

**Think twice before you sign!
An experiment on a cautionary function
of contractual formalities.**

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Abstract

Legal scholars have long assumed that contractual formalities, such as formal writing, protect individuals from entering into ill-considered contracts. This assumption although fundamental has never been tested before. In a controlled laboratory experiment, I compared four forms of concluding a contract – clicking “OK”, typing in one’s name, entering a PIN code (which should reflect a qualified e-signature) and handwritten signing. I examined how these different forms of confirming a decision influence intertemporal choices. More specifically, I investigated whether handwritten signing indeed leads participants to choose more patiently. I found that individuals are more impulsive when making their decision by clicking on “OK” or by typing in one’s name than when confirming their decision by a handwritten signature. No differences were observed between traditional written form and the one with a PIN code. Further investigation of underlying mechanisms of this observation might provide a basis for designing equivalent online forms of concluding a contract which would fulfill the cautionary function as effective as a written form but would be yet simpler than a qualified e-signature.

I. Introduction

Freedom of contracts is fundamental to contract law in most legal systems – contractual parties can freely decide whether and what contract to conclude. Notwithstanding this established principle, legislators often introduce restrictions on contractual freedom either to shield contractual partners from abusive practices such as fraud (Collins 2006) or to protect the “weaker” contractual party (i.e. German consumer protection law, Kötz 2012). With contractual formalities (such as written, notarized or witnessed form), legislators seek to protect individuals from entering into ill-advised agreements by making them think twice before concluding a contract (cautionary function). The conviction that contractual formalities will prevent people from making rash decisions seems widespread and uncontested in the Common Law (Fuller 1941; Eigen and Hoffman 2015) as well as the Civil Law (i.e. Einsele, Münchener Kommentar §126 BGB, sec. 1) jurisdictions. An implicit assumption must be that a careful consideration before entering into a binding agreement would induce people to make better choices. Otherwise, the additional time and effort spent on thinking about a contract would be worthless. The law and economics scholars made this claim explicitly by positing that “formalities may provide an effective response to bounded rationality if their presence triggers some cognitive or institutional process that operates as a safeguard against the specific dysfunctional behavior at issue. [...] [T]he extra transaction costs of a formal writing may be justified because they deter impulsive and myopic decision” (Hermalin, Katz, Craswell, 2007). This assumption although fundamental has never been tested before.

In this project, I examined whether a traditional written form (a printed and signed contract) indeed protects contractual parties from concluding ill-considered contracts. More specifically, I investigated whether a written form in comparison to other simpler forms of concluding a contract (e.g. clicking on OK-button or typing in one’s name with a keyboard) as well as to a qualified e-signature (i.e. requiring a PIN Code) is more effective in deterring impulsive decisions.

There are many different understandings of an “impulsive decision” in economic and psychology research.¹ For the purpose of the current investigation I decided however to adopt a definition of an “impulsive decision” as a choice of a smaller/sooner reward over a larger/later one.² These kind of choices when individuals are asked to decide between options

¹ “Impulsivity is a multidimensional concept that has been defined variously as an inability to wait, a tendency to act without forethought, insensitivity to consequences, an inability to inhibit inappropriate behaviors” (Reynolds et al., 2006, p. 306).

² Similarly to Lempert and Phelps (2016).

with consequences at different points in time are called “intertemporal choices” (Berns et al., 2007). We face them in everyday life and they range from the minor (e.g. deciding whether to buy a TV set today on credit or rather to save money and buy it later on) to more crucial ones (e.g. investments, saving or retirement plan choices). These are also decisions for which some legislators still require either a qualified e-signature or a written paper form.³

According to the standard economic theory individual preferences, also for intertemporal choices, are stable (Loewenstein and Thaler 1989). It means that a person preferring 10€ now over 15€ in a month should also choose 100€ immediately instead of 150€ in a month. The context of a decision, i.e. the magnitude of reward, should not change this person’s preferences. Thus, given the standard theory people choices over entering into a contract should not differ depending on its form. There is however a growing body of economic and psychology research showing that people tendency to make impulsive choices is susceptible to the context of a decision⁴ such as the magnitude of reward (Thaler 1981), available options (Loewenstein and Prelec 1993), or whether the options are presented as gains or losses (Loewenstein 1988).

Research on contract formation revealed that people attach a special meaning to signing a written document. In particular, they interpret the very moment of giving a handwritten signature as the point of entering into a binding contract (Wilkinson-Ryan and Hoffman 2015). People are also less willing to breach a contract if it is concluded in writing and signed than if it is only a verbal contract (Wilkinson-Ryan 2015). Furthermore, studies investigating the influence of a signature on consumers’ behavior showed that a handwritten signature in contrast to a print name serves as a self-identity prime and results in different shopping decisions and group identification (Kettle and Häubl 2011). Other research revealed that signing one’s name at the beginning of a form leads to less fraudulent and cheating behavior than signing at the end of a form (Shu et al. 2012). Chou (2015a, 2015b) observed similar results comparing a handwritten signature (or a signature entered via a mouse cursor) to different forms of e-signatures. In her studies, people showed less dishonest behavior and stronger self-presence when signing with hand (Chou 2015a) as compared to all forms of e-signatures. Additionally, others perceived a contract with a handwritten signature as one

³ See for instance German provisions on consumer credits: §492 BGB. Interestingly, the German legal commentator argued that “the requirement of a written paper form fulfills another important function – it should protect a person who is signing the document from a hasty decision-making regarding important and risky transactions (cautionary function). (...) Both - a mousclick as well as the use of a card reader or a similar devices - would not create a psychological barrier equivalent to the one (still) created by a signature.” (Einsele *Münchener Kommentar* 2015 § 126a sec. 22-25)

⁴ For a review: Frederick et al. 2002, Berns et al. 2007, Lempert and Phelps 2016.

which is less likely to be breached than contracts confirmed with e-signatures (Chou 2015b). Altogether, the results of these studies suggest that a handwritten signature indeed might have a special meaning for individuals entering into a contract.

In the current project, I investigated how contractual formalities influence peoples' decision-making about entering into a contract. In a controlled laboratory experiment, I compared how the mode of confirming a decision (by clicking on OK-button, typing in one's name, entering a PIN code or handwritten signing) influence an intertemporal choice between receiving 10€ now or 12.50€ in a month. A patient decision-maker would choose the latter option resulting in a higher monetary payoff. An impulsive decision-maker could be however tempted to pick an immediate reward of 10€ instead of waiting a month for a higher one. The results revealed that more individuals decide for a later/larger option when they confirm their decision with a handwritten signature or a PIN-code than when they only type in their name or click on OK-button.

Further investigation is required to determine what drives the observed behavior. In particular, it could be examined whether a PIN-code and a handwritten signature change the context of a decision by, for instance, indicating its importance or irrevocability.

II. **Methods**

1. **Design and participants**

Ninety-six participants (age: $M = 21.9$, $SD = 3.8$, 59% female) were randomly assigned to one of four conditions in a between-subjects design (twenty-four per condition). Participants were recruited from the BonnEconLab subject pool consisting of students with heterogeneous fields of studies.⁵ Each session lasted about 45 minutes. Participants total payments in the main part of the experiment⁶ ranged from 10 to 12.50€. The experiment was programmed using z-Tree (Fischbacher 2007).

In each condition participants first performed a real effort task. Each participant earned 10€ for this task. Subsequently, participants were asked to make an intertemporal decision by choosing between receiving 10€ on the day of the experiment in cash or up to 12.50€ in a month via a bank transfer. Depending on the condition participants confirmed their decision differently. The modes of confirming a decision were designed to reflect four most common

⁵ Participants were recruited using an online recruitment tool hroot (Bock, Nicklisch and Baetge, 2012).

⁶ After the main experiment an additional independent experiment was conducted. The main experiment lasted about 25 minutes. At the beginning of the experimental session, participants were instructed that the whole experiment consists of a few parts which are independent from each other.

ways of concluding a contract (clicking on OK-button, typing in one's name, entering a PIN-code, handwritten signing).

2. Materials and procedures

The experiment consisted of two parts. Separate instructions were displayed on computer screens immediately preceding each part of the experiment. Before starting the first part participants were prompted to fill in a form with their names and bank account details. Participants were notified in an invitation to the experiment that they will be asked to provide bank account data. Participants were instructed that some or all payments in the experiment will be done via bank transfer. They were informed that the bank transfers will be conducted by the administration of the Max Planck Institute for Research on Collective Goods⁷ in Bonn and that the data will be stored only for the purpose of this experiment.⁸ They were also given an information sheet with contact details to the experimenter and a person responsible for transfers. This experimental procedure was introduced for three reasons: First, it should ensure that participants are confident about later payments when making an intertemporal choice.⁹ Second, it should prevent a situation in which participants are deciding for an immediate payment, because they want to avoid sharing bank account details. Third, since anonymity of decision making is by design excluded in three treatments (participants must confirm the decision with their own name and a PIN-code is also personalized), this procedure makes sure that participants identity is revealed in all treatments equally from the very beginning.

In the first part of the experiment, participants performed a word encryption task (Benndorf et al. 2014, Erkal et al. 2011), for which they were rewarded with 10€. Previous experiments have shown that people make different risky and intertemporal choices depending on the source of the income. In particular, they tend to be more patient when they decide about hard earned money than when a decision concerns windfall gains (Hvide and Lee 2015). Thus, to increase external validity the decision made in the current experiment concerned money earned in a real effort task to resemble everyday decisions about spending money when concluding contracts.

In the real effort task participants were presented on a screen with a table of 26 letters of the alphabet in a random order (Figure 1). Each letter was randomly assigned a three digits'

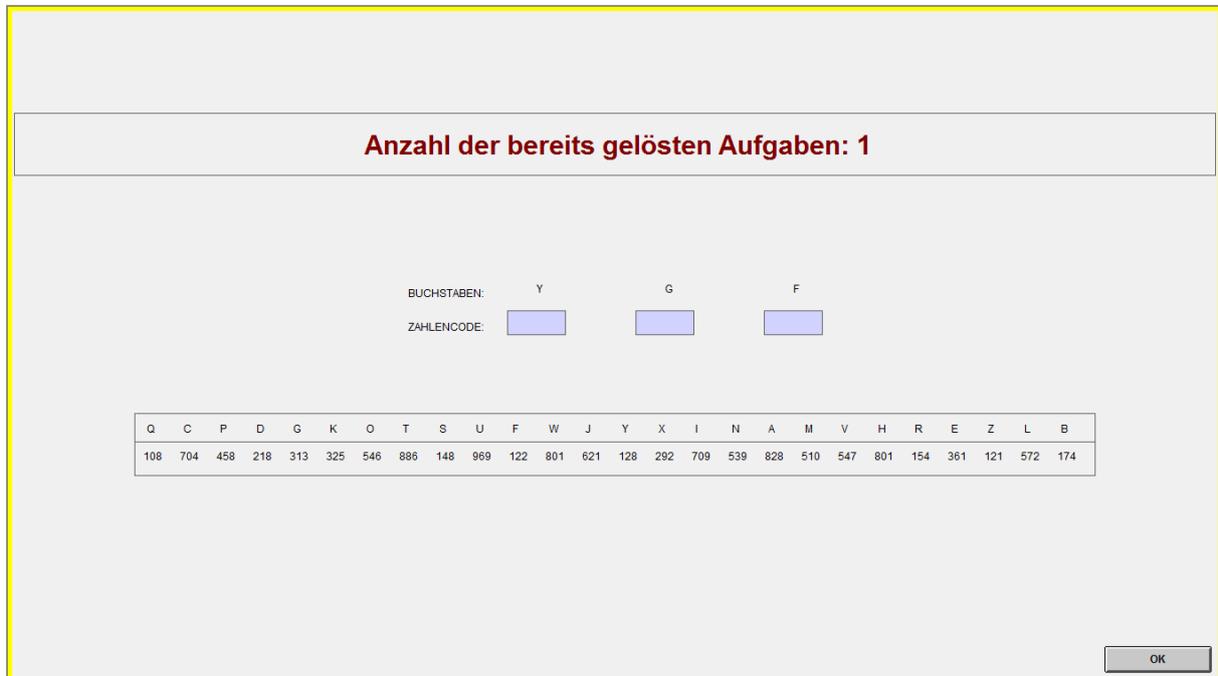
⁷ Max Planck Institute is a highly regarded research institution in Germany.

⁸ Please see the experimental instructions (Appendix 1) for the exact wording.

⁹ Similar procedure was introduced by Kuhn et al. 2014. Although it cannot be fully excluded, it is rather unlikely that participants would be distrustful about later payments.

number. Additionally, participants saw three randomly selected letters from the alphabet. Their task was to encode these letters, i.e. to find in a table a three-digit-code assigned to each of the letters and enter the appropriate code into a blank field.

Figure 1 A screenshot of the experiment depicting the word encryption task



If at least one of the numbers entered did not correspond to the assigned code, an error message appeared and a participant was prompted to enter all three numbers anew.

Participants were informed that they receive 10€ for completing 20 blocks of the task correctly. The order of letters, the codes, as well as three letters presented to encode, changed in each block.

In the second part of the experiment, participants decided whether they would like to receive 10€ they earned in a real effort task on the day of the experiment in cash. Alternatively, they could decide to receive nothing or only part of the money on the day of the experiment. Participants could choose an integer number from 0 to 10€. The rest of the money which has not been withdrawn on the day of the experiment was invested and this amount together with 25% interest rate was transferred to participants' bank accounts in a month (maximum 12.50€). To help to calculate the respective amounts which will be transferred to a bank account, participants were provided with a table (Table 1) displaying the amount received in a month (*in einem Monat*) depending on how much money a participant decided to receive today (*Heute*):

Table 1 A table from the experiment displaying amounts received in cash on the day of the experiment and respective payments in a month

Heute	0€	1€	2€	3€	4€	5€	6€	7€	8€	9€	10€
In einem Monat	12.50€	11.25€	10€	8.75€	7.50€	6.25€	5.00€	3.75€	2.50€	1.25€	0€

Participants were asked to declare how much money they would like to receive in cash on the day of the experiment by filling in a statement: “I declare that I would like to receive ... € today in cash.”¹⁰

Once a participant filled in a declaration, he/she was given a paper-and-pencil questionnaire. When distributing the questionnaire, the experimenter collected the forms from participants in the treatment in which a decision was confirmed by a handwritten signature. In the first question, participants were asked how satisfy they are about the decision they have just made. The question was answered on a seven-points-Likert-scale with higher scores representing higher satisfaction with the decision. The remaining of the questionnaire was designed to collect information about participants’ current financial situation¹¹ as well as to elicit their time preferences.¹² It was conducted to make sure that participants did not differ between the treatments with respect to their financial situation and time preferences.

3. Treatments

Confirmation of a decision on how much money participants would like to receive in cash on the day of the experiment differed across treatments.

Treatment	Confirmation of a decision
OK-BUTTON	The decision was made by entering a number and clicking on OK-button.
TYPED NAME	The decision was made by entering a number, typing in one’s name and clicking on OK-button.

¹⁰ For the English translation of the German instructions please see Appendix 1.

¹¹ Participants were asked 3 questions: (1) *Would you say, that you are at the moment short of money?* (1-7 scale, 1 – rather yes, 7 – rather no), (2) *Do you have debts?* (No, Very little, To a manageable degree, A lot), (3) *Do you need cash at the moment?* (1-7 scale, 1 – rather yes, 7 – rather no).

¹² The questions implemented to elicit participants’ time preferences were adopted from Falk et al. 2016 and consisted of a qualitative and quantitative part. In a qualitative part participants answered one self-assessment question: *In comparison to others, are you a person who is generally willing to give up something today in order to benefit from that in the future or are you not willing to do so?* The question was answered on a ten-points-Likert-scale whereas 1 meant *completely unwilling to give up something today* and 10 – *very willing to give up something today*. The quantitative part included 25 hypothetical choices between 100€ today or a larger amount in 12 months. The delayed amount increases with each choice.

PIN CODE	The decision was made by entering a number, typing in a PIN Code and clicking on OK-button. PIN Code was provided on a plastic card in a closed envelope with participant's name on it. The envelopes were distributed directly before the second part of the experiment.
HANDWRITTEN SIGNATURE	The decision was made by entering a number on a paper and confirming with a handwritten signature. The paper forms were distributed before the second part of the experiment.

III. Results

1. Intertemporal choice

A decision on how much money to receive on the day of the experiment in cash is the main dependent variable measured in the experiment. Participants could choose an integer value from 0€ to 10€. The more money a participant decided to receive immediately the lower was his/her overall profit. Participants who decided to receive 0€ on the day of the experiment, received 12.50€ in a month. The ones who decided for the opposite option (10€ on the day of the experiment) received nothing in a month.

Sixty-two percent of all participants decided to wait and to receive all money transferred to their account in a month.¹³ The second most frequent decision (20% of all participants) was to receive all money – 10€ – on the day of the experiment in cash. Only 18% of the participants chose to split the money between a present and future payment. Figure 2 displays the share of participants deciding for one of the three options (12.50€ in a month, 10€ on the day of the experiment or split) separately for each treatment. Importantly, whereas only 54.3% and 50% of the participants decided for 12.50€ in the OK-Button and TYPED NAME treatments respectively, 79.2% of the participants chose this option in PIN CODE and 78.3% in HANDWRITTEN SIGNATURE treatment.¹⁴

According to legal scholars a traditional written paper contract, in contrast to other ways of entering into a contract, fulfills the cautionary function by preventing people from making rash and impulsive decisions. Thus, the HANDWRITTEN SIGNATURE treatment was adopted as a baseline in the current study. To test whether participants in each of the treatments decided more impulsively than in the HANDWRITTEN SIGNATURE treatment, I

¹³ One participant was excluded from all analyses since he did not have a European bank account and was not able to provide all the details necessary for a bank transfer outside of the European Union.

¹⁴ The exact distribution of decisions is displayed in Figure 5 in Appendix 2.

conducted a Wilcoxon rank-sum test comparing the amounts of money received on the day of the experiment in each of the treatments to the amounts in the HANDWRITTEN SIGNATURE treatment (see Figure 3). In the TYPED NAME treatment participants chose more money in cash on the day of the experiment ($M = 4.58$, $SD = 4.87$) than in the HANDWRITTEN SIGNATURE treatment ($M = 1.52$, $SD = 3.43$), $z = 2.183$, $p = .029$. The difference between the amounts of money received by participants in the OK-BUTTON treatment ($M = 3.20$, $SD = 4.17$) and the HANDWRITTEN SIGNATURE treatment was marginally significant, $z = 1.657$, $p = .097$. The comparison between PIN CODE treatment ($M = 1.58$, $SD = 3.29$) and HANDWRITTEN SIGNATURE treatment revealed no statistically significant difference ($z = -0.060$, $p = .952$).

Figure 2 Percentage of participants deciding either to receive 12.50€ in a month, 10€ on the day of the experiment or to split the amount in each treatment

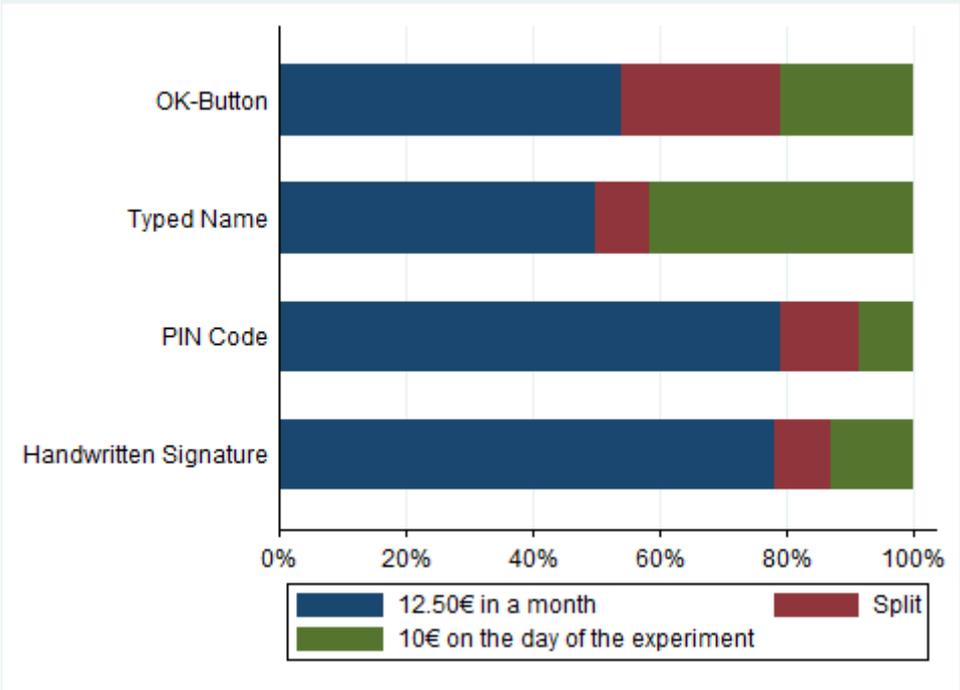
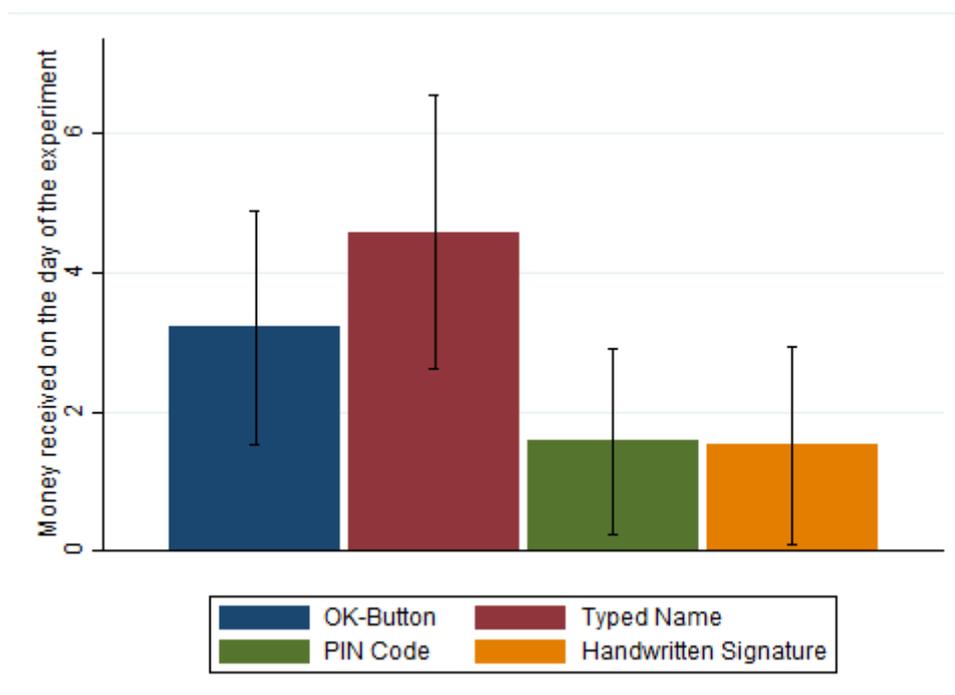


Figure 3 Money received on the day of the experiment by participants in each treatment



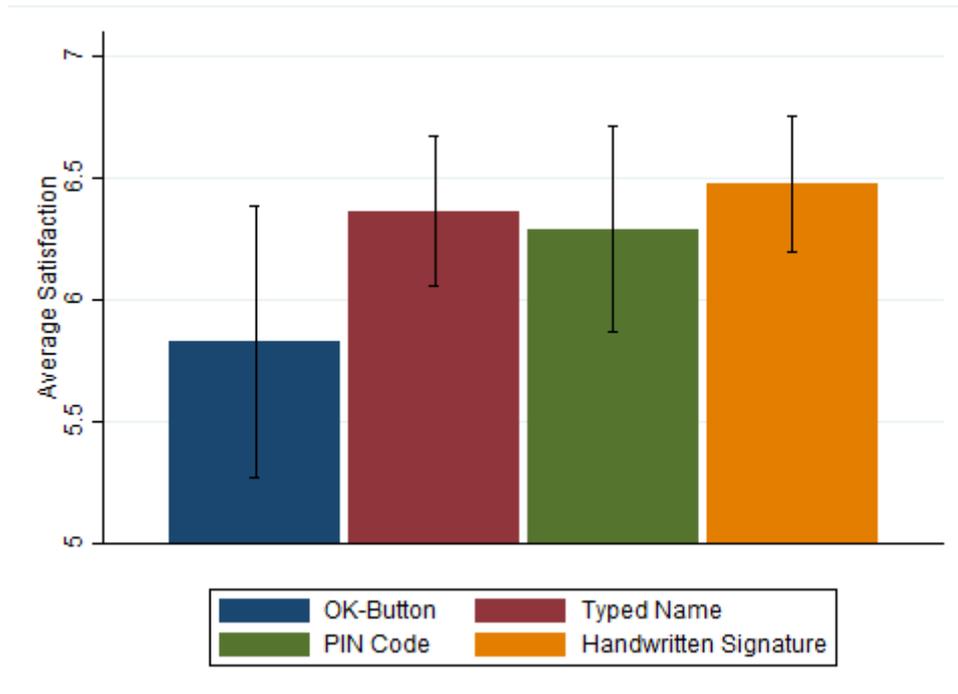
Note: Average amounts of money received by participants on the day of the experiment in cash separately in each treatment. Spikes represents 95% confidence intervals.

2. Satisfaction

After making the intertemporal choice participants were asked how satisfy they are with their decision (on a scale from 1 to 7, 1 represents “not satisfied” and 7 “very satisfied”), see Figure 4.

No difference was observed comparing TYPED NAME and PIN-CODE with the HANDWRITTEN SIGNATURE treatment ($z = -0.561$, $p = .574$; $z = -0.299$, $p = .764$, respectively). Participants in the OK-BUTTON treatment were less satisfied with their decisions than participants in the HANDWRITTEN SIGNATURE treatment ($z = -1.824$, $p = 0.068$).

Figure 4 Satisfaction with the decision in each treatment



Note: Average responses to the question about satisfaction with the intertemporal decision separately in each treatment. Spikes represents 95% confidence intervals.

3. Financial situation and time preferences

The questionnaire conducted after the experiment included also three questions asking about participants’ financial situation and further questions eliciting participants’ time preferences (one self-assessment question and 25 hypothetical intertemporal choices).¹⁵

I calculated Kruskal-Wallis tests to determine whether participants’ responses to the questions on the financial situation differed between the four treatments. None of the tests was significant across the treatments (Question regarding cash: $\chi^2(3) = 2.683$, $p = 0.443$; Question regarding shortage of money: $\chi^2(3) = 3.366$, $p = 0.338$; Question regarding debts: $\chi^2(3) = 0.562$, $p = 0.905$). Similar results were obtained comparing participants’ responses to the self-assessment question regarding time preferences ($\chi^2(3) = 2.172$, $p = 0.537$) as well as a time preferences measure constructed on the basis of 25 intertemporal choices¹⁶ ($\chi^2(3) = 2.480$, $p = 0.478$).

¹⁵ Questionnaires from two participants from the first experimental session are missing, since participants’ computer cabins’ numbers were not noted on the paper with a questionnaire and could not be matched with their responses in the experiment.

¹⁶ The number of a choice in which a participant switched from an earlier to a later option was adopted as a measure of time preferences. For example, if a participant in first 5 choices decided for an earlier option and switched to a later option in the sixth choice, than 6 was adopted as his/her measure of time preferences. If a participant switched more than once then a mean of switching numbers was taken.

IV. Discussion

One of the reasons for introducing contractual formalities (such as a legal requirement of some contracts to be concluded in writing or with a qualified e-signature) is to protect individuals from entering into ill-considered contracts. Paper writing together with handwritten signature is assumed to prevent people from making impulsive or myopic decisions when an immediate gain is chosen over a higher but distant payoff. The current experiment provides the first empirical test of this assumption. In the experiment, I compared four forms of concluding a contract - two 'simplest' ways (clicking on OK-Button and typing in one's name) with two more 'complex' forms – entering a PIN Code (which should reflect a qualified e-signature) and handwritten signing. The results showed that the form with a handwritten signature indeed lead people to choose less myopically than when a decision is confirmed only by clicking on OK or by typing one's name. No differences were found between traditional written form and the one with a PIN Code. Interestingly, people were less satisfied with their decisions made by clicking on OK compared with decisions confirmed by a handwritten signature.

The law and economics scholars argued that the additional transaction costs created by a requirement to conclude a contract in a written form would be justified if they prevent people from impulsive or myopic decisions. The results of this study show that this might indeed be the case. However, from this experiment, one cannot conclude anything about the underlying mechanisms of this observation. Research aiming to understand the mechanism is needed because it might provide a basis for designing equivalent online forms of concluding a contract. Such a form could fulfill the cautionary function equally effective as the traditional handwritten form or a qualified e-signature yet would be simpler and digital. This way the additional transaction costs might be avoided and individuals would remain prevented from entering into ill-considered contracts.

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Appendix 1

„Bank Account Details“

Some of the payments in today's experiment will be transferred to your bank account. Please, enter now your bank account details. Your data will be stored securely. Under no circumstances, your data will be used for advertising or marketing purposes or be disclosed to third parties. The data you will provide will be used only to execute the payments in this experiment. The data analysis, as well as publication of the results, will be anonym.

Bank transfers will be executed by the administration of the Max Planck Institute for Research on Collective Goods. There is an information sheet on your table with contact details to responsible persons from the Institute. Please, take this information sheet with you. Do not hesitate to contact us if you have any questions regarding the payments.

Please, enter your data carefully. Before you click on "Continue", make sure that you entered the data correctly.

General instructions for participants

You are about to take part in an economic experiment. In this experiment, you can earn a significant amount of money depending on your decisions. For this reason, it is essential to read the instructions carefully. The instructions you obtained are for your private use only. Please note that you are not allowed to communicate with other participants during this experiment. Should you have any questions, please ask us for assistance. If you do not comply with the rules we will have to exclude you from the experiment and from all payments. Today's experiment includes several parts. The instructions will be displayed on the computer screen directly preceding each part of the experiment. The payments in this experiment depend on your decisions. All decisions will be made individually – this means that you can let us know as soon as you are done with all parts of the experiment and leave the laboratory.

Part I – Word encryption task

In the first part of the experiment, you are asked to perform several blocks of a task. In each block of a task, you need to translate a combination of letters into a number code. For each letter, you will need to find an appropriate code. A table with letters and assigned number codes will be displayed on a screen in each block of a task. The task will look on a screen in the following way:

Anzahl der bereits gelösten Aufgaben: 1

BUCHSTABEN: Y G F

ZAHLENCODE:

Q	C	P	D	G	K	O	T	S	U	F	W	J	Y	X	I	N	A	M	V	H	R	E	Z	L	B
108	704	458	218	313	325	546	886	148	969	122	801	621	128	292	709	539	828	510	547	801	154	361	121	572	174

At the top of the screen, you see how many blocks of a task you have already performed. In this example, one task has been already solved. In the current task three letters “Y”, “G” and “F” need to be translated into three-number codes. The solution to this task can be found in the table below. “Y” is assigned a code 128. “G” is assigned 313 and “F” is assigned 122. Once all three codes are entered, please click on „OK“. The program will check whether the codes are entered correctly. Only in this case, the task will be counted as solved. Different letters to be solved as well as the different assignment of codes to the letters will be generated in each task. Please note that the table includes 26 letters from the alphabet and the position of each letter can change in each task.

Once a new combination of letters is displayed on the screen, you need to click in the first blank field to enable entering a number. You can proceed to the next task first when you correctly solved the current one. If at least one of the codes is entered incorrectly, all numbers that were entered will be deleted and you will be asked to enter them anew. The table does not change in this case.

Your task is to solve 20 blocks with three letters. As a payment for completing the task, you will receive 10€. Should you have any questions, please raise your hand.

Part II – Intertemporal decision

You can either receive the money you earned for performing the task (10 Euro) today in cash or decide to invest it for a month. You can also split this amount - receive some of it today and invest the remaining amount. Should you decide to invest all or some of the money, you will receive additional 25 Cents for each invested Euro. The total amount will be transferred to your account in a month. In the table below you can find the respective amounts which will be transferred to your account depending on how much money you decide to receive today.

Heute	0€	1€	2€	3€	4€	5€	6€	7€	8€	9€	10€
In einem Monat	12.50€	11.25€	10€	8.75€	7.50€	6.25€	5.00€	3.75€	2.50€	1.25€	0€

Should you have any questions, please raise your hand.

OK-BUTTON treatment:

Please make your decision now. Please enter the respective amount that you would like to receive in cash today below in the blank field. You can enter any number from 0 to 10. To confirm your entry, please click on OK.

TYPED NAME treatment:

Please make your decision now. Please enter the respective amount that you would like to receive in cash today below in the blank field. You can enter any number from 0 to 10. To confirm your entry, please typed in your first and last name in the respective field below. Next, click on OK.

PIN CODE treatment

Please make your decision now. Please enter the respective amount that you would like to receive in cash today below in the blank field. You can enter any number from 0 to 10. To confirm your entry, please enter a PIN code from the plastic card. The card is in the envelope that you have just received. Next, click on OK.”

HANDWRITTEN SIGNATURE treatment

Please make your decision now. Please enter the respective amount that you would like to receive in cash today in the form. Please sign the form. Next, click on OK.”

Appendix 2

Figure 5 Histogram of the amounts of money participants decided to receive on the day of the experiment

