subsequent questions about the confidence in their answers. We contribute by implementing the first RCT assessing response bias, and exploring which intervention can help close it. Our extreme treatment, without IDK, is comparable to Bucher-Koenen et al. (2021). The main difference, when comparing to their study, is that there is no concern over potential learning in our design, as it is a between-participant design and we use exactly the section identical to the baseline, with the only change being the removal of the "I do not know" answer option. We further complement the literature by evaluating alternative interventions, providing relatively more precise estimates on how gender gaps vary with contributing factors, as well as by studying alternative outcomes, which are not typically available in public data.

Another strand of the literature we contribute is the study of gender differences in educational tests. In particular, to a large literature that has studied how gaps vary in multiple-choice tests with and without differential grading for omitting questions and providing wrong answers. Women are found to omit more questions than men (Ben-Shakhar and Sinai, 1991; Baldiga, 2014; Pekkarinen, 2015; Coffman and Klinowski, 2020; Espinosa and

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Gardeazabal, 2020; Iriberri and Rey-Biel, 2021), which can be related to choosing "I do not know" answers. These studies often find that deleting differential grading of incorrect and omitted answers reduces gender gaps in performance measures. Our study analyzes a very different setting with anonymized, non-stakes survey responses on financial literacy, and shows how interventions can help reduce gaps and equalize men's and women's answer choices.

The rest of the paper is organized as follows. In Section 2 we describe the survey design and the treatments. Section 3 presents the results. Finally, Section 4 concludes.

2   Survey Design and Treatments

We designed an online survey experiment to test the effectiveness of three interventions to reduce the frequency of choosing "I do not know" answers and their effect on financial literacy. The main focus is on their effect on gender gaps in these three outcomes: percent IDK, percent correct and percent incorrect. The survey design was approved by the Ethics Committee at the Institutional Review Board and the survey design and pre-analysis plan were pre-registered.[4]

The survey consisted of about 40 questions, lasted 15 minutes on average, and was administered by the survey company 40dB in Spain between October 24 and November 18 of 2022. Survey takers received a small fixed payment of 1.20€ for completing the questionnaire. This amount was determined based on the expected time required to complete the survey and is standard compensation in the survey company. The survey was divided into three main parts, starting with individual demographic questions, continuing with a financial literacy section, and ending with additional questions on perceptions, experiences, and managing finances. For a diagram of the experimental design, see Figure A1 in the Appendix A. All

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[4]The University of the Basque Country UPV/EHU Ethics Committee certified the exemption (https://www.ehu.eus/en/web/ceid/) because the researchers received anonymized data from the survey company, 40dB, which has configured and implemented a personal data protection program in accordance with the reforms of the European Data Protection Regulation 2016/679 and the Organic Law on Protection of Personal Data 3/2018. The experiment and the pre-analysis plan are pre-registered in the AEA RCT Registry under the RCT ID AEARCTR-0009896.

the questions included in the survey can be found in Appendix B.

The survey started with questions about individual demographic information, family and household background, and the elicitation of behavioral traits and perceptions such as interest and perceived knowledge of financial topics and risk preferences. The inclusion of these questions is motivated by the research that shows that these are important variables in explaining gender gaps in financial literacy.[5] We also included questions on intergenerational background, such as parental education, to have a richer set of control variables. This section was the same for all survey takers and had no time limit. These questions where included before participants received each treatment and entered the financial literacy section for two reasons. First, this sequence aligns with INFE toolkit guideline and thus follows the standard structure used in international surveys practice measuring financial literacy. Second, this order ensures that participants' responses are not affected by the treatments, preventing potential biases such as shifts in confidence or risk aversion.

Then, the survey included a financial literacy section based on the INFE/OECD questionnaire. The introductory section text is standard and encourages participants to try to avoid choosing the "I do not know" answer option. Specifically, it follows INFE/OECD toolkit for measuring financial literacy suggestion (OECD, 2022) and uses the verbatim text from the Spanish Financial Competences Survey (Hospido et al., 2023). Related to "I do not know" answers, it states: "If you do not know the answer, just say so. If you think you have the right answer, it is likely that you do." Of course, this text was excluded from the treatment arm without IDK. This section included 10 questions with a total time limit of 7 minutes to complete.[6] These included the Big Five financial literacy questions that assess the understanding of inflation, compound interest rate, risk diversification, mortgages and bond pricing concepts. These will be the focus for the main results.[7] The goal of providing a

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[5]See, for instance, Bucher-Koenen et al. (2017) for an overview of the literature exploring gender gaps in financial literacy.

[6]The purpose of the time limit was to minimize the probability of searching for answers online. As shown in Section 3.3, this seems to be the case, as participants did not spend considerable time on these questions, and there are no differences by gender.

[7]In addition to the Big Five, we included a simple division question, an interest rate question without

time limit to complete was to minimize the probability of section interruptions and searching for answers. We also kept track of the time spent answering the financial literacy section.

Finally, after the financial literacy section, the survey ended with 7 additional questions about participants' experiences, perceptions, and holdings of financial products. Unlike previous studies, we gathered information on individual's experiences which might help explain decision-making and gender gaps. Based on participants' experiences, we construct a lean-in index as a standardized measure combining information such as asking for a job promotion or wage increase. The perceptions refer to behavioral traits such as having the confidence to deal with unexpected events. The financial products questions referred to ownership and means of interacting with banks (e.g., online). Then, the questionnaire ended with a question on perceived survey difficulty. This last part was the same for all survey takers and had no time limit.

Importantly, we randomly varied the financial literacy section design while keeping the same questions. The survey design included a control version and three treatments to evaluate as interventions to potentially reduce "I do not know". Following standard survey practices, the control group included the financial literacy questions with the option "I do not know" among the answer options. The first treatment arm, without IDK, omitted this option from the possible answers and the standard introductory section text omitted the mention of "I do not know" answers. The second treatment arm, incentives, kept the "I do not know" option in the answers and offered additional monetary incentives for correct answers. Specifically, the incentive consisted of paying 7 additional cents for each correct answer, up to 70 cents if all 10 questions were answered correctly. Although the overall incentives are low, they are substantial in relative terms, as they can earn an additional 60% of their fixed payment of 1.20€. Finally, the third treatment, referred to as information, also kept "I do not know" among the answers and included an introductory text before starting the financial literacy section. This information aimed to increase awareness of gender differences in propensities

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compounding, a probability question, a question included in the cognitive reflection test, and a simple subtraction exercise that we used to identify those survey takers who did not pay attention.

to choose "I do not know" and repeated the instruction to try to avoid choosing "I do not know" answers to nudge them away from choosing this answer. Specifically, all survey takers assigned to this treatment, both men and women, received the following information:

Men typically answer 7 out of 10 financial questions correctly. Women 6 out of 10. This difference is mostly explained (65%) because women choose the answer "I do not know" more often than men. Therefore, we ask you to - please - avoid answering "I do not know".

These statistics came from the microdata of the Spanish Survey of Financial Competences implemented by the Bank of Spain and the Comisin Nacional del Mercado de Valores in 2016. Any intervention using informational nudges might be susceptible to potential experimenter demand effects. However, it is reassuring that De Quidt et al. (2018) show that experimenter demand effects tend to be small in online experiments.

The survey code randomly assigned each treatment by gender immediately before entering the financial literacy section. The survey was pre-tested in a pilot implemented in September 2022. For the final sample, we received 6,000 completed surveys in total (3,000 men and 3,000 women): 2,400 in the control group (40 percent of the sample: 1,200 men and 1,200 women) and 1,200 (20 percent of the sample: 600 men and 600 women) in each of the three treatment arms. To obtain 6,000 completed surveys, the survey company collected 6,879 surveys, of which 879 survey takers abandoned the survey before completing it. In Subsection 3.3, we test whether there are gender differences in the probability of exiting the survey, and, in particular, we analyze if different treatment arms impact the probability of exiting the survey differently.

3   Results

3.1   Descriptive Statistics and Randomization

Table 1 presents summary statistics for the control and the three treated groups. It includes all characteristics later used as control variables and outcome variables used in the main analysis and shows the p-value for the F-test on differences across groups.

First, regarding respondents' main demographics, they are equally represented by gender by design, are, on average, 46 years old, about 92% were born in Spain, and more than 50% live in big cities. More than half of them have completed at most secondary education, and over 68% are currently working.

Second, regarding respondents' household characteristics, over 70% live with a partner, have an average of about 3 household members, and are most likely the primary income earners. Survey takers' parents have low education, as more than half of mothers and fathers have completed at most primary education. In line with this, close to 75% recall having fewer than a bookshelf of books when they were 10 years old.

Third, regarding their self-assessments on financial knowledge and risk-taking behavior, we find that most participants perceive they have either neutral (over 40%) or good (close to 40%) knowledge of financial topics. In line with this, they believe they would get close to 6 correct answers in a 10-question financial questionnaire and their interest in finance is about 6 on a scale between 0 and 10. Both risk aversion measures, one qualitative and one lottery choice using the elicitation method by Eckel and Grossman (2002), show that the survey takers are, on average, slightly risk averse.

Finally, they place themselves close to 4 in their self-efficacy, confidence and lean-in measures, which come from statements with an agreement scale between 0 and 5. Regarding their management of finances, they have, on average, 2.5 out of 6 saving or investing products, such as saving accounts or pension plans, and about 1.4 out of 3 debt products, among loans, mortgages, and credit cards. Most have performed online bank operations over the last 12 months, while about 3% had no bank operations.

The last column reports the p-values for the F-test when comparing all control variables across the four treatment groups. Overall, all these values show that the randomization was implemented successfully. The exceptions are the education level (the proportion of those with primary education and university studies), the assessment of having good or very good financial knowledge, the expected number of correct answers. Reassuringly, the results are

not sensitive to including these characteristics as controls.

These descriptive statistics are also presented, separately by gender, in Tables A1 and A2 in the Appendix. Consistent with the literature, men and women differ in some characteristics, mainly in behavioral traits and perceptions. They also differ in managing finance variable characteristics. For example, women tend to be more risk-averse (Croson and Gneezy, 2009), less interested in finance (Brown and Graf, 2013), and less confident in their self-perceived financial knowledge than men (Bordalo et al., 2019). They also hold fewer financial products, are less likely to do online bank operations, and are more likely to have no bank operations (Almenberg and Dreber, 2015; Bottazzi and Lusardi, 2021; Balutel et al., 2023). Most importantly, the p-values in the final columns show that, when split by gender, both men and women have comparable socio-demographics, family background, behavioral traits, and experience managing finances across the four treatment groups.

3.2 Main Results: Evaluation of the Three Interventions

The *main outcomes* panel in Table 1 show the mean values for the percent of "I do not know", correct and incorrect answers for the Big Five financial literacy questions, for each of the treatment groups. In the control group, the survey takers choose the "I do not know" answer on average in about 15 percent of the questions, while the three treatment arms reduce this percentage significantly. Mechanically, the biggest decrease is when this option is eliminated, followed by the information treatment, chosen in 7 percent of the questions, and finally, introducing monetary incentives, chosen in 9 percent of the questions. The results in financial literacy are also shifted. On average, in the control group, survey takers answer 53 percent of the questions correctly, and the three treatment arms are effective in increasing this percentage. When deleting the "I do not know" option, survey takers answer correctly 60 percent of the questions, followed by providing information and monetary incentives, with about 57 and 56 percent correct each, respectively. The interventions also increase the percent incorrect, from 30 percent in the control to 38, 33 and 34 percent in the without

IDK, incentives and information nudge, respectively.[8] As expected by these differences, the p-values in the final column show that the different interventions impacted these two outcome variables significantly.

With respect to gender differences, for the control group, we confirm the two main findings on gender gaps in financial literacy, which we show in Figure 1. First, we observe a gender gap of about 9 percentage points in measured financial literacy, in line with the existing literature and comparable to the findings by Hospido et al. 2023, that report a 10 percentage point gender gap among the Spanish adult population, and slightly smaller than the one found by Bucher-Koenen et al. 2021, that report a 14 percentage point gender gap in the dutch speaking population in Netherlands. In our survey, on average, men, answer about 58 percent of the questions correctly, while women answer correctly 49 percent of them. Second, the about 9 percentage point difference is explained by a 6 percentage point gender gap in "I do not know" answers. Consistent with Bucher-Koenen et al. (2021) and Hospido et al. (2023), about two-thirds of the gender gap in measured financial literacy corresponds to different propensities to choose "I do not know" answer. Specifically, men choose the "I do not know" in close to 12 percent of the questions. In comparison, women choose it at a higher rate (18 percent). Last, when looking at the percent incorrect answers, an outcome not usually studied in the literature, we find that men's and women's performance differs by less than 2 percentage points (significant at the 10% significance level). It is worth noting that the gender gap in "I do now know" answers and measured financial literacy remain large and significant in the specifications that add control variables. For instance, adding confidence and risk aversion among the controls helps reduce the gender gap in measured financial literacy from 9 percentage points to 6, and in IDK from 6.5 to 4 percentage points (as shown in Tables 3 and 2) . Importantly, the adjusted gender gap in incorrect answers is further reduced and no longer significantly different from zero, as shown in Tables 2, 3 and 4,

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[8]Skipped answers are not considered correct, incorrect or "I do not know" answers. This account for 1.2 percent in the control group, 1.7, 1.7, and 2 percent in the without IDK, incentives and information treatment. Table A8 shows the results do not vary if these are considered as "I do not know" answers.

respectively.

As a next step, we evaluate the impact of the three interventions on the gender gaps in both, the frequency of "I do not know", financial literacy and percent incorrect measures. Figure 2a and Table 2 show the results for the choice of "I do not know", Figure 2b and Table 3 show the results for financial literacy, and finally, Figure 2c and Table 4 show the results for percent incorrect. Figures 2a, 2b and 2c show the mean values by gender and by treatment. Tables 2, 3 and 4 show the estimation results without any controls, shown in column (1), with all controls, shown in column (2), and with a lasso-selected set of controls that include the main controls variables from column (2) and interactions between these, shown in column (3). Appendix Tables A3, A4 and A5 report all the estimated coefficients of the corresponding Tables 2, 3 and 4, respectively.

Regarding the impact on "I do not know" answers, with the extreme intervention of deleting the option of "I do not know", this is mechanically reduced to 0, and consequently, the gender gap is closed. Offering incentives also reduces significantly this answer option. However, the gender gap is not significantly reduced with this intervention. Finally, the information nudge is also effective in reducing the percent of "I do not know". In this case, however, the effect is significantly larger for women (reduced to 8.6 percent) than for men (reduced to 5.7 percent), at the 1% significance level, such that the gender gap is reduced. In the specification without controls, in column (1), the response bias is reduced to half, from 6 to 3 percentage points, and in the specification with controls, in columns (2) and (3), the gender gap in the propensity to choose "I do not know" is closed. As shown in Table 2, we reject the hypothesis that all treatment effects are equal for each gender.

How do these results in the "I do not know" answers translate into the financial literacy and percent incorrect measures? As shown in Tables 3 and 4, we reject the null hypothesis that all treatment effects in percent correct and incorrect are equal for both men and women.

While the extreme intervention of deleting the option of "I do not know" mechanically closed the gender gap on "I do not know" answers, it does not significantly reduce the gap in

measured financial literacy. It raises the percent of correct answers more for women than men but the effect is not significantly different from zero. On the other hand, it does increase the percent incorrect significantly more for women. When we delete the answer option "I do not know", we can measure how the 12% of men's and 18% of women's "I do not know" answers distribute into correct and incorrect answers. For women, when reducing the 18% of IDK, there is an increase of 8 percentage points in percent correct, while a 10 percentage points increase in percent incorrect. For men, when reducing the 12% of IDK, there is an increase of 6 percentage points in both percent correct and incorrect. First, this clearly shows that IDK is not only capturing true lack of knowledge. Second, the gender gap in percent correct reduces.

The introduction of incentives significantly increases the percent of correct answers for men with respect to their control group, but it is not effective for women. If anything, this intervention would *increase* the gender gap, although not significantly. On the other hand, it does increase the percent incorrect significantly more for women.

Finally, the information treatment increases the percent of correct answers for men and women. Contrary to incentives, the increase is significantly larger for women (5 percentage points increase) than for men (2 percentage points), such that this intervention significantly decreases the gender gap in the percent of correct answers, although at the 10% level. Women are found still to be less financially literate than men, but the gender gap is reduced to half, from 6 to 3 percentage points.[9] In addition, this treatment does not significantly affect the gender gap in incorrect answers.

As our analysis tests for the impact on multiple outcomes, we additionally examined whether the impacts are significant due to multiple hypothesis testing. Following Anderson (2008), we calculated the adjusted $q-$values that control for the false discovery rate (FDR). Appendix Table A6 shows that the conclusions remain similar to our main analysis. Using

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[9]Pairwise comparisonsshow that the treatment effects in financial literacy are significantly different, except when comparing men in the without IDK and incentives group, where the p-value for the last specification is 0.45.

the three main outcomes, we find that the significance remains at similar levels for all the estimates using the FDR-adjusted $q-$values. The exception corresponds to the impact in correct answers for men receiving the information treatment, where the $q-$value increases to 0.115. The gender gap, however, is still significantly reduced at the 10% with this treatment.

This pattern of results remains when analyzing the Big Five questions individually, as shown in Tables A7 in the Appendix. Although the behavioral patterns go in the same direction and are less precise for each of the Big Five questions, the strongest effects in closing the gender gap in the choice of "I do not know" answers with the information treatment seem to come from the questions on inflation, risk diversification and bond pricing. In addition, we re-do the analysis with alternative measures of financial literacy. We use different sets of questions included in the financial literacy section (see Table A8 in the Appendix). Specifically, we include the Big Five but define omitted questions as "I do not know" answers (column 2) [10], the Big Three (column 3), which excludes the questions on the mortgages and bond pricing from the Big Five questions. We add the simple interest rate question to the Big Five questions ("Big Six", column 4), and finally, we include all the questions in the financial literacy section (All, column 5). The results are robust to all the different measures.

Overall, three interventions are highly effective in reducing the percent of "I do not know" answers and increasing both financial literacy and percent incorrect measures. Moreover, the choice of "I do not know" option is differently malleable by gender. Despite survey participants' knowledge being comparable across groups as the interventions cannot affect their effective knowledge, the gender gaps in measured financial literacy varies. In the control group, the gender gap in measured financial literacy is 9 percentage points (6 pp when adding control variables). The highest gender gap of 12 percentage points is obtained when monetary incentives are offered (8 pp when adding control variables). Deleting the IDK answer option yields an estimate of 6 percentage point gap (4 pp when adding control variables). Finally,

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[10]There are 140 participants that skip at least one of the Big Five questions. They are currently considered non-IDK, non-correct, and non-incorrect answers. In this robustness exercise, they are considered IDK answers

the lowest estimates of 6 percentage points of the gender gap in measured financial literacy are obtained when we use the intervention of the information nudge (3 pp with control variables). Only the information nudge treatment is able to significantly reduce the gender gap in measured financial literacy, suggesting that the type of female participants affected by this treatment are the ones with some financial literacy that is not typically captured with standard survey methods.

3.3 Further Results: Evaluation of the Three Interventions using Random Guessing Framework, and other Outcome Variables

An alternative way to evaluate the effect on financial literacy by treatment and gender is to compare the observed increase in percent correct answers with the expected increase by random guessing. For example, if participants answered one additional question and that question had 4 answer options, we would expect an increase of 25% in financial literacy measured by simple random guessing. For a treatment to be effective, we would like the observed increase in financial literacy to be *higher* than the one expected by random guessing, as this means that those participants who decide to provide the answer with this intervention are providing an informed guess. The differences between the observed increase in percent correct and the expected increase under random guessing are provided in the Appendix Table A9, by treatment and by gender.[11] This alternative evaluation shows that for women, the observed increase in percent correct is highest relative to an expected increase from random guessing in the information treatment, for which the average expected random guessing increase is 0.037, and the observed is 0.048. By contrast, this difference is even negative for incentives (0.023 under random guessing versus 0.012 observed). For men, on the contrary, the highest increase is for incentives (0.021 under random guessing versus 0.043 observed), and this difference is negative for information (0.024 under random guessing versus 0.020

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[11]To calculate the expected increase in percent correct by random guessing, we first calculate the expected increase question by question, weight it by the increase in provided answers, and then we take the simple average. In particular, as the inflation question has 3 alternative answers, the interest rate question has 4, the risk diversification and mortgages are true/false questions and the bond pricing one has 3 alternative answers, the expected increase for each type of question would differ.

observed). For the intervention of deleting the "I do not know" answer option, this difference is positive for both men and women and similar in magnitude. This alternative evaluation suggests that the information treatment is the best candidate for closing the gender gap in financial literacy measurement.

Finally, we also study the impact of the treatments on measures of attrition, perceived difficulty and completion time of the Big Five questions obtained from the survey. These additional results are shown in Table A10 in the Appendix. Overall, there are no outstanding differences by treated group and gender, except for completion time. The probability of abandoning the survey is a policy-relevant outcome, particularly, for online surveys. The survey company 40dB collected 6,879 surveys to obtain 6,000 completed surveys. Therefore, 879 survey takers left the survey before completing it, a metric that is expected by 40dB. Of those, we exclude 115 individuals whose gender is not reported as they exit the survey before reaching the first question. For the 6,764 remaining participants, we can test whether men and women have a different likelihood of exiting the survey, and for the 6,220 remaining participants who stayed until randomization into treatments was implemented, we can further test if the three treatments impact differently the probability of exiting the survey. We find that 13 percent of the survey takers abandon the test and that, on average, they do it early in the questionnaire, in question numbers 1 and 2. However, once participants have passed the first part of the questionnaire and are assigned to different treatments, the exit rate is as low as 4%. Women are more likely to abandon the test early (4.5 percentage points higher) but this gender gap disappears once they complete the first part. More importantly, we find no evidence that the three treatments affect differently the probability of abandoning the test (columns 1 to 4 in Table A10 in the Appendix).

With respect to perceived difficulty, measured on a scale between 0 and 10, survey takers, on average, give a score slightly over 4, as shown at the bottom part of Table 1. Women, on average, find it more difficult than men. However, we find no evidence that the treatments affect differently participants' perceived difficulty (columns 5 and 6 in Table A10 in the

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Appendix).

Finally, regarding the completion time of the Big Five questions, the bottom part of Table 1 shows participants take about a minute and a half to do the 5 questions. If completion time is taken as a proxy for effort, see for example in Augenblick et al. 2015 and Gneezy et al. 2019, we would conclude that there are not effort differences by gender or treatment. The only remarkable effect is that the without IDK treatment increases completion time significantly for female survey takers (columns 7 and 8 in Table A10 in the Appendix).

4 Concluding Remarks

This paper shows that, consistent with other studies, there is a gender gap in financial literacy measures, but how men and women choose the "I do not know" answer option has to be taken into account when comparing gender gaps in financial literacy. As the main contribution, we carried out the first RCT to evaluate how different interventions impact men's and women's propensity to choose "I do not know" answers and consequently observed financial literacy and percent incorrect measures.

We find that all three interventions - removing "I do not know" answer option, providing incentives and information treatments - effectively reduce the propensity to choose "I do not know" answers, confirming that the choice of this answer option does not reflect *only* lack of knowledge. The interventions also increase both financial literacy and percent incorrect. However, we find important gender differences. The extreme intervention of deleting "I do not know" answers, which is unlikely to be feasible in voluntary surveys implemented by institutions, mechanically closes the "I do not know" answer gap, but does not impact the gender gap in financial literacy and increases the gender gap in percent incorrect. This intervention might also not be desirable, as it reduce bias from choosing "I do not know" but introduces it from forcing participants to select an answer when it is not known. Then, the incentives treatment also reduces the "I do not know" but not the gender gap. In fact, if anything, this seems to go in the direction of increasing the gender gap both in financial

literacy and percent incorrect. By contrast, the provision of information is the only treatment that can close the gender gap in the propensity to choose "I do not know" answer option, and it significantly reduces the gender gap in measured financial literacy in half, from 6 to 3 percentage points, while not affecting the gap in percent incorrect. Incorporating this type of information treatment into surveys could be both feasible and cost-effective, while addressing gender differences in response behavior and enhancing the accuracy of gender gap measurements in financial literacy.

These results show that standard surveys to measure financial literacy mainly *overstate* gender gaps in financial literacy, as women tend to choose "I do not know" more frequently, and that women's higher propensity to choose IDK is not uniquely motivated by lack of knowledge. We therefore should interpret measured gender gaps in standard financial literacy surveys with caution. In addition, we show that an important design policy to increase precision in measuring the gender gap in financial literacy is including a simple information nudge, which is relatively easy to implement. Further research should be devoted to understanding how information treatments can work in repeated surveys.

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Figures and Tables

Figure 1: Main Outcomes in the Big Five Questions in the Control Group by Gender
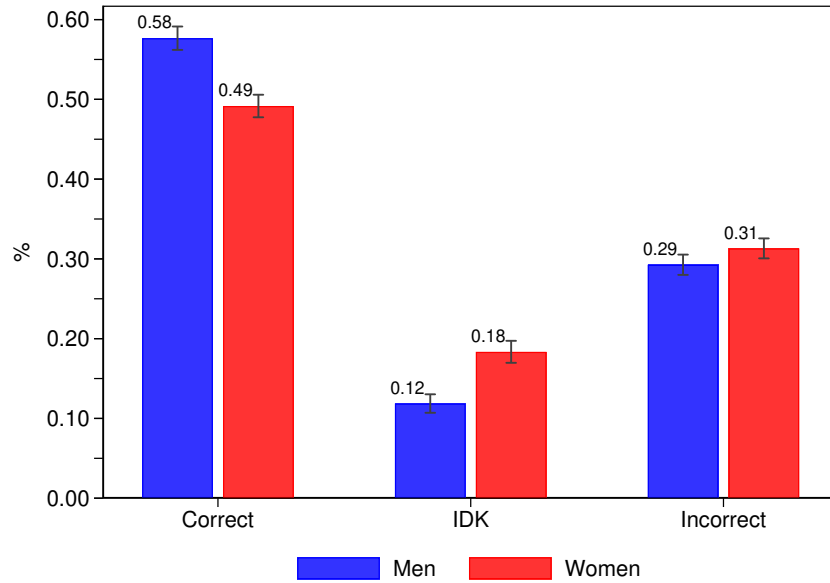
Notes: Raw average percent correct answers, percent IDK answer option, and percent incorrect answers, along with their 95% confidence intervals, for the Big Five questions in the control group, by gender. Average percents do not add up to 1 because 1.2% of men and 1.2% of women skipped at least one question. There are 140 participants that skipped at least one of the Big Five questions. There are currently considered non-IDK, non-correct, and non-incorrect answers as in the Spanish Financial Competences Survey.

Figure 2: Percent IDK, Percent Correct and Incorrect by Treatment Group and Gender
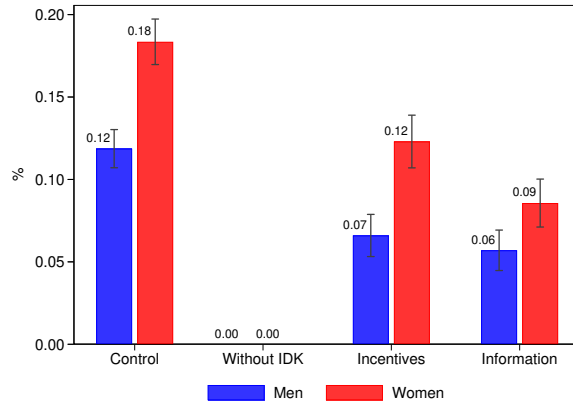
(a) Percent "I do not know"
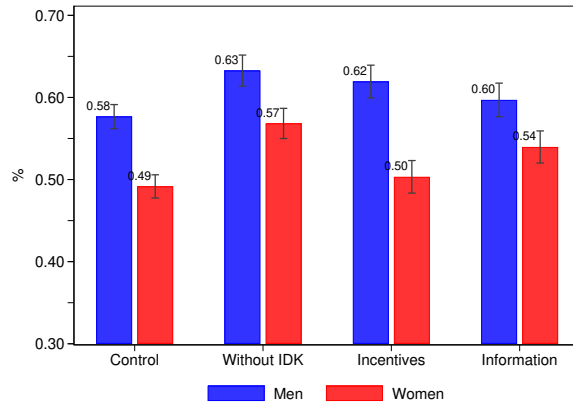
(b) Percent Correct
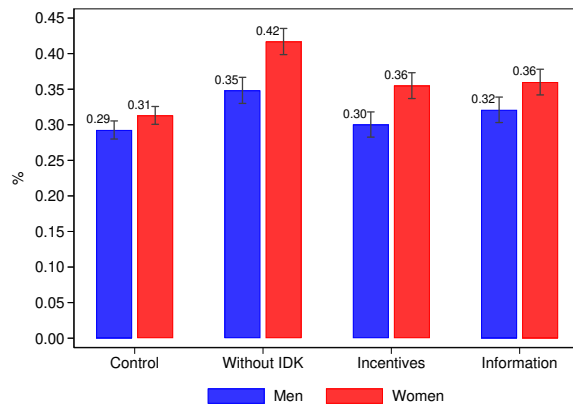
(c) Percent Incorrect

Notes: Panel (a) plots raw average percent IDK answer option, panels (b) and (c) plot raw average percent correct and incorrect answers, along with their 95% confidence intervals, for the Big Five questions by treatment group and gender. Average percents do not add up to 1 because 1.2% of men and 1.2% of women skipped at least one question. There are 140 participants that skipped at least one of the Big Five questions. They are currently considered non-IDK, non-correct, and non-incorrect answers as in the Spanish Financial Competences Survey.

Table 1: Descriptive Statistics (mean values) and Randomization

		(1) Control	(2) Without IDK	(3) Incentives	(4) Information	(5) p-value
Demographics	Woman	0.50	0.50	0.50	0.50	1.00
	Age 18-34	0.19	0.19	0.17	0.18	0.70
	Age 35-44	0.26	0.27	0.26	0.27	0.87
	Age 45-54	0.30	0.30	0.30	0.30	0.97
	Age 55-70	0.25	0.24	0.27	0.26	0.47
	Spaniard	0.91	0.93	0.93	0.91	0.16
	Pop. size 0-20th	0.21	0.18	0.19	0.20	0.16
	Pop. size 20th-100th	0.27	0.26	0.28	0.27	0.70
	Pop. size 100th+	0.52	0.56	0.53	0.53	0.16
	Primary education	0.20	0.17	0.25	0.21	0.00
	Secondary education	0.34	0.37	0.35	0.35	0.36
	University education	0.35	0.35	0.30	0.34	0.02
	Master, PhD education	0.11	0.11	0.10	0.10	0.76
	Working	0.70	0.69	0.67	0.67	0.12
	Retired	0.10	0.10	0.12	0.11	0.37
	Unemployed	0.19	0.19	0.20	0.21	0.31
Household	< 1 bookshelf at age 10	0.75	0.74	0.73	0.73	0.74
	> 2 bookshelves at age 10	0.25	0.26	0.27	0.27	0.74
	Household size	2.99	2.97	3.04	2.97	0.43
	Primary earner	0.67	0.66	0.69	0.66	0.44
	Lives with partner	0.73	0.71	0.72	0.73	0.59
	Mother: Primary education	0.60	0.57	0.59	0.59	0.60
	Mother: Secondary education	0.19	0.21	0.19	0.20	0.43
	Mother: Post-secondary education	0.20	0.19	0.19	0.19	0.80
	Father: Primary education	0.53	0.53	0.55	0.56	0.38
	Father: Secondary education	0.20	0.20	0.20	0.19	0.68
	Father: Post-secondary education	0.23	0.23	0.20	0.22	0.42
	Partner: Primary education	0.17	0.15	0.18	0.18	0.12
	Partner: Secondary education	0.24	0.25	0.24	0.23	0.78
	Partner: Post-secondary education	0.33	0.32	0.30	0.32	0.50
Assessments	Very low financial knowledge	0.02	0.02	0.02	0.03	0.70
	Low financial knowledge	0.12	0.12	0.12	0.12	0.94
	Neutral financial knowledge	0.42	0.41	0.40	0.44	0.20
	Good financial knowledge	0.38	0.41	0.40	0.37	0.09
	Very good financial knowledge	0.06	0.04	0.06	0.05	0.03
	Expected correct answers	5.58	5.73	5.79	5.52	0.00
	Interest in finance	6.10	6.13	6.14	5.97	0.35
	Risk willingness	4.65	4.77	4.74	4.62	0.48
	Lottery choice	3.62	3.58	3.67	3.65	0.77
Perceptions	Lean-in index	0.01	0.01	-0.03	0.00	0.39
	Perceived self-efficacy	3.96	4.00	4.00	4.02	0.20
	Perceived confidence	3.80	3.87	3.83	3.83	0.18
	Perceived lean-in	3.65	3.67	3.64	3.63	0.84
Managing finances	Saving products (N)	2.53	2.60	2.46	2.56	0.07
	Debt products (N)	1.39	1.39	1.36	1.42	0.48
	Online bank operations	0.80	0.82	0.80	0.81	0.66
	No bank operations	0.03	0.03	0.03	0.04	0.34
Main outcomes	Big five: IDK answers (%)	0.15	0.00	0.06	0.08	0.00
	Big five: Correct answers (%)	0.53	0.60	0.56	0.57	0.00
Other outcomes	Big five: Incorrect answers (%)	0.30	0.38	0.33	0.34	0.00
	Perceived survey difficulty	4.23	4.15	4.17	4.13	0.76
	Big-five: Completion time	99.57	102.34	100.77	102.59	0.49
Observations		2,400	1,200	1,200	1,200	

Table 2: Percent "I do not know" Answers: Big Five Questions

	(1)	(2)	(3)
Women	0.065***	0.041***	0.041***
	(0.009)	(0.009)	(0.009)
Without IDK	-0.119***	-0.115***	-0.114***
	(0.006)	(0.006)	(0.006)
Incentives	-0.053***	-0.049***	-0.050***
	(0.009)	(0.008)	(0.008)
Information	-0.062***	-0.063***	-0.060***
	(0.009)	(0.008)	(0.008)
Women x Without IDK	-0.065***	-0.067***	-0.071***
	(0.009)	(0.009)	(0.009)
Women x Incentives	-0.008	-0.015	-0.015
	(0.014)	(0.013)	(0.012)
Women x Information	-0.036***	-0.038***	-0.041***
	(0.013)	(0.012)	(0.012)
Av outcome for control group men	0.119	0.119	0.119
Controls	No	All	Selected
P-value Test: treatments equal for men	0.000	0.000	0.000
P-value Test: treatments equal for women	0.000	0.000	0.000
Observations	6000	6000	6000
R-squared	0.105	0.239	0.263

Notes: OLS regression of the outcome percent IDK answers in the Big Five questions. The first column includes no control variables, the second column includes all control variables specified in Table 1 and the third column includes a lasso-selected set of control variables from a regression of the outcome variable on these control variables and the interactions between them. Table A3 in the Appendix repors the estimated values of the baseline coefficients in each of the columns. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Percent Correct Answers: Big Five Questions

	(1)	(2)	(3)
Women	-0.085***	-0.056***	-0.076***
	(0.010)	(0.010)	(0.012)
Without IDK	0.056***	0.052***	0.052***
	(0.012)	(0.011)	(0.011)
Incentives	0.043***	0.040***	0.043***
	(0.013)	(0.012)	(0.011)
Information	0.020	0.021*	0.021*
	(0.013)	(0.012)	(0.011)
Women x Without IDK	0.021	0.021	0.019
	(0.017)	(0.016)	(0.016)
Women x Incentives	-0.031*	-0.021	-0.024
	(0.018)	(0.016)	(0.016)
Women x Information	0.028	0.028*	0.029*
	(0.018)	(0.017)	(0.016)
Av outcome for control group men	0.577	0.577	0.577
Controls	No	All	Selected
P-value Test: treatments equal for men	0.042	0.077	0.056
P-value Test: treatments equal for women	0.000	0.000	0.000
Observations	6,000	6,000	6,000
R-squared	0.037	0.176	0.208

Notes: OLS regression of the outcome percent correct answers in the Big Five questions. The first column includes no control variables, the second column includes all control variables specified in Table 1 and the third column includes a lasso-selected set of control variables from a regression of the outcome variable on these control variables and the interactions between them. Table A4 in the Appendix reports all the estimated values of the baseline coefficients in each of the columns. Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 4: Percent Incorrect Answers: Big Five Questions

	(1)	(2)	(3)
Women	0.021**	0.017*	0.007
	(0.009)	(0.009)	(0.011)
Without IDK	0.056***	0.056***	0.054***
	(0.011)	(0.011)	(0.011)
Incentives	0.008	0.006	0.008
	(0.011)	(0.011)	(0.011)
Information	0.028**	0.029***	0.027**
	(0.011)	(0.011)	(0.011)
Women x Without IDK	0.048***	0.051***	0.056***
	(0.016)	(0.016)	(0.016)
Women x Incentives	0.034**	0.030*	0.030**
	(0.016)	(0.015)	(0.015)
Women x Information	0.018	0.019	0.019
	(0.016)	(0.016)	(0.015)
Av outcome for control group men	0.293	0.293	0.293
Controls	No	All	Selected
P-value Test: treatments equal for men	0.001	0.000	0.001
P-value Test: treatments equal for women	0.000	0.000	0.000
Observations	6000	6000	6000
R-squared	0.026	0.080	0.117

Notes: OLS regression of the outcome percent incorrect answers in the Big Five questions. The first column includes no control variables, the second column includes all control variables specified in Table 1 and the third column includes a lasso-selected set of control variables from a regression of the outcome variable on these control variables and the interactions between them. Table A5 in the Appendix reports all the estimated values of the baseline coefficients in each of the columns. Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

A   Additional Figures and Tables

Figure A1: Diagram of the Experimental Design

Demographic, Household, Perception section No time limit

↓

Treatments: Financial Literacy section Time limit: 7 minutes

Group 1: Control With IDK	Group 2: Without IDK Without IDK	Group 3: Incentives With IDK 0.07€ per correct	Group 4: Information With IDK "Men typically... ...to avoid answering IDK"

↓

Perception, Managing Finances section No time limit
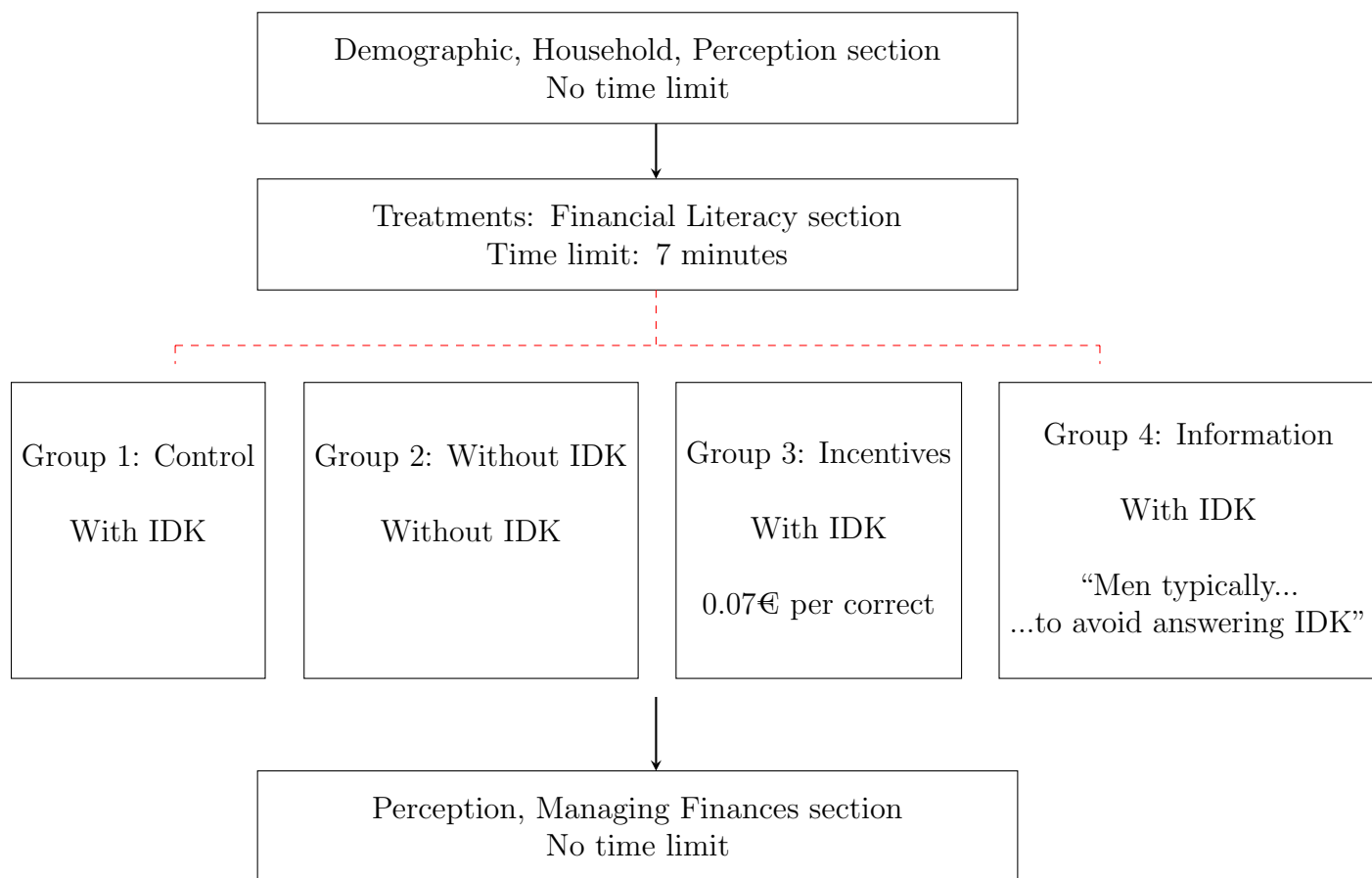
Table A1: Descriptive Statistics (mean values) and Randomization: Women Sample

		(1)	(2)	(3)	(4)	(5)
		Control	Without IDK	Incentives	Information	p-value
Demographics	Age 18-34	0.20	0.21	0.20	0.17	0.35
	Age 35-44	0.28	0.30	0.28	0.27	0.77
	Age 45-54	0.31	0.28	0.29	0.33	0.39
	Age 55-70	0.21	0.21	0.23	0.23	0.63
	Spaniard	0.90	0.91	0.92	0.90	0.56
	Pop. size 0-20th	0.22	0.17	0.20	0.20	0.04
	Pop. size 20th-100th	0.26	0.28	0.28	0.29	0.49
	Pop. size 100th+	0.52	0.55	0.52	0.51	0.37
	Primary education	0.21	0.15	0.26	0.20	0.00
	Secondary education	0.31	0.36	0.36	0.35	0.06
	University education	0.36	0.37	0.28	0.36	0.00
	Master, PhD education	0.12	0.13	0.10	0.08	0.02
	Working	0.67	0.66	0.63	0.61	0.08
	Retired	0.07	0.07	0.08	0.09	0.45
	Unemployed	0.25	0.24	0.28	0.29	0.18
Household	< 1 bookshelf at age 10	0.71	0.73	0.70	0.73	0.64
	> 2 bookshelves at age 10	0.29	0.27	0.30	0.27	0.64
	Household size	3.03	2.98	3.02	3.02	0.85
	Primary earner	0.51	0.50	0.54	0.49	0.35
	Lives with partner	0.72	0.70	0.69	0.70	0.61
	Mother: Primary education	0.59	0.57	0.61	0.60	0.40
	Mother: Secondary education	0.19	0.22	0.20	0.19	0.52
	Mother: Post-secondary education	0.20	0.20	0.17	0.19	0.29
	Father: Primary education	0.54	0.51	0.56	0.54	0.39
	Father: Secondary education	0.20	0.20	0.20	0.22	0.89
	Father: Post-secondary education	0.21	0.25	0.19	0.20	0.10
	Partner: Primary education	0.19	0.16	0.19	0.18	0.38
	Partner: Secondary education	0.23	0.24	0.26	0.25	0.50
	Partner: Post-secondary education	0.30	0.30	0.25	0.27	0.06
Assessments	Very low financial knowledge	0.03	0.02	0.03	0.02	0.29
	Low financial knowledge	0.15	0.16	0.16	0.14	0.84
	Neutral financial knowledge	0.44	0.43	0.39	0.47	0.07
	Good financial knowledge	0.33	0.37	0.38	0.34	0.11
	Very good financial knowledge	0.05	0.03	0.04	0.03	0.03
	Expected correct answers	5.22	5.37	5.35	5.17	0.28
	Interest in finance	5.88	5.73	5.80	5.70	0.50
	Risk willingness	4.24	4.34	4.32	4.18	0.75
	Lottery choice	3.59	3.48	3.48	3.58	0.69
Perceptions	Lean-in index	-0.12	-0.11	-0.16	-0.13	0.41
	Perceived self-efficacy	3.96	3.98	4.00	4.02	0.56
	Perceived confidence	3.82	3.85	3.79	3.83	0.73
	Perceived lean-in	3.64	3.67	3.62	3.65	0.88
Managing finances	Saving products (N)	2.35	2.42	2.21	2.33	0.04
	Debt products (N)	1.35	1.39	1.32	1.34	0.51
	Online bank operations	0.79	0.81	0.78	0.80	0.71
	No bank operations	0.04	0.04	0.04	0.06	0.27
Main outcomes	Big five: IDK answers (%)	0.18	0.00	0.12	0.09	0.00
	Big five: Correct answers (%)	0.49	0.57	0.50	0.54	0.00
	Big five: Incorrect answers (%)	0.31	0.42	0.36	0.36	0.00
Other outcomes	Perceived survey difficulty	4.41	4.45	4.36	4.38	0.94
	Big-five: Completion time	99.23	108.92	103.41	104.36	0.02
Observations		1,200	600	600	600	

Table A2: Descriptive Statistics (mean values) and Randomization: Men Sample

		(1)	(2)	(3)	(4)	(5)
		Control	Without IDK	Incentives	Information	p-value
Demographics	Age 18-34	0.17	0.17	0.15	0.18	0.49
	Age 35-44	0.25	0.25	0.24	0.26	0.87
	Age 45-54	0.30	0.31	0.30	0.28	0.58
	Age 55-70	0.29	0.27	0.30	0.28	0.63
	Spaniard	0.92	0.94	0.94	0.92	0.25
	Pop. size 0-20th	0.20	0.20	0.17	0.20	0.74
	Pop. size 20th-100th	0.28	0.24	0.28	0.25	0.15
	Pop. size 100th+	0.52	0.56	0.54	0.56	0.32
	Primary education	0.20	0.20	0.23	0.21	0.22
	Secondary education	0.36	0.38	0.34	0.35	0.61
	University education	0.34	0.34	0.32	0.31	0.61
	Master, PhD education	0.11	0.10	0.11	0.13	0.30
	Working	0.73	0.72	0.71	0.72	0.77
	Retired	0.14	0.12	0.15	0.13	0.45
	Unemployed	0.12	0.14	0.13	0.13	0.72
Household	< 1 bookshelf at age 10	0.78	0.76	0.76	0.73	0.19
	> 2 bookshelves at age 10	0.22	0.24	0.24	0.27	0.19
	Household size	2.95	2.97	3.06	2.92	0.15
	Primary earner	0.83	0.81	0.83	0.83	0.76
	Lives with partner	0.75	0.73	0.75	0.76	0.69
	Mother: Primary education	0.61	0.58	0.57	0.59	0.60
	Mother: Secondary education	0.18	0.20	0.19	0.20	0.75
	Mother: Post-secondary education	0.19	0.18	0.20	0.18	0.71
	Father: Primary education	0.52	0.54	0.54	0.57	0.18
	Father: Secondary education	0.21	0.21	0.20	0.16	0.09
	Father: Post-secondary education	0.24	0.21	0.22	0.23	0.62
	Partner: Primary education	0.15	0.14	0.17	0.17	0.24
	Partner: Secondary education	0.24	0.26	0.23	0.21	0.31
	Partner: Post-secondary education	0.35	0.34	0.35	0.37	0.71
Assessments	Very low financial knowledge	0.01	0.02	0.01	0.03	0.01
	Low financial knowledge	0.09	0.09	0.09	0.09	0.99
	Neutral financial knowledge	0.40	0.38	0.40	0.41	0.84
	Good financial knowledge	0.43	0.46	0.42	0.40	0.25
	Very good financial knowledge	0.07	0.05	0.08	0.07	0.19
	Expected correct answers	5.94	6.09	6.23	5.87	0.01
	Interest in finance	6.32	6.53	6.48	6.25	0.15
	Risk willingness	5.05	5.19	5.17	5.06	0.69
	Lottery choice	3.66	3.68	3.87	3.72	0.35
Perceptions	Lean-in index	0.13	0.12	0.10	0.13	0.80
	Perceived self-efficacy	3.96	4.01	4.01	4.02	0.41
	Perceived confidence	3.79	3.90	3.87	3.82	0.06
	Perceived lean-in	3.65	3.67	3.65	3.62	0.87
Managing finances	Saving products (N)	2.70	2.79	2.71	2.78	0.52
	Debt products (N)	1.44	1.38	1.41	1.50	0.09
	Online bank operations	0.82	0.83	0.82	0.82	0.93
	No bank operations	0.03	0.01	0.02	0.02	0.38
Main outcomes	Big five: IDK answers (%)	0.12	0.00	0.07	0.06	0.00
	Big five: Correct answers (%)	0.58	0.63	0.62	0.60	0.00
	Big five: Incorrect answers (%)	0.29	0.35	0.30	0.32	0.00
Other outcomes	Perceived survey difficulty	4.04	3.86	3.99	3.88	0.50
	Big-five: Completion time	99.92	95.72	98.16	100.79	0.51
Observations		1,200	600	600	600	

Table A3: Percent IDK Answers with All Coefficients: Big Five Questions

	(1)	(2)	(3)
Women	0.065***	0.041***	0.041***
	(0.009)	(0.009)	(0.009)
Without IDK	-0.119***	-0.115***	-0.114***
	(0.006)	(0.006)	(0.006)
Incentives	-0.053***	-0.049***	-0.050***
	(0.009)	(0.008)	(0.008)
Information	-0.062***	-0.063***	-0.060***
	(0.009)	(0.008)	(0.008)
Women x Without IDK	-0.065***	-0.067***	-0.071***
	(0.009)	(0.009)	(0.009)
Women x Incentives	-0.008	-0.015	-0.015
	(0.014)	(0.013)	(0.012)
Women x Information	-0.036***	-0.038***	-0.041***
	(0.013)	(0.012)	(0.012)
Age 35-44		-0.001	
		(0.007)	
Age 45-54		-0.007	
		(0.007)	
Age 55-70		-0.018**	
		(0.007)	
Spaniard		-0.002	
		(0.008)	
Pop. size 20th-100th		-0.002	
		(0.007)	
Pop. size 100th+		-0.004	
		(0.006)	
Secondary education		-0.005	
		(0.008)	
University education		-0.016*	
		(0.008)	
Master, PhD education		-0.014	
		(0.010)	
Working		-0.002	
		(0.018)	
Retired		-0.003	
		(0.019)	
Unemployed		0.002	
		(0.018)	
> 2 bookshelves at age 10		0.002	
		(0.005)	
Household size		0.002	
		(0.002)	
Primary earner		-0.008	
		(0.006)	
Lives with partner		-0.029***	
		(0.008)	
Mother: Secondary education		0.009	
		(0.006)	
Mother: Post-secondary education		0.001	
		(0.007)	
Father: Secondary education		-0.007	
		(0.006)	
Father: Post-secondary education		-0.001	
		(0.007)	
Partner: Secondary education		0.010	
		(0.007)	
Partner: Post-secondary education		0.014*	
		(0.008)	
Low financial knowledge		-0.056**	
		(0.026)	
Neutral financial knowledge		-0.082***	
		(0.025)	
Good financial knowledge		-0.106***	-0.011
		(0.026)	(0.007)
Very good financial knowledge		-0.113***	-0.010
		(0.027)	(0.011)
Interest in finance		-0.008***	-0.008***
		(0.001)	(0.002)
Expected correct answers		-0.001	-0.001
		(0.002)	(0.002)
Risk willingness		-0.002**	-0.002**
		(0.001)	(0.001)
Lottery choice		-0.001	
		(0.001)	
Saving products (N)		-0.004**	-0.005***
		(0.002)	(0.002)
Debt products (N)		-0.006**	
		(0.003)	
Online bank operations		-0.006	
		(0.007)	
No bank operations		0.104***	
		(0.024)	
Lean-in index		-0.016***	0.005
		(0.003)	(0.010)
Perceived self-efficacy		-0.004	
		(0.003)	
Perceived confidence		-0.013***	-0.014***
		(0.004)	(0.003)
Perceived lean-in		-0.006**	-0.005**
Constant	0.119***	0.433***	0.299***
	(0.006)	(0.035)	(0.016)
Controls	No	All	Selected
Observations	6000	6000	6000
R2	0.105	0.239	0.263

Notes: OLS regression of the outcome percent IDK answers in the Big Five questions. The first column includes no control variables, the second column includes all control variables and the third column includes the coefficients from the set of a lasso-selected control variables, excluding the selected interaction terms. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A4: Percent Correct Answers with Main Coefficients: Big Five Questions

	(1)	(2)	(3)
Women	-0.085***	-0.056***	-0.076***
	(0.010)	(0.010)	(0.012)
Without IDK	0.056***	0.052***	0.052***
	(0.012)	(0.011)	(0.011)
Incentives	0.043***	0.040***	0.043***
	(0.013)	(0.012)	(0.011)
Information	0.020	0.021*	0.021*
	(0.013)	(0.012)	(0.012)
Women x Without IDK	0.021	0.021	0.020
	(0.017)	(0.016)	(0.016)
Women x Incentives	-0.031*	-0.021	-0.024
	(0.018)	(0.016)	(0.016)
Women x Information	0.028	0.028*	0.030*
	(0.018)	(0.017)	(0.016)
Age 35-44		0.013	
		(0.009)	
Age 45-54		0.036***	
		(0.009)	
Age 55-70		0.071***	
		(0.010)	
Spaniard		0.008	
		(0.011)	
Pop. size 20th-100th		0.007	
		(0.009)	
Pop. size 100th+		-0.000	
		(0.008)	
Secondary education		0.033***	
		(0.009)	
University education		0.079***	0.027
		(0.011)	(0.042)
Master, PhD education		0.074***	
		(0.014)	
Working		-0.002	
		(0.025)	
Retired		0.003	
		(0.027)	
Unemployed		-0.010	
		(0.025)	
> 2 bookshelves at age 10		0.009	
		(0.007)	
Household size		-0.005*	-0.006*
		(0.003)	(0.003)
Primary earner		0.004	
		(0.008)	
Lives with partner		0.012	
		(0.010)	
Mother: Secondary education		-0.021**	
		(0.009)	
Mother: Post-secondary education		-0.018*	
		(0.011)	
Father: Secondary education		0.001	
		(0.008)	
Father: Post-secondary education		-0.011	
		(0.010)	
Partner: Secondary education		-0.000	
		(0.010)	
Partner: Post-secondary education		0.010	
		(0.011)	
Low financial knowledge		0.031	
		(0.023)	
Neutral financial knowledge		0.030	
		(0.023)	
Good financial knowledge		0.033	
		(0.024)	
Very good financial knowledge		0.011	
		(0.028)	
Interest in finance		0.011***	0.012***
		(0.002)	(0.003)
Expected correct answers		0.008***	
		(0.002)	
Risk willingness		-0.002*	
		(0.001)	
Lottery choice		-0.002	
		(0.001)	
Saving products (N)		0.011***	0.006*
		(0.003)	(0.004)
Debt products (N)		0.005	
		(0.004)	
Online bank operations		0.062***	
		(0.009)	
No bank operations		-0.050**	
		(0.021)	
Lean-in index		0.026***	
		(0.005)	
Perceived self-efficacy		0.011**	0.011**
		(0.004)	(0.005)
Perceived confidence		0.007	0.006
		(0.005)	(0.005)
Perceived lean-in		0.005*	0.004
		(0.003)	(0.003)
Constant	0.577***	0.189***	0.305***
	(0.007)	(0.039)	(0.024)
Controls	No	All	Selected
Observations	6000	6000	6000
R2	0.037	0.176	0.208

Notes: OLS regression of the outcome percent correct answers in the Big Five questions. The first column includes no control variables, the second column includes all control variables and the third column includes a lasso-selected set of control variables. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix - 5

Table A5: Percent Incorrect Answers with Main Coefficients: Big-five Questions

	(1)	(2)	(3)
Women	0.021**	0.017*	0.007
	(0.009)	(0.009)	(0.011)
Without IDK	0.056***	0.056***	0.054***
	(0.011)	(0.011)	(0.011)
Incentives	0.008	0.006	0.008
	(0.011)	(0.011)	(0.011)
Information	0.028**	0.029***	0.027**
	(0.011)	(0.011)	(0.011)
Women x Without IDK	0.048***	0.051***	0.056***
	(0.016)	(0.016)	(0.016)
Women x Incentives	0.034**	0.030*	0.030*
	(0.016)	(0.015)	(0.015)
Women x Information	0.018	0.019	0.020
	(0.016)	(0.016)	(0.015)
Age 35-44		-0.017*	
		(0.009)	
Age 45-54		-0.040***	
		(0.009)	
Age 55-70		-0.057***	
		(0.010)	
Spaniard		-0.004	
		(0.011)	
Pop. size 20th-100th		-0.006	
		(0.008)	
Pop. size 100th+		0.000	
		(0.008)	
Secondary education		-0.031***	
		(0.009)	
University education		-0.069***	-0.014
		(0.010)	(0.033)
Master, PhD education		-0.078***	
		(0.013)	
Working		0.010	
		(0.023)	
Retired		0.011	
		(0.026)	
Unemployed		0.015	
		(0.024)	
> 2 bookshelves at age 10		-0.008	
		(0.007)	
Household size		0.002	
		(0.003)	
Primary earner		0.002	
		(0.007)	
Lives with partner		0.013	
		(0.010)	
Mother: Secondary education		0.003	
		(0.008)	
Mother: Post-secondary education		0.014	
		(0.010)	
Father: Secondary education		0.008	
		(0.008)	
Father: Post-secondary education		0.016	
		(0.010)	
Partner: Secondary education		-0.011	
		(0.010)	
Partner: Post-secondary education		-0.018*	
		(0.010)	
Low financial knowledge		0.013	
		(0.024)	
Neutral financial knowledge		0.040*	
		(0.023)	
Good financial knowledge		0.063***	
		(0.024)	
Very good financial knowledge		0.086***	
		(0.028)	
Interest in finance		-0.002	
		(0.002)	
Expected correct answers		-0.007***	
		(0.002)	
Risk willingness		0.005***	0.002
		(0.001)	(0.002)
Lottery choice		0.003***	0.003
		(0.001)	(0.004)
Saving products (N)		-0.006**	0.005
		(0.002)	(0.008)
Debt products (N)		-0.002	
		(0.003)	
Online bank operations		-0.054***	-0.003
		(0.008)	(0.020)
No bank operations		-0.051***	
		(0.020)	
Lean-in index		-0.008	
		(0.005)	
Perceived self-efficacy		-0.006	
		(0.004)	
Perceived confidence		0.008*	
		(0.005)	
Perceived lean-in		0.001	
		(0.003)	
Constant	0.293***	0.369***	0.358***
	(0.006)	(0.038)	(0.017)
Controls	No	All	Selected
Observations	6000	6000	6000
R2	0.026	0.080	0.117

Notes: OLS regression of the outcome percent incorrect answers in the Big Five questions. The first column includes no control variables, the second column includes all control variables and the third column includes a lasso-selected set of control variables. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A6: Ajusted p-values for the effect of interventions on the percent "I do not know", Correct and Incorrect for the Big-Five Questions

	"I do not know"		Correct		Incorrect	
	(1)	(2)	(3)	(4)	(5)	(6)
	Estimate	FDR $q-$value	Estimate	FDR $q-$value	Estimate	FDR $q-$value
Women	0.041***	0.001	-0.076***	0.002	0.007	0.511
	(0.009)	[0.000]	(0.012)	[0.000]	(0.011)	[0.051]
Without IDK	-0.114***	0.001	0.052***	0.001	0.054***	0.001
	(0.006)	[0.000]	(0.011)	[0.000]	(0.011)	[0.000]
Incentives	-0.050***	0.001	0.043***	0.001	0.008	0.493
	(0.008)	[0.000]	(0.011)	[0.000]	(0.011)	[0.469]
Information	-0.060***	0.001	0.021*	0.115	0.027**	0.025
	(0.008)	[0.000]	(0.011)	[0.082]	(0.011)	[0.014]
Women x Without IDK	-0.071***	0.001	0.019	0.228	0.056***	0.001
	(0.009)	[0.000]	(0.016)	[0.194]	(0.016)	[0.000]
Women x Incentives	-0.015	0.262	-0.024	0.207	0.030**	0.083
	(0.012)	[0.237]	(0.016)	[0.157]	(0.015)	[0.051]
Women x Information	-0.041***	0.002	0.029*	0.087	0.019	0.228
	(0.012)	[0.001]	(0.016)	[0.058]	(0.015)	[0.195]

Notes: This table reports the adjusted $p-$values for the impact of the interventions on the Big Five percent of IDK, correct, and incorrect answers. Columns (1), (3), and (5) reproduce the results for each outcome from Column (3) of tables 2, 3 and 4. Columns (2), (4) and (6) report the false discovery rate (FDR) adjusted $p-$values ("$q-$values"), standard $p-$values are reported below each adjusted $p-$value in brackets. The FDR adjusted $p-$values control for the number of false positives when multiple hypotheses are tested following Anderson (2008).

Table A7: Percent IDK Answers Question by Question: Big Five Questions

	(1) Inflation	(2) Compound Interest Rate	(3) Risk Diversification	(4) Mortgages	(5) Bond Pricing
Women	0.027***	0.023**	0.064***	0.010	0.079***
	(0.010)	(0.011)	(0.017)	(0.013)	(0.017)
Without IDK	-0.046***	-0.051***	-0.196***	-0.090***	-0.193***
	(0.006)	(0.006)	(0.011)	(0.008)	(0.012)
Incentives	-0.013	-0.017*	-0.100***	-0.040***	-0.073***
	(0.009)	(0.010)	(0.016)	(0.012)	(0.017)
Information	-0.024***	-0.031***	-0.123***	-0.039***	-0.098***
	(0.009)	(0.009)	(0.015)	(0.012)	(0.017)
Women x Without IDK	-0.045***	-0.039***	-0.104***	-0.030**	-0.118***
	(0.011)	(0.011)	(0.018)	(0.013)	(0.018)
Women x Incentives	-0.017	-0.012	-0.003	-0.012	-0.029
	(0.016)	(0.016)	(0.026)	(0.018)	(0.026)
Women x Information	-0.029**	-0.010	-0.051**	-0.022	-0.079***
	(0.014)	(0.015)	(0.024)	(0.018)	(0.025)
Constant	0.317***	0.265***	0.622***	0.353***	0.609***
	(0.045)	(0.044)	(0.063)	(0.051)	(0.063)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	6000	6000	6000	6000	6000
R2	0.101	0.091	0.163	0.102	0.149

Notes: OLS regression of the outcome percent IDK answers in each of the Big Five questions with all control variables included. Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A8: Percent IDK Answers with Big Five, Big Five, Big Three, Big Six and All Nine Questions

	(1)	(2)	(3)	(4)	(5)
	Big Five	Big Five	Big Three	Big Six	All Nine
Women	0.041***	0.040***	0.038***	0.040***	0.037***
	(0.009)	(0.009)	(0.009)	(0.008)	(0.007)
Without IDK	-0.115***	-0.108***	-0.098***	-0.113***	-0.108***
	(0.006)	(0.008)	(0.006)	(0.006)	(0.005)
Incentives	-0.049***	-0.046***	-0.043***	-0.047***	-0.044***
	(0.008)	(0.009)	(0.008)	(0.008)	(0.007)
Information	-0.063***	-0.050***	-0.059***	-0.061***	-0.056***
	(0.008)	(0.010)	(0.008)	(0.008)	(0.007)
Women x Without IDK	-0.067***	-0.072***	-0.063***	-0.064***	-0.057***
	(0.009)	(0.012)	(0.009)	(0.009)	(0.008)
Women x Incentives	-0.015	-0.009	-0.011	-0.012	-0.005
	(0.013)	(0.014)	(0.013)	(0.012)	(0.011)
Women x Information	-0.038***	-0.048***	-0.030**	-0.032***	-0.027**
	(0.012)	(0.014)	(0.013)	(0.012)	(0.011)
Constant	0.433***	0.442***	0.401***	0.429***	0.400***
	(0.035)	(0.037)	(0.037)	(0.033)	(0.029)
Controls	All	All	All	All	All
Observations	6000	6000	6000	6000	6000
R2	0.239	0.191	0.204	0.249	0.251

Notes: OLS regression of the outcome percent IDK answers in different set of question with all control variables included. Column (1) reproduces our main results for the Big Five answers, Column (2) shows the results for the Big Five anwers redefining the IDK to include the skipped answers, Column (3) uses the Big Three answers, corresponding to inflation, compount interest rate and risk diversification, Column (4) adds the simple interest rate answer to the Big Five, and Column (5) includes all questions of the section. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A9: Big-Five: Benchmark of Random Guessing

	(1)	(2)	(3)	(4)
	Δ Answers	Δ Correct	Δ Correct by Random Guessing	Difference
	All			
Without IDK	0.15	0.066	0.057	0.010
Incentives	0.06	0.027	0.022	0.005
Information	0.08	0.034	0.030	0.004
	Women			
Without IDK	0.18	0.077	0.069	0.008
Incentives	0.06	0.012	0.023	-0.011
Information	0.10	0.048	0.037	0.011
	Men			
Without IDK	0.12	0.056	0.045	0.011
Incentives	0.05	0.043	0.021	0.022
Information	0.06	0.020	0.024	-0.003

Notes: The first column shows the increase in the percent of provided answers. The second column shows the observed increase in percent correct. The third column shows the expected increase under random guessing. The fourth column shows the difference between Columns (2) and (3).

Table A10: Further Results: Prob. of Exiting, Perceived Difficulty and Completion Time

	(1) Exit	(2) Exit Q N.	(3) Exit	(4) Exit Q N.	(5) Difficulty	(6) Difficulty	(7) Time	(8) Time
Women	0.045***	0.520***	0.006	0.170	0.368***	0.246**	-0.692	0.064
	(0.008)	(0.126)	(0.007)	(0..175)	(0.113)	(0.116)	(2.930)	(2.732)
Without IDK			0.002	0..007	-0.183	-0.146	-4.195	-3.843
			(0.008)	(0.197)	(0.137)	(0.132)	(3.084)	(3.067)
Incentives			0.005	0.151	-0.052	-0.027	-1.765	-1.952
			(0.009)	(0.217)	(0.139)	(0.133)	(3.166)	(3.225)
Information			0.006	0.248	-0.162	-0.180	0.866	1.793
			(0.009)	(0.231)	(0.145)	(0.140)	(3.136)	(3.054)
Women x Without IDK			-0.000	-0.085	0.222	0.212	13.887***	13.514***
			(0.012)	(0.287)	(0.196)	(0.191)	(4.565)	(4.467)
Women x Incentives			0.011	0.192	-0.002	-0.010	5.947	5.343
			(0.013)	(0.332)	(0.195)	(0.190)	(4.552)	(4.470)
Women x Information			-0.005	-0.264	0.130	0.198	4.265	1.638
			(0.013)	(0.319)	(0.200)	(0.196)	(4.325)	(4.225)
Men control	0.089	1.326	0.029	0.681	4.042	4.042	99.920	99.920
Sample	All	All	Treated	Treated	Treated	Treated	Treated	Treated
Controls	No	No	No	No	No	Yes	No	Yes
Observations	6764	6764	6220	6220	6000	6000	5844	5844
R2	0.000	0.001	0.001	0.001	0.007	0.067	0.003	0.058

Notes: Columns (1) and (3) show the probability abandoning or exiting the survey. Columns (2) and (4) show the number of question in which the survey taker abandons the survey. Columns (5) and (6) show the survey perceived difficulty measured in a scale between 0 and 10. Columns (7) and (8) show the time spent in responding the Big Five questions in seconds. Men control row refers to the mean value of each outcomes variable for men in the control group, except for Columns (1) and (2) that show this value for men. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

B   Survey Questions in the Four Different Versions

The text in squared brackets [] is not shown to the survey respondents but we include it here to ease the understanding of the survey design to readers.

[The survey starts here:]

This Bank of Spain survey aims to measure the familiarity of the Spanish population with basic economic and financial concepts. Its duration is approximately 15 minutes. The survey is carried out in accordance with the applicable regulations on the protection of personal data, which guarantees that your data will be processed solely for statistical purposes and for quality control of the survey, guaranteeing their due integrity and confidentiality. We inform you that both your personal identification and contact data provided by 40db, as well as the academic-professional, economic-financial and related to your personal characteristics that you provide us, are processed by the Bank of Spain exclusively for (i) measure for statistical purposes the familiarity of the Spanish population with basic economic and financial concepts; and (ii) supervise and control the quality of the survey. You can withdraw your consent by sending an email to micro@bde.es and exercise your rights regarding the protection of personal data, proving your identity, either in person, by postal mail to C/Alcalá 48, 28014, Madrid (A/A Data Protection Officer) or electronically through the procedure indicated in the Virtual Office of the Bank of Spain, available at: link

For more information, you can consult the Record of Processing Activities available at:link

Q1. Do you agree to participate and the processing of your data for the purposes indicated?

a. Yes

b. No

[First part of the questionnaire: questions include socio-demographic variables, family background variables and variables measuring behavioral traits: Q2-Q29]

Q2. Are you a ...?

a. Man

b. Woman

Q3. How old were you on your last birthday?

Q4. In which country were you born?

a. Spain

b. Other, which one?

Q5. About how many books were in your home when you were 10 years old? (Do not include magazines, newspapers, or textbooks)

a. None or very few (between 0 and 10 books)

b. Enough to fill a shelf (between 11 and 25 books)

c. Enough to fill a bookshelf (between 26 and 100 books)

d. Enough to fill two bookshelves (between 101 and 200 books)

e. Enough to fill more than two bookshelves (more than 200 books)

Appendix - 12

Q6. Zip Code

Q7. What is your current relationship status?
a. I live with a partner
b. I do not live with a partner

Q8. What is your current legal marital status?
a. Single (never married or domestic partner before)
b. Married or common-law partner
c. Divorced or separated
d. Widower
e. Other, which one?

Q9. Including yourself, how many people live in your household?
a. 1 person
b. 2 people
c. 3 people
d. 4 people
e. 5 people
f. 6 or more people

Q10. Including yourself, how many people receive some type of income?
a. 0
b. 1
c. 2
d. 3
e. 4 or more

Q11. Are you the person who contributes the most income to the household?
a. Yes
b. No

[If Q11 is answered with "a" then jump to Q17]

Q12. What is your relationship with the person who contributes the most income to the household?
a. It is my partner
b. It is my father
c. It is my mother
d. He is my son
e. She is my daughter
f. Other, which one?

Q13. What are the highest level official studies that the main breadwinner of the household

has completed? (We understand the main breadwinner or head of the family to be the person from whom the basic income of the family comes).

a. Can't read or write
b. Without studies or with unfinished primary studies
c. First Grade (School certificate, 1st stage of EGB, more or less up to 10 years old)
d. Second Grade - 1st Cycle (School graduate, or EGB 2nd stage, or 1st and 2nd ESO, up to 14 years old)
e. Second Grade - 2nd Cycle (FP I and II, High School, BUP, ESO 3 and 4, COU, PREU, 1 and 2 Baccalaureate, up to 18 years old)
f. Third Degree - 1st Cycle (Equivalent to Technical Engineer, 3 years, University Schools, Technical Engineers, Technical Architects, Experts, Teaching, ATS, University Diplomas, 3-year degree, Social Graduates, Social Assistants, etc.)
g. Degree, Degree - 2nd Cycle (Universities, Higher Graduates, Faculties, Higher Technical Schools, etc.)
h. Third Degree (Master)
i. Third Degree (PhD)
j. Others

Q14. What is the employment status of the main breadwinner in the household?
a. Currently working
b. Retired/pensioner/disabled
c. Unemployed, have previously worked
d. Unemployed, has not previously worked
e. Student
f. Unpaid household work

Q15. What is the current employment status of the main breadwinner? (If he/she is not currently working, please indicate the status of the last job he/she had)
a. Employee account (eg: employee)
b. Own account (eg: self-employed or entrepreneur)

Q16. What is the profession of the main breadwinner? (If not currently working, please indicate the last job held)
a. Agricultural entrepreneur with 6 or more employees
b. Agricultural entrepreneur with 1 to 5 employees
c. Farm owner with no employees
d. Member of agricultural cooperatives
e. Entrepreneur/Businessperson with 6 or more employees
f. Entrepreneur/Trader with 1 to 5 employees
g. Businessman/Trader without employees
h. Non-agricultural cooperative member
i. Self-employed Professional or Technician (Doctor, Lawyer, etc.)
j. Self-employed manual worker and Craftsman (Bricklayer, Painter, Plumber, Electrician, Upholsterer, etc.)
k. None of the above

l. Director of a Public or Private Company with 25 or more workers
m. Director of a Public or Private Company with less than 25 workers
n. Senior Management/Employee at a higher level of Companies, Public Administration or Army Chiefs (Occupations associated with 2nd and 3rd cycle university degrees)
o. Intermediate Management/Employee at the medium level of Companies, Public Administration or Army Officers (Occupations associated with 1st cycle university degrees, diplomas, etc...)
p. Foreman, Supervisor, Warrant Officer Army
q. Commercial Agent, Representative, etc...
r. Administrative
s. Specialized worker, Civil Guard and Police number
t. Seller, Clerk, etc...
u. Junior Clerk (Janitor, etc.)
v. Unskilled worker, Laborer, Domestic Service
x. Farm laborer
y. Other unqualified personnel
z. None of the above

Q17. What are the highest level official studies that you have completed? (obtaining the corresponding official degree)
[Answers as in Q13]

Q18. In which of the following situations do you currently find yourself?
a. I currently work
b. Retired/pensioner/disabled
c. Unemployed, I have worked before
d. Unemployed, has not previously worked
e. Student
f. Unpaid household work

[If Q18 answered with ("d", "e", or "f") then Q21]
Q19. What is the current labor regime in which you find yourself? (If you are not currently working, please indicate the status of the last job you had)
a. Employee account (eg: employee)
b. Own account (eg: self-employed or entrepreneur)

Q20. What is your profession? (If you are not currently working, please indicate the last job you had)
[Answers as in Q16]

[Do not show if Q8 answered with "a" or Q7 answered with "b"]
Q21. What are the highest level official studies that your partner completed? (obtaining the corresponding official degree)
[Answers as in Q13.]

[Do not show if Q8 answered with "a" or Q7 answered with "b"]

Q22. In which of the following situations is your partner currently?
a. I currently work
b. Retired/pensioner/disabled
c. Unemployed, I have worked before
d. Unemployed, has not previously worked
e. Student
f. Unpaid household work

[Show only if (Q11=b and Q12!=c) or Q11=a)]

Q23. What are the highest level official studies that your mother has completed? (obtaining the corresponding official degree)
[Answers as in Q13]

[Show only if (Q11=b and Q12!=b) or Q11=a]

Q24. What are the highest level official studies that your father has completed? (obtaining the corresponding official degree)
[Answers as in Q13.]

Q25. How would you rate your level of general knowledge on financial topics?
a. Very good
b. good
c. Neutral
d. Bad
e. Very bad

Q26. How many correct answers do you think you could have in 10 questions about basic financial topics? Use a scale of 0 to 10, where 0 means "none correct" and 10 "all correct"

Q27. What is your interest in financial matters? (We refer to the management of personal finances) Use a scale from 0 to 10, where 0 indicates "No interest" and 10 "Maximum interest"

Q28. Are you generally willing to take risks? Use a scale from 0 to 10, where 0 indicates "I am not willing to take any risk" and 10 "I am totally willing to take risk"

Q29. Choose which of the following 8 lotteries you would prefer to participate in. Each lottery has two possible payouts, each with a 50% probability:
a. Lottery 1 1.1€ with 50% and 1.1€ with 50%
b. Lottery 2 1.0€ with 50% and 1.2€ with 50%
c. Lottery 3 0.7€ with 50% and 1.6€ with 50%
d. Lottery 4 0.6€ with 50% and 1.8€ with 50%
e. Lottery 5 0.5€ with 50% and 1.9€ with 50%

f. Lottery 6 0.3€ with 50% and 2.0€ with 50%
g. Lottery 7 0.1€ with 50% and 2.1€ with 50%
h. Lottery 8 0€ with 50% and 2.2€ with 50%

[Middle part of the questionnaire: Financial Literacy questions, FQ1-FQ10. We will also underline the questions included in the big-five, which will be the main focus of our main results. Define 4 groups. Group 1: *Control*, group 2: *Without IDK*, group 3: *Incentives*, and group 4: *Information*]

The next 10 questions include various exercises. It is okay if you can not answer them all, but it is important that you try to answer each one.

If you do not know the answer, just say so. If you think you have the right answer, it is likely that you do. [Filter show if Group = 1, 3 or 4]

[If *Incentives* treatment only:]
You will earn an additional 7 cents for each correct answer. If all 10 answers are correct, you can earn 70 more cents, increasing your payment for participating by more than 60%.

[If *Information* treatment only:]
Men typically answer 7 out of 10 financial questions correctly. Women 6 out of 10. This difference is explained mostly (65%) because women choose the answer "I do not know" more often than men. Therefore, we ask you - please - to avoid answering "I do not know".

The section must be completed in a maximum of 7 minutes. Once started, you will not be able to interrupt it. If you exceed this time, the screen will take you to the next section and you will not be able to go back. When you are ready to start, click "next".

FQ1: Imagine that 5 brothers receive a gift of 1,000 euros in total. If they share the money equally, how much will each get?
a.
b. I do not know [Filter show if Group = 1, 3 or 4]

FQ2 [Big Five.1: Inflation]: Now imagine that the 5 brothers had to wait a year to get their share of the 1,000 euros, and that inflation for that year was 8%. With that money and within a year they will be able to buy:
a. More than they could buy today with their share of the money
b. The same amount
c. Less than they could buy today
d. I do not know [Filter show if Group = 1, 3 or 4]

FQ3: Suppose you deposit 100 euros in a savings account with a fixed interest of 2% per year. If you do not make any other deposits or withdraw any money, how much money will be in the account at the end of the first year, after interest is paid? (In this account there are no commissions or taxes)

a.

b. I do not know [Filter show if Group = 1, 3 or 4]

FQ4 [Big Five.2: Interest Rates and Compounding]: Again, if you do not make any deposits or withdraw any money, how much money will be in the account after 5 years, after the interest payment is paid? (Remember that the savings account has a fixed interest of 2% per year).

a. More than 110 Euros

b. Exactly 110 Euros

c. Less than 110 Euros

d. It is impossible to say with the information given

e. I do not know [Filter show if Group = 1, 3 or 4]

FQ5 [Big Five.3: Risk Diversification]: Generally, it is possible to reduce the risk of investing in the stock market by buying a wide variety of stocks. True or false?

a. True

b. False

c. I do not know [Filter show if Group = 1, 3 or 4]

FQ6 [Big Five.4: Mortgages]: A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less. True or false?

a. True

b. False

c. I do not know [Filter show if Group = 1, 3 or 4]

FQ7 [Big Five.5: Bond Pricing]: What happens to the price of the bonds if the interest rate increases?

a. Falls

b. Goes up

c. Stays the same

d. The price of the bonds is not related to the interest rate

e. I do not know [Filter show if Group = 1, 3 or 4]

FQ8: In a lottery, the probability of winning a prize is 1%. How many people do you think will win a prize if 1,000 people each buy a single different ticket?

a.

b. I do not know [Filter show if Group = 1, 3 or 4]

FQ9a: If 5 machines take 5 minutes to make 5 objects, how long would it take 100 machines to make 100 objects?

FQ9b: If 5 microwaves take 5 minutes to heat 5 plates, how long would it take 100 microwaves to heat 100 plates?

FQ9c: If 5 microwaves take 5 minutes to heat 5 plates, how long would it take 100 microwaves to heat 100 plates?

a. 15 minutes
b. 10 minutes
c. 100 minutes
d. 200 minutes
e. I do not know [Filter show if Group = 1, 3 or 4]

FQ10: Imagine that you are reviewing your household budget. What is 10 − 2?
a. 3
b. 8
c. 10
d. 20

[Final part of the questionnaire: variables measuring behavioral traits.]

POSTQ1: Thinking about this section with 10 questions, how many do you think you have answered correctly?

POSTQ2: If the Spanish population answered these same 10 questions, on average, how many correct answers do you think the following groups would have? The average grade can take values between 0 and 10 where 0 indicates that none would be correct and 10 indicates that all would answer the 10 questions correctly.
a. The entire population:
b. Women:
c. Men:
d. Young people (between 18 and 30 years old):

POSTQ3: Do you have any of the following products? Click on any of the four possible answers: Yes-No-I do not know-I do not know the product
a. Checking account:
b. Savings accounts or deposits:
c. Credit card:
d. Mortgage:
e. Personal loans:
f. Individual or company pension plans:
g. Mutual funds or stocks:
h. Cryptocurrencies:
i. Life or medical insurance:

POSTQ4: In the last 12 months, have you done banking in any of the following ways? (Check all that apply)
a. By personally visiting a bank branch
b. Using an ATM
c. Calling on the phone
d. Using the computer or tablet
e. Using mobile phone apps

f. Otherwise, which one?

g. None of the above

POSTQ5: Of the following options, mark all that you have done at least once:

a. I applied for a promotion at work

b. I asked for an increase in my payroll/salary/pay

c. I was a class representative at school/institute/university

d. I competed in an individual sport (for example: swimming, tennis, judo, fencing, etc.)

e. I competed in a team sport (for example: soccer, gymnastics, basketball, volleyball, etc.)

f. None of the above

POSTQ6: Tell us to what extent you agree with each of the statements. Use a scale of 1 to 5, where 1 indicates strongly disagree and 5 strongly agree.

a. I can solve most problems if I put in the necessary effort

b. I am confident that I can handle unexpected events efficiently

c. I tend to ask questions in class/work meetings

d. Men tend to handle financial problems better than women

POSTQ7: How complicated did you find the survey? Use a scale from 0 to 10, where 0 indicates no complexity and 10 maximum complexity