CONVOLUTED LANGUAGE HAS AN ADVERSE EFFECT ON CONSUMERS OF FINANCIAL PRODUCTS

Technical report

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THINK FORWARD INITIATIVE

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October, 2020

Abstract

Convoluted language makes excessive use of difficult expressions and style. This type of language is often used to describe financial products. Anecdotal and empirical evidence suggests that convoluted language can have an adverse effect on consumers. However, it is less clear how exactly convoluted language affects consumers' financial decisions. The main objective of our project was to explore how convoluted language affects consumers of financial products. We conducted two online experiments in which we investigated the impact of terms and conditions of car insurance policies described in simple versus convoluted language to consumers. Results indicate that convoluted language has an adverse effect on the emotional aspects of financial well-being, purchase intention, and the understanding of financial products; even when controlling for demographic variables (e.g., gender, age). Consumer's financial self-efficacy, financial knowledge, and numerical ability had little impact on this adverse effect. Our findings highlight the importance to consider—and potentially change—how information is presented when describing and communicating financial products.

***Keywords*:** Convoluted language, Personal finance, Insurance policies, Financial well-being, Financial understanding

[*] This report has been prepared by the authors for the Think Forward Initiative.

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1. Introduction

A unique aspect of today's world is the complexity of its financial products (Lusardi, 2015). One characteristic of this complexity is the convoluted language that is used to describe financial products to consumers. Convoluted language can be defined as communication that makes excessive use of difficult expressions (e.g., jargon) and difficult style (e.g., complicated sentence structure). The Financial Conduct Authority (FCA) stresses the impact convoluted language can have on consumers by writing: "[t]he way financial products are communicated and marketed can make it difficult for consumers to understand and identify the right products for them" (Rowe, De Ionno, Peters, & Wrigh, 2015, p. 31).

This is particularly problematic for basic financial products that are important for matters of financial inclusion (for more information about financial inclusion, see The World Bank, 2018). One example for such a basic financial product are car insurance policies. Indeed, many consumers perceive the langue of car insurance policies as unclear (Patel, 2019). This is perhaps not surprising since car insurance policies often contain technical vocabulary to describe terms and conditions. Yet, it is less clear how convoluted language impacts consumers.

In this project, we set out to investigate the effect of convoluted language in financial products on consumers' financial well-being, their understanding of these products, their willingness to purchase them, and their ability to discern better financial products from worse. We do so by conducting two online experiments in which we present individuals with terms and conditions of an insurance policy described either using simple or convoluted language. We find that convoluted language has adverse effects on consumer's financial well-being, their willingness to purchase, and their understanding of the product. However, a majority of individuals are able to identify and choose the product with the better terms and conditions, regardless of the language used to describe it.

The remainder is organized in the following. We start with a brief theoretical background on convoluted language in the financial context. That section then finishes with our predictions. Next, we present the empirical results of two online experiments that tested these predictions in the context of car insurance policies. Following, we discuss the results and finish with practical implications and recommendations.

2. Theoretical Background

Anecdotal evidence and empirical data suggest that consumers perceive financial products to be laden with convoluted language. Moreover, it is likely that convoluted language has adverse effects on consumers. For instance, it is plausible that convoluted language could reduce consumers' understanding of financial products. However, it is less clear how exactly convoluted language affects consumers' financial decisions. Indeed, how does convoluted language affect consumers of financial products such as car insurance policies?

2.1 Prior research on processing fluency and relevance for financial decisions

To answer this question, we draw on prior research on processing fluency. Fluency can be defined as "the subjective experience of ease or difficulty with which we are able to process information" (Oppenheimer, 2008, p. 237). Prior research on fluency has covered a wide variety of different types of fluencies (for an overview, see Alter & Oppenheimer, 2009). In this project, we focus on what Alter and Oppenheimer (2009) have described as lexical and syntactic fluency. The authors suggest that lexical fluency is manifested in the choice of words and syntactic fluency in the complexity of sentence structure. To exemplify this, imagine a consumer reading the terms and conditions that describe the extend of coverage provided by an insurance policy. In this context, technical language, jargon, and terminology of the terms and conditions could impact her lexical fluency and the sentence structure and voice could impact her syntactic fluency. Both lexical fluency and syntactic fluency could jointly impact how she perceives the information in the insurance policy in this example.

To start with, processing fluency can produce positive feeling in people. In line with this argument, Reber, Winkielman, and Schwarz (1998) show that perceptual fluency—the optical ease to process information—is associated with self-reported positive affective judgments. Moreover, Winkielman and Cacioppo (2001) find that this effect of processing fluency holds also when positive affect is measured with implicit, psychophysiological measures. Moreover, a review of prior research suggests that fluency has a positive relation with liking and level of confidence (Alter & Oppenheimer, 2009); arguably a finding that is relevant for a variety of judgement and decisions made by consumers. Thus, the literature on processing fluency highlights that, not only the information itself but also how the information is presented is important for judgment and choice.

On the most basic level, processing fluency influences people's understanding. The same information presented in a simple versus convoluted language can impact people's understanding. Indeed, Van Boom, Desmet, and Van Dam (2016) conducted an experiment with a representative sample of Dutch citizens to investigate the effect of objectively convoluted versus simple language of a car insurance policy. Their results indicate that consumers perceive convoluted language as harder to understand. Moreover, Garrison, Hastak, Hogarth, Kleimann, and Levy (2012) show that simplifying financial institutions' privacy notice (e.g., its language but also other elements) can increase consumers' understanding. In line with these findings, Huhmann (2017) argues that materials describing financial products can be convoluted and discusses a number of acts and reforms introduced to simplify the language used when describing and communicating financial products. For instance, he writes: "The Dodd-Frank Wall Street Reform and Consumer Protection Act, signed into law by US President Barack Obama on July 21, 2010, encouraged simpler language and presentations of some financial product and service information" (p.756). Thus, not

only consumers but also policy makers recognize the effect simple versus convoluted representation of the same information can have on understanding.

Financial well-being is an important concept to understand consumers' affect in financial decision-making. Financial well-being can be conceptualized as having two dimensions; consumers' feelings of financial anxiety and financial security (see, for instance, Lind, Ahmed, Skagerlund, Strömbäck, Västfjäll, & Tinghög, 2020; Strömbäck, Lind, Skagerlund, Västfjäll, & Tinghög, 2017). Netemeyer, Warmath, Fernandes, and Lynch (2017) argue further that financial well-being has a present and a future dimension. This temporal dimension maps well onto the anxiety and security conceptualization as they contain feelings related to the present and the future. As previously mentioned, existing research shows that processing fluency can induce positive affect (e.g., Reber, Winkielman, & Schwarz, 1998). In line with this finding, we suggest, that convoluted language has an adverse effect on financial anxiety and security. That is, more convoluted language leaves consumers feeling anxious about their understanding of and insecure about coverage of insurance policies.

Prior research also indicates that easier-to-process information have an impact on purchase intention and choice. For instance, Gomez, Werle, and Corneille (2017) find that the processing fluency of nutrition labels impacts consumers' purchase intention. This effect was observed for both healthy and unhealthy food products. Similarly, Coulter and Roggeveen (2014) found that, in the context of price promotions, price-related deal processing fluency has a positive effect on purchase intention. Easier to process promotional prices increased purchase intention. Finally, in the financial domain, Alter and Oppenheimer (2006) show that short-term performance of easier to pronounce stocks is higher than that of harder to pronounce ones. Commenting on this finding, Oppenheimer (2008, p. 237) suggests that "stocks from fluently named companies are judged to have higher values, and this perception of value drives purchasing decisions, which inflates the actual value of stocks". Given these results, we think it is quite likely that these fluency effects extend beyond nutrition labels, price promotion, and the stock market to consumers' purchase intention and choice in the realm of their personal finance.

2.2 Relevance of individual differences for financial decisions

In addition to the language used to describe and communicate financial products, individual differences can affect consumers' financial decisions. In particular, we expect that individual differences interact with the language of financial products by influencing how people process convoluted language. That is, certain individual differences should allow consumers to more easily process convoluted language. In what follows, we describe a number of relevant individual differences that may moderate the impact of convoluted language.

Financial self-efficacy can be defined as consumers' confidence in their own ability to handle challenging financial situations (see also Lown, 2011). Prior research finds that self-efficacy has a positive relation with financial literacy (Skagerlund, Lind, Strömbäck, Tinghög, & Västfjäll, 2018). Moreover, Farrell, Fry, and Risse (2016) find that financial self-efficacy predicts women's financial decision-making. For instance, women with greater financial self-efficacy are more likely to have a savings account. Finally, there is also indication that people who consider themselves more sophisticated investors have a greater financial self-efficacy (Lown, 2011). Given these findings, we expect that consumers' financial self-efficacy decreases the adverse effect convoluted language has on their judgment and decision-making. We think this is the case because consumers with more financial self-efficacy should have a greater belief in their ability to overcome the challenge of convoluted language.

Subjective and objective financial knowledge are an important aspect in financial decision-making. Whereas subjective financial knowledge represents people's own perception of their financial knowledge, objective financial knowledge is their actual understanding of financial concepts (see Lind et al., 2020). For instance, people's belief that they understand how the stock market works can be considered subjective financial knowledge. On the other hand, the same people's performance on a test on bonds and stocks is objective financial knowledge. Indeed, some banks assess their customers' objective financial knowledge before they allow them to invest in and trade with more advanced financial products. Finally, subjective financial knowledge and self-efficacy share similarities but they are nevertheless distinct. Subjective financial knowledge focuses on a person's perceived present level of financial knowledge. Self-efficacy, on the other hand, on a person's ability to apply financial knowledge to handle financial challenges. Thus, the latter is more behavioral in nature.

Unsurprisingly, a lot of prior research has focused on the effects of both subjective and objective financial knowledge on consumers' judgement and decision-making. For instance, Anderson, Baker, and Robinson (2017) find that subjective financial knowledge has an important part to play in consumers' retirement awareness. Further, both subjective and objective financial knowledge are negatively related to financial anxiety (Lind et al., 2020). Similarly, Strömbäck et al. (2017) found that objective financial knowledge has a negative relation with financial anxiety. Additionally, existing research suggests that objective (Strömbäck et al. 2017) and subjective financial knowledge (Lind et al., 2020) have a positive relation with financial security. Prior research finds also that objective financial knowledge has a positive relation with stock market participation (van Rooij, Lusardi, & Alessie, 2011). Moreover, Strömbäck et al. (2017) found that objective financial knowledge has a positive relation with financial management behavior. Taken together, we expect consumers' financial knowledge decreases the adverse effect convoluted language has on their judgment and decision-making. We argue that this is the case because consumers with more financial knowledge ought to use their knowledge to overcome the challenge convoluted language represents.

Finally, numeracy is another relevant concept when it comes to consumers' financial decision-making. Numeracy can be "defined as the ability to process basic probability and numerical concepts" (Peters, Västfjäll, Slovic, Mertz, Mazzocco, & Dickert, 2006, p. 407). Previous research has argued that greater numerical ability should enable consumers to make more sound financial decisions. In line with this argument Estrada-Mejia, de Vries, and Zeelenberg (2016) find that numeracy is positively related to people's wealth accumulation. Finally, Skagerlund et al. (2018), found that numeracy has a positive relation with financial literacy. Given these results, we predict that a greater numerical ability decreases the adverse effect convoluted language has on consumers' judgment and decision-making. This should be due to the fact that consumers with a higher numeracy should be able to overcome more convoluted language.

2.3 Summary and our predictions

Taken together, financial products are complex. A distinct aspect that can hamper consumers' financial decision-making is the convoluted language used to describe and communicate these products. We argue that convoluted language reduces consumers' processing fluency and the reduced processing fluency impacts a variety of outcome measures. Thus, we make the following predictions[1]:

[1] Note, our hypotheses differ slightly in wording—but not in their prediction—from those in the preregistration. These adaptions were made for the purpose of clarity and to reflect that we collected additional measures that we do not report here (see also Footnote 4).

Hypothesis 1: Convoluted language has an adverse effect on consumers of financial products. In particular, convoluted language has (a) a positive effect on financial anxiety but (b) a negative effect on financial security, (c) a negative effect on purchase intention, (d) a negative effect on understanding, and (e) a negative effect on consumers ability to make an optimal choice between available options (i.e. choose the option which is in their own best interest).

Hypothesis 2: The effects in Hypotheses 1a-e will be attenuated in people who score higher on financial self-efficacy, higher on financial knowledge, and higher on numeracy.

3. Overview of Present Research

We conducted an online pilot study and two online experiments. The general setting for both experiments is consumers' understanding of the terms and conditions of car insurance policies. We choose to focus on terms and conditions information of insurances because it allows us to realistically manipulate convoluted language. We randomly allocated participants to one of the two conditions. Participants in the convoluted condition saw terms and conditions resembling an actual insurance available today (including jargon and technical terms). Participants in simple condition saw the same terms and conditions in plain English. Thus, we use a single factor between-subject design.

The pilot study established that the two conditions differ in their degree of convolutedness. The first experiment focuses on the main effects of convoluted language (H_1). The second experiment focuses on the moderating effect of financial self-efficacy, subjective financial knowledge, objective financial knowledge, and numeracy (H_2). Prior to data collection, we preregistered our analysis plan for the two main experiments on the Open Science Framework (OSF; https://osf.io/ex7zj).

3.1 Pilot study

We started out by validating our experimental design with consumers from the same population as the two main experiments. We recruited 100 respondents (M_{age} = 38.10, *SD* = 11.17; male = 23, female = 76, undisclosed = 1) through the online platform Prolific and paid £1. Most respondents (60.00%) had at least a Bachelor's degree and most (83.00%) indicated to earn less than £3,000 per month before taxes. The vast majority had a driver's license (99.00%) and owned a car (95.00%). We only allowed people that are UK citizens, reported to have obtained a drivers' license, and own a car to participate in this pilot study and in the subsequent experiments.[2]

Respondents were randomly assigned either to the simple language (*N* = 50) or the convoluted language (*N* = 50) condition of the car insurance policy (we explain this in more detail in 3.2.1 Method). After reading the scenario, respondents in each condition rated on a single item (adapted from Wu, Shah, Kardes, & Wyer, 2020) their perceived difficulty in understanding the information provided in the insurance policy (1 = "*very easy*"; 5 = "*very difficult*"). Respondents in the simple language condition (*M* = 2.00, *SD* = 0.83) indicated that it was less difficult to understand the information, than respondents in the convoluted language condition (*M* = 2.64, *SD* = 1.12); $t(90.49) = -3.24$, $p = 0.002$, $d = -0.648$.[3] These results indicate that our manipulation was successful. Among others, we also asked subjects a series of factual questions (monetarily incentivized) in order to pre-test whether these questions are an appropriate measure of understanding to be used in the main experiments. We revised this initial series of factual questions because some of them appeared to be too easy to answer (see Experiment 1 for more information on the final version of these questions and the monetary incentivization).

3.2 Experiment 1: Main effects

The first experiment tests the prediction that subjects in the convoluted language condition will feel more anxious, less secure, indicate a lower purchase

[2] Prolific allowed us to pre-select respondents who indicated previously that they have a driver's license and own a car. We choose this population since it is relevant for our investigation. However, some of the sampled respondents indicated during data collection that they do not have a driver's license and/or a car. We did not exclude these respondents in any of our studies because—despite their current situation—they belong to the relevant population as they had at some point in time a driver license and owned a car. However, the conclusions regarding our hypotheses remain qualitatively the same if we exclude participants who do not have a driver's license and/or a car.

[3] We use Welch's t-test when applicable throughout the report.

intention, have a lower understanding, and make fewer optimal choices than subjects in the simple language condition.

3.2.1 Method

Respondents were recruited through Prolific to answer our survey and paid £1.50. We received 300 complete responses, but 3 individuals failed the attention check which left us with 297 respondents (M_{age} = 36.90, *SD* = 11.95; male = 95, female = 202). The attention check item was included in the financial security scale (reported in 3.2.2 Measures) and read "This is an attention check answer completely". Most respondents (61.95%) had at least a Bachelor's degree and most (80.81%) indicated to earn less than £3,000 per month before taxes. The vast majority had a driver's license (99.66%) and owned a car (97.31%).

We used a single factor (simple language vs. convoluted language) between-subjects design. Respondents started by answering demographic question. Then, we assigned them randomly to either the simple language (*N* = 148) or the convoluted language (*N* = 149) condition (see Appendix A). The scenario described to the respondents that they have recently purchased a new car and that they are now looking for car insurance. We then provided respondents with information about one car insurance and asked them to read this information carefully. Each condition featured the same ten blocks of terms and conditions information typically provided in car insurance policies, but that differed in in terms of simple versus convoluted language. To illustrate this approach, we reproduce hereafter the block on reckless driving:

"We do not pay for damage caused by reckless driving." [simple language]

"Claims for damage to the covered motor vehicle that arise from reckless operation of the motor vehicle by the policyholder or any other party shall be forfeited." [convoluted language]

After reading the respective car insurance scenario, the respondents answered the questions pertaining to the dependent variables and a manipulation check item. We present these item in order of appearance in the next section.

3.2.2 Measures

We measured financial well-being with two measurement scales, financial anxiety and financial security. Both scales were adapted from existing scales (Fünfgeld & Wang, 2009; Strömbäck et al., 2017) to fit with our experimental context (see Appendix B for these and all other scales reported herein)[4]. Respondents rated their agreement with a series of statements on five-point scales (1 = "*not at all"*; 5 = "*completely"*). An exemplary item in the financial anxiety scale is: *"I got unsure by the lingo of the insurance policy".* The financial security scale included items like: *"I feel secure about the coverage provided by the insurance policy"*. We used 3 items for financial anxiety and 3 items for financial security. The items were averaged to create two constructs with good reliability ($\alpha_{Anxiety}$ = 0.78; $\alpha_{Security}$ = 0.92). A confirmatory factor analysis also indicated that the two constructs have an acceptable fit (i.e., all standardized indicator loadings are above 0.60 and significant at $p < 0.001$; χ^2 [8, *N* = 297] = 49.63, $p < 0.001$; CFI = 0.96; TLI = 0.92; SRMR = 0.05; RMSEA = 0.13).

Purchase intention was measured with a single-item (*"How likely is it that you would buy the insurance policy"*) rated on a five-point scale (1 = "*very unlikely"*; 5 = "*very likely").*

Next, respondents in each condition rated on a single item (adapted from Wu et al., 2020) their perceived difficulty in understanding the information provided in the insurance policy (1 = "*very easy"*; 5 = "*very difficult"*). We used this scale as manipulation check.

[4] We collected data on additional measures in Experiment 1 and 2, which we preregistered but do not report here.

We assessed respondents' understanding by asking them to indicate the correctness of 10 factual statements about the car insurance (e.g., *"the car insurance provides unlimited coverage to repair or replace damaged glass at any repair facility following an accident"* [incorrect statement]). Respondents chose between the following answer options; *"correct"*, *"incorrect"*, and *"I don't know".* Right answers were incentivized by paying the 10 percent of the respondents who answer most questions correct an additional £0.5. The total number of correct answers per respondent were summed to create an index.

To measure optimal choice, respondents saw the original car insurance policy again and one additional insurance policy. Both policies were very similar, except that the additional policy had objectively slightly better terms and conditions. Importantly, this better option matched the respondents' condition. That is, it was written in the same language (simple vs. convoluted) as the original car insurance policy. After reading through the additional car insurance policy, respondents answered whether they would choose the original or the additional car insurance policy (i.e., they made a binary choice).

3.2.3 Results

To start with, we checked whether our manipulation was successful. Respondents in the simple language condition (M = 2.06, SD = 0.93) indicated that it was less difficult to understand the information, than respondents in the convoluted language condition (M = 3.01, SD = 1.06); $t(290.66) = -8.20$, $p < 0.001$, d = -0.952. These results indicate that our manipulation was successful.

Figure 1 shows the effect of language on the dependent variables without considering demographic variables. To corroborate these findings, we ran a series of regression analyses in which we control for respondents' demographic differences (see Appendix C, Table C1).[5] The results from our analyses are the following.

Respondents in the simple language condition (M = 2.23, SD = 0.88) indicated that they felt significantly less anxious about the insurance policy, than respondents in the convoluted language condition (M = 2.65, SD = 1.03); $t(295) = -3.71$, $p < 0.001$, d = -0.430. The regression results indicate that the conclusion that convoluted language increases respondents' anxiety is robust to the inclusion of demographic variables (Table C1, Model 1).

Respondents in the simple language condition (M = 3.57, SD = 0.90) indicated that they felt significantly more secure about the insurance policy, than respondents in the convoluted language condition (M = 3.27, SD = 0.80); $t(290.29) = 2.99$, $p = 0.003$, d = 0.347. The regression results indicate that the conclusion that convoluted language decreases respondents' security is robust to the inclusion of demographic variables (Table C1, Model 2).

Respondents in the simple language condition (M = 3.47, SD = 1.04) indicated significantly stronger purchase intention, than respondents in the convoluted language condition (M = 3.21, SD = 1.08); $t(295) = 2.05$, $p = 0.041$, $d = 0.238$. The regression results indicate that the conclusion that convoluted language decreases respondents' purchase intention is robust to the inclusion of demographic variables (Table C1, Model 3).

Respondents in the simple language condition (M = 7.35, SD = 1.31) answered significantly more questions about the insurance policy correctly, than respondents in the convoluted language condition (M = 6.44, SD = 1.52); $t(289.32) = 5.57$, $p < 0.001$, d = 0.646. The regression results indicate that the conclusion that convoluted language decreases

[5] The regression results in both experiments differs slightly from the pre-registered analysis plan. Originally, we planned to include driver's license and car ownership as control variables but due to the very few people that did not have a car and/or a driver's license, we excluded these control variables.

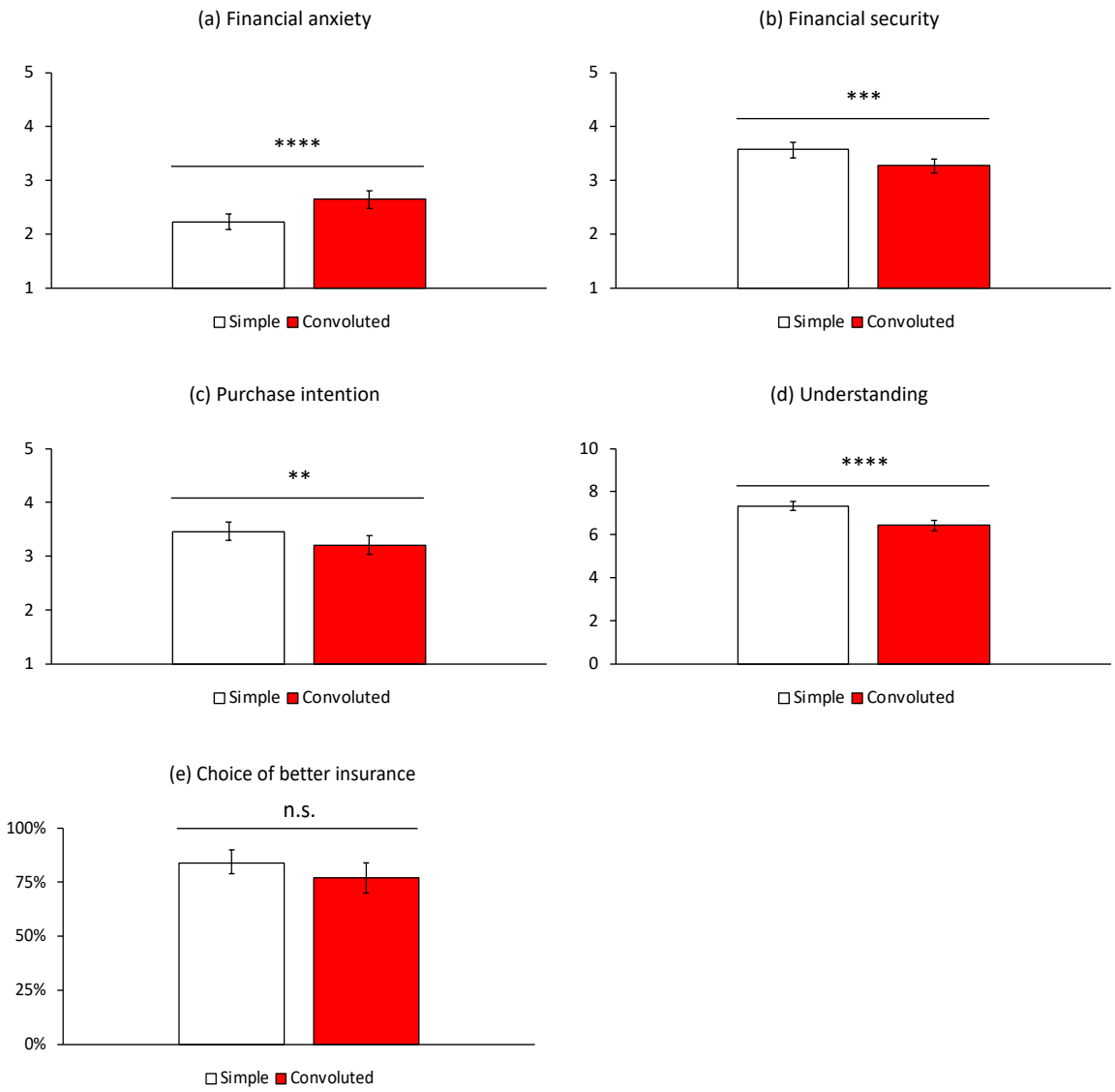
respondents' understanding of the insurance policy is robust to the inclusion of demographic variables (Table C1, Model 4).

Finally, there was no significant difference regarding optimal choices between the respondents in the simple language condition (*optimal choice* = 84.46%) and the respondents in the convoluted language condition (*optimal choice* = 77.18%); χ^2 (1, N = 297) = 2.54, p = 0.111, φ = 0.092. Similarly, the regression results do also not provide conclusive evidence that convoluted language decreases respondents' ability to make optimal choices (Table C1, Model 5).

3.2.4 Discussion

Overall, the results of Experiment 1 find support for H_1 to a great extent. In particular, convoluted language increases consumers financial anxiety and decreases their financial security, purchase intention, and understanding of insurance policies. However, convoluted language does not affect individuals' ability to choose more optimal insurance policies. These results highlight the adverse effect convoluted language has on consumers. We will come back to these findings when we try to replicate them in Experiment 2.

Figure 1: The effect of convoluted language on consumers (Experiment 1)



Note: (a) level of perceived anxiety in relation to the insurance policy (1 = not at all; 5 = completely); (b) level of perceived security in relation to the insurance policy (1 = not at all; 5 = completely); (c) likelihood of purchase (1 = very unlikely; 5 = very likely); (d) average number of correct answers (0 = no question answered correctly; 10 = all questions answered correctly); (e) percentage of respondents who choose the optimal insurance policy. Error bars are 95% confidence intervals; * p < .1; ** p < .05; *** p < .01; **** p < .001.

3.3 Experiment 2: Moderation of individual differences and replication

The second experiment's aim was to test the moderating effect of financial self-efficacy, subjective financial knowledge, objective financial knowledge, and numeracy on the adverse effect of convoluted language. Additionally, it replicated Experiment 1.

3.3.1 Method

Again, respondents were recruited through Prolific and paid £2. We received 601 complete responses, but 7 individuals failed the attention check which left us with 594 respondents (M_{age} = 35.71, *SD* = 10.80; male = 172, female = 421, other = 1). The attention check item and approach were identical to the one reported in Experiment 1. Most respondents (60.94%) had at least a Bachelor's degree and most (84.68%) indicated to earn less than £3,000 per month before taxes. The vast majority had a driver's license (98.82%) and owned a car (95.79%).

As in Experiment 1, we used a single factor (simple language vs. convoluted language) between-subjects design. Respondents started by answering demographic question. Then, we assigned them randomly to either the simple language (*N* = 304) or the convoluted language (*N* = 290) condition (see Appendix A). After reading the respective car insurance scenario, the respondents answered the questions pertaining to the dependent variables. The respondents finished the experiment by answering the questions pertaining to the moderators.

3.3.2 Measures

We measured financial well-being, purchase intention, the manipulation check item, understanding, and optimal choice exactly as in Experiment 1. Additionally, we measured a number of moderators (see Appendix B). Again, the adapted financial well-being scales showed a good reliability ($\alpha_{Anxiety}$ = 0.78; $\alpha_{Security}$ = 0.93). A confirmatory factor analysis indicated again that the two constructs have an acceptable fit (i.e., all standardized indicator loadings are above 0.70 and significant at $p < 0.001$; χ^2 [8, *N* = 594] = 80.75, *p* < 0.001; CFI = 0.97; TLI = 0.94; SRMR = 0.05; RMSEA = 0.12).

We measured financial self-efficacy with an existing measurement scale taken from Lown (2011). Respondents rated their agreement to six items (e.g., "*It is hard to stick to my spending plan when unexpected expenses arise*") on four-point scales (1 = *"exactly true"*; 4 = *"not at all true"*). The items were averaged to create a construct (α = 0.80). A confirmatory factor analysis indicated acceptable fit (i.e., all standardized indicator loadings are above 0.55 and significant at $p < 0.001$; χ^2 [9, *N* = 594] = 50.26, *p* < 0.001; CFI = 0.96; TLI = 0.93; SRMR = 0.03; RMSEA = 0.09).[6]

We used two different strategies to measure financial knowledge. We first asked respondents to self-report their financial knowledge (1 = *"very low"*; 7 = *"very high"*). This question has been previously used to assess subjective financial knowledge (Lind et al., 2020). Then, we assessed respondents' objective financial knowledge through five knowledge-based questions or statements (e.g., *"Buying a single company's stock usually provides a safer return than a stock mutual fund"*), which were taken and slightly adapted from Lusardi (2011). The total number of correct answers per respondent were summed to create an index.

We measured numeracy with four questions slightly adapted from the Berlin Numeracy Test (Cokely, Galesic, Schulz, Ghazal, & Garcia-Retamero, 2012) and three questions slightly adapted from Schwartz, Woloshin, Black, and Welch (1997). This combined usage has been suggested by Cokely et al. (2012) and been previously employed by Skagerlund et al. (2018). Respondents gave free-text answers to these numerical challenges (e.g., *"Imagine we are throwing a five-sided die 50 times. On average, out of these*

[6] Including the financial well-being scales and the financial self-efficacy items in a single confirmatory factor analysis does not change the conclusions regarding fit in any meaningful way.

50 throws how many times would this five-sided die show an odd number (1, 3 or 5)?"). The total number of correct answers per respondent were summed to create an index.

3.3.3 Results

To start with, we checked whether our manipulation was successful. Respondents in the simple language condition (M = 2.16, SD = 0.95) indicated that it was less difficult to understand the information, than respondents in the convoluted language condition (M = 2.83, SD = 1.06); $t(578.75) = -8.15$, $p < 0.001$, $d = -0.670$. These results indicate that our manipulation was successful.

Next, we successfully replicated the main effects found in Experiment 1. Figure 2 shows the effect of language on the dependent variables without considering demographic variables and Appendix C, Table C2 shows the results from a series of regression analyses in which we control for respondents' demographic differences.

Respondents in the simple language condition (M = 2.17, SD = 0.89) indicated that they felt significantly less anxious about the insurance policy, than respondents in the convoluted language condition (M = 2.63, SD = 0.94); $t(592) = -6.15$, $p < 0.001$, $d = -0.505$. The regression results indicate that the conclusion that convoluted language increases respondents' anxiety is robust to the inclusion of demographic variables (Table C2, Model 1).

Respondents in the simple language condition (M = 3.45, SD = 0.87) indicated that the insurance policy gave them a significantly stronger feeling of financial security, than respondents in the convoluted language condition (M = 3.29, SD = 0.92); $t(592) = 2.14$, $p = 0.033$, $d = 0.176$. The regression results indicate that the conclusion that convoluted language decreases respondents' security is robust to the inclusion of demographic variables (Table C2, Model 2).

Respondents in the simple language condition (M = 3.50, SD = 1.00) indicated a significantly stronger purchase intention, than respondents in the convoluted language condition (M = 3.27, SD = 1.11); $t(578.33) = 2.75$, $p = 0.006$, $d = 0.226$. The regression results indicate that the conclusion that convoluted language decreases respondents' purchase intention is robust to the inclusion of demographic variables (Table C2, Model 3).

Respondents in the simple language condition (M = 7.21, SD = 1.51) answered significantly more questions about the insurance policy correctly, than respondents in the convoluted language condition (M = 6.23, SD = 1.61); $t(592) = 7.67$, $p < 0.001$, $d = 0.630$. The regression results indicate that the conclusion that convoluted language decreases respondents' understanding of the insurance policy is robust to the inclusion of demographic variables (Table C2, Model 4).

Finally, there was no significant difference regarding optimal choices between the respondents in the simple language condition (*optimal choice* = 75.33%) and the respondents in the convoluted language condition (*optimal choice* = 71.38%); χ^2 (1, N = 594) = 1.19, $p = 0.276$, $\varphi = 0.045$. The regression results also do not indicate that convoluted language affects respondents' ability to make optimal choices (Table C2, Model 5).

Next, we investigated H_2 by looking at the moderation effects of consumers' financial self-efficacy, financial knowledge and numerical ability. That is, we tested whether financial self-efficacy, (subjective and objective) financial knowledge, and numerical ability had an impact on the adverse effects of convoluted language. In other words, we tested the interactions between these variables and the language of the policy (simple vs. convoluted language). Our predictions in H_2 were generally not supported except for the interaction effect of condition with financial self-efficacy on optimal choice and the interaction effect of condition with subjective financial knowledge

on optimal choice. To conserve space, we focus only on the significant results of these analyses in the main text. Figure 3 shows a graphical overview of these two interaction effects. The corresponding regression results for these two—and all other interaction effects—are reported in Appendix C, Table C3-C7.

We used the PROCESS plug-in for SPSS by Hayes (2018) to test these moderation effects. Besides the two main effects and their interaction we included the same controls as in the regression models testing H_1.

The results indicate that the financial self-efficacy × language condition interaction had a significant effect on optimal choice in the predicted direction (see Table C7, Model 1). Consumers' probability to make the optimal choice increased slightly with an increase in their financial self-efficacy but only in the convoluted language condition. In particular, on average those consumers' probability to make the optimal choice increased from 63.86% to 80.25% (see Figure 3).

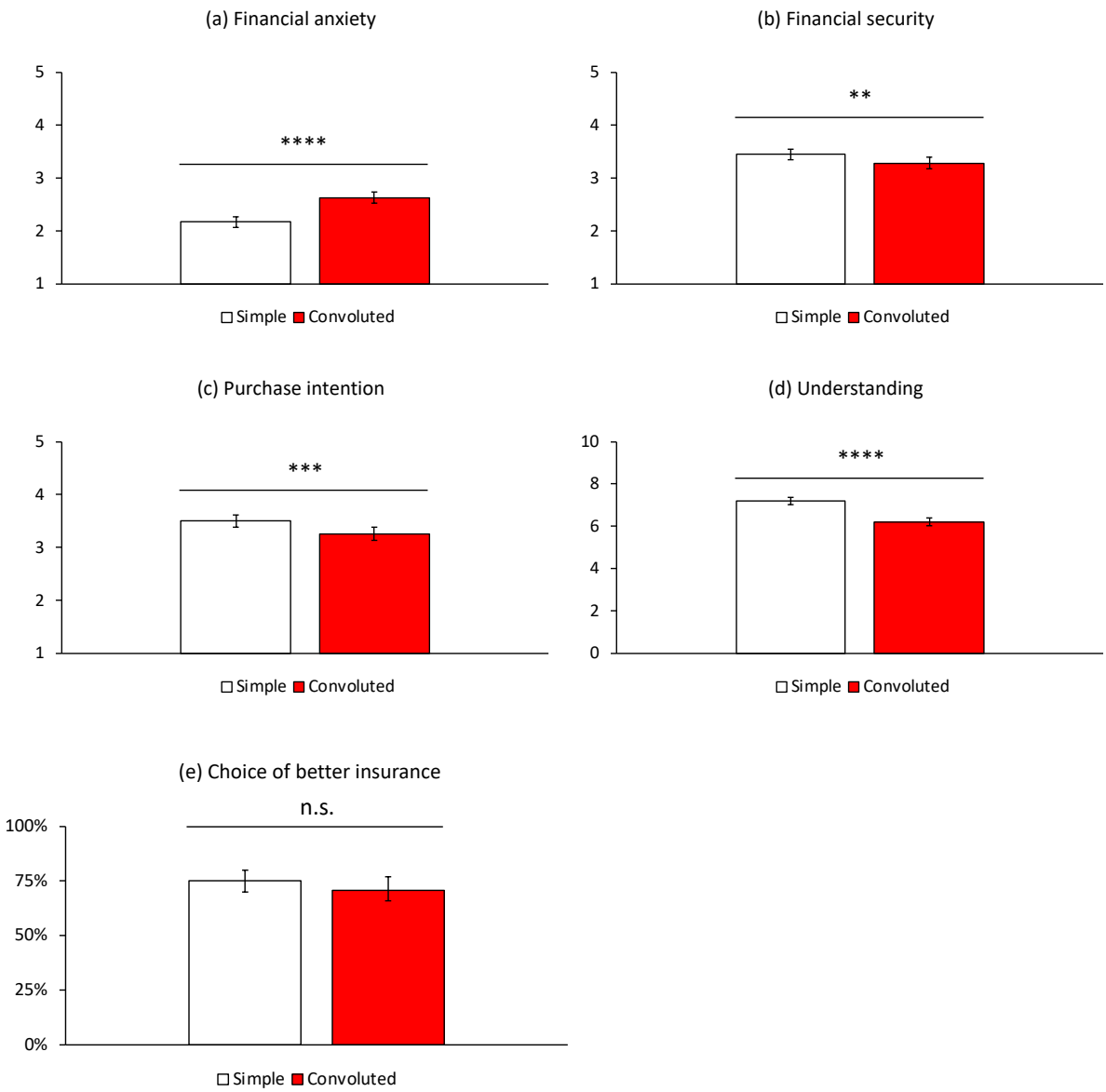
Finally, the subjective financial knowledge × language condition interaction had a significant effect on optimal choice in the predicted direction (see Table C7, Model 2). Consumers' probability to make the optimal choice increased slightly with an increase in their subjective financial knowledge but only in the convoluted language condition. In particular, on average those consumers' probability to make the optimal choice increased from 66.33% to 77.74% (see Figure 3).

3.3.4 Discussion

The findings in Experiment 2 are twofold. First, Experiment 2 replicates the findings from Experiment 1. In particular, we find support for the prediction that convoluted language increases consumers' financial anxiety and decreases their financial security, purchase intention, and understanding of insurance policies. Experiment 2 also shows that convoluted language has no effect on optimal choice. Overall, these results highlight the robustness of the adverse effect convoluted language has on consumers.

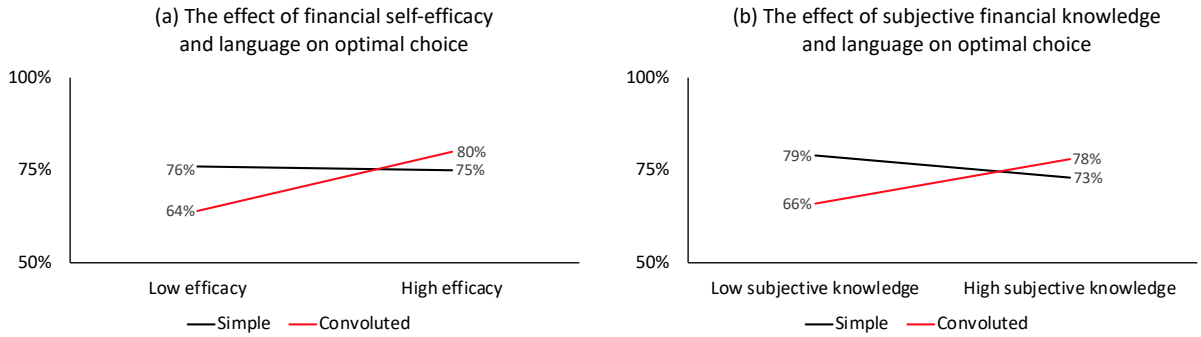
Second, we find little support that consumers' financial self-efficacy, financial knowledge, and numerical ability attenuates this adverse effect. In particular, greater financial self-efficacy, subjective and objective financial knowledge, and numeracy generally do not help consumers who have to deal with convoluted language more compared to those who have to deal with simple language. For instance, having a greater belief in your own financial abilities (i.e. one's financial self-efficacy) can reduce consumers' financial anxiety felt in connection with terms and conditions of insurance policies both described with simple and convoluted language. While we found two significant interactions, we urge readers to interpret these results with caution considering that most of our predictions in H_2 are not supported.

Figure 2: The effect of convoluted language on consumers (Experiment 2)



Note: (a) level of perceived anxiety in relation to the insurance policy (1 = not at all; 5 = completely); (b) level of perceived security in relation to the insurance policy (1 = not at all; 5 = completely); (c) likelihood of purchase (1 = very unlikely; 5 = very likely); (d) average number of correct answers (0 = no question answered correctly; 10 = all questions answered correctly); (e) percentage of respondents who choose the optimal insurance policy. Error bars are 95% confidence intervals; * p < .1; ** p < .05; *** p < .01; **** p < .001.

Figure 3: The interaction effect of convoluted language and individual differences on consumers' choice (Experiment 2)



Note: Results are based on the PROCESS plug-in for SPSS by Hayes (2018) and the results reported in Table C3. The panels show the probability to choose the optimal insurance policy at low (1 SD below the mean) versus high (1 SD above the mean) levels of the respective moderator. (a) level of perceived financial self-efficacy (1 = exactly true; 4 = not at all true); (b) level of subjective financial knowledge (1 = very low; 7 = very high).

4. General Discussion

Basic financial products, such as insurance policies, are important in modern economies because a wide variety of consumers are dependent on them. Common sense would suggest that if a financial product fulfills a fundamental need, it would also be described and communicated with simple language. Yet, anecdotal evidence and empirical data suggests otherwise; many consumers perceive financial products such as insurance policies to be laden with convoluted language.

Across two online experiments we investigate the effect of convoluted language in car insurance policies on consumers. We find that convoluted language has an adverse effect on consumers' emotional aspects of financial well-being; that is, financial anxiety and financial security. In addition, it has also an impact on purchase intention for, and understanding of insurance policies. However, we do not find support for the notion that convoluted language affects consumers' choice of optimal versus suboptimal insurance policies.

Considering this multidimensional adverse effect of convoluted language, our research makes a number of important theoretical contributions. First, we contribute to the literature on behavioral finance and consumers' financial decision-making by highlighting that the language used to describe and communicate financial products can have a negative effect on cognitive but also emotional aspects of financial behavior.

While it has been argued before that many consumers "do not understand basic financial concepts" (Lusardi, 2015, p. 261), our findings contribute with further insights what role convoluted language of financial products plays in consumer's financial decision-making. We do not only show that convoluted language impacts consumers' understanding but also that it impacts consumers well-being and has downstream consequences for their purchase intention.

Second, we also contribute to the literature on processing fluency (e.g., Oppenheimer, 2008) by investigating convoluted word alternatives and sentence structures in the financial context. Similarly, to Alter & Oppenheimer (2006) who show that processing fluency influences stock popularity, we find that the language used in terms and conditions of insurance policies influences consumers in a variety of ways. This highlights that processing fluency of information can have vital consequences for consumers' financial decision-making.

Third, our results highlight that consumers in general are vulnerable to convoluted language of financial products. That is, generally we did not find that financial self-efficacy, financial knowledge, and numerical ability attenuates the adverse effect of convoluted language more than it attenuates the impact of simple language. Prior literature has highlighted the importance of financial self-efficacy (e.g., Farrell, Fry, & Risse, 2016), financial knowledge (van Rooij, Lusardi, & Alessie, 2011), and numeracy (e.g., Estrada-Mejia, de Vries, & Zeelenberg, 2016) for a variety of financial decisions made by consumers. Thus, increasing consumers' self-efficacy, knowledge, and numerical ability is evidently a good thing. However, our results indicate that in the case of convoluted language, these factors are not enough. Put differently, to *effectively* help consumers, the convoluted language used in connection with financial products has to be simplified instead.

While we are convinced that our study makes an important contribution, like all research, it is not without limitations. While the combination of self-

reports in prior literature and our online experiments indicate a (causal) effect between language and several outcome measures, it is important to notice that we cannot be sure that these findings translate into *actual* consumer behavior in the marketplace. While it is reasonable to assume that convoluted language in the marketplace has an adverse effect on consumers, this is not certain. Further research should—considering the ethical ramifications of such an investigation—find ways to test how far our results translate into actual behavior. For instance, through field experiments or natural experiments.

On a technical note, we measured the manipulation check item in the middle of the survey. This could have potentially influenced subsequent answers (e.g., answers on the understanding and choice items). While we think that this is less likely because these and most other items in the later part of the surveys are objective measures (e.g., asking about people's knowledge and understanding), we cannot rule out that there was some effect. Further research could try to replicate our findings and measure the manipulation check item later or potentially exclude it.

Finally, while both language conditions differed in their level of perceived difficulty, participants considered neither of them to be extremely difficult in absolute terms. Yet, it is important to highlight that both conditions differ in grade reading level (Flesch-Kincaid Grade $\text{Level}_{\text{Simple}}$ = 9.3 vs. Flesch-Kincaid Grade $\text{Level}_{\text{Convoluted}}$ = 13) and percentage of passive sentences (passive $\text{sentences}_{\text{Simple}}$ = 30.4% vs. passive $\text{sentences}_{\text{Convoluted}}$ = 42.8%), as indicated by Microsoft Word. Yet, the respondents' lower level of perceived difficulty of the convoluted language condition might explain the non-significant optimal choice and moderation results. While it is difficult to make the convoluted langue condition more convoluted without losing external validity (i.e., creating a mismatch between the convoluted language in the scenario and the *actual* language of insurance policies in the market), further research may use a more diverse sample of respondents. For instance, less educated people might respond stronger to the convoluted language condition than our fairly educated sample. In such a sample, the predicted optimal choice and moderation effects might emerge. We encourage further research in this direction.

5. Practical Implications & Recommendations

The results of this project have a number of practical implications for individual consumers, policy makers, and financial institutions.

First, the results are relevant to consumers. Consumers need to keep in mind that it is important to understand the implications of financial products before they make a purchase. Generally, consumers should choose financial service providers that are able and willing to openly describe and communicate the advantages and disadvantages of their products to them. Moreover, in case they feel *confused* or *unsure* about particular information they should ask their financial service provider to use simpler language and illustrative examples when explaining the product to them (i.e., less financial jargon and terminology). Thus, we recommend consumers to request financial institutions to engage with them in a manner that considers their needs.

Second, our results are also relevant for policy makers. The results provide evidence that the language used to describe insurance policies influences consumers well-being and understanding negatively. Unfortunately, the results also indicate, that—at large—consumers' financial self-efficacy, financial knowledge, and numerical ability does not help them much in handling convoluted language. That means, that simply empowering consumers by increasing their financial ability and knowledge seems not feasible to specifically combat convoluted language. Rather our findings suggest that reducing convoluted language in the first place should be the focus of policy makers. Policy makers could for instance introduce a mandatory and unified fact sheet that could proceed the actual insurance policy. This fact sheet could require how (e.g., bullet points, required reading grade level) and what (e.g., compulsory excess, coverage) key information needs to be explained to potential customers. This fact sheet would require financial institutions to provide a simple summary of the main features of even the most convoluted insurance policy. This measure could also be relevant for other financial products. For instance, to highlight key information in loan applications such as total costs of the loan, monthly repayment, and overdue fees in simple terms. Policy makers may also consider introducing new or extending already established acts and reforms on the financial market that aim at protecting consumers from convoluted language (for a discussion of some of these acts and reforms, see Huhmann, 2017). Finally, policy makers need to keep in mind that merely providing consumers with more information is unlikely to be sufficient. For instance, providing a glossary with plain English definitions of financial jargon and technical terms is common in the insurance industry. However, our experiments show that despite a glossary the negative effect of convoluted language arises.

Last but not least, the results have also implications for financial institutions that want to empower their current and potential future customers. The results indicate the simple versus convoluted language has a positive impact on consumers' purchase intention. While financial institutions may be interested in consumer well-being and their understanding, our results suggest that combating convoluted language could also have a positive impact on their bottom line. These results are relevant for banks and insurance companies that want to combat jargon and lingo in the communication of their products but need an economic argument to convince shareholders in order to do so. Despite potential disadvantages (e.g., change in claims behavior of simpler insurance policies [Van Boom, Desmet, & Van Dam, 2016]), simpler language in financial products could align interest of financial institutions and their customers.

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7. Appendix

Appendix A: Scenario

Please imagine the following: You are married, have two small children and have recently purchased a new car. Now, you are looking for car insurance that will cover you, your partner, and all passengers while operating or riding in the new car. In addition to regular daily use, you have planned to use the car during family vacations. Below, you see information about a car insurance. Please read this information carefully, then answer the associated questions on the next page.

Simple condition **[bold indicates text in simple condition of the better policy]**	Convoluted condition **[bold indicates text in convoluted condition of the better policy]**
We will not cover your car if you use it to earn money by carrying passengers and/or freight.	The insurance policy only provides coverage for motor vehicles used by the insured for purposes other than hire or reward.
We will pay to repair or replace your car's glass windscreens, sunroof, and/or glass windows after it has been damaged in an accident. You will need to contribute £55 **[£50]** for each accepted request for payment, and we will cover all remaining costs. However, this only applies when the repair or replacement is performed by a car repair shop that has been previously authorized and approved by us. While your car is being repaired, you will always be provided with a temporary replacement car.	The insurance policy will provide unlimited coverage of the insured motor vehicle for accidental damage to that necessitates the repair or replacement of glass windscreens, sunroofs, and/or glass windows, less the compulsory excess of [£55] **[£50]** per covered claim. The unlimited coverage provision is only applicable when the repair or replacement is completed by a motor vehicle repair shop previously authorized and approved by the insurer. A courtesy vehicle will always be provided while the insured motor vehicle is being repaired.
If your car is involved in an accident and you **[and/or your spouse/civil partner]** sustain permanent physical bodily injuries, we will pay up to £30 000 **[per injured person]** in personal injury protection benefits.	In the event that the covered motor vehicle is involved in an accident and the named insured **[and/or their spouse/civil partner]** sustains permanent physical bodily injuries, the maximum payable amount **[to any one individual]** provided under the insurance policy's personal injury protection coverage is £30 000.
We do not pay for damage caused by reckless driving.	Claims for damage to the covered motor vehicle that arise from reckless operation of the motor vehicle by the policyholder or any other party shall be forfeited.
We allow you to request payment related to incidents that happen within [the United Kingdom (England, Wales, Scotland and Northern Ireland)] **[Great Britain and Ireland (England, Wales, Scotland, Northern Ireland and the Republic of Ireland)]**.	Valid claims are confined to those arising within the territorial limits [of the United Kingdom] **[Great Britain and Ireland]. ***
We pay up to £150 **[per child seat]** for the replacement of child seats that were within your car at the time of accident. Requests are approved if child seats need to be replaced because of damage or loss due to an accident or if they were stolen. A request for payment is only approved when it is connected to an accepted request for payment for accidental damage to your car.	The insurance policy will replace child seats located in the covered motor vehicle at the time of accident; however, the policy will pay no more than £150 **[per child seat]**. Claims shall be limited to damage or loss due to an accident or theft in conjunction with a valid and covered claim of accidental damage to the covered motor vehicle.
We do not pay for loss and/or damage to your car that occur as a result of normal usage over time.	The insurance policy does not provide coverage for any loss and/or damage to the covered motor vehicle due to wear and tear.

If your car is fuelled with the wrong fuel, payment will only be made to cover engine damage. The costs of draining and flushing the incorrect fuel will not be covered. [We will cover all costs for one engine repair or replacement per contract period] **[We will cover all costs for engine repair or replacement]**.	In the event of misfuelling, claims payments are constrained to engine damage sustained by the covered motor vehicle. All costs associated with draining and flushing of the incorrect fuel are precluded. [Coverage is limited to one engine repair or replacement per period of insurance.] **[Coverage for engine repair or replacement is unlimited.]**
You must provide information that is correct to the best of your knowledge when you request payment. Otherwise, we will not pay and may take legal action against you for falsely stating facts.	You must provide information regarding the facts that concern any claims made or the claim shall be forfeited. The insurer reserves the right to take legal action against fraudulent misrepresentation.
We will cover you during the contract period. After this one-year period, you must renew the insurance if you wish to continue to receive coverage.	The insurance policy will cease to provide coverage for claims arising one year after the designated inception date.
	Definitions Claim: a request by a policyholder to an insurer for coverage or compensation Compulsory excess: the amount paid out of pocket by the policyholder before the insurer will pay any expenses Courtesy vehicle: a temporary replacement car provided to you while your car is being repaired Fraudulent misrepresentation: untrue or misleading statement of facts Hire or reward: to transport passengers for payment ** Insured: the person(s) covered under the insurance policy Insurer: the insurance company Misfuelling: to fuel your car with the wrong fuel Motor vehicle: your car Period of insurance: the contract period Policyholder: the person owning the insurance policy Territorial limit: the countries or locations where the insurance policy is valid Wear and tear: loss and/or damage that occurs as a result of normal usage over time

Note: the text was presented in consecutive running text; * Missing ‘of’; ** The definition of hire or reward does not include freight. While this is unfortunate, it is unlikely that this impacts our results. First, it makes the convoluted insurance version slightly more attractive than the simple one (i.e., transporting freight is not forbidden in the convoluted version) and thus makes our findings conservative estimates. Second, we checked if excluding the ‘hire or reward’ item from the understanding scale impacts our results. Excluding this item, does not alter the conclusion regarding any of our predictions.

Appendix B: Measures

Table B1: Financial well-being

No	Item(s)	Experiment 1	Experiment 2
	Anxiety ($\alpha_{Experiment\ 1}$ = 0.78, $\alpha_{Experiment\ 2}$ = 0.78)		
1.	I got unsure by the lingo of the insurance policy.	2.24 (1.12)	2.22 (1.10)
2.	I am uncertain about my understanding of all the terms and conditions of the insurance policy.	2.48 (1.25)	2.44 (1.16)
3.	I am anxious whether the insurance policy is right or wrong for me.	2.60 (1.16)	2.54 (1.14)
	Security ($\alpha_{Experiment\ 1}$ = 0.92, $\alpha_{Experiment\ 2}$ = 0.93)		
1.	I feel secure about the coverage provided by the insurance policy.	3.43 (0.91)	3.35 (0.96)
2.	I feel confident that the insurance policy would cover me well.	3.38 (0.98)	3.36 (0.98)
3.	I feel protected by the insurance policy.	3.44 (0.90)	3.41 (0.92)

Note: Mean (Standard deviation); items measured on a five-point scale (1 = not at all; 5 = completely).

Table B2: Purchase intention

No	Item(s)	Experiment 1	Experiment 2
1.	How likely is it that you would buy the insurance policy?	3.34 (1.06)	3.39 (1.06)

Note: Mean (Standard deviation); item measured on a five-point scale (1 = very unlikely; 5 = very likely).

Table B3: Understanding

No	Item(s)	Correct	Experiment 1	Experiment 2
1.	The car insurance will only provide limited coverage for your car if it is used for financial gain (e.g., professional transportation of goods).	No	69.70%	66.16%
2.	The car insurance provides unlimited coverage to repair or replace damaged glass at any repair facility following an accident.	No	56.57%	62.29%
3.	The car insurance offers injury coverage and—in case of an accident—will pay damages for bodily injury that you are legally liable to pay.	No	14.81%	14.31%
4.	The car insurance company will not pay for damage to your car that results from racing your car.	Yes	87.54%	88.05%
5.	The car insurance has no geographical limitation.	No	78.79%	72.22%
6.	The car insurance company will pay the costs to replace child seats following product defect.	No	61.28%	58.08%
7.	The car insurance company will pay to repair damage to your car due to natural deterioration.	No	91.25%	90.57%
8.	The car insurance company will pay for all costs due to misfuelling.	No	87.21%	88.72%
9.	The car insurance company may take legal action against you if you provide false information when making a claim.	Yes	91.25%	89.23%
10.	The car insurance will be automatically renewed after the end of the contract period.	No	50.84%	43.43%

Note: Percentage of respondents who gave correct answers is shown. Multiple choice answer format (i.e. “correct”, “incorrect”, and “I don’t know”)

Table B4: Financial self-efficacy

No	Item(s)	Experiment 1	Experiment 2
1.	It is hard to stick to my spending plan when unexpected expenses arise.	—	2.19 (0.91)
2.	It is challenging to make progress toward my financial goals.	—	2.22 (0.82)
3.	When unexpected expenses occur I usually have to use credit.	—	2.88 (0.99)
4.	When faced with a financial challenge, I have a hard time figuring out a solution.	—	2.74 (0.77)
5.	I lack confidence in my ability to manage my finances.	—	2.99 (0.87)
6.	I worry about running out of money in retirement.	—	2.20 (0.92)

Note: Mean (Standard deviation); items measured on a four-point scale (1 = exactly true; 4 = not at all true); $\alpha_{Experiment\ 2}$ = 0.80

Table B5: Financial knowledge

No	Item(s)	Experiment 1	Experiment 2
S1.	On a scale from 1 to 7, where 1 means very low and 7 means very high, how would you estimate your financial knowledge?	—	4.52 (1.00)
O1.	Suppose you had £100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? • **More than £102** • Exactly £102 • Less than £102 • Don't know	—	94.61%
O2.	Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than, exactly the same as or less than today with the money in this account? • More than today • Exactly the same as today • **Less than today** • Don’t know	—	71.04%
O3.	Buying a single company's stock usually provides a safer return than a stock mutual fund. • True • **False** • Don't know	—	43.77%
O4.	If interest rates rise, what will typically happen to bond prices? • The prices will rise • **The prices will fall** • The prices will stay the same • There is no relationship between interest rates and bond prices • Don't know	—	17.51%
O5.	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** • False • Don't know	—	85.69%

Note: Seven-point scale for single item self-report [mean (standard deviation)]. Multiple choice answer format for question O1-O5 (correct answer is highlighted in bold).

Table B6: Numeracy

No	Item(s)	Experiment 1	Experiment 2
1.	Imagine that we throw a fair coin 1,000 times. How many times do you think the coin will show tails?	—	89.23%
2.	In a small American lottery the chance of winning $10 is 1%. What is your best guess about how many people will win the $10 prize if 1,000 people each buy a single ticket?	—	77.61%
3.	In another lottery the chance of winning a car is 1 in 1,000. What percent of tickets win a car?	—	57.07%
4.	Out of 1,000 people in a small town 500 are members of a choir. Out of these 500 members in the choir 100 are men. Out of the 500 inhabitants that are not in the choir 300 are men. What is the probability that a randomly drawn man is a member of the choir? Please indicate the probability in percent.	—	31.48%
5.	Imagine we are throwing a five-sided die 50 times. On average, out of these 50 throws how many times would this five-sided die show an odd number (1, 3 or 5)?	—	66.67%
6.	Imagine we are throwing a loaded die (6 sides) 70 times. The probability that the die shows a 6 is twice as high as the probability of each of the other numbers. On average, out of these 70 throws how many times would the die show the number 6?	—	37.88%
7.	In a forest 20% of mushrooms are red, 50% brown and 30% white. A red mushroom is poisonous with a probability of 20%. A mushroom that is not red is poisonous with a probability of 5%. What is the probability that a poisonous mushroom in the forest is red? Please indicate the probability in percent.	—	9.26%

Note: free-text answer format

Appendix C: Regression results

Table C1: Regression results of H1a-e for Study 1

	Dependent variable(s)				
	Model 1: Anxiety	**Model 2: Security**	**Model 3: Purchase intention**	**Model 4: Understanding**	**Model 5: Optimal choice**
Predictor					
Condition (0 = simple; 1 = convoluted)	**H1a** 0.41 (0.11) ****	**H1b** -0.30 (0.10) ***	**H1c** -0.26 (0.12) **	**H1d** -0.92 (0.16)****	**H1e** -0.50 (0.30)
Controls					
Age	-0.02 (0.01) ***	0.01 (0.00) ***	0.00 (0.01)	0.02 (0.01)***	0.01 (0.01)
Gender (0 = male; 1 = female)	0.04 (0.12)	0.10 (0.10)	0.02 (0.13)	-0.16 (0.19)	-0.15 (0.33)
Education (0 = low; 1= high)	0.04 (0.12)	-0.24 (0.10) **	-0.28 (0.13) **	0.44 (0.18)**	0.53 (0.33)
Income (0 = low; 1= high)	-0.16 (0.15)	0.12 (0.13)	-0.06 (0.18)	-0.17 (0.23)	-0.80 (0.38)**
Intercept	2.82 (0.24) ****	3.17 (0.22) ****	3.56 (0.26) ****	6.40 (0.36)****	1.15 (0.60)*
Observations	297	297	297	297	297
R^2 (Nagelkerek R^2 for Model 5)	0.09 ****	0.08 ****	0.03 *	0.14****	0.04

Note: Results in Model 1-4 are based on ordinary least square (OLS) regressions. Model 5 is based on a binary logistic regression. Robust standard errors are shown in parentheses. * p < 0.10; ** p < 0.05; *** p < 0.01; **** p < 0.001. Most extreme tolerance and VIF = 0.84 and 1.19, respectively. Respondents who indicated to earn less than £3,000 were coded as low on the income dummy, the rest as high on it; respondents who indicated to have at least a Bachelor's degree were coded as high on the education dummy, the rest as low on it.

Table C2: Regression results of H1a-e of Study 2 (replication)

	Dependent variable(s)				
	Model 1: Anxiety	**Model 2: Security**	**Model 3: Purchase intention**	**Model 4: Understanding**	**Model 5: Optimal choice**
Predictor					
Condition (0 = simple; 1 = convoluted)	**H1a** 0.46 (0.08) ****	**H1b** -0.16 (0.07) **	**H1c** -0.24 (0.09) ***	**H1d** -0.98 (0.13)****	**H1e** -0.21 (0.19)
Controls					
Age	-0.01 (0.00) ***	0.00 (0.00)	0.00 (0.00)	0.02 (0.01)***	0.01 (0.01)
Gender (0 = male; 1 = female)	0.04 (0.08)	-0.03 (0.08)	0.11 (0.10)	-0.09 (0.15)	-0.09 (0.22)
Education (0 = low; 1= high)	-0.06 (0.08)	-0.10 (0.08)	-0.09 (0.09)	0.17 (0.13)	0.33 (0.19)*
Income (0 = low; 1= high)	0.05 (0.11)	-0.15 (0.11)	-0.09 (0.13)	0.22 (0.18)	0.42 (0.30)
Intercept	2.59 (0.17) ****	3.50 (0.16) ****	3.61 (0.18) ****	6.45 (0.28)****	0.72 (0.39)*
Observations	593	593	593	593	593
R^2 (Nagelkerek R^2 for Model 5)	0.08 ****	0.02	0.02 *	0.11****	0.02

Note: Results in Model 1-4 are based on ordinary least square (OLS) regressions. Model 5 is based on a binary logistic regression. Robust standard errors are shown in parentheses. * p < 0.10; ** p < 0.05; *** p < 0.01; **** p < 0.001. Most extreme tolerance and VIF = 0.92 and 1.08, respectively. We excluded one respondent from the analyses because they did not indicate their gender to be male or female. Respondents who indicated to earn less than £3,000 were coded as low on the income dummy, the rest as high on it; respondents who indicated to have at least a Bachelor's degree were coded as high on the education dummy, the rest as low on it.

Table C3: Regression results of H2 (interaction effects on anxiety) of Study 2

	Dependent variable(s)			
	Model 1: Anxiety	**Model 2: Anxiety**	**Model 3: Anxiety**	**Model 4: Anxiety**
Predictor				
Condition (0 = simple; 1 = convoluted)	0.31 (0.33)	0.58 (0.35)	0.73 (0.24)***	0.62 (0.19)***
Financial self-efficacy (FSE)	-0.23 (0.08)***			
Subj. financial knowledge (SFK)		-0.19 (0.05)****		
Obj. financial knowledge (OFK)			-0.06 (0.05)	
Numeracy				-0.02 (0.03)
Interaction **H2**				
Condition x FSE	0.06 (0.13)			
Condition x SFK		-0.03 (0.08)		
Condition x OFK			-0.09 (0.07)	
Condition x Numeracy				-0.04 (0.05)
Controls	Included	Included	Included	Included
Intercept	3.17 (0.27)****	3.37 (0.28)****	2.76 (0.23)****	2.67 (0.22)****
Observations	593	593	593	593
R^2	0.10****	0.12****	0.09****	0.08****

Note: Results in Model 1 to 4 are based on an OLS regression. The models are based on the PROCESS plug-in for SPSS by Hayes (2018). Robust standard errors are shown in parentheses. * p < 0.10; ** p < 0.05; *** p < 0.01; **** p < 0.001. We excluded one respondent from the analyses because they did not indicate their gender to be male or female.

Table C4: Regression results of H2 (interaction effects on security) of Study 2

	Dependent variable(s)			
	Model 1: Security	**Model 2: Security**	**Model 3: Security**	**Model 4: Security**
Predictor				
Condition (0 = simple; 1 = convoluted)	0.35 (0.32)	0.06 (0.33)	-0.06 (0.23)	-0.32 (0.19)*
Financial self-efficacy (FSE)	0.15 (0.08)*			
Subj. financial knowledge (SFK)		0.15 (0.05)***		
Obj. financial knowledge (OFK)			-0.04 (0.05)	
Numeracy				-0.03 (0.03)
Interaction **H2**				
Condition x FSE	-0.20 (0.12)			
Condition x SFK		-0.05 (0.07)		
Condition x OFK			-0.03 (0.07)	
Condition x Numeracy				0.04 (0.05)
Controls	Included	Included	Included	Included
Intercept	3.12 (0.27)****	2.88 (0.26)****	3.60 (0.21)****	3.63 (0.21)****
Observations	593	593	593	593
R^2	0.02*	0.03***	0.02	0.02

Note: Results in Model 1 to 4 are based on an OLS regression. The models are based on the PROCESS plug-in for SPSS by Hayes (2018). Robust standard errors are shown in parentheses. * p < 0.10; ** p < 0.05; *** p < 0.01; **** p < 0.001. We excluded one respondent from the analyses because they did not indicate their gender to be male or female.

Table C5: Regression results of H2 (interaction effects on purchase intention) of Study 2

	Dependent variable(s)			
	Model 1: Purchase intention	**Model 2: Purchase intention**	**Model 3: Purchase intention**	**Model 4: Purchase intention**
Predictor				
Condition (0 = simple; 1 = convoluted)	0.25 (0.37)	-0.10 (0.41)	-0.40 (0.28)	-0.55 (0.22)**
Financial self-efficacy (FSE)	0.10 (0.09)			
Subj. financial knowledge (SFK)		0.15 (0.06)**		
Obj. financial knowledge (OFK)			-0.07 (0.06)	
Numeracy				-0.04 (0.04)
Interaction **H2**				
Condition x FSE	-0.19 (0.14)			
Condition x SFK		-0.03 (0.09)		
Condition x OFK			0.05 (0.09)	
Condition x Numeracy				0.09 (0.05)
Controls	Included	Included	Included	Included
Intercept	3.34 (0.30)****	2.98 (0.32)****	3.84 (0.25)****	3.76 (0.25)****
Observations	593	593	593	593
R^2	0.02*	0.04***	0.02*	0.02*

Note: Results in Model 1 to 4 are based on an OLS regression. The models are based on the PROCESS plug-in for SPSS by Hayes (2018). Robust standard errors are shown in parentheses. * p < 0.10; ** p < 0.05; *** p < 0.01; **** p < 0.001. We excluded one respondent from the analyses because they did not indicate their gender to be male or female.

Table C6: Regression results of H2 (interaction effects on understanding) of Study 2

	Dependent variable(s)			
	Model 1: Understanding	**Model 2: Understanding**	**Model 3: Understanding**	**Model 4: Understanding**
Predictor				
Condition (0 = simple; 1 = convoluted)	-0.75 (0.55)	-1.39 (0.63)**	-1.08 (0.39)***	-0.93 (0.33)***
Financial self-efficacy (FSE)	0.22 (0.14)			
Subj. financial knowledge (SFK)		0.03 (0.10)		
Obj. financial knowledge (OFK)			0.26 (0.08)***	
Numeracy				0.19 (0.05)****
Interaction **H2**				
Condition x FSE	-0.09 (0.21)			
Condition x SFK		0.09 (0.13)		
Condition x OFK			0.03 (0.12)	
Condition x Numeracy				-0.01 (0.08)
Controls	Included	Included	Included	Included
Intercept	5.88 (0.48)****	6.35 (0.54)****	5.67 (0.39)****	5.67 (0.35)****
Observations	593	593	593	593
R^2	0.12****	0.12****	0.14****	0.15****

Note: Results in Model 1 to 4 are based on an OLS regression. The models are based on the PROCESS plug-in for SPSS by Hayes (2018). Robust standard errors are shown in parentheses. * p < 0.10; ** p < 0.05; *** p < 0.01; **** p < 0.001. We excluded one respondent from the analyses because they did not indicate their gender to be male or female.

Table C7: Regression results of H2 (interaction effects on optimal choice) of Study 2

	Dependent variable(s)			
	Model 1: Optimal choice	**Model 2: Optimal choice**	**Model 3: Optimal choice**	**Model 4: Optimal choice**
Predictor				
Condition (0 = simple; 1 = convoluted)	-1.95 (0.79)**	-2.17 (0.90)**	-0.72 (0.57)	0.32 (0.44)
Financial self-efficacy (FSE)	-0.04 (0.22)			
Subj. financial knowledge (SFK)		-0.15 (0.15)		
Obj. financial knowledge (OFK)			0.14 (0.13)	
Numeracy				0.32 (0.09)****
Interaction **H2**				
Condition x FSE	0.71 (0.31)**			
Condition x SFK		0.44 (0.20)**		
Condition x OFK			0.17 (0.18)	
Condition x Numeracy				-0.15 (0.12)
Controls	Included	Included	Included	Included
Intercept	0.81 (0.69)	1.40 (0.74)*	0.29 (0.57)	-0.54 (0.52)
Observations	593	593	593	593
Nagelkerek R^2	0.04 **	0.03**	0.04**	0.06****

Note: Results in Model 1 to 4 are based on a binary logistic regression. The models are based on the PROCESS plug-in for SPSS by Hayes (2018). Robust standard errors are shown in parentheses. * p < 0.10; ** p < 0.05; *** p < 0.01; **** p < 0.001. We excluded one respondent from the analyses because they did not indicate their gender to be male or female.

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