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Naïve advice in financial decision making: Hidden costs of a free offer

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Julia Sprenger[1]

Naïve Advice in Financial Decision Making: Hidden Costs of a Free Offer

Abstract

The current study examines individual decision making in the field of personal finance. A laboratory experiment investigates the way naïve advice influences the decision-making process. When advice is offered on demand, participants prefer expert over naïve advice. Although naïve advice is only half the price of expert advice, demand for naïve advice is negligible. When naïve advice is given unsolicited, however, it has nevertheless a strong impact on the decision process by lowering engagement in information acquisition and promoting a passive adoption of the recommended option. While high levels of financial literacy buffer this effect, issuing a warning does not. In case compliance with naïve advice leads to a low decision quality and the saving in information acquisition costs does not make up for this effect, the free offer of naïve advice produces financial losses. This can be interpreted as hidden costs of free naïve advice resulting from a switch in information strategy. People with low financial literacy are most vulnerable to this effect.

JEL Classification: C91, G02, D83

Keywords: Financial literacy; financial decision making; experiment; naïve advice

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1 Introduction

Before making a financial decision people often consult external information, be it impersonal information such as product information sheets or personal information such as the advice of a financial consultant or the recommendation of an acquaintance. While advice from a consultant (expert advice) is usually received upon request and against a fee, advice from friends or family members (naïve advice) is usually received in an informal way, without financial obligations and in some cases even without request. The current paper seeks to explore the role of naïve advice in financial decision making.

According to the literature, people tend to overweigh their own opinion and to discount the opinion of others (Yaniv, 2004b; Yaniv & Kleinberger, 2000; Gardner & Berry, 1995; Harvey & Fischer, 1997).
Several contextual factors influence how pronounced the tendency to discount advice is: One influence factor is the source of advice with expert advice being more influential than novice advice (Jungermann & Fischer, 2005). Moreover, advice that has been solicited is more likely to be followed than advice that has been given without request (Gibbons et al., 2003) and purchased advice is weighted more heavily than advice that is offered for free (Gino, 2008). Taking this into account, naïve advice should attract low demand when offered as an alternative to expert advice and should be ignored when given unsolicited and at no costs.

Yet changes in neuronal activation patterns indicate that one effect of expert advice on financial decision making is that individuals offload the burden of the decision process to the advisor (Engelmann et al., 2009). Engelmann et al. (2009) analyze financial decisions under uncertainty with the help of an fMRI scan and show that with advice displayed to participants neuronal activation patterns flatten. According to these results, it is very hard to ignore advice, even if it comes unsolicited and free of costs.

This paper pursues the question if this could apply to naïve advice as well.
The question is of special interest as naïve advice other than expert advice does not necessarily come on demand. Furthermore, it might often be the first source of information a consumer receives. If naïve advice, too, tempts people to offload the burden of decision making to the advisor they might become less engaged in further information acquisition and more likely to passively follow the recommendation.

The paper examines as well the potential of two influence factors to buffer the tendency to offload a decision to a naive advisor: (1) the individual level of financial literacy and (2) the issuance of a warning.

Previous research has shown that financial literacy promotes advice discounting, raising the question if people of high financial literacy are as well less prone to offload a decision to an advisor. Generally, advice discounting is less pronounced for subjects who are less knowledgeable relative to their advisors (Harvey & Fischer, 1997; Sniezek et al., 2004). Bucher-Koenen and Koenen (2011) showed that individuals with high financial literacy are less likely to follow financial advice. A possible explanation for this finding can be found in the idea that advice discounting occurs because subjects have access to their internal justifications for arriving at a particular decision but no access to the advisors' reasoning (Yaniv, 2004a; Yaniv, 2004b; Yaniv & Kleinberger, 2000). Less knowledgeable subjects accordingly retrieve less

supporting information for their own decision and therefore discount advice less than more knowledgeable subjects do (Yaniv, 2004b).
Furthermore, the tendency to offload a decision to a naive advisor might be reduced by a warning. Price and Stone (2004) have shown that people use the advisors' confidence to infer his knowledge. People might thus naively infer from the stated expertise of an advisor to his objective expertise in finance and offload the decision to him. A warning works as a reminder that the naive advisor is not necessarily an expert in finance. Such a comment from a third person points to the lack of certainty about the competences of the advisor and thus traverses a confidence heuristic. Greater awareness of delegating a financial decision to an advisor with unverified expertise might in turn buffer the tendency to offload.

The role of naïve advice in decision making is examined with the help of an experiment. In the experiment participants have to make a range of financial decisions that require the evaluation of various financial products. The quality of the decision determines the participant's payoff. To prepare the decision, participants can make use of external information such as expert advice, naïve advice, and explanations of specific financial terms. In one treatment, information items are displayed on demand only and it's use is charged. In the other treatment, naïve advice is displayed unsolicited and free of costs while expert advice and explanations remain subject to request and charge. The objective of the experiment is to show if low demand for naïve advice in the first treatment translates automatically into neglect of naïve advice in the second treatment or if naive advice, too, influences the way a decision is taken.

The paper thereby contributes to the existing literature in several ways:
First, it extends the literature (e.g., Engelmann et al., 2009) on the role of advice in decision making by introducing the question how the presence of advice influences demand for alternative sources of information, shifting the focus from neurobiological patterns to behavioral consequences of receiving advice.
Second, it relates different strands of literature by testing if the tendency to offload the burden of decision making can be shown across settings with varying support of contextual factors and if it can be shown for people with varying degrees of financial literacy. The paper thus includes the aspect under which circumstances advice is most likely to lower engagement in information acquisition and how to buffer this effect.

The results are in relevant in a number of contexts.
First, they contribute to the debate on consumer empowerment (see e.g., Williams, 2007; Adkins & Ozanne, 2005). The present work explores if unsolicited naïve advice lowers further engagement in information search. This would be diametrically opposed to the objective of consumer activation.
Second, the results are relevant in the context of financial consulting, revealing if there is a crowing out effect and which consumers are especially likely to forgo expert advice once they receive unsolicited naïve advice.

The rest of the paper is organized as follows. Section 2 introduces the research questions and the hypotheses. Section 3 gives a detailed description of the experimental design. Section 4 reports the experimental results. Section 5 discusses the results. Section 6 concludes.

2 Research questions and hypotheses

2.1 Research questions

The current study analyses the role of naïve advice in financial decision making. The focus is not on the neurobiological level but on the behavioral consequences of receiving advice.

A first behavioral consequence could be that people acquire fewer alternative pieces of information such as impersonal information or expert advice. Impersonal sources of information require active processing as the task of figuring out the best decision option remains in the hands of the subject. If the burden of decision making has been offloaded to the advisor, there should be lower demand for impersonal sources of information. Likewise, there should be lower demand for expert advice as the decision has already been shifted to the naïve advisor.

A second behavioral consequence could be that people follow advice independent of its quality. This would imply that there is low critical evaluation of the quality of advice as the decision has been offloaded to the advisor.

These considerations lead us to the first research question:

(1) Does unsolicited naïve advice lower engagement in information acquisition?

When naïve advice is offered as a charged alternative to expert advice, people might come to the conclusion that naïve advice is not the best basis for decision making and prefer to acquire expert advice. When naive advice is given unrequested, however, people could be tempted to offload the decision to the advisor and become more passive in the decision making process.

Table 1 provides an overview of the different types of advice considered: Expert advice that is received on demand and against a fee has full support of contextual factors. Naïve advice that is received unsolicited and free of costs is at the other end of the scale and receives no support by contextual factors. Naïve advice that has to be bought is somewhat in between.

Table 1: Types of advice considered

Naïve Advice		**On demand**	
Expert Advice		1	0
Costly	1	**XX**	
	0		**X**

The objective of this paper is to examine if unsolicited naïve advice, although it receives no support by contextual factors, tempts people nevertheless to offload the decision to the advisor and subsequently acquire fewer pieces of alternative information.

(2) Does financial literacy buffer the decline in information acquisition?

The second question aims to show if people are equally prone to offload the decision to a naïve advisor. The term *financial literacy* is used here to denote the objective knowledge level in the field of finance. In line with Huston (2010) and Lusardi & Mitchell (2007a, 2007b) the term refers to both the knowledge of basic financial concepts such as compound interest or inflation and basic numerical skills.

According to the literature (e.g., Bucher-Koenen & Koenen, 2011; Yaniv 2004a; Yaniv, 2004b) high knowledge levels in the field of finance should support advice discounting. People of high financial literacy are best equipped to work out a solution to a decision problem themselves and thus have the least need of advice. Furthermore, it is easier for them to assess the quality of advice which should make them more critical towards advice. But one can argue as well that high financial literacy is of no help when the presence of naïve advice supports the passive adoption of the recommendation with internal knowledge not being activated. It thus remains an open question if high levels of financial literacy can prevent a decline in search for information in the presence of unsolicited naive advice.

(3) Does a warning prevent the decline in information acquisition?

Naïve advice can stem from an advisor that is no more knowledgeable than the advisee. People might nevertheless offload a decision to a naïve advisor because they do not critically reflect his ability to give good advice but naively infer from his stated expertise to his objective expertise in finance (Price & Stone, 2004). The paper examines if a simple reminder of the source of advice can prevent the tendency to offload advice. A warning by a third party might sanitize people to the fact that they have no guarantee about their advisors competences when they receive naïve advice and traverse such a confidence heuristic. It does, however, not add any new information to the decision maker; it only brings the source of advice back to mind. This could lead to a revaluation process and change the role of naïve advice in the decision making process.

2.2 Hypotheses

Hypothesis 1 (H1): Unsolicited naïve advice lowers engagement in information acquisition. Demand for alternative information is thus lower in a treatment with free naïve advice than it is in a treatment without free naïve advice.

Hypothesis 2 (H2): Financial literacy buffers this effect. Demand for information for highly literate subjects does not change significantly between treatments with and without free naïve advice.

Hypothesis 3 (H3): A warning reduces this effect. Demand for information is higher in a treatment where free naïve advice is followed by a warning than in a treatment where no warning is issued.

3 Experimental Design

The experiment consists of two parts. In the first part, the financial literacy of each participant is ascertained, once by self-assessment and once by a financial literacy test. In the second part, participants have to solve five decision problems from the field of personal finance. At each decision problem they have to choose a financial product out of a set of four or five. The participant's payment depends on the

degree to which the chosen product meets the decision criteria predefined in the task. To better prepare their decision, participants can use additional pieces of information such as explanations of specific terms or a recommendation on which option to choose (naïve or expert advice).

The availability of additional pieces of information varies across treatments: In the control treatment (NAC), participants can acquire explanations, expert advice, and naïve advice on demand and against a fee. In treatment 1 (NAF), naïve advice is turned into an information that is displayed unsolicited and free of costs while expert advice and explanations remain subject to request and charge. In treatment 2 (NAF+W), too, naïve advice is given unsolicited and free of costs while expert advice and explanations remain subject to request and charge. Besides, naïve advice is followed by a warning. The warning points to the fact that the advisee has no guarantees about the advisors competences.

Table 2: Treatment overview

		Treatments	
Naïve advice (NA) is..	NAC	NAF	NAF+W
costly (C)	X		
for Free (F)		X	X
followed by warning (W)			X

3.1 Financial literacy test

At the beginning of the experiment, participants were asked to rate their financial literacy on a scale from zero to five. Five indicated that the participant considered his financial literacy to be very high, zero indicated that the participant considered his financial literacy to be very low. Only integer numbers could be entered.

Thereafter, participants took part in a financial literacy test (see Appendix B).[1] The test consisted of five multiple choice questions and measured the comprehension of basic economic concepts as well as the competences in basic financial numeracy. After the test, participants learned how many questions they answered correctly. For each correct answer they received € 1.

3.2 Decision problems

The second part of the experiment consisted of five subsequent decision problems (see Appendix D). At each decision problem, participants had 10 minutes time to choose a financial product. A counter at the bottom of the screen displayed the time remaining. At some decision problems, participants had different financial products at choice and had to decide for example between depositing their money in a savings account, an instant access savings account or a fixed deposit account. At other decision problems, they had to compare financial products of the same kind and choose for example between different credit cards.

[1] The questions build on the financial literacy test derived by Lusardi & Mitchell (2006) for the HRS

Table 3: Overview of the decision problems

Problem No.	Task
1	Choose one of the following options to deposit your money.
2	Choose one of the following bank giro accounts.
3	Choose one of the following credit cards.
4	Choose one of the following options to obtain credit.
5	Choose one of the following savings schemes.

At each decision problem, it was necessary to identify the product that met the predefined decision criteria best in order to maximize the payoff.

Example: *Choose one of the following giro accounts. These are your priorities:*

1. *You are not willing to accept an interest rate higher than 10% when using the credit facility.*
2. *You only accept a giro account at a bank that offers a secure procedure for online banking.*
3. *After one year the amount on your giro account should have grown as much as possible.*

A table provided information about up to eight attributes of the products. Similar to real-world decisions, participants were required to select helpful from distracting information: While some of information provided by the table were necessary to assess in how far a product meets the decision criteria (e.g., interest rate), others were completely irrelevant for the decision (e.g., the level of deposit protection fund). At each decision problem, participants could call up a calculator on their screen, e.g., to compare costs and returns across several products.

The decision criteria were displayed in hierarchical order. To generate a payoff the chosen option had to meet the first criterion. If the participant chose a product that met the first criterion only, he earned €1 euro. If he chose a product that met the first and the second criterion, he earned €2. If he chose a product that met all criteria, he earned €3. Each decision problem entailed one product that met all decision criteria and led to the maximum payment of €3, one product that did not meet the first criterion and led to the minimum payment of €0, and two to three products with moderate fit with the criteria. To make sure all participants understood this mechanism the instructions entailed a detailed example and the recommendation to analyze the fitness of a product starting with the first criterion.
Participants did not get direct feedback after completing a decision problem. Only after completing the whole series of decision problems, they learned how much they earned in the second part of the experiment. This payoff added up to what they earned in the financial literacy test.

3.3 Treatments

Treatment 1: NAF

In this treatment, participants could acquire two types of additional information at each decision problem: Explanations and expert advice. Both were disclosed only on demand and against a fee. Besides, participants received naïve advice unsolicited and free of costs. The wording of both types of advice was standardized to "*Choose product X!*". While expert advice was guaranteed to come from an advisor with high levels of financial literacy, naïve advice lacked such a guarantee and only offered the assurance that the advisor himself judged his financial literacy to be very high.

Participants in this treatment had an initial budget of €4 they could use for information acquisition. They were free to choose how much of this budget to spend on information before deciding for a financial product. After each decision problem, they saw the amount of their remaining budget. In case the budget was not exhausted, the remaining part added up to the participant's final payoff.

If participants had problems understanding the product details, they could acquire explanations of financial terms (e.g., APR). Next to each term was a button labeled "*Buy for €0.20*". If they clicked the button, a box popped up where the term was explained. In total, 19 explanations were available (see Appendix E).

To receive expert advice, participants first had to click a button labeled "*Buy for €0.80*". Then a box popped up with a recommendation for a certain product (e.g., *Choose product Y!)*. Participants knew that expert advice had been created as follows: All participants of a preliminary treatment who correctly answered all questions in the financial literacy test were selected. One of them was randomly chosen and his advice was displayed to everyone in this treatment who clicked the advice button. [2]

In each decision problem, naïve advice was displayed to participants. Participants knew that naïve advice had been created as follows: All participants of the preliminary treatment who rated their financial literacy with five (very high) were selected. One of them was randomly chosen and his advice was displayed to all participants.

If, for example, a participant acquired two explanations and the expert advice in the first decision problem, he received the following message after making his choice: "*Your remaining budget is €2.80*". After completing the last decision problem, the remaining budget and the payoff from solving the decision problems were displayed.

Treatment 2: NAF+W

In this treatment, too, participants could acquire explanations and expert advice. Both were disclosed only on demand and against a fee. Besides, participants received naïve advice unsolicited and free of costs. The wording of both types of advice was standardized to "*Choose product X!*". While expert advice was guaranteed to come from an advisor with high levels of financial literacy, naïve advice lacked such a guarantee and only offered the assurance that the advisor himself judged his financial literacy to be very

[2] Participants from the preliminary treatment had the same decision problems. But their answer options were framed as advice (Choose option ___!) and not as choice (I choose option ___).They had the opportunity to acquire explanations before deciding which product to recommend. Besides, they had an incentive to recommend a product with a maximal fit with the decision criteria as their payoff depended on the quality of their advice.

high. Naïve advice was followed by a warning that self-assessment can be error-prone and might not reflect the objective expertise of the advisor.

Participants had an initial budget of €4 they could use for information acquisition. They were free to choose how much of this budget to spend on information before ticking one answer option. After each decision problem, they saw the amount of their remaining budget. In case the budget was not exhausted, the remaining part added up to the participant's final payoff.
If participants had problems understanding the product details, they could acquire explanations of financial terms (e.g., APR). Next to each term was a button labeled "*Buy for €0.20*". If they clicked the button, a box popped up where the term was explained. In total, 19 explanations were available.
To receive expert advice, participants first had to click a button labeled "*Buy for €0.80*". Then a box popped up with a recommendation for a certain product (e.g., *Choose product Y!)*. Participants knew that expert advice had been created as follows: All participants of a preliminary treatment who correctly answered all questions in the financial literacy test were selected. One of them was randomly chosen and his advice was displayed to everyone who clicked the advice button.
In each decision problem, naïve advice was displayed to participants. Participants knew that naïve advice had been created as follows: All participants of the preliminary treatment who rated their financial literacy with five (very high) were selected. One of them was randomly chosen and his advice was displayed to all participants. Naïve advice was followed by a warning written in bold red font.
Example: *Choose product X!*

> **WARNING: Please note that a self-assessment can be error-prone. You do not know how your advisor scored on the financial literacy test and how good he actually is in making financial decisions.**

Control treatment: NAC
In the control treatment, explanations as well as naïve and expert advice were displayed on demand only and against a fee.

Participants had an initial budget of €4 they could use for information acquisition and were free to choose how much of this budget to spend on information before ticking one answer option.
If participants had problems understanding the product details, they could acquire explanations of financial terms (e.g., APR) for €0.20 per explanation. In total, 19 explanations were available.
To receive expert advice, participants first had to click a button labeled "*Buy for €0.80*". Then a box popped up with a recommendation for a certain product. The advice came from a participant of the preliminary treatment who answered all questions in the financial literacy test correctly.
To receive naive advice, participants first had to click a button labeled "*Buy for €0.40*". Then a box popped up with a recommendation for a certain product. The advice came from a participant of the preliminary treatment who rated his financial literacy with five (very high).

3.3 Procedure

The experiments were programmed and conducted with the software z-Tree (Fischbacher, 2007). The experimental sessions took place in the laboratory of the Ruhr-University Bochum (rubex). Each session lasted 90 minutes. Before the experiment started, participants received a copy of instructions explaining the experimental design. The researcher also read the instructions aloud and gave participants the opportunity to ask questions. Throughout the experiment it was assured that participants could neither communicate with each other nor observe another participant's actions. After the experiment participants filled in a questionnaire recording their gender, age, and field of study. Earnings were paid in private at the end of the session. 122 students from various faculties participated in the experiment. 58 of them were female (47.54%) and 64 of them were male (52.46%). Their mean age was 24.23 (SD = 0.28).

4 Results

In this section the control treatment, where naïve advice is received on demand, and treatment 1 and 2, where naïve advice is received unrequested, are compared to each other with respect to information acquisition behavior. As shown in table 4, the test results indicate that participants of both groups are quite similar to each other with respect to financial literacy, age, gender and subject.

Table 4: Basic characteristics of subjects across treatments

	Control treatment	**Treatment 1 and 2**	**Test**
Financial Literacy M(SD)	3.67 (0.19)	3.94 (0.12)	Mann Whitney U: z= -1.002, p= .316
Self-Assessment M(SD)	3.21 (0.14)	3.32 (0.12)	Mann Whitney U: z= -0.680, p= .496
Age M(SD)	24.78 (0.47)	23.91 (0.51)	Mann Whitney U: z= 1.548, p= .121
Female	18 (48.6%)	32 (57.1%)	Fisher's exact: p= .525
Studying economics	19 (51.3%)	35 (62.5%)	Fisher's exact: p= .282
N	37	56	

A first look at information acquisition behavior in the control treatment reveals two interesting insights. The first one is that participants who make their decisions with the help of an advisor strongly prefer expert advice over naïve advice: While 25 pieces of expert advice have been acquired, naïve advice has only been acquired twice. This reveals that participants are highly sensitive towards the source of advice. The fact that naïve advice is only half the price of expert advice does not compensate for the lack of guaranteed expertise of the advisor.

The second one is: In the majority of decisions that were made with the help of advice (24/27) participants do not acquire any explanations items in addition to advice but solely use advice to prepare their decision.

The majority of participants in the control treatment (61.1%) uses external information to prepare a decision. Including external information in the decision making process is thus the dominant information strategy in this treatment. In treatment 1 and 2, by contrast, the dominant information strategy is to refrain from acquiring external information. Table 5 compares treatment 1 and 2 to the control treatment with respect to information strategy. Data are pooled across subjects and decisions. It shows that the information strategy differs significantly between treatments (X^2 (1, 465)= 7.410, p=.006).

Table 5: Information strategy I

Information strategy	**Control treatment**	**Treatment 1 and 2**
Strategy 0: Acquire no external information	72 (38.9%)	145 (51.8%)
Strategy 1: Acquire external information	113 (61.1%)	135 (48.2%)

The availability of naïve advice has apparently created a switch in the dominant information strategy. But the level of association between both variables is not too strong (Phi= -.126, p= .008) and the Goodman and Kruskal's Tau value of .016 (p= .008) reveals that the treatment variable adds only a moderate amount of accuracy in predicting strategy. The determinants of information strategy are thus analyzed in more depth with two probit models. The results summarized in table 6.

Table 6: Information strategy II

Dependent Variable: Strategy	**Probit (1)**			**Probit (2)**		
	Coefficient	**(Std. Err.)**	**P>|z|**	**Coefficient**	**(Std. Err.)**	**P>|z|**
Treatment 1				-.259	(.145)	.075
Treatment 2				-.359	(.147)	.015
Treatment 1 +2	-.308	.124	.013			
Age	-.020	(.017)	.249	-.020	(.017)	.252
Female	.069	(.136)	.609	.066	(.136)	.624
Economics	-.213	(.120)	.078	-.196	(.123)	.122
Overconfidence	.124	(.231)	.590	.124	(.231)	.590
Accurate self perception	.140	(.159)	.378	.150	(.160)	.349
Financial literacy	-.063	(.093)	.497	-.064	(.093)	.486
_cons	1.038	(.609)	.088	1.033	(.611)	.091
Observations		465			465	
Prob > chi2		.012			.018	
	Margin*	**(Std.Err.)**	**P>|z|**	**Margin***	**(Std.Err.)**	**P>|z|**
Control treatment	.607	(.036)	<.001			
Treatment 1 +2	.485	(.030)	<.001			
Control treatment				.607	(.036)	<.001
Treatment 1				.505	(.043)	<.001
Treatment 2				.465	(.043)	<.001

*At means

Probit (1) discriminates between the control treatment (NAC) on the one hand and treatment 1 and 2 on the other hand. Receiving unrequested naïve advice lowers the probability of choosing a strategy that includes the use of external information by 12.16%. Probit (2) discriminates between the control treatment (NAC), treatment 1 (NAF) and treatment 2 (NAF+W). Again, treatment has a significant effect on the information strategy adopted (X^2= 6.54, df= 2, p= .03). Being in treatment 1 lowers the probability of choosing to use external information to prepare a decision by 10.22% and being in treatment 2 lowers the probability of choosing this strategy by 14.18% compared to the control treatment. Despite the warning in treatment 2, demand for information does not differ much from treatment 1 (Mann Whitney U test: z= 0.530, p= .59). Therefore, in the following course of analysis, treatment 1 and 2 are summarized and the simple distinction between naïve advice on demand on the one hand and unrequested naïve advice on the other hand of probit (1) is adopted.

Table 7: Marginal effects of financial literacy and treatment on information strategy

Treatment		**NAC**	**NAF**
Financial Literacy			
Number of correctly answered questions in the financial literacy test	**1**	.672*** (.097)	.556*** (.110)
	2	.649*** (.069)	.531*** (.076)
	3	.626*** (.044)	.506*** (.045)
	4	.602*** (.037)	.481*** (.030)
	5	.578*** (.058)	.457*** (.049)

Standard error in parenthesis. P>|z|is <.001 for all estimates. NAF refers to both treatment 1 and 2.

Table 7 offers an insight into the effects of treatment and financial literacy on information strategy. The probability of choosing a strategy that includes the use of external information to prepare a decision is higher in the control treatment than in the treatment with unsolicited naïve advice (NAF) across all levels of financial literacy. In NAC as well as in NAF, the probability of choosing this strategy steadily declines with financial literacy. In NAC, the probability of choosing to acquire external information declines by about 10% percent points between those who only answered one question correctly (67.25%) and those who answered all questions correctly (57.80%). The same applies in the treatment with unsolicited naïve advice though on an overall lower level: Those who answered only one question correctly choose to make use of external information with a probability of 55.65% while those who answered all questions correctly do so with a probability of only 45.70%. Subjects with very high financial literacy are those the least likely to choose this strategy in the control treatment. But they are still more likely to do so than subjects of very low financial literacy in treatments where naïve advice is presented without request. This result indicates that the availability of naïve advice influences the information strategy in a strong way that is not blurred by differences in financial knowledge.

Table 8 offers a more detailed picture of changes in information acquisition behavior by comparing demand for information and investment in information between treatments. The results show that the switch in dominant information strategy leads to a lower demand for information in NAF compared to the control treatment.

Table 8: Information acquisition behavior compared

Mean (SD) amount of money invested in	NAC	NAF	Mann Whitney U Test
explanations + expert and naïve advice	1.32 (0.15)	0.90 (0.10)	z=-2.282, p= .022
explanations + expert advice	1.30 (0.15)	0.90 (0.10)	z=-2.176, p= .030
explanations	0.76 (0.08)	0.61(0.06)	z=-1.607, p= .108
expert advice	0.54 (0.14)	0.28 (0.08)	z=-1.532, p= .125
Mean (SD) number of			
explanations + expert and naïve advice acquired	4.56 (0.41)	3.42 (0.33)	z=-2.151, p= .031
explanations + expert advice acquired	4.51 (0.41)	3.42 (0.33)	z=-2.036, p= .042
explanations acquired	3.83 (0.40)	3.07 (0.33)	z=-1.607, p= .108
expert advice acquired	0.67 (0.18)	0.35 (0.10)	z=-1.532, p= .125

The mean amount invested in information is significantly lower in NAF than in NAC (z= -2.282, p= .022). This result remains valid as well when the investment in naïve advice in the control treatment is excluded and only the investment in explanations and expert advice is compared across treatments (z= -2.176, p=.030). Both the mean number of explanations and the mean number of expert advice acquired is lower in NAF than in NAC. Although naïve advice is far less popular than expert advice in NAC, making naïve advice freely available in NAF nearly halves the mean amount of expert advice acquired.

As shown in table 9, this result is further refined by taking into account the level of financial literacy as well.[3] It shows that the reduction in demand for information is mainly produced by participants with low financial literacy. For participants with high financial literacy differences between treatments are less pronounced.

Table 9: Financial literacy and demand for information

Mean (SD) number of	Financial Literacy	NAC	NAF	Mann Whitney U Test
explanations	High	3.57 (0.45)	3.19 (0.41)	z=-0.750, p= .453
acquired	Low	4.18 (0.72)	2.73 (0.52)	z=-1.514, p= .140
expert advice	High	0.33 (0.14)	0.26 (0.09)	z=-0.398, p= .691
acquired	Low	1.12 (0.35)	0.60 (0.30)	z=-1.264, p= .281
information	High	3.90 (0.45)	3.46 (0.42)	z= 0.974, p= .329
acquired	Low	5.31 (0.72)	3.33 (0.52)	z=-1.972, p= .049

Information = explanations + expert advice

[3] A closer look at the results of the financial literacy test revealed, that the first three questions were answered correctly by a great majority of participants whereas the fourth and fifth question represented a hurdle to many of them. This sharp drop in the share of correct answers was used to group participants: Participants who answered 4-5 questions correctly are referred to as participants with a *good* test result, indicating a *high* level of financial literacy, whereas participants who answered 0-3 questions correctly are referred to as participants with a *bad* test result, indicating a *low* level of financial literacy.

A second subgroup especially prone to reduce demand for information are female participants.

Table 10: Gender and demand for information

Mean (SD) number of	Female	NAC	NAF	Mann Whitney U Test
Explanations	1	3.72 (0.55)	3.03(0.44)	z= 1.042, p= .297
Acquired	0	3.94 (0.59)	3.12 (0.50)	z= 1.075, p= .282
Expert Advice	1	1.22 (0.30)	0.21 (0.09)	z= -3.404, p= .001
Acquired	0	0.15 (0.11)	0.54 (0.20)	z= -1.498, p= .134
Information	1	4.94 (0.58)	3.25 (0.44)	z= 2.366, p= .018
Acquired	0	4.10 (0.60)	3.66 (0.52)	z= 0.532, p= .594

1 = female, 0 = male

Female participants acquire significantly fewer pieces of expert advice in the presence of free naïve advice. The mean amount of expert advice acquired declines from 1.22 in NAC to 0.21 in NAF. Substituting expert advice with naïve advice seems to only work for female participants as male participants increase their demand for expert advice from NAC to NAF. Table 11 summarizes treatment differences in information acquisition behavior and takes into account both the level of financial literacy and gender.

Table 11: Gender, financial literacy, and demand for information

Female	Financial Literacy	NAC	NAF	Explanations Acquired
0	High	3.80 (0.57)	3.20 (0.58)	Mann Whitney U Test: z= 0.876, p= .380
	Low	4.50 (2.06)	2.75 (0.85)	Mann Whitney U Test: z= -0.581, p= .686
1	High	3.00 (0.68)	3.19 (0.58)	Mann Whitney U Test: z= -0.059, p= .977
	Low	4.08 (0.75)	2.72 (0.66)	Mann Whitney U Test: z= -1.244, p= .235
Female	**Financial Literacy**	**NAC**	**NAF**	**Expert Advice Acquired**
0	High	0.20 (0.14)	0.35 (0.15)	Mann Whitney U Test: z= -0.813, p= .587
	Low	--	1.50 (0.95)	Mann Whitney U Test: z= -1.512, p= .343
1	High	0.66 (0.33)	0.19 (0.11)	Mann Whitney U Test: z= -1.808, p= .195
	Low	1.50 (0.41)	0.27 (0.19)	Mann Whitney U Test: z= -2.389, p= .032
Female	**Financial Literacy**	**NAC**	**NAF**	**Information Acquired**
0	High	4.00 (0.58)	3.55 (0.61)	Mann Whitney U Test: z= 0.742, p= .458
	Low	4.50 (2.06)	4.25 (0.47)	Mann Whitney U Test: z= -0.298, p= .886
1	High	3.66 (0.71)	3.38 (0.59)	Mann Whitney U Test: z= 0.533, p= .594
	Low	5.58 (0.74)	3.00 (0.67)	Mann Whitney U Test: z= -2.121, p= .037

As expected, it is especially female participants with low financial literacy who reduce their demand for expert advice and their demand for information.[4] They are thus especially vulnerable of unrequested naïve advice preventing them to engage in further information acquisition. This might be due to a higher general acceptance of naïve advice. Both participants in the control treatment who acquired naïve advice were female.

To summarize, although naïve advice was of little interest when given on demand it is by no means ignored when given unrequested. Turning naïve advice available reduces engagement in information acquisition, especially for those of low financial literacy. The warning did not prevent this effect.
In order to further analyze the impact of advice on decision making we take into account as well if subjects follow advice. Table 12 provides an overview of compliance with expert advice. Expert advice has full support by contextual factors. In all treatments, compliance with expert advice is very strong with noncompliance being a rare exception.

Table 12: Compliance with expert advice

Treatment	NAC	NAF
No. of expert advice acquired	25	20
Compliance	24/25	19/20
N	37	56

In NAC, compliance with naïve advice is very strong as well: Naïve advice is bought twice and followed each time. No participant in the control treatment acquires both expert and naïve advice when solving a task.

When naïve advice is offered for free, compliance with naïve advice depends on age and information strategy. Table 13 exhibits the relation between information strategy and compliance. Data are pooled across subjects and tasks. It shows that including external sources of information leads to a lower reliance on naïve advice ($X^2(1, 336)= 10.167$, p= .002) while leaving aside external sources of information increases compliance: 75.3% of decisions made without the use of explanation items or expert advice follow the recommendation of the naïve advisor though naïve advice only leads in task 1 and task 5 to the optimal solution to the decision problem.

Table 13: Compliance with naïve advice in NAF I

Information strategy	Noncompliance	Compliance
Strategy 0: Use no external information	55 (24.7%)	168 (75.3%)
Strategy 1: Use external information	47 (41.6%)	66 (58.4%)

Data from task 4 had to be excluded for compliance with naïve advice was not 100% observable.

The Phi coefficient indicates that the association between both variables is rather weak (Phi= -.174, p= .002) and the Goodman and Kruskal's Tau value of .030 (p= .002) reveals that strategy adds only a small

[4] When including a corresponding interaction term in the probit models summarized in table 6, however, it did not show to be significant. This might be due to the small sample size.

amount of accuracy in predicting compliance. We therefore use two probit models (see table 14) to further examine which factors determine compliance.

Table 14: Compliance with naïve advice in NAF II

Dependent Variable: Compliance	**Probit (1)**			**Dependent Variable: Compliance**	**Probit (2)**		
	Coeff.	**(Std. Err.)**	**P>|z|**		**Coeff.**	**(Std. Err.)**	**P>|z|**
Age	-.058	(.019)	.003	Age	-.058	(.019)	.003
Female	-.151	(.162)	.351	Female	-.217	(.166)	.192
Economics	-.173	(.158)	.275	Economics	-.100	(.161)	.536
Confidence	-.000	(.082)	.994	Confidence	.000	(.083)	.999
Strategy: use external inform.	-.543	(.156)	<.001	Strategy: use explanations	-.426	(.162)	.009
				Strategy: use advice	-1.917	(.599)	.001
Financial literacy	.053	(.119)	.625	Financial literacy	.006	(.121)	.955
_cons	2.109	(.670)	.002	_cons	2.294	(.680)	.001
Observations		336		Observations		333	
Prob > chi2		.0026		Prob > chi2		<.001	

Marginal effects of strategy

Strategy	Use no external information	Use external information	Use no external information	Use explanations	Use advice
	.765***	.570***	.765***	.617***	.116
	(.029.)	(.047)	(.028)	(.049)	(.115)

Marginal effects of strategy and age

Strategy Age (Years)	Use no external information	Use external information	Use no external information	Use explanations	Use advice
23	.779***	.590***	.780***	.636***	.129
	(.028)	(.046)	(.028)	(.048)	(.123)
25	.743***	.544***	.744***	.592***	.106
	(.030)	(.049)	(.030)	(.051)	(.107)
27	.704***	.498***	.705***	.546***	.086
	(.036)	(.055)	(.036)	(.058)	(.092)

Probit (1) discriminates between two strategies: Use external information or not. Subjects who use external information are less likely to follow naïve advice. The probability of following advice varies with age: Participants who only rely on internal sources of information are most likely to follow naïve advice at the age of 23 (77.9%), less likely to do so at the age of 25 (74.3%) and least likely to do so at the age of 27 (70.4%). Age thus seems to make participants more critical towards naïve advice. The age effect can be observed for participants who acquire external information as well: They have overall lower levels of compliance that vary between 59.0% probability for participants of 23 years and 49.8% for participants of 27 years.

Probit (2) discriminates between three strategies: Use no external information, use explanations only, and use expert advice only. The strategy to use explanations as well as advice was excluded because of perfectly predicting behavior. All three decisions that were made with both the help of expert advice and explanations lead to a better decision than the one recommended by naïve advice. These three observations were dropped. Information strategy has a significant impact on compliance (X^2= 15.57, df=

2, p<.001) with using explanations lowering compliance with naïve advice by 14.82% and using expert advice lowering compliance with naïve advice by 64.92%. The same age effect as for probit (1) can be observed. In both models financial literacy had no effect on compliance.
An interesting by-result is, that with respect to advice participants were more source sensitive than they were quality sensitive: Participants in treatment 1 and 2 follow expert advice even when expert advice leads to a worse solution than naïve advice. High levels of financial literacy do not prevent this mistake.

5 Discussion

The results indicate that subjects offload the burden of decision making across several types of advice: Compliance with expert advice is very strong in all treatments. Moreover, in most decisions participants do not acquire explanations in addition to advice (36/45). When explanations are acquired in addition to advice, most participants (6/9) acquire explanations first and turn to advice when they fail to work out a solution themselves. Only 3 out of 9 participants that use expert advice and explanations to solve a decision task acquire advice first and later on acquire explanations. Overall, advice that is strongly supported by contextual factors turns subjects passive in the decision making process with little evidence of critical assessment of the advice and low willingness to invest in alternative information.
When naïve advice is received on demand and against a fee, high compliance and foregoing of alternative sources of information can be observed as well. Offloading thus seems to work as well when one of the contextual factors does not promote compliance (expert status of advisor). But naïve advice is far less popular than expert advice with the majority of participants who use advice wanting the advice to come from an expert (25/27).
Low demand for naïve advice does by no means imply that naïve advice is ignored once that it is received unrequested and for free. Especially participants of low financial literacy lower their engagement in information acquisition while their more financial literate counterparts are more likely to keep it at a similar level. Financial literacy thus seems to buffer the tendency to offload the burden of decision making to an advisor whose expertise is not guaranteed. But financial literacy did not prevent subjects from following advice of moderate quality. Age, by contrast, turned it less likely for an individual to follow unsolicited naïve advice. This can be interpreted as a signal that learning from experience influences the willingness to follow naïve advice more than financial knowledge. Subjects in their late twenties may have yet experienced that naive advice is not always an ideal basis for financial decision making and build up a more critical attitude towards naïve advice than subjects in their early twenties who might consider unsolicited naïve advice as supportive and have not yet experienced disappointing results from doing so.

Especially female subjects with low financial literacy reacted to unsolicited naïve advice with lower engagement in information acquisition and reduced their demand for expert advice. This finding can be linked to similar empirical findings: Bucher-Koenen et al. (2016) have shown that there are large differences in financial literacy between women and men with women being very unlikely to consult professional advisors in order to compensate for their lack of financial knowledge. On the contrary, women are more likely to rely on informal sources of advice (OECD 2013; ANZ Retirement Commission, 2009; CCFSI, 2011). If women generally have a greater acceptance of naïve advice as a means for decision making, free naïve advice becomes an appreciated substitute for acquiring expert advice.

One surprising result is that the warning in NAF+W is of no impact. There are no significant differences between treatment NAF and NAF+W with respect to investment in information or with respect to compliance with naïve advice. Chater et al. (2010), by contrast, show in an experiment on advised investment decisions that participants are less willing to follow the recommendation to invest in case a warning draws the attention to the advisor's conflict of interest. This effect was more pronounced when the warning was presented in a bold red font (strong warning) than in case the warning was not highlighted (mild warning). The warning in this experiment does not caution against the incentives of the advisor but against his qualifications. The presentation of the warning corresponds to the strong warning in the experiment of Chater et al. (2010) but does not create a comparable effect. This might be due to differences in type of non-compliance: In the experiment of Chater et al., participants can express distrust in the advice gradually by lowering the investment amount. In this experiment, participants had to decide for or against a recommended option. Switching to another option might be harder and thus require a stronger impetus than lowering the investment amount because it requires participants to identify a better option themselves.

6 Conclusion

The present paper has shown the effect of unsolicited naïve advice on financial decision making. Most people would not seek this advice and rather consult an expert. But once they receive naïve advice unsolicited it has nevertheless a strong impact on their decision by lowering engagement in the decision process and promoting a passive adoption of the recommended option.

These findings have implications for two areas.

First they fit in the debate on consumer empowerment. According to the results people who receive unsolicited naïve advice make decisions on a thinner information base and use the advice as a foundation for their decisions, especially when they are of low financial literacy. This passive behavior is diametrically opposed to the goal of consumer activation. One can argue that consumer activation and consumer empowerment entail some costs for consumers as well, for example in the form of regret (Wathieu et al., 2002). Mattila and Cranage (2005) aver that greater ownership of choices made also increases the burden of responsibility. But it is very likely that reliance on naïve advice and low information search turn out to be not less costly: In case compliance with naïve advice leads to a low decision quality and the saving in information acquisition costs does not make up for this effect, the free offer of naïve advice produces financial losses. This can be interpreted as hidden costs of free advice resulting from a switch in information strategy. While a warning did not show to be sufficient to prevent overreliance on naïve advice financial literacy buffers this effect. Strengthening financial literacy could therefore have a positive effect on information behavior prior to financial decision making.

Second, the findings are relevant for the financial services industry. According to the results consumers prefer expert advice over naïve advice when both are received on demand but free naïve advice can nevertheless crowd out expert advice. These findings suggest a need to offer low-threshold access to expert advice and to approach consumers proactively, especially those with low financial literacy. Availability thus should become an important attribute of financial consulting. Future research could further examine how the anchor set by the unrequested naïve advice can be overcome.

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Appendix

A. Instructions

Instructions for treatment NAC, NAF, and NAF+W

Welcome to the experiment!
The experiment is about financial decisions. The experiment consists of two parts (*introductionary part* and *main part*) and takes about 90 minutes.

1. Introductionary Part

In the introductionary part you will be asked to assess your ability to make financial decisions on a scale from 0 to 5. You cannot earn any money at this first step.

The first step is followed by a short financial literacy test. The test consists of five questions. Each question has several answer options. Only one answer option is correct. Please only tick one answer per question. You can earn money by completing the financial literacy test: For each correct answer you get €1. At maximum you can earn €5 by completing the test. The money is paid out after the experiment. It is not possible to lose any money by selecting an incorrect answer option.

2. Main Part

In the main part of the experiment you receive five tasks about financial products. For every task you have 10 minutes time to find the solution. At the first four tasks you can earn €3 respectively. The fifth task consists of three sub questions. You can earn €3 at each sub question. In total you can earn €21 in the main part of the experiment.
Please find the task, the decision criteria, and the answer options at the left hand side of the screen. Beneath the answer options you find a table with additional information. A short example from a different thematic domain will illustrate the evaluation scheme.

Example:

You want to take over a god parenthood for a zoo animal. Please select one of the 4 animals listed below. You have 5 minutes time to do so.

These are your decision criteria:

1. (top priority) You want an animal that is on the Red List of Threatened Species.
2. (medium priority) You want an animal that does not hibernate.
3. (low priority) You want an animal as large as possible“

I choose

- ☐ Animal A
- ☐ Animal B
- ☐ Animal C
- ☐ Animal D

OK

	Animal A	Animal B	Animal C	Animal D
Name	Leopard (Panthera pardus)	Vancouver Island Marmot	Wildcat (Felis silvestris)	Jaguar (Panthera onca)
Habitat	Africa, Asia	Vancouver Island	Europe, Central Asia	Central and South America
Hibernation	-	6-9 months	-	-
Shoulder height (cm)	70-80	<30	35-40	65

Solution and Evaluation
Please select one answer. With the OK button you confirm your entry irrevocably.
Your earnings depend on the quality of your answer. Try to find an animal that fulfils all decision criteria. Start with the first decision criterion.

Three of the four animals are on the Red List of Threatened Species. If you choose animal C (the only animal which is not on that list thereby not fulfilling the most important criterion), you earn €0. You should therefore make sure that the first criterion is definitely met. In this case eliminate option C and move on to the next decision criterion.

Only animal B hibernates. If you choose animal B, you earn at least €1 as the most important criterion is fulfilled (B is on the Red List of Threatened Species). But the answer is not optimal because the second criterion is not fulfilled (you do not want an animal that hibernates). Therefore, eliminate option B and move on to the next criterion.

With respect to the third criterion animal A fares better than animal D. If you choose animal A, you earn €3. If you choose animal D, you earn €2. Only animal A fulfills all decision criteria. Animal D fulfills the first two criteria but is inferior to animal A with respect to the third criterion.

This example is to show you how your decisions and your earnings are related. As the decision criteria are displayed in hierarchical order it is advisable to work through the decision criteria top down. Please note: Even if animal C were the largest animal (and thereby dominant with respect to the third criterion), you would earn €0 by choosing it because it does not fulfill the first criterion.

As you can see from the example, the table contains relevant as well as irrelevant information. In this case the information about the animal's habitat is irrelevant for optimizing the decision. Other characteristics are not listed in the table at all (here: biohazard). In that case you can draw on the *support items* on the right hand side of the screen.

Support Items:
Please find different support items on the right hand side of the screen.

1. Calculator
   Please find the calculator icon on top of the screen. Clicking on icon opens up the calculator in a separate window. You can use the blank pages behind the instruction sheet to take notes or write down calculation steps. Please submit the instruction sheet at the end of the experiment.

2. Explanations

   Beneath the calculator icon you will find several explanation items. Next to each explanation item is a button labeled „*Buy for €0.20*“. Clicking the button opens up a window with a brief explanation of the respective term. All explanations are kept simple and comprehensible. The length of the explanation may vary.

   Example: You tend to recommend animal A because it meets the second and third criterion. But you are not sure if that animal is endangered. In that case you could open the explanation item *Panthera Pardis* containing a brief profile of the animal (generic group, appearance, biohazard). The number of explanation items varies across tasks. In total, 19 explanation items are available.

3. Advice

   At each task you can resort to two pieces of advice. At the fifth task you can resort to two pieces of advice per subtask.

Treatment NAC	Treatment NAF and NAF+W
Next to one advice item you find a button labeled „*Buy for €0.40*“. If you click the button, a window with a recommendation opens up. For example: *Choose product B!* Next to the other advice item you find a button labeled „*Buy for €0.80*“. Again, clicking the button opens up a window with a recommendation.	Next to one advice you find a button labeled „*Buy for €0.80*“. If you click the button, a window with a recommendation opens up. For example: *Choose product B!* Below the button you will find another piece of advice.

What is the difference between both pieces of advice and where do they come from?

In a previous experiment, participants had to pass a financial literacy test and tasks on financial products as well. The introductionary part of this experiment was identical with the introductionary part of this experiment. In the main part, participants received the same five tasks you are going to receive. Their job was to give a recommendation on which answer to choose. In contrast to you participants of the previous experiment had no advice items among the support items. But they could buy the same explanations as you. Participants also had 10 minutes time for each task and each explanation had a price of €0.20.

If you buy the advice for €0.80, all participants of the previous experiment who answered all five questions of the financial literacy test correctly are selected. One of them is randomly chosen and his advice is provided to you. All participants who take part in the experiment today receive the same recommendation when purchasing the advice.

Treatment NAC	Treatment NAF and NAF+W
If you buy the advice for €0.40, all participants of the previous experiment who reported to be very good in financial decision-making and rated their abilities in this field with 5 (maximum score) are selected.	To create the costless piece of advice, all participants of the previous experiment who reported to be very good in financial decision-making and rated their abilities in this field with 5 (maximum score) are selected.

Please note that in selecting the participants the number of correctly answered questions in the financial literacy test is not considered. The selection can include participants with very good test results as well as participants with bad or medium test results. Again, one of the selected participants is randomly chosen and his advice is provided to you. All participants who take part in the experiment today receive the same recommendation when purchasing the advice.

Please note: Participants of the previous experiment have no reason to recommend an answer to you that leads to a low payoff. How much these participants earned depended on the quality of their advice. This implies: If a participant of the first experiment has recommended answer A, and choosing answer a leads to the maximum payment of €3, the participant received €3 for this advice. If choosing the answer the participant has recommended leads to a payment of €0 the participant does not earn anything as well. His payoff is not affected by the question if someone actually decides to purchase his advice or not. All participants of the previous experiment had an incentive to recommend the optimal answer.

Initial Budget

Your initial budget amounts to €4. You can make use of this budget to purchase explanations or advice. You are free to decide whether to spend the money on explanations and/or advice or not. You can as well spend it in part only. The budget is not bulked up after each task. As all explanations cost €0.20 you can afford to buy each explanation. After each task the amount of your remaining budget is displayed. If you have looked up two terms at the first task, the information „*Your remaining budget is €3.60*" is displayed on your screen before you move on to the second task. If you purchase an advice for €0.80 at the second task, the information „*Your remaining budget is €2.80*" is displayed on your screen before you move on to the third task. If you did not spend your initial budget in total, the remaining budget is paid out to you after the experiment.

Payoff

After the introductionary part you get to see how much money you earned so far. This amount is between €0 (you answered no question correctly) and €5 (you answered all questions correctly). After the main part you see how much you earned by completing the five tasks. This amount is at maximum €21 (you always chose the optimal solution) and at minimum €0 (you always chose the worst solution). Your remaining budget adds up to your earnings from the introductionary part an the main part. The remaining budget is at maximum €4 (you purchased no support items at all) and at minimum €0.00 (you spend the total budget on explanations/ advice). In total you can earn €30 at maximum. Your earnings are paid to you in cash at the end of the experiment. Please note that you do not have an entitlement to a specific amount of money. How much you earn depends solely on your behavior and on your decisions.

Instructions Preliminary Treatment

Welcome to the experiment!

The experiment is about financial decisions. The experiment consists of two parts (*introductionary part* and *main part*) and takes about 90 minutes.

1. Introductionary Part

In the introductionary part you will be asked to assess your ability to make financial decisions on a scale from 0 to 5. You cannot earn any money at this first step.

The first step is followed by a short financial literacy test. The test consists of five questions. Each question has several answer options. Only one answer option is correct. Please only tick one answer per question. You can earn money by completing the financial literacy test: For each correct answer you get €1. At maximum you can earn €5 by completing the test. The money is paid out after the experiment. It is not possible to lose any money by selecting an incorrect answer option.

2. Main Part

In the main part of the experiment you receive five tasks about financial products. These tasks are given as well to participants of a subsequent experiment. Your job is to give these participants an advice on how to solve the tasks. By giving an advice you can earn money. At the first four tasks you can earn €3 respectively. The fifth task consists of three sub questions. You can earn €3 at each sub question. In total you can earn €21 in the main part of the experiment.

Please find the task and the decision criteria at the left hand side of the screen. Please select one of the advice items below. Beneath the advice items you find a table with additional information. A short example from a different thematic domain will illustrate the evaluation scheme.

Example:

The participants of the subsequent experiment receive the following task: *„You want to take over a god parenthood for a zoo animal. Please select one of the 4 animals listed below. You have 5 minutes time to do so.*

These are your decision criteria:

1. *(top priority) You want an animal that is on the Red List of Threatened Species.*
2. *(medium priority) You want an animal that does not hibernate.*
3. *(low priority) You want an animal as large as possible"*

Please give these participants an advice which animal to choose. You have 10 minutes time to do so.

- ☐ Choose animal A!
- ☐ Choose animal B!
- ☐ Choose animal C!
- ☐ Choose animal D!

OK

	Animal A	Animal B	Animal C	Animal D
Name	Leopard (Panthera pardus)	Vancouver Island Marmot	Wildcat (Felis silvestris)	Jaguar (Panthera onca)
Habitat	Africa, Asia	Vancouver Island	Europe, Central Asia	Central and South America
Hibernation	-	6-9 months	-	-
Shoulder height (cm)	70-80	<30	35-40	65

Solution and Evaluation
Please select one advice item. With the OK button you confirm your entry irrevocably.
Your earnings depend on the quality of your advice. Try to find an animal that fulfils all decision criteria. Start with the first decision criterion.

Three of the four animals are on the Red List of Threatened Species. If you recommend to choose animal C (the only animal which is not on that list thereby not fulfilling the most important criterion), you earn €0. You should therefore make sure that the first criterion is definitely met. In this case eliminate option C and move on to the next decision criterion.

Only animal B hibernates. If you recommend animal B, you earn at least €1 as the most important criterion is fulfilled (B is on the Red List of Threatened Species). But the advice is not optimal because the second criterion is not fulfilled (you do not want an animal that hibernates). Therefore, eliminate option B and move on to the next criterion.

With respect to the third criterion animal A fares better than animal D. If you recommend animal A, you earn €3. If you recommend animal D, you earn €2. Only animal A fulfills all decision criteria. Animal D fulfills the first two criteria but is inferior to animal A with respect to the third criterion.

This example is to show you how your decisions and your earnings are related. As the decision criteria are displayed in hierarchical order it is advisable to work through the decision criteria top down. Please note: Even if animal C were the largest animal (and thereby dominant with respect to the third criterion), you would earn €0 by recommending it because it does not fulfill the first criterion. Your earnings solely depend on the quality of your advice. It does not matter if you advice is followed.

As you can see from the example, the table contains relevant as well as irrelevant information. In this case the information about the animal's habitat is irrelevant for optimizing the decision. Other characteristics are not listed in the table at all (here: biohazard). In that case you can draw on the *support items* on the right hand side of the screen.

Support Items
Please find different support items on the right hand side of the screen.

1. Calculator
   Please find the calculator icon on top of the screen. Clicking on icon opens up the calculator in a separate window. You can use the blank pages behind the instruction sheet to take notes or write down calculation steps. Please submit the instruction sheet at the end of the experiment.
2. Explanations
   Beneath the calculator icon you will find several explanation items. Next to each explanation item is a button labeled „*Buy for €0.20*". Clicking the button opens up a window with a brief explanation of the respective term. All explanations are kept simple and comprehensible. The length of the explanation may vary.
   Example: You tend to recommend animal A because it meets the second and third criterion. But you are not sure if that animal is endangered. In that case you could open the explanation item *Panthera Pardis* containing a brief profile of the animal (generic group, appearance, biohazard). The number of explanation items varies across tasks. In total, 19 explanation items are available.

Initial Budget

Your initial budget amounts to €4. You can make use of this budget to purchase explanations. You are free to decide whether to spend the money on explanations or not. You can as well spend it in part only. The budget is not bulked up after each task. As all explanations cost €0.20 you can afford to buy each explanation. After each task the amount of your remaining budget is displayed. If you have looked up two terms at the first task, the information „*Your remaining budget is €3.60*" is displayed on your screen before you move on to the second task. If you did not spend your initial budget in total, the remaining budget is paid out to you after the experiment.

Payoff

After the introductionary part you get to see how much money you earned so far. This amount is between €0 (you answered no question correctly) and €5 (you answered all questions correctly). After the main part you see how much you earned by completing the five tasks. This amount is at maximum €21 (you always recommended the optimal solution) and at minimum €0 (you always recommended the worst solution). Your remaining budget adds up to your earnings from the introductionary part and the main part. The remaining budget is at maximum €4 (you purchased no explanations at all) and at minimum €0.20 (you purchased all explanations available). In total you can earn €30 at maximum. Your earnings are paid to you in cash at the end of the experiment. Please note that you do not have an entitlement to a specific amount of money. How much you earn depends solely on your behavior and on your decisions.

B. Financial Literacy Test

Please answer the following questions by ticking one of the answer options. For each correct answer you receive €0.50. For each incorrect answer you receive €0.

1. Suppose you have €100 in a savings account and the interest rate is 2% per year. After 5 years, how much do have in the account if you left the money to grow?
   - ☐ More than €102
   - ☐ Exactly €102
   - ☐ Less than €102
   - ☐ Don't know
2. 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 today
   - ☐ Exactly the same as today
   - ☐ Less than today with the money in this account?
   - ☐ Don't know
3. Please judge the following statement: "Buying a single company stock usually provides a safer return than a stock mutual fund."
   - ☐ True
   - ☐ False
   - ☐ Don't know

4. Suppose you deposit €1,000 in a savings account earning 1% per year. The interest is added to your account every quarter (that is every three month) and is subject to interest as well. How much money do you have after 2 years?
   - ☐ More than €1,020.17
   - ☐ Less than €1,020.17
   - ☐ Exactly €1,020.17
   - ☐ Don't know

Hint:

$1{,}000 \cdot (1+1/100)^8 = 1{,}082.85$	$1{,}000 \cdot (1+1/400)^8 = 1{,}020.17$	$1{,}000 \cdot (1+1/400)^2 = 1{,}005.00$

5. Suppose you deposit €1,000 in a savings account earning 2% per year. The interest is added to your account every month and is subject to interest as well. How much money do you have after 2 years?
   - ☐ More than 1,040.77
   - ☐ Less than 1,040.77
   - ☐ Exactly 1,040.77
   - ☐ Don't know

Hint:

$1{,}000 \cdot (1+2/1200)^2 = 1{,}003.35$	$1{,}000 \cdot (1+2/1200)^{24} = 1{,}040.77$	$1{,}000 \cdot 1.02^{24} = 1{,}608.43$

C. Results of the financial literacy test

Financial literacy test	Number of correct answers	Number of incorrect answers
Question 1	120	2
Question 2	116	6
Question 3	89	33
Question 4	62	60
Question 5	82	40

D. Tasks in the Main part

Please note: For some financial terms the English expression is more telling than the German equivalent. For example the term *borrowing rate* clearly indicates that it refers to the amount of money you need to pay in exchange for borrowing money, not to an interest you receive for depositing money. The German term *Sollzins* by contrast does not contain the verb for borrowing (German: leihen) which makes it harder to interpret the term. In the information table the German expression can be found beneath the English translation.

Task 1

You inherited €10,000 and want to invest the money for the next two years in a safe and riskless way. Please choose one of the four options in the table beneath.

These are your decision criteria:

1. (high priority): You want to make sure you can always access a part of your money. You want to be able to withdraw up to €1,000 each month as a cushion against unexpected financial needs.
2. (low priority): You want a return as high as possible.

Please choose one of the options below. You have 10 minutes time to do so.

I choose…

- ☐ Bankbook 1!
- ☐ Bankbook 2!
- ☐ Call Money!
- ☐ Cash on Deposit!

OK

	Bankbook 1 Sparbuch 1	Bankbook 2 Sparbuch 2	Call Money Tagesgeld	Cash on Deposit Festgeld
Bank Bank	A	B	C	D
Interest rate Zinssatz	1.5%	1.5%	2.5%	2.5%
Compounding Zinsintervall	At the end of year	Quarterly	Monthly	At the end of term
Deposit Protection Fund Einlagensicherung	100%	100%	100%	100%
Tenor Laufzeit	Not fixed	Not fixed	Not fixed	2 years
Account-keeping Kontoführung	Free	Free	One-off fee of €10	Free
Specials Besonderheit	€80 Starting balance	€80 Starting balance	-	-

Task 2

You want to pay €5,000 into a giro account. Please choose one of the five options beneath.

These are your decision criteria:

1. (top priority): You are not willing to pay more than 10% interest when using the credit line.
2. (medium priority): You want use the online banking service. Only giro accounts at a bank that provides a secure online banking procedure come into question.
3. (low priority): After one year the amount in your account should have increased as much as possible.

Please choose one of the options below. You have 10 minutes time to do so.

I choose…

- ☐ Giro account A!
- ☐ Giro accountB!
- ☐ Giro account C!
- ☐ Giro account D!
- ☐ Giro account E!

OK

	Giro account A Girokonto A	Giro account B Girokonto B	Giro account C Girokonto C	Giro account D Girokonto D	Giro account E Girokonto E
Interest rate p.a. Zinssatz p.a.	2.5%	2%	1.5%	3%	1.8%
Starter bonus Starterbonus	0	0	€10	€10	€10
Account Management Charge Kontoführungsgebühren	€3 per month	-	-	-	€1 per month
Minimum Incoming Salary Deposits Mindestgehaltseingang	0	0	0	0	0
Deposit Protection Fund Einlagensicherung	€107,052,000	Unlimited	€1,614,000,000	Unlimited	Unlimited
Borrowing rate Overdraft Facility Sollzins vereinbarter Dispositionskredit	7.9%	9.4%	9.3%	8.5%	12%
Borrwoing rate Tolerated Overdrafts Sollzins für geduldete Überziehungen	12%	13.9%	16.9%	13.5%	15.2%
Online banking Procedure Onlinebankingverfahren	Sm@rtTan plus	mTan	HBCI	PIN/TAN	mTan

Task 3

Please choose one of the credit cards beneath.

These are your decision criteria:

1. (top priority): Next year you want to spend a four-month semester abroad at a university in another European country. During this time you want to withdraw money from cash machines and this should be as cost-effective as possible. You exclude the offer most expensive in this respect. Assume that you always withdraw €200 to cover the expenditures for the current week.
2. (medium priority): During the examination period at the end of the semester you want to pause your side job and overdraw your credit card for 4 weeks instead. Doing so should be as cost-effective as possible.
3. (low priority): After one year your money should have multiplied. This implies that any dues you have accepted should be compensated by an adequate interest payment. Every month at minimum €1,000 will be kept within your account.

Please choose one of the options below. You have 10 minutes time to do so.

I choose..

- ☐ Credit card A!
- ☐ Credit card B!
- ☐ Credit card C!
- ☐ Credit card D!

OK

	Credit card A Kreditkarte A	Credit card B Kreditkarte B	Credit card C Kreditkarte C	Credit card D Kreditkarte D
Fee (1st year)* Gebühr 1. Jahr	€0	€10	€0	€10
Fee (2nd year) Gebühr 2. Jahr	€0	€0	€0	€0
Interest on credit balances** Guthabenzinsen	2.6%	1%	0%	1.5%
Non-interest payment target Zinsfreies Zahlungsziel	2 weeks	4 weeks	5 weeks	3 weeks
Borrowing rate Sollzins	15%	25%	16%	6%
Cash Advance Fee (% of transaction amount) Bargeldgebühr in % vom Auszahlungsbetrag	2% Minimum charge: €11	4%	3%	5% Minimum charge: €5

*Due at the beginning of the year **credited at the end of the year

Task 4

You need €5,000 for your first year in the Master programme. Please choose one of the following options to have this amount at your disposal.

These are your decision criteria:

1. (high priority): Flexibility is important to you. In times where you have spare money you want to be able to make exceptional redemption payments.
2. (low priority): You want to keep the costs of the credit as low as possible.

Please choose one of the options below. You have 10 minutes time to do so.

I choose…

- ☐ to use the call credit!
- ☐ to use the micro-credit!
- ☐ to charge my credit card!
- ☐ to overdraw my giro account!

OK

Option 1	Call credit Abrufkredit
Credit line Kreditrahmen	300- 25,000
Minimum amount per call Mindestsumme pro Abruf	50
Minimum monthly redemption payment Monatliche Mindesttilgung	0
Administrative charge (% of consumed amount) Bearbeitungsgebühr (Prozent des verfügten Betrags)	0
Borrowing rate (percent p.a.) Sollzins (prozent p.a.)	11.0
APR Effektiver Jahreszins	13.5

Option 2	Mirco-credit Kleinkredit
Net loan Nettodarlehensbetrag	€5,000
Tenor in month Laufzeit in Monaten	48
Borrwoing rate p.a. Sollzins p.a.	4.5%
APR Effektiver Jahreszins	4.59%
Processing Fee Bearbeitungsentgeld	0
Total amount Gesamtbetrag	€5,472.48
Monthly Installment Monatliche Rate	€114.01

Option 3	Credit card Kreditkarte
Fee, 1st year Gebühr 1. Jahr	0
Fee, 2nd year Gebühr 2. Jahr	0
Interest on credit balances Guthabenzinsen	2.6%
Non-interest payment target Zinsfreies Zahlunsgziel	2 weeks
Borrowing rate Sollzins	10% p.a
APR Effektiver Jahreszins	16.8%
Cash advance fee Bargeldgebühren	0
Foreign usage fee Auslandsgebühren	1%

Option 4	
Minimum incoming salary deposits Mindestgehaltseingang	0
Account maintenance charge Kontoführungsgebühren	0
Deposit protection fund Einlagensicherung	Unlimited
Overdraft facility Höhe des Dispokredits	€0- €6,000
Borrowing rate for tolerated overdraft Sollzins für geduldete Überziehungen	15% p.a. APR: 17%
Deposit interest Guthabenzinsen	1%
Interest overdraft facility Zinssatz Dispositionskredit	9% p.a. APR: 13%

Task 5

Please choose one of the saving schemes beneath. You have 10 minutes time to do so.

These are your decision criteria:

1. (high priority): You are not willing to accept any uncertainty about the exact level of interest payment.
2. (low priority): You want the interest to be as high as possible.

5.1 Which bank do you choose if the investment period is 4 years?

- ☐ Bank A!
- ☐ Bank B!
- ☐ Bank C!
- ☐ Bank D!

OK

5.2 Which bank do you choose if the investment period is 6 years?

- ☐ Bank A!
- ☐ Bank B!
- ☐ Bank C!
- ☐ Bank D!

OK

5.3 Which bank do you choose if the investment period is 8 years?

- ☐ Bank A!
- ☐ Bank B!
- ☐ Bank C!
- ☐ Bank D!

OK

	Description										
Bank A	The interest rate is variable and is oriented on the 3-month EURIBOR, reduced by a fixed deduction of 3.00% p.a. It amounts to at least 0.50% p.a.										
Bank B	The interest rate is fixed. This applies to both falling and raising market interest rates. The interest rate amounts to 0.25% p.a. for a tenor of 4 years 0.70% p.a. for a tenor of 6 years 1.60% p.a. for a tenor of 8 years The interest is credited to the account on 31st of December.										
Bank C	The interest rate is independent of the investment period. The saving scheme offers an interest rate of 1.45 %p.a. over the entire term. Interest is credited after one year and subsequently also accrues interest (compound interest).										
Bank D	The interest is credited to the account on 31st of December.										
	In year	1	2	3	4	5	6	7	8	9	10
	interest p.a. amounts to	0.60%	0.60%	0.85%	1.00%	1.30%	1.50%	1.70%	2.00%	2.20%	2.50%

E. Explanation items

Task 1	
Tagesgeld Call money	Tagesgeld refers to an interest-bearing account with demand deposits that can be called by the account-holder any time. In contrast to a bankbook, there is no cancelation period or limit. The daily deposit availability makes Tagesgeld an ideal alternative for parking money in the short term. As interest rate conditions are fairly attractive, Tagesgeld is often used for long-term deposits as well. In contrast to giro accounts, Tagesgeld accounts are not admitted for payment transactions. Depository transfers can only be made onto the reference account stipulated by the user. Direct debit transactions cannot be withdrawn from the Tagesgeld account as well.
Festgeld Cash on deposit	Festgeld denotes a form of investment where a specified amount of money is deposited at a bank for predetermined period of time at a fixed interest rate. At the end of this period, the deposited amount and the accrued interest are paid out onto the client's bank account. During the investment period one cannot withdraw funds. The level of interest depends on market conditions at the time of concluding the contract as well as on amount and duration of the deposit. In case the Festgeld is not terminated at due date, it is extended automatically by the bank at the actual interest rate and the predetermined period of time. Before concluding the contract, you can opt as well for a transfer of the money on your bank account upon the expiry date.

Zinsintervall Compounding interval	Zinsintervall denotes the frequency of compounding. Usually, interest is credited on an annual basis at the end of year. Some banks offer accounts where interest is credited more frequently. Besides annual compounding, interest can be credited as well after 1, 3, or 6 months. This case is referred to as monthly, quarterly or semi-annual Zinsintervall. In case the interest earned ads up to the available balances, the interest begins earning interest on itself from the next period onwards. The higher the frequency of compounding, the larger the resulting annual interest returns.
Task 2	
Kontoführungs-gebühren Account management charge	At some giro accounts, Kontoführungsgebühren are incurred. The level can vary depending on the financial institution and the services the bank provides. The bank uses the account management charges in order to settle administrative expenses emerging when establishing and maintaining a giro account.
Dispokredit Overdraft facility	Dispokredit is short for Dispositionskredit. A Dispokredit allows for withdrawing more than you have in your private giro account up to a specified maximum negative balance. The credit line is specified by the provider and depends on the monthly income transferred to the account. Banks usually grant a credit line to private persons amounting to two to three times the monthly income. When making use of the Dispokredit interest accrues daily. Interest is only incurred on the amount of your limit that is actually used.
Geduldete Überziehung Tolerated overdraft	Geduldete Überziehung refers to an overdraft of the giro account that exceeds the overdraft facility agreed with the bank.
Sicherheit im Onlinebanking Security in online banking	The simple PIN/TAN method is currently considered outdated and insecure. A single free TAN number and the PIN is enough for criminals to get access to your money. The method is particularly vulnerable to phishing, where criminals use a fake mail to pretend to be your bank. The mTAN method is considered technically sound, for one thing, because the transaction number is generated during the request and therefore cannot be stolen beforehand, and for another thing, because TAN and all other relevant data are send per sms to the user's mobile and not to his PC that might be contaminated with malware. The HBCI method offers a high safety standard. Unlike the PIN/TAN method, a TAN is not required for conducting a transaction. The user signs his transaction data with a secret key on his smartcard by inserting the PIN via a smartcard reader. An assailant usually cannot read out the secret key from the smartcard in order to sign own transactions. Sm@rtTAN plus and Sm@rtTAN optic These two new methods are considered safe! Analogous to the mTAN method, the generated TAN plus the target account data are displayed again for one to check. If the displayed target account number is not equivalent to the desired target account number, the client can simply cancel the transaction. Unlike the mTAN method, the target account data have to be confirmed via the card reader before a TAN is generated. This offers additional security for the client.

Task 3	
Bargeldgebühren Cash advance fee	If you use your credit card to withdraw money from a bank counter or from an automated teller machine (ATM), a Bargeldgebühr is incurred. Usually, these costs are a fraction of the amount in cash withdrawn. In case the resulting amount deceeds the minimum charge, the minimum charge applies and your account is debited with the minimum charge.
Zinsfreies Zahlungsziel Non-interest payment target	The zinsfreies Zahlungsziel of your credit card designs the period of time during which using the credit line is interest-free.
Sollzinsen Borrowing rate	Interest a bank requires you to pay for borrowing money or for overdrawing your account.
Task 4	
Kleinkredit Micro-credit	A Kleinkredit designs an installment credit with low borrowing amounts. Because of the low credit sum (usually a four-digit euro amount) the creditor faces a manageable credit default risk. Repayment is made every month in equal amounts. Micro-credits often involve an interest burden higher than 20 per cent. Providers justify this with high additional expenditures they face when counseling potential borrowers.
Sollzinsen Borrowing rate	Interest a bank requires you to pay for borrowing money or for overdrawing your account.
Effektiver Jahreszins APR	The effektiver Jahreszins matters with respect to credit transactions as well as with respect to financial investments. For both lending and savings interest rates one has to differentiate between nominal interest rate and effective interest rate. The nominal interest rate represents the mere interest costs of a credit or alternatively the mere interest revenue of a financial investment. The effective interest rate, by contrast, includes all related costs and fees of a financial investment or a credit. Therefore, investors as well as borrowers should use the effective interest rate to compare different offers. The effektiver Jahreszins always refers to a one-year period thereby facilitating the comparison of different offers. All banks over here are obliged to state the effektiver Jahreszins. For investment products such as Tagesgeld or Festgeld, the effective interest rate is either identical to the nominal interest rate or below the nominal interest rate. For credits, the nominal interest rate is usually below the effective interest rate because the effective interest rate includes costs as well as the settlement of the redemption.
Dispokredit Overdraft facility	Dispokredit is short for Dispositionskredit. A Dispokredit allows for withdrawing more than you have in your private giro account up to a specified maximum negative balance. The credit line is specified by the provider and depends on the monthly income transferred to the account. Banks usually grant a credit line to private persons amounting to two to three times the monthly income. When making use of the Dispokredit interest accrues daily. Interest is only incurred on the amount of your limit that is actually used.

Geduldete Überziehung Tolerated overdraft	Geduldete Überziehung refers to an overdraft of the giro account that exceeds the overdraft facility agreed with the bank.
Abrufkredit Call credit	The Abrufkredit is very similar to the overdraft facility. The bank provides a drawing limit to the client he can use when needed. Doing so incurs interest. Similar to the overdraft facility, the interest for the amount taken orientates at the level of market rates. But the interest for the call credit is usually a bit higher than the interest for an overdraft facility. Interest and repayments are payed off in monthly installments. Further costs are optional and many Banks forego account management fees. The level of interest is variable. It depends on income, the credit amount, and the speed this amount is payed off. The credit is variable: On the one hand, paying off the amount at a faster rate than initially planned can save costs. On the other hand, an expansion of the credit amount can lead to higher interest rates. A call credit is most useful when expenditures are to be made and the size of the expenditures cannot be specified completely. The flexible credit line at moderate interest rates offers a high leeway to the credit user.
Task 5	
Zinseszinseffekt Compound interest effect	Depositing money at a bank usually yields interest because the bank can work with this capital. Depending on the bank and the financial product, interest is credited annual, semi-annual, or quarterly to your investment amount. Zinseszinseffekt refers to the phenomenon that the interest payments are kept in your account and bear interest itself from the next period onwards. This effect increases exponentially because the amount in your account keeps growing as more and more interest payments add up to it. The more frequent the interest is credited, the stronger the compound interest effect and the higher the return.
Variabler Zinssatz Variable interest rate	A variable interest rate is not fixed but is adjusted to the current market rates. Variable interest rate conditions are often less expensive. But a variable interest rate can become a huge disadvantage when market rates surge. Taken as a whole, variable interest rates lead to a lower planning security.
Zins p.a. Interest p.a.	The abbreviation p.a. stands for "per annum" or "pro anno" and means "per year". One can frequently find this abbreviation in the context of interest rates, underlining that the interest rate applies to a one-year period. Next to *Zins p.a.* one can find as well the term *Jahreszinssatz* or *jährlicher Zinssatz* (annual interest rate).