



UNIVERSITÀ
di **VERONA**

Department
of **ECONOMICS**

Working Paper Series
Department of Economics
University of Verona

Promoting Financial Literacy among the Elderly: Consequences on Confidence

Alessandro Buccioli, Simone Quercia, Alessia Sconti

WP Number: 12

July 2020

ISSN: 2036-2919 (paper), 2036-4679 (online)

Promoting Financial Literacy among the Elderly: Consequences on Confidence*

Alessandro Buccioli[†]

Simone Quercia[‡]

Alessia Sconti[§]

July 2020

Abstract

Financial literacy is a crucial skill for personal wealth management and economic well-being. Hence, it is important to evaluate the impact of interventions aimed at increasing financial literacy in the most vulnerable groups of the society. We conduct an impact evaluation of an intervention consisting in a two-hour lecture by university professors targeting the elderly population. We find that the intervention does not have a significant effect on literacy but has a significant effect on confidence. Our results highlight that short programs meant to increase financial literacy may have a severe drawback in favoring an increased confidence in one's own competence, not supported by an increased competence.

Keywords: Financial literacy; Confidence; Overconfidence.

JEL Classification: G53; D91.

*The intervention was funded by the Veneto Region under the project called "Il Futuro Conta". We also thank Annamaria Nodari, Luigina Tollin, UNIVIA and UNIVIA Breganze for their support. The usual disclaimers apply.

[†]University of Verona. Email address: alessandro.buccioli@univr.it

[‡]University of Verona. Email address: simone.quercia@univr.it

[§]University of Verona. Email address: alessia.sconti@univr.it

1. Introduction

Since few decades, governments have been changing their welfare system, shifting the responsibility of saving onto private individuals (Thaler and Benartzi, 2004). Individuals are this way asked to accumulate an adequate level of wealth, and dedicate their time to financial matters. Over the past years, financial markets have become accessible to a larger fraction of the population, but at the same time the complexity of financial products has increased considerably. This all leads financial literacy to be one of the crucial skills required for personal wealth management in the 21st century (Lusardi, 2015). According to OECD (2014), financial literacy is not only the financial knowledge and skills necessary for sound wealth management, but also the way to improve financial well-being, rational decision-making, and self-confident participation in economic life for the whole society.

To this end, governments and other public and private bodies have been devoting increasing efforts to implement programs to assess and especially increase the level of financial literacy (OECD, 2006; Agarwal et al., 2009; Klapper et al., 2015). Understanding the effectiveness of these programs is of paramount importance to identify strategies for improving financial literacy, in particular among the most vulnerable groups (young, women, elderly, poorer and lower educated people; see Lusardi and Mitchell, 2014).

In this paper, we report an impact evaluation of a financial education project targeted to the over-60 population in the North of Italy. The project was promoted as part of the strategy to increase financial literacy among vulnerable groups in the population. While many financial education programs are addressed to young people (Romagnoli and Trifilidis, 2013; Bruhn et al., 2016; Brugiavini et al., 2018; Frisancho, 2018), and more recently also to women (Attanasio et al., 2019), very little has been done targeting the elderly population. However, targeting this group is particularly important for several reasons. First, older people may find it more difficult to keep up with the ongoing technological evolution of financial markets. Second, being part of the baby boomers' generation, they are likely to have saved substantial wealth over their lifetime and they need the information and skills to participate to financial markets without exposing themselves to excessive risks. Finally, even if they typically hold more savings than younger people, their financial literacy is lower since it decreased over time (Lusardi and Mitchell, 2007a; Korniotis and Kumar, 2009; Finke et al., 2017).

The intervention we evaluate consists in a two-hour personal finance lecture by University of Verona professors on several issues, such as wealth management, investments and risk diversification. We assessed the impact of the intervention on three main outcomes: financial literacy, absolute confidence and overconfidence. Our im-

pact evaluation consists in the administration of a questionnaire before and after the intervention which allows us to test changes in the above-mentioned outcomes.

While the impact of an intervention on financial literacy is of common interest, confidence and overconfidence also constitute important aspects (Brugiavini et al., 2018). In particular, evidence shows that lower financial inclusion is associated with a lower level of self-assessed financial literacy (lower investments, lower access to debt, and lower appeal for pension plans; see Di Salvatore et al. (2018)). Hence, it is important to assess whether financial literacy interventions help increasing individuals' levels of confidence. Previous literature has measured confidence through a direct unincentivized question that asks respondents to self-assess their level of financial literacy on a Likert scale (see, e.g., Lusardi and Mitchell, 2007b; Brugiavini et al., 2018). Our novelty compared to this approach is twofold: (i) we measure confidence for each question separately being able to connect confidence with the given answer in each question and (ii) we provide monetary incentives in the elicitation of confidence which may offer a higher level of experimental control, alleviate potential hypothetical bias, and increase accuracy (List and Gallet, 2001; Gächter and Renner, 2010).¹ Finally, being overconfidence one of the most critical biases in the financial environment (Biais et al., 2005; Daniel and Hirshleifer, 2015), it is important to assess whether the intervention has an effect on this aspect too. Previous literature suggests that one side effect of interventions may be to raise confidence without effectively raising financial literacy (Bruhn et al., 2016; Brugiavini et al., 2018), a phenomenon that we label overconfidence and we investigate in our impact evaluation.

Our findings show that the intervention does not significantly increase individuals' financial literacy. However, it has a significant and positive effect on confidence. This suggests that longer and more effective approaches compared to a two-hour lecture may be needed to increase financial literacy of the over-60 population. In contrast, we do not find evidence of an increase in overconfidence. Overall our results suggest that short programs meant to increase financial literacy may have a severe drawback in favoring an increased confidence in one's own competence, not supported by an increased competence.

The remainder of the paper is organized as follows. Section 2 describes the setup of

¹The literature on absolute confidence in psychology dates back to Fischhoff et al. (1977) and typically assesses confidence with short unincentivized questions asking to report the likelihood of having answered correctly to a certain question or task (see Alba and Hutchinson, 2000, for a review). More recent contributions in experimental economics include Blavatskyy (2009); Clark and Friesen (2009); Hollard et al. (2016); Murad et al. (2016). This literature is distinct from the literature on relative confidence which elicits individuals' beliefs on their performance relative to others (see, e.g., Svenson, 1981; Camerer and Lovo, 1999; Hoelzl and Rustichini, 2005; Moore and Cain, 2007; Niederle and Vesterlund, 2007; Benoît and Dubra, 2011; Benoît et al., 2015). Clearly, the related definition of overconfidence also differs across these two strands of literature.

the intervention and the impact evaluation methods, Section 3 summarises the main findings, and Section 4 concludes. The Appendix reports the output from a robustness check. A separate Online Appendix includes the questionnaires.

2. The Intervention

Our impact evaluation takes place within the framework of a project named "Il Futuro Conta" (*Future Matters*) funded by the Veneto region with the aim of increasing the level of financial literacy among elderly people. The intervention is organized by the University of Verona in partnership with UNIVIA – the University of the Third Age in the province of Vicenza. UNIVIA has several locations in the province, mostly in small towns. We randomly selected one of these locations, the town of Breganze (nearly 9,000 inhabitants). The intervention consisted in providing a two-hour personal finance lecture by University of Verona professors to people attending meetings at the University of the Third Age.

The timeline of our intervention was as follows. On February 10th, 2020, respondents participated to a first generic lecture unrelated to financial matters. At the end of this first meeting, we administered an anonymous baseline questionnaire with the aim of establishing the initial levels of financial literacy and confidence. Upon completion, participants were instructed to tear the first page of the questionnaire booklet containing a unique ID number which was also reported on each page of the questionnaire. They were further instructed to keep the first page with the ID number for the next meeting, and to return the filled questionnaire.

One week after, on February 17th, we provided a two-hour lecture on basic financial topics (inflation, diversification, financial planning and numeracy). After this second meeting, we asked subjects to present their ID number and we administered a follow-up questionnaire. Assigning a follow-up questionnaire with the same ID number to participants allowed us to track responses at the individual level while preserving anonymity.

We incentivized responses with a voucher worth up to 5 euros, that participants could use at a local cafe'. Below we report details about the voucher and its random assignment.

2.1. The Questionnaire

Our questionnaires are composed by seven multiple-choice questions on personal finance matters, related to the topics covered in the two-hour lecture. Among the questions we include the well known "Big Three" questions of Lusardi and Mitchell (2011).

Each question is presented with three possible alternative answers, with only one correct. We provide two versions (A and B) of the questionnaire. Four questions are the same across the two questionnaires while three are different; see the Online Appendix for the full list of questions. Each respondent received both questionnaires: Half of the participants received Questionnaire A as baseline and Questionnaire B as follow-up, while the other half received Questionnaire B first and Questionnaire A later to control for potential order effects.

Each question is followed by a table meant to elicit absolute confidence, in a fashion similar to [Murad et al. \(2016\)](#). The table contains ten rows, each asking to choose between two options: a guaranteed amount "A" and a lottery "B" returning 5 EUR if the participant gives the correct answer to the question, and 0 otherwise. Rows differ in the size of the guaranteed amount, that shrinks by 0.5 EUR row by row, starting at 5 EUR down to a minimum of 0.5 EUR. This way it becomes progressively less attractive to choose Option A. Participants are expected to choose Option A in the first row and potentially switch from Option A to Option B at some point going down in the table. We interpret their switching point as a measure of absolute confidence. Under reasonable assumptions on the utility function, it is irrational to switch back from Option B to Option A. An example of the decision table is reported in Figure 1.

FIGURE 1 ABOUT HERE

Choices are incentivized as follows. At the end of the second meeting we randomly chose one of the two meetings to be relevant for payment. Among the choices made in that meeting, we randomly chose one question and one row of the corresponding table to be payoff-relevant. If participants had chosen Option A in that row they would receive a voucher corresponding to the respective guaranteed amount. If they had chosen Option B, they would earn a 5 EUR voucher if the corresponding answer was correct and no voucher otherwise. This mechanism was announced before administering the first questionnaire and all random choices were publicly performed at the end of the second meeting.

2.2. Data and summary statistics

Our main analysis is performed at the level of a single question. This way, for each of the 67 participants in the two meetings we have up to 14 observations overall (seven before and seven after treatment), that is, 938 observations. In the absolute confidence task, irrational decisions are not unusual (see, e.g., [Murad et al., 2016](#)): indeed, in 6.93% of our sample we observe tables with more than one switching point, or tables with switches back from Option B to Option A. After removing 65 observations

with irrational decisions, and 160 observations with missing values on the explanatory variables, we are left with a sample of 60 participants and 713 observations.

In our benchmark analysis we focus only on the four questions that are identical before and after the intervention (409 observations for the 60 participants). We do this as these questions offer higher comparability. The drawback is that participants in the second meeting could have learnt how to answer. For this reason in a robustness check shown in the Appendix, we also consider the questions that vary before and after the treatment. These questions do not offer the same comparability as the others, but are free from learning effects.

We consider three dependent variables: a dummy equal to one if the reported answer is correct (variable *Correct*), the level of confidence (variable *Confidence*) and the level of overconfidence (variable *Overconfidence*). Confidence is measured as the last guaranteed amount before the switch to the lottery in the confidence elicitation table, that is, when the participant switches from Option A to Option B. This can be interpreted as the certainty equivalent of the lottery.² Overconfidence is measured as the product between confidence and a dummy equal to one if the reported answer is wrong. Comparing this variable across the two questionnaires gives an indication on whether confidence increases also for questions in which the subject is wrong. It is worth noticing that this definition of overconfidence does not coincide with the one used in the literature on relative confidence, that is, confidence on own performance relative to the performance of others (see Footnote 1). Here, we define overconfidence as the evidence that absolute confidence increases even when financial literacy does not.

Table 1 reports summary statistics on the variables in our dataset. Here we learn that participants answered correctly to 73% of the questions, and reported an average certainty equivalent of the lottery equal to 2.476 EUR. In addition to the three dependent variables and the treatment dummy (informing whether the data were collected in the second rather than the first meeting), we report information from a short post-experimental questionnaire where we ask to self-rate the willingness to take risks using the general risk question of Dohmen et al. (2011) (variable *Risk*, on a Likert scale from 0 to 10), financial knowledge before the course (dummy variable *Initial Good Knowledge*, equal to 1 if good knowledge), and overall satisfaction with the lecture (variable *Satisfaction* on a Likert scale from 0 to 2). Our respondents are generally risk averse (the average risk attitude is 2.848, and we observe no answers above 7) and moderately satisfied with the lecture. Only a minority (25.2%) believe to have good

²For instance, if a participant believes to have a 75% chance that the answer was correct, he/she should switch at Row 4, because the expected payoff from the lottery ($0.75 \cdot 5 = 3.75$ EUR) is higher than the guaranteed amount (3.5 EUR) provided as an alternative.

knowledge of financial matters. Furthermore, we collect socio-demographic information on age (in years), gender (a dummy equal to 1 if male) and education (a dummy equal to 1 if high school or higher education). Our average respondent is 69.039 years old, female (in 80% of the cases) and with high school or higher education (in 56.4% of the cases). Responses to socio-demographic questions were not compulsory for privacy reasons, and 18 participants decided not to answer. The average characteristics of our sample, however, are roughly in line with those of the students enrolled at the University of the Third Age (average age 71, 71.6% females, 44.04% high school or university graduates. Source: UNIVIA Breganze). Because we have missing values on these variables, we run our analyses both with and without the socio-demographic controls, respectively to retain more observations and to exploit more information.

TABLE 1 ABOUT HERE

In Figures 2 and 3 we report the fraction of correct answers and the average overconfidence conditional on the level of confidence. The figures highlight a clear positive relationship between confidence, correct answers and overconfidence. The correlation is of course stronger for overconfidence (0.29 as opposed to 0.08), that is defined as a function of confidence.

FIGURE 2 ABOUT HERE

FIGURE 3 ABOUT HERE

2.3. Hypotheses

The effectiveness of financial education programs is mixed in previous literature due to the different intensity of treatments. A recent meta-analysis by Kaiser et al. (2020), finds a strong positive effect in improving financial literacy among young people (through at least 7-hour courses addressed to 33 years older adults, on average). However, Brugiavini et al. (2018) find some positive effects on financial literacy levels of a short lecture addressed to university students. This leads to our first hypothesis:

H1: The intervention increases the level of financial literacy.

Our second and third hypotheses are derived from findings in Brugiavini et al. (2018), who report an increased self-reported confidence after a short course. Our absolute confidence task allows to test the impact of intervention on confidence and overconfidence:

H2: The intervention increases confidence;

H3: The intervention increases overconfidence.

We test the second hypothesis studying if there are variations in the amount chosen in the absolute confidence table before and after the course. We test the third hypothesis comparing before and after the course the combination of the answer with the absolute confidence table.

3. Results

As a first step, Table 2 reports the average value of our three dependent variables before and after the treatment. The last column of the table shows the output of a t-test on the comparison of the average after and before the treatment. Following the treatment, we observe no statistical difference in the fraction of correct answers, while we find a significant increase of confidence and weak evidence (significant at the 10% level) of an increase in overconfidence. In the remaining part of this section we elaborate further on the effects of the treatment.

TABLE 2 ABOUT HERE

Table 3 shows the output from our benchmark regression analyses, where standard errors are always clustered at the individual level to account for potential correlation across observations regarding the same individual. We consider probit and OLS models, depending on the nature of the dependent variable (probit if dummy, OLS otherwise).

We start our analysis assessing whether the intervention is successful in raising participants' financial literacy. In Column (1) we report average marginal effects from a probit regression using the dummy *Correct* as dependent variable and our treatment variable as independent variable controlling for *Risk*, *Initial Good Knowledge* and *Satisfaction*. We find no evidence of a significant effect of our treatment on the probability to answer correctly, meaning that the intervention is unable to improve the level of financial literacy. Findings are unchanged when we add the socio-demographic controls in Column (2).

Next, we turn to the effects of the intervention on confidence. Column (3) reports output from an OLS model and uses *Confidence* as dependent variable and the same specification of Column (1). Here we find that the treatment has a positive and significant effect on absolute confidence. The coefficient remains significant and slightly increases in size when we add the socio-demographic controls in Column (4). For instance, from Column (4) we learn that the treatment increases the certainty equivalent of the lottery by 0.86 EUR. This increase is not negligible, as the average value of the certainty equivalent in the sample is 2.476 EUR.

Finally, it is interesting to assess whether the increase in confidence leads to overconfidence. This would imply a general increase in confidence without a corresponding increase in financial literacy and could eventually be detrimental to people in their prospective financial decisions. Column (5) reports the output from an OLS model with *Overconfidence* as dependent variable and the same specification of Columns (1) and (3). The coefficient on the treatment dummy shows that overconfidence is only weakly significant, indicating that the risk of increasing confidence without increasing financial literacy is not a strong threat of our treatment. Moreover, when we include additional socio-demographic controls in Column (6), the coefficient on overconfidence is smaller and no longer significant. From the two previous analyses we learnt that the treatment increased confidence but not the correctness of the answers. Since our overconfidence measure is the combination of the two variables on correctness and confidence, we read this result as suggesting that, after the short course, the rise in confidence is not large enough to overcome the stability of the correctness of the answers.

TABLE 3 ABOUT HERE

Appendix Table A1 reports a robustness check based on the full sample, also including the questions that differ in the two questionnaires. All results are in line with the benchmark ones reported in Table 2, both in terms of size and in terms of significance.

In sum we find that, while the intervention does not have a significant effect on the level of financial literacy, it increases significantly confidence on the correctness of the answer. Going back to our research hypotheses, we find evidence in support to *Hypothesis 2* (on confidence) but not on *Hypotheses 1* and *3* (on the correctness of the answer and on overconfidence).

4. Conclusions

Nowadays individuals are more responsible for their personal finances than ever before and hence financial literacy is considered a crucial skill to a sound wealth management (Lusardi, 2019). However, the level of financial literacy remains quite low especially among vulnerable groups of the population. In light of this, in this paper, we have chosen to target one of the most vulnerable groups, the elderly, enrolled at the University of the Third Age of Breganze, a small town in Italy. In the international context, and especially in the Italian one, the role of the elderly is crucial in supporting the economy due to their higher savings in comparison to young people. However, this group is one of the most vulnerable due to the increasing complexity, risks

and technology of the financial markets. Hence, we have tested the effect of a short two-hour personal finance lecture on financial literacy, confidence and overconfidence using incentivized elicitation.

We have found that the intervention does not have a significant effect on participants' financial literacy. We have also shown that the intervention has substantially boosted individuals' confidence without increasing overconfidence.

Our results highlight that short programs meant to increase the level of financial literacy may have a severe drawback in favoring an increased confidence in one's own competence, not supported by an increased competence. In principle, this evidence could hold also outside the financial literacy environment. Confidence without competence is potentially dangerous. Future programs should take this drawback into account, and regularly stimulate the participants to realize that there is much they still do not know.

In our view, this work is a first step in the analysis of the joint effects of financial education programs on financial literacy, confidence and overconfidence. We are aware of at least two limitations of the study, that need to be addressed in future research. First, the intervention we consider (a two-hour lecture) may be too short to be effective for financial literacy. It is possible that a longer intervention could raise elderly knowledge of personal finance matters. Second, effects are measured right after the intervention. While this prevents external events from potentially disturbing the analysis, we acknowledge that effects should be better evaluated on a longer time distance. We leave these extensions for future research.

As confidence alone is not sufficient to ensure high levels of financial inclusion, one important further question for future research is to establish which length and type of interventions are likely to affect *both* financial literacy and confidence. Another interesting question is whether different educational tools and techniques, such as more engaging and interactive instruments compared to the standard lecture format we have tested here, could produce enduring effects on elderly financial education.

References

- Agarwal, S., J. Driscoll, X. Gabaix, and D. Laibson (2009). The age of reason: Financial decisions over the life cycle and implications for regulation. *Brookings Papers on Economic Activity* 40(2), 51–117.
- Alba, J. W. and J. W. Hutchinson (2000). Knowledge calibration: What consumers know and what they think they know. *Journal of Consumer Research* 27(2), 123–156.
- Attanasio, O., M. Bird, L. Cardona-Sosa, and P. Lavado (2019). Freeing financial education via tablets: Experimental evidence from Colombia. Technical Report 25929, National Bureau of Economic Research.
- Benoît, J.-P. and J. Dubra (2011). Apparent overconfidence. *Econometrica* 79(5), 1591–1625.
- Benoît, J.-P., J. Dubra, and D. A. Moore (2015). Does the better-than-average effect show that people are overconfident?: Two experiments. *Journal of the European Economic Association* 13(2), 293–329.
- Biais, B., D. Hilton, K. Mazurier, and S. Pouget (2005). Judgemental overconfidence, self-monitoring, and trading performance in an experimental financial market. *Review of Economic Studies* 72(2), 287–312.
- Blavatsky, P. R. (2009). Betting on own knowledge: Experimental test of overconfidence. *Journal of Risk and Uncertainty* 38(1), 39–49.
- Brugiavini, A., D. Cavapozzi, M. Padula, and Y. Pettinicchi (2018). On the effect of financial education on financial literacy: Evidence from a sample of college students. *Journal of Pension Economics and Finance* 19(3), 1–9.
- Bruhn, M., L. d. S. Leão, A. Legovini, R. Marchetti, and B. Zia (2016). The impact of high school financial education: Evidence from a large-scale evaluation in Brazil. *American Economic Journal: Applied Economics* 8(4), 256–95.
- Camerer, C. and D. Lovo (1999). Overconfidence and excess entry: An experimental approach. *American Economic Review* 89(1), 306–318.
- Clark, J. and L. Friesen (2009). Overconfidence in forecasts of own performance: An experimental study. *Economic Journal* 119(534), 229–251.
- Daniel, K. and D. Hirshleifer (2015). Overconfident investors, predictable returns, and excessive trading. *Journal of Economic Perspectives* 29(4), 61–88.

- Di Salvatore, A., F. Franceschi, A. Neri, and F. Zanichelli (2018). Measuring the financial literacy of the adult population: The experience of Banca d'Italia. Technical Report 435, Bank of Italy.
- Dohmen, T., A. Falk, D. Huffman, U. Sunde, J. Schupp, and G. G. Wagner (2011). Individual risk attitudes: Measurement, determinants, and behavioral consequences. *Journal of the European Economic Association* 9(3), 522–550.
- Finke, M. S., J. S. Howe, and S. J. Huston (2017). Old age and the decline in financial literacy. *Management Science* 63, 213–230.
- Fischhoff, B., P. Slovic, and S. Lichtenstein (1977). Knowing with certainty: The appropriateness of extreme confidence. *Journal of Experimental Psychology: Human Perception and Performance* 3(4), 552–564.
- Frisancho, V. (2018). The impact of school-based financial education on high school students and their teachers: Experimental evidence from Peru. Technical Report 8835, Inter-American Development Bank.
- Gächter, S. and E. Renner (2010). The effects of (incentivized) belief elicitation in public goods experiments. *Experimental Economics* 13(3), 364–377.
- Hoelzl, E. and A. Rustichini (2005). Overconfident: Do you put your money on it? *Economic Journal* 115(503), 305–318.
- Hollard, G., S. Massoni, and J.-C. Vergnaud (2016). In search of good probability assessors: An experimental comparison of elicitation rules for confidence judgments. *Theory and Decision* 80(3), 363–387.
- Kaiser, T., A. Lusardi, L. Menkhoff, and C. J. Urban (2020). Financial education affects financial knowledge and downstream behaviors. Working Paper 27057, National Bureau of Economic Research.
- Klapper, L., A. Lusardi, and v. O. Peter (2015). Financial literacy around the world: Insights from the Standard and Poor's ratings services global financial literacy survey. Technical report, Standard & Poor's Ratings Services.
- Korniotis, G. and A. Kumar (2009). Do older investors make better investment decisions? *Review of Economics and Statistics* 93, 244–265.
- List, J. A. and C. A. Gallet (2001). What experimental protocol influence disparities between actual and hypothetical stated values? *Environmental and Resource Economics* 20(3), 241–254.

- Lusardi, A. (2015). Financial literacy skills for the 21st century: Evidence from PISA. *Journal of Consumer Affairs* 49(3), 639–659.
- Lusardi, A. (2019). Financial literacy and the need for financial education: evidence and implications. *Swiss Journal of Economics Statistics* 155(1), 1–8.
- Lusardi, A. and O. S. Mitchell (2007a). Baby Boomer retirement security: The roles of planning, financial literacy, and housing wealth. *Journal of Monetary Economics* 54(1), 205–224.
- Lusardi, A. and O. S. Mitchell (2007b). Financial literacy and retirement planning: New evidence from the rand american life panel. Technical Report 2007-157, Michigan Retirement Research Center.
- Lusardi, A. and O. S. Mitchell (2011). Financial literacy around the world: An overview. *Journal of Pension Economics and Finance* 10(4), 497–508.
- Lusardi, A. and O. S. Mitchell (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature* 52(1), 5–44.
- Moore, D. A. and D. M. Cain (2007). Overconfidence and underconfidence: When and why people underestimate (and overestimate) the competition. *Organizational Behavior and Human Decision Processes* 103(2), 197–213.
- Murad, Z., M. Sefton, and C. Starmer (2016). How do risk attitudes affect measured confidence? *Journal of Risk and Uncertainty* 52, 21–46.
- Niederle, M. and L. Vesterlund (2007). Do women shy away from competition? do men compete too much? *Quarterly Journal of Economics* 122(3), 1067–1101.
- OECD (2006). Improving financial literacy: Analysis of issues and policies. Technical report, OECD.
- OECD (2014). Pisa 2012 results: Students and money: Financial literacy skills for the 21st century. Technical report, OECD.
- Romagnoli, A. and M. Trifilidis (2013). Does financial education at school work? evidence from Italy. Technical Report 155, Bank of Italy, Economic Research and International Relations Area.
- Svenson, O. (1981). Are we all less risky and more skillful than our fellow drivers? *Acta Psychologica* 47(2), 143–148.
- Thaler, R. and S. Benartzi (2004). Save more tomorrow: Using behavioral economics to increase employee saving. *Journal of Political Economy* 112(1), 5164–5187.

Table 1: Summary statistics

Variable	Observations	Mean	Std. Dev.	Min.	Max.
Correct	409	0.726	0.446	0	1
Confidence	339	2.476	2.095	0	5
Overconfidence	339	0.527	1.357	0	5
Risk	409	2.848	2.043	0	7
Initial Good Knowledge	409	0.252	0.435	0	1
Satisfaction	409	0.917	0.609	0	2
Age	280	69.039	6.028	60	85
Male	280	0.200	0.401	0	1
High education	280	0.564	0.497	0	1

Table 2: Average Dependent Variables

Variable	Pre Treatment	Post Treatment	t-test
Correct	0.735 (0.443)	0.718 (0.451)	-0.370
Confidence	2.211 (2.117)	2.711 (2.052)	2.207**
Overconfidence	0.396 (1.158)	0.642 (1.504)	1.666*

Notes: the table reports the average of the three dependent variables before and after the intervention. Standard deviations in parentheses. The last column reports the value of a t-test on the comparison of the average after and before the treatment. ** $p < 0.05$, * $p < 0.1$.

Table 3: Regression Results

Variables Model	(1) Correct Probit	(2) Correct Probit	(3) Confidence OLS	(4) Confidence OLS	(5) Overconfidence OLS	(6) Overconfidence OLS
Treatment	-0.016 (0.044)	-0.005 (0.054)	0.722** (0.329)	0.860** (0.400)	0.326* (0.184)	0.269 (0.180)
Risk	0.003 (0.011)	0.006 (0.014)	-0.035 (0.119)	0.024 (0.143)	-0.037 (0.051)	-0.006 (0.065)
Initial Good Knowledge	-0.006 (0.054)	0.052 (0.067)	0.519 (0.505)	0.729 (0.621)	0.117 (0.202)	-0.013 (0.197)
Satisfaction	-0.010 (0.044)	0.007 (0.040)	-0.215 (0.335)	-0.194 (0.286)	-0.170 (0.158)	-0.190 (0.129)
Age		0.007 (0.005)		0.014 (0.034)		-0.005 (0.014)
Male		-0.079 (0.067)		1.144* (0.580)		0.312 (0.297)
High education		-0.002 (0.057)		0.444 (0.494)		0.145 (0.168)
Constant			2.252*** (0.440)	0.243 (2.558)	0.575*** (0.161)	0.730 (1.045)
Pseudo R-squared	0.001	0.012				
R-squared			0.026	0.109	0.019	0.029
Individuals	60	42	53	40	53	40
Observations	409	280	339	258	339	258

Notes: Columns (1) and (2) report average marginal effects. Standard errors clustered at the individual level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Figure 1: Example table for the elicitation of confidence

Example Table				
Row	Option A: Guaranteed Amount	Your Choice		Option B: Lottery
		A	B	
1	5.00€	<input type="checkbox"/>	<input type="checkbox"/>	You earn 5€ if your answer is correct and 0€ otherwise
2	4.50€	<input type="checkbox"/>	<input type="checkbox"/>	
3	4.00€	<input type="checkbox"/>	<input type="checkbox"/>	
4	3.50€	<input type="checkbox"/>	<input type="checkbox"/>	
5	3.00€	<input type="checkbox"/>	<input type="checkbox"/>	
6	2.50€	<input type="checkbox"/>	<input type="checkbox"/>	
7	2.00€	<input type="checkbox"/>	<input type="checkbox"/>	
8	1.50€	<input type="checkbox"/>	<input type="checkbox"/>	
9	1.00€	<input type="checkbox"/>	<input type="checkbox"/>	
10	0.50€	<input type="checkbox"/>	<input type="checkbox"/>	

Figure 2: Fraction of correct answers conditional on confidence

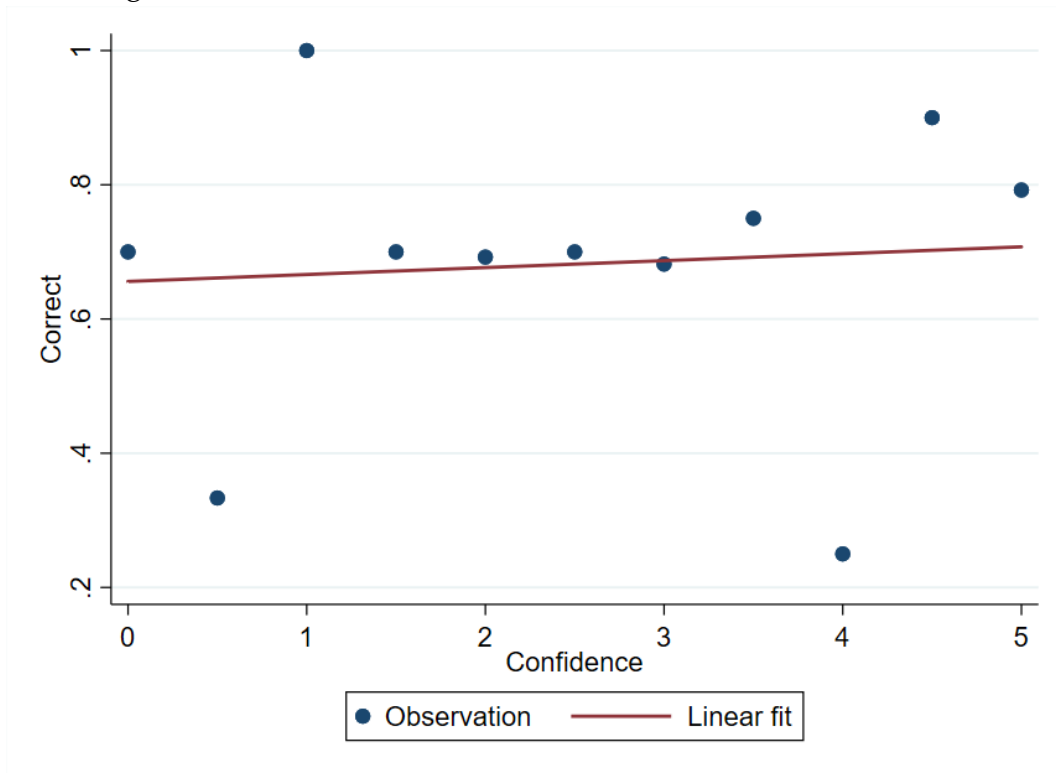
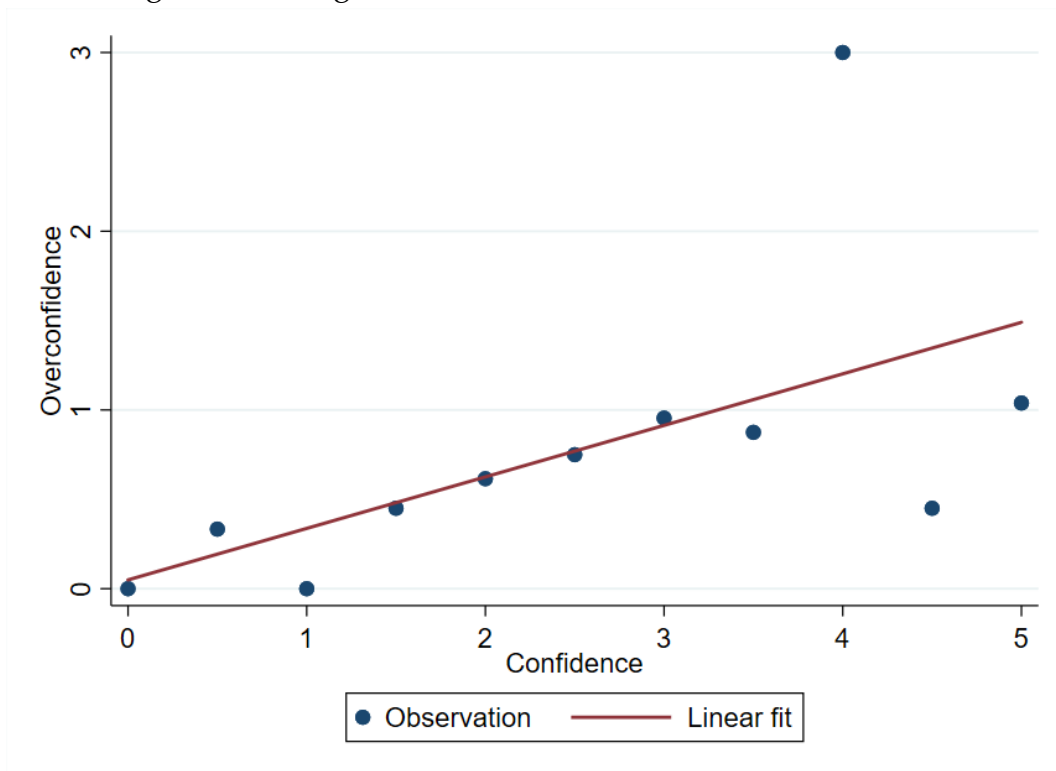


Figure 3: Average overconfidence conditional on confidence



A. Appendix: Additional results

Table A1: Robustness check on the full sample

Variables Model	(1) Correct Probit	(2) Correct Probit	(3) Confidence OLS	(4) Confidence OLS	(5) Overconfidence OLS	(6) Overconfidence OLS
Treatment	0.058 (0.037)	0.052 (0.052)	0.772** (0.322)	1.015*** (0.368)	0.099 (0.153)	0.215 (0.181)
Risk	0.008 (0.009)	0.003 (0.014)	-0.043 (0.110)	0.000 (0.121)	-0.056 (0.037)	0.010 (0.041)
Initial Good Knowledge	-0.028 (0.046)	-0.022 (0.059)	0.606 (0.484)	0.915 (0.560)	0.204 (0.204)	0.302 (0.232)
Satisfaction	-0.008 (0.037)	0.001 (0.042)	-0.206 (0.315)	-0.234 (0.259)	-0.100 (0.111)	-0.238** (0.101)
Age		0.004 (0.005)		0.023 (0.030)		0.002 (0.014)
Male		0.049 (0.084)		1.124** (0.480)		-0.118 (0.211)
High education		0.039 (0.051)		0.323 (0.458)		-0.010 (0.157)
Constant			2.171*** (0.418)	-0.376 (2.254)	0.737*** (0.157)	0.393 (1.029)
R-squared			0.031	0.121	0.011	0.014
Pseudo R-squared	0.006	0.009				
Individuals	60	42	54	41	54	41
Observations	713	489	593	452	593	452

Notes: Columns (1) and (2) report average marginal effects. Standard errors clustered at the individual level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.