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## If I close my eyes, nobody will get hurt. The effect of ignorance on performance in a real effort experiment

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# If I close my eyes, nobody will get hurt. The effect of ignorance on performance in a real effort experiment

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**Abstract**

This paper tests whether staying ignorant about the negative consequences of one's own actions affects agents' performance in a real effort experiment. We conducted treatments in which subjects' effort either increased only one's own payoff or also increased the donation to a *bad* charity. Ignorance was introduced by letting agents to decide whether or not to learn if the effort benefits the charity. Overall, we find that in the conditions with complete information agents exert significantly higher efforts if there are no benefits for the bad charity. With respect to ignorance, we show that (i) almost a third of agents stay ignorant, and (ii) the ignorant agents exert significantly more effort than agents who know that their effort benefits the bad charity. We also find evidence for a sorting of low social types into ignorance, as exogenously uninformed agents exert less effort than ignorant agents.

**Key Words:** ignorance, moral wiggle room, experiment, real effort

**JEL Classification**: C91, D03, D80, M52

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*1 Introduction*

In some everyday situations people willfully decide to avoid information. For instance, a smoker lights on a cigarette in a bar without asking a person sitting next to him whether it disturbs him, assuming it does not. When it comes to the workplace, there are also many situations in which people choose ignorance. For instance, an investment banker uses *tricks* that he does not understand in detail, but he does not inform himself how his actions affect economy. A hip student who works at an Apple store, however, he does not read about the working conditions in Apple factories. Or there is a restaurant that offers you a well-paid job. The restaurant is very successful and you ask yourself whether they launder money, however, you do not want to know.

In the last few years, a growing number of experimental studies have analyzed ignorance in dictator games (Dana, et al. (2007), Larson and Capra (2009), Grossman (2010), Matthey and Regner (2011), Grossman and van der Weele (2013), Bartling et al. (2014), van der Weele (2014)), ultimatum games (Conrads and Irlenbusch (2013)) and trust and moonlighting games (van der Weele et al. (forthcoming)). Most of these studies find that ignorant agents behave in a more selfish way, since they use lack of knowledge as an excuse for selfish behavior and may also have the illusion of acting fair.[2] However, to the best of our knowledge, there is still no experimental evidence on how ignorance may affect subjects' decisions in the workplace environment. With our experimental setting, we aim at filling this gap and showing how ignorance affects agents' performance in a setting close to the workplace environment.

To test for the link between ignorance and work output, we conducted a real effort experiment with a simple task, in which agents decoded letters (as in Charness et al. (2014)). By exerting effort, agents could increase only their

[2] Only van der Weele et al. (forthcoming) find no effect of ignorance on being more selfish. They argue that it is due to the richer moral context of their experiment.

payoff or also the payoff of the National Rifle Association (NRA), which is considered as a negative charity on the campus.[3] Subjects were randomly assigned to conditions in which there was a zero or positive piece rate for the NRA. Subjects were also randomly assigned to have complete information about the payoff functions or not. In the first condition with incomplete information, subjects could reveal whether the piece rate of the NRA is zero or positive, whereby they knew that there was a 50% probability of it being zero or positive. The subjects who decided not to learn the piece rate are considered as ignorant agents. In the second condition with incomplete information, we tested whether there is a sorting of types who have low social preferences into ignorance. In the model by Grossman and van der Weele (2013), an agent with low social preferences may sort into ignorance since it allows avoiding a situation in which the agent has to behave unambiguously selfishly. Sorting may thus be the driver of the selfish behavior by the ignorant agents. To test for sorting, we conducted a treatment with incomplete information about the piece rate of the NRA without the possibility to find out the actual piece rate of the NRA, which we then compared with the condition where agents endogenously chose to be ignorant about the piece rate of the NRA.

We find that in the conditions with complete information, on average, agents exert significantly higher efforts if there is no payment to the NRA. Considering the role of ignorance, we observe that when agents decide not to know they exert a high effort, similar to their behavior in the condition where the piece rate of NRA is zero. Thus, our result that ignorant agents behave in a more selfish way is in line with previous experimental evidence from dictator and ultimatum games listed above. However, since our game introduces a negative externality in a form of a donation to a *bad* charity, we can additionally conclude that ignorant subjects are not only more likely to behave selfishly, but they are even more likely to behave anti-socially by creating a negative externality for a third party.

[3] We ran a survey about the image of NRA (see Section 2).

Finally, we find that agents with low social preferences sort into being ignorant, since agents who decide not to know the piece rate of the NRA behave slightly more selfishly than the agents who were exogenously assigned to the treatment with uncertainty about the piece rate of the NRA and no possibility to learn more. Thus, we show that not having information about the consequences of one's own actions alone does not lead to a selfish behavior, but rather the sorting of lower social types into ignorance drives the selfish behavior of ignorant agents.

The remainder of this paper is organized as follows: In Section 2 we describe experimental design. We report our results in Section 3 and Section 4 concludes.

## *2 Experimental Design*

### *2.1 Set-Up*

In our experiment, participants worked on a real effort task. The task was very similar to the decoding task by Charness et al. (2014), which consisted of decoding letters into two-digit numbers. The table with letters in the first column and numbers in the second column was displayed on the computer screen in zTree (Fischbacher (2007)), whereby only one particular letter in the table had to be decoded with the corresponding number. After the subject decoded the letter, a new table with different numbers and letters combinations appeared. Moreover, the accuracy of entries was checked, as a participant could move to the next decoding task only if the letter was decoded correctly.[4]

We implemented a between-subjects design with four treatments. First, our baseline condition (denoted by BA) was conducted to measure the base pace of work in the piece rate environment. Here, all the subjects acted as agents and were paid 5 ECU for each letter that was correctly decoded, whereby 100

[4] See instructions in Appendix B for an example of a code table that was used in the experiment.

ECU were equal to 1 EUR. Thus, the more an agent worked, the more he earned.

The second treatment (denoted by NRA) differed from the reference condition insofar as a bad cause charity was introduced.[5] Agents were told that they would get 5 ECU for each decoded letter. At the same time, they were informed that each decoded letter yields 7 ECU for the National Rifle Association (NRA). The subjects received a short description of the NRA and were told that 93% of the subjects who took part in the survey at the campus perceive the NRA negatively.[6]

The third treatment (ignorance treatment) was conducted to investigate if and how ignorance might affect agents' performance. Here, agents could choose whether they want to learn the piece rate of NRA, whereby they knew that there was a 50% probability of it being 0 or 7 ECU. Thus, the performance could either increase only the agent‘s payoff and have no benefits for the NRA *or* it could increase the payoffs for both agent and the NRA. We decided on the piece rate by a flip of a coin just before a session started, and this random mechanism was common knowledge. If a subject decided to inform herself about the impact of her effort, the randomly chosen piece rate was shown on the screen, and if she did not want to reveal the piece rate a question mark appeared. We denote the subjects who learned that the piece rate is 0 (7) ECU with NI0 (NI7) in the remainder of the paper. The subjects who stayed ignorant are denoted with IG.

Finally, the uncertainty treatment (denoted by UN) was conducted to test whether low social types sort into ignorance, which may possibly explain what drives the behavior of ignorant agents. In this treatment, agents knew that the piece rate of the NRA is 0 or 7 ECU, with a 50% probability of either rate.

[5] The instructions (see Appendix B for translations from German) used neutral formulations. So we did not use such words as "good" or "bad".

[6] We ran the survey two weeks before the first sessions were conducted. 100 participants were asked to rate NRA on a 7-point scala from 1 "I find it very bad" to 7 "I find it very good". If the answer lies between 1 and 3, the opinion about NRA is considered to be negative.

However, different from the ignorance treatment, here agents did not have the possibility to find out the actual piece rate of the NRA. When comparing the output in the uncertainty treatment (UN) and the output exerted by ignorant subjects (IG), we can measure the sorting effect.

Moreover, in all the treatments, agents could choose a timeout by pushing the "Pause" button. If the button was used, the screen locked for 20 seconds. The agents were paid 4 ECU for each pause, which represents the opportunity costs of working.[7]

*2.2 Hypotheses*

The task contains low costs, since not only the opportunity costs but also the costs from exerting effort are low (i.e., the task is simple and requires little thinking). Given the low costs and the piece rate incentives, we expect agents to exert a positive effort in the baseline condition.

With respect to the NRA condition, our hypothesis is that agents work less than in the baseline condition, since working on the task not only financially benefits the agent but also the NRA, which on the other hand is negatively perceived by majority of University of Cologne students. Thus, it creates a trade-off between self-image (*If my effort benefits the NRA, I am a bad person*) and monetary payoff.[8]

With respect to the ignorance treatment, we expect that a minority of agents decide to stay ignorant. We base this hypothesis on the previous systematic experimental evidence showing that a minority of subjects remain ignorant about the consequences of one's own decision.[9] Furthermore, we expect the ignorant agents to work more than agents who know that they work for the

[7] We use a very similar form of opportunity costs as Berger et al. (2013), who used the "Pause" button for a break in their real effort experiment.
[8] Furthermore, Ariely et al. (2009) showed that subjects produced significantly less output for NRA than Red Cross.
[9] In all the studies cited in the introduction minority of agents stays ignorant.

NRA, which may be driven by the moral wiggle room that protects self-image (as in Dana et al. (2007)) and/or the sorting of lower social types into ignorance (as in Grossman and van der Weele (2013)).

Furthermore, we test for sorting effects and thus compare performance in exogenous and endogenous information conditions. According to the model by Grossman and van der Weele (2013), subjects who reveal (do not reveal) the information are on average more (less) prosocial than the subjects who were given the information exogenously. With respect to our experimental setting, we expect that agents who choose to inform themselves about the piece rate of the NRA behave more prosocially than agents who were given the information exogenously.[10] In other words, agents who find out that the piece rate of the NRA is positive should work less than agents who were given this information exogenously. With respect to the conditions with incomplete information, agents who choose to be ignorant should behave more selfishly (i.e., decode more letters) than agents in the uncertainty treatment, since lower social types sort into ignorance.

As for the timeouts, we expect that agents do not use pause button if there is no donation to the NRA or if the subjects are ignorant, as on average working leads to a higher monetary payoff than taking a break.[11] However, if the agents know that the piece rate of the NRA is 7 or if the agents were assigned to the uncertainty condition, the pause button may represent a morally good alternative to earn money instead of working for the NRA, and thus agents should push the timeout button more often.

[10] Note that no sorting effects are expected if the agent finds out (or exogenously knows) that the piece rate of NRA is zero, because all the decisions made in BA or NI0 treatments affect only one's own payoff but not the payoff of others and thus the prosociality of agents does not affect their behavior in such context.

[11] In the BA condition, the average amount of decoded letters is 18.47 per minute. It follows that the average agent earns more than 30 ECU in 20 seconds, which is notably more than 4 ECU for a pause.

*2.3 Experimental Procedure*

Our experiment was conducted in March-June 2014 at the Cologne Laboratory for Economic Research using the experimental software zTree (Fischbacher (2007)). Participants were recruited via ORSEE (Greiner (2004)). We ran 10 sessions with altogether 267 subjects. No subject participated in more than one of our sessions.

At the beginning of the experiment, participants received written instructions for the experiment and were allowed to ask questions privately. To ensure that each participant understood the instructions, subjects had to answer comprehension questions that were examined by the experimenters before the task started. Then each participant had 90 seconds for the trial period of the decoding task. In this stage they were paid 5 ECU for every correctly decoded letter, and timeouts could not be chosen.[12] After each participant finished the trial task, the actual decoding task started, for which subjects had 10 minutes time. Each agent received identical decoding tasks in the same order.[13]

After the actual experiment was finished, the subjects were requested to complete a post-experiment questionnaire including questions on gender, age, field of study, Big Five personality traits and motives behind the decisions. At the end, subjects privately received their payoffs in cash and left the laboratory. Each session lasted approximately one hour. The average payoff was 12.81 Euros (minimum 4.20 Euro, maximum 16.15 Euro), including a show-up fee of 2.50 Euros.

The transfer to NRA was made after all sessions were finished. To ensure that the donation is credible, we wrote in the instructions that the subjects can give us their email address if they want to get proof of the donation, and we sent them the proof at a later date.

[12] We introduced this stage as an ability checker.
[13] There was a limit of 240 decoding tasks. 9 out of 267 subjects reached the limit at the very end of the task.

## *3 Results*

In line with our predictions, agents exert substantial effort in the baseline treatment and decode an averge of 184.67 letters in 10 minutes of working on the task (see Figure 1).[14] With respect to the NRA treatment, we observe that agents work less when their effort benefits the NRA: With 163.15 decoded letters, average performance in this condition is significantly smaller compared to BA (p=0.01093, two-sided Fisher-Pitman permutation test for independent samples).[15] Hence, we observe that agents are less motivated to work if a negatively perceived organization benefits, which is in line with our hypothesis.

Concerning the ignorance treatment, we observe that 28.35% of subjects (or 36 out of 127) decide not to find out how their action will affect others. This share is smaller than, for instance, in the seminal study by Dana et al. (2007), where 44% of subjects are ignorant. The difference between our and their result probably reflects the fact that our setting implemented the opportunity to give to the NRA. In the study by Dana et al. (2007), the *worse* game only means that if the dictator chooses the payoff-maximizing option, the receiver gets less money than in the *better* game. In our setting, on the other hand, the *worse* game leads to a donation to a guns lobbying organization, which may be perceived as anti-social behavior.

With respect to the output in the ignorance treatment, we observe that agents who choose to find out how their action will affect others, and find out that the piece rate of NRA is 0 (NI0), decode 190.33 letters on average. At the same time, the performance of agents who find out that the piece rate is 7 (NI7)

[14] See Figure A.2 in Appendix for the distribution of agents' output.

[15] In this paper we use the Fisher-Pitman permutation test for independent samples, which is a non-parametric statistical test and provides *p*-values for the difference in means of outcomes in two independent groups. The test is superior to Wilcoxon tests if the observed values are given on at least an interval scale (see Kaiser (2007)). Note that we use Monte Carlo simulations to calculate the p-values (200000 runs). Furthermore, all of our results also hold if we use *t*-test.

decreases to 150.69 forms. The difference between output levels in NI0 and NI7 is highly statistically significant with p=0.00234.

**Figure 1:** Average performance per agent, in number of decoded letters

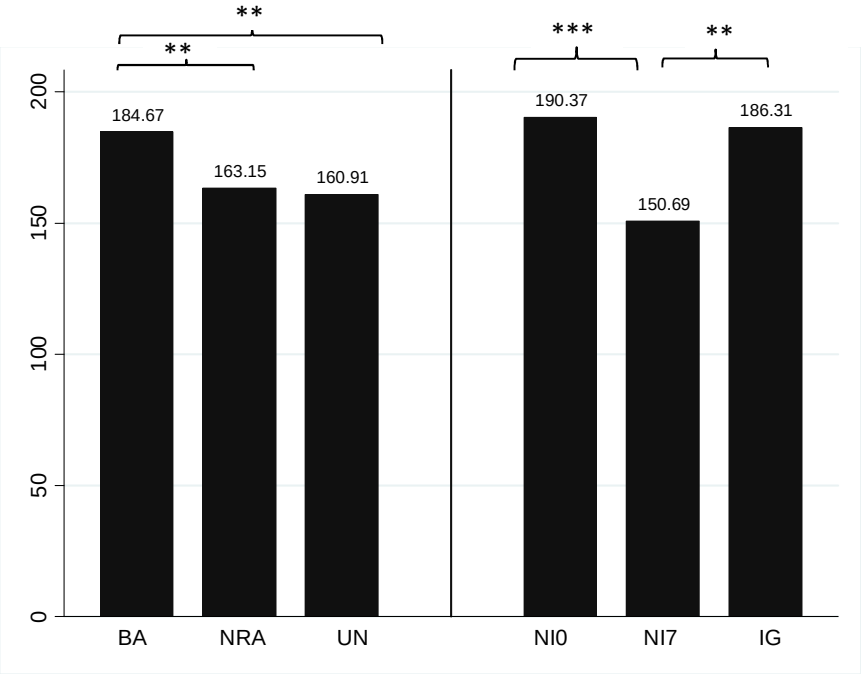


Figure 1 plots the average amount of decoded letters. Stars indicate significance level of two-sided Fisher-Pitman permutation test. *** indicates significance on the 1%-level and **- on the 5%- level. Number of subjects amounts to 48, 48, 44, 46, 45 and 36 in BA, NRA, UN, NI0, NI7 and IG conditions, respectively.

Concerning the impact of ignorance on the output, we observe that among agents who have decided not to learn the piece rate of the NRA (denoted by IG) performance increases by 23.64% to 186.31 letters, on average, compared to condition where agents know that the piece rate is 7 (NI7). This difference is significant with p=0.01812. Thus, as predicted, agents who are ignorant about the consequences of their actions work more than agents who know that there is a negative externality. One interpretation of the result is that not knowing maintains the illusion of acting in a good way. Moreover, when we compare the ignorant agents with the agents who know that the piece rate is 0

(NI0), we see no difference in the output levels (p=0.60927), which suggests that ignorant agents behave as if they were in the condition with the zero piece rate (NI0).

In the next step, we analyze the selection effects of agents. First, we compare agents in NRA condition with agents in NI7 condition. As discussed above, agents who choose to know should be more prosocial on average than agents who were given the information exogenously. However, when comparing the output in NI7 and NRA, we find no significant differences in the distributions (p=0.37904). Second, we expect agents who choose to be ignorant to behave, on average, less prosocially than agents in the uncertainty condition, since lower prosocial types sort into not knowing. We find that agents in the UN condition decode 160.91 letters, which is 13.63% less than in the IG condition, i.e., agents in UN behave on average more prosocially than agents in IG. The effect is marginally statistically significant with p=0.05757. Thus, it follows that not knowing about the consequences of one's own action does not necessarily lead to behaving in a selfish way. Rather, the negative effect of ignorance is driven by the selection effect in our experimental setting, i.e. lower social types sort into ignorance and behave in a more selfish way.

Finally, with respect to the pauses, we find that agents almost never take a break in the baseline treatment.[16] Here, average number of timeouts amounts to 0.10 (see Figure A.1 in Appendix). In NRA condition, on the other hand, the average number of pauses increases to 3.25. This between treatment difference is highly statistically significant with p=0.00005. One interpretation of the result is that in the NRA treatment agents take breaks because they believe it is a morally right alternative to earn money instead of working for the NRA. In line with this interpretation, agents in NI7 take also significantly more breaks than agents in NI0, whereas the average amount of breaks is 5.84 and 0.07 in NI7 and NI0, respectively (p=0.00011). Finally, agents in IG take

[16] When pooling the data from all the treatments, Spearman rank correlation coefficient shows negative and significant correlation between output and timeouts (rho= - 0.5498, p = 0.0000).

1.03 breaks, on average, which is significantly less than in NI7 condition ($p=0.01707$). On the other hand, agents who were assigned to the incomplete information condition UN take 3.95 breaks on average, which is almost four times more than agents in IG condition. However, the difference is only marginally statistically significant ($p=0.10782$).

All in all, we observe that agents who work for the NRA or are in the UN condition substitute part of their work by incentivized timeouts, while agents who work only for themselves or are ignorant work significantly more and take only very few or no breaks. Thus, it follows that agents care about the moral consequences of their actions, even if there is uncertainty about whether there is a negative externality at all. However, agents who choose to be ignorant behave in a more selfish way, as on average lower prosocial types sort into ignorance.

## *4 Conclusion*

We conducted a real effort laboratory experiment to study the effects of ignorance on agents' performance in a setting close to a workplace environment. We studied a simple setting where agents worked on a decoding task and the effort either increased only one's own payoff or also increased the payoff for the NRA. Ignorance was introduced by letting agents to decide whether or not to learn if their effort increases the donation to the NRA. Overall, we find that, in all of our treatments, agents exert on average significantly higher effort in the conditions without payments to the NRA than in the conditions with a transfer to the NRA. It follows that agents decide to forego a part of their monetary payment, so that they avoid a negative externality.

However, the results from the ignorance treatment show that ignorant agents behave in a more selfish way, as they exert more effort. In order to explain the result, we conducted a treatment with exogenously introduced uncertainty

about the piece rate of the NRA and found that agents in this condition exerted less effort and thereby behaved more prosocially than ignorant agents. Thus, we conclude that uncertainty about the consequences of own actions does not necessarily lead to selfish behavior, but rather the negative effect of ignorance is driven by a selection effect. Namely, on average, social agents of a low type sort into ignorance. One interpretation of the sorting effect, in the light of the model by Grossman and van der Weele (2013), is that ignorance allows lower social types to avoid a situation in which they have to behave unambiguously selfishly.

Furthermore, our results suggest that ignorance may not only reduce altruistic behavior, as found in previous experiments on ignorance in ultimatum and dictator games, but may even lead to anti-social behavior. Ignorant agents in our experiment give to a bad cause, which may be interpreted as a negative externality. We thereby show that ignorance may have even higher welfare costs than found in previous studies.

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*Appendix*

*A. Further statistics*

**Figure A.1:** Average amount of timeouts per agent

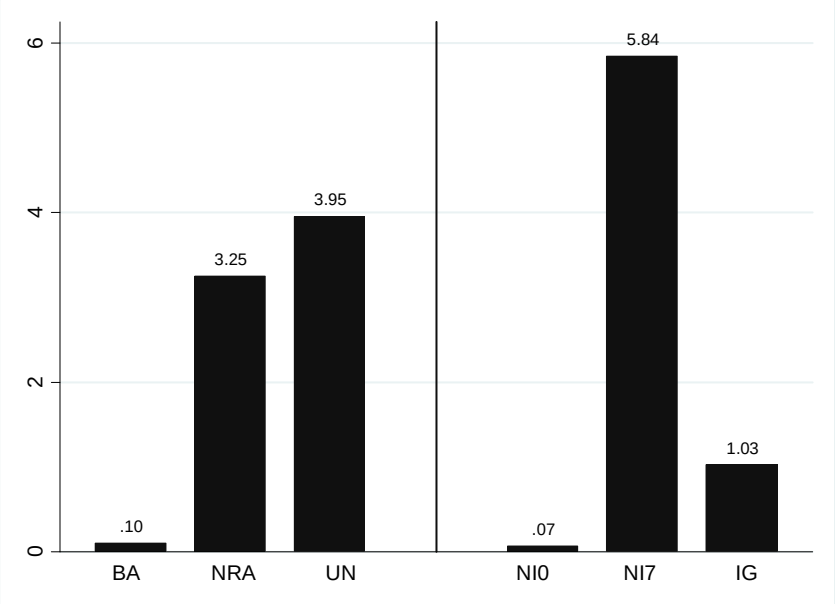



**Figure A.2** The distribution of agents' output

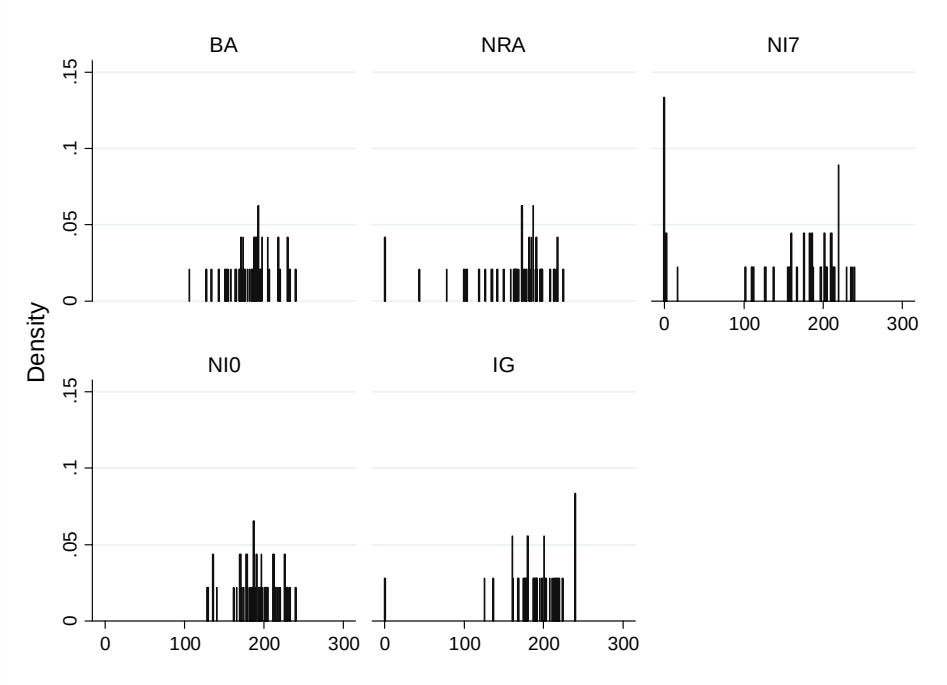
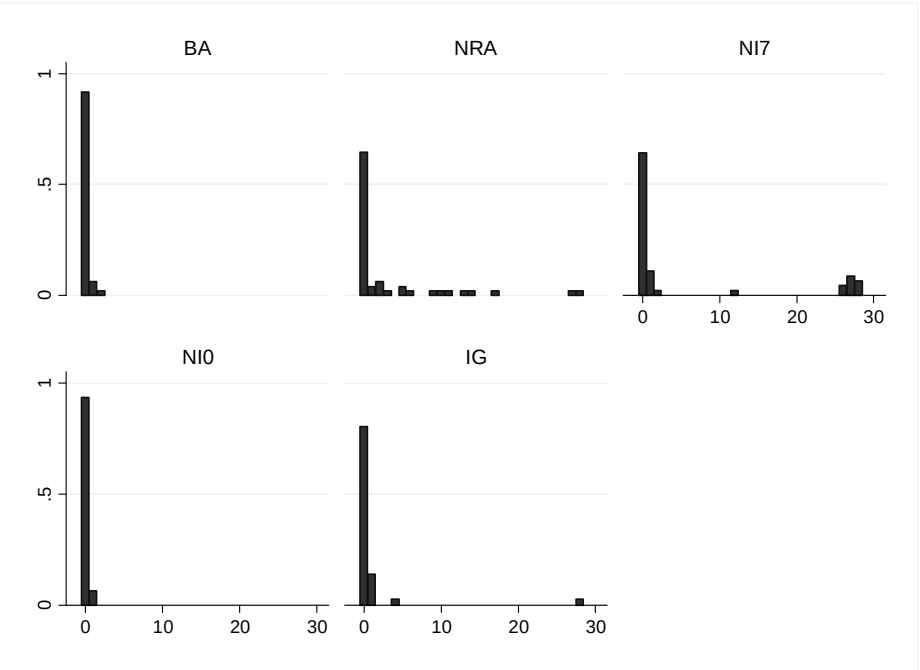


**Figure A.3** The distribution of agents' timeouts




## *B. Experimental Instructions*

*Below you find translated instructions. Original instructions were in German.*

Welcome in our experiment! Please read the instructions carefully. If you have a question, please raise your hand. We will come over to you and answer your question. Communication with other participants is not allowed. If you break this rule, we will have to exclude you from the experiment and you will not receive any payment.

Every participant will receive 2.50 Euros for attending, which will be paid out independently of the decisions made in the experiment.

Furthermore, you can get additional payoffs in this experiment. How it works is described more precisely below. In the experiment, experimental currency units (ECU) are used. The payoff in ECU will be converted into euros and paid in cash. The exchange ratio is:

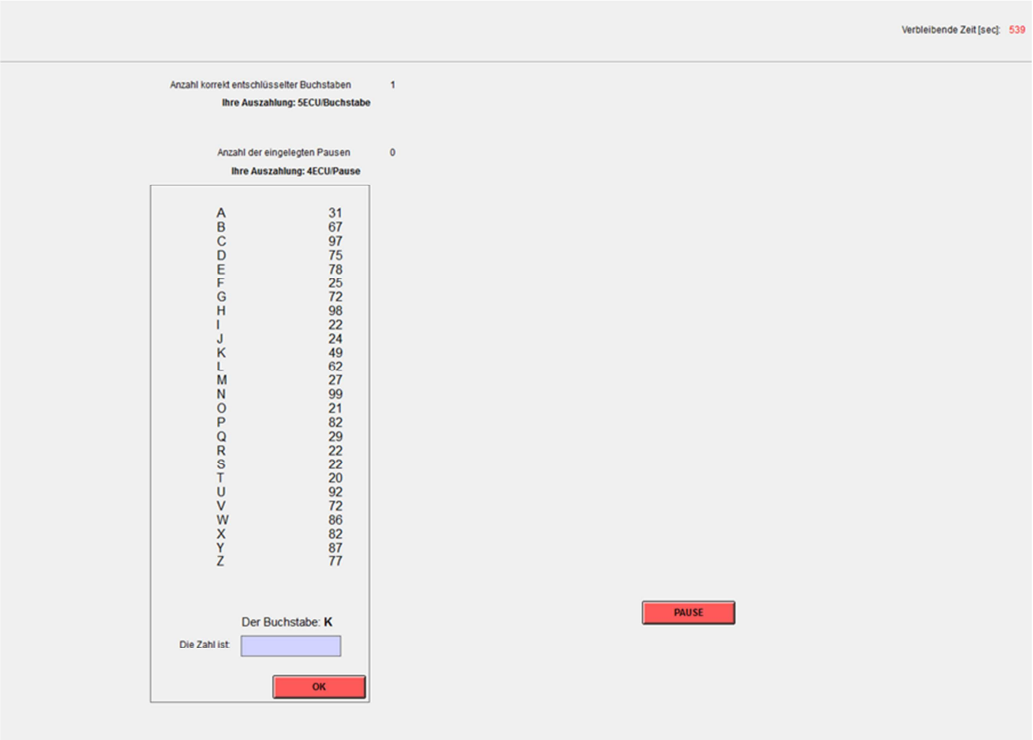
**100 ECU=1 Euro**

Neither during the experiment, nor after the experiment will any of the participants be informed about the identity of other participants or about their payoffs.

All participants received the same instructions.

**The task:**

A table with two columns (one column with letters and one column with numbers) will appear on your computer screen. The table looks like the following screen-shot:




Your task is to decode the letter, which is denoted in the table. In order to decode the letter, please find the number which corresponds to the letter. In the example displayed above letter “K” has to be decoded. From the table it follows that the corresponding number is “49” (the number is placed in the same row as the letter “K”). Therefore, you should enter number “49” in the blue field and press OK-button.

If you have decoded the letter correctly, a new input mask with a new table appears. Now, you can decode a new letter. If you made a mistake while decoding the letter, an error message will appear. In that case, please correct the input and press the OK-button.

There is also a Pause-button displayed on the computer screen. If you press the Pause-button, your computer screen will be frozen for 20 seconds. During this time, you will be unable to decode letters. Please note that no pauses can be takes within the last 20 seconds of the task.

***Procedure and payoffs:***

The experiment consists of two stages:

***Stage 1: Trial period.*** Before the actual experiment starts, you have an opportunity to practice the task. The trial period will last 90 seconds and you will receive 5 ECU for every letter which was decoded correctly. The remaining time will be displayed on the screen.

In the trial period, the Pause-button will not be displayed.

| Your payoff in Stage 1 = 5 ECU * number of correctly decoded letters |
|---|

***Stage 2: Main part of the experiment.*** In this stage, you have 10 minutes for the task. The remaining time will be displayed on the screen.

*[Treatment BA]*

For every correctly decoded letter you will receive 5 ECU.

If you press the Pause-button, the screen will be frozen for 20 seconds. For every pause you take, you receive 4 ECU.

The payoff in Stage 2 is:

| Your payoff in Stage 2 = 5 ECU * number of correctly decoded letters +<br>4 ECU * number of pauses |
|---|

If you have any questions, please raise your hand.

*[Treatment NRA]*

In the main part of the experiment, your effort increases not only your payoff but also the donation to National Rifle Association (NRA). The National Rifle Association is a gun lobbying organization in the USA, which fights for the right to all the USA citizens to be able to buy, own, carry, pass on and use a gun. The USA is one of the countries with the highest death rates caused by firearms.

2 weeks ago, we ran a questionnaire about the image of the National Rifle Association at the campus of the University of Cologne. 93% of the subjects perceive NRA negatively.

For every correctly decoded letter you will receive 5 ECU. Additionally, for every correctly decoded letter, 7 ECU will be transferred to the "National Rifle Association".

If you press the Pause-button, the screen will be frozen for 20 seconds. For every pause you take, you receive 4 ECU.

Your payoff and the payoff of NRA are:

| |
|---|
| Your payoff in Stage 2 = 5 ECU * number of correctly decoded letters + 4 ECU * number of pauses |
| Your contribution to NRA = 7 ECU * number of correctly decoded letters |

Subsequently to the experiment, the contributions of all the participants will be added up and transferred to "National Rifle Association". We will transfer the money after the experiment. You can give us your email address and we will send you the proof of the donation.

If you have any questions, please raise your hand.

*[Treatments SI and UN]*

In the main part of the experiment, your effort may increase not only your payoff but also the donation to National Rifle

Association (NRA). The National Rifle Association is a gun lobbying organization in the USA, which fights for the right to all the USA citizens to be able to buy, own, carry, pass on and use a gun. The USA is one of the countries with the highest death rates caused by firearms. 2 weeks ago, we ran a questionnaire about the image of the National Rifle Association at the campus of the University of Cologne. 93% of the subjects perceive NRA negatively.

For every correctly decoded letter you will receive 5 ECU. Additionally, for every correctly decoded letter, 0 ECU or 7 ECU will be transferred to the "National Rifle Association". Whether 0 ECU or 7 ECU will be transferred to NRA for every correctly decoded letter was decided by a flip of a coin before this experiment. The probability that the payment to NRA is 0 ECU or 7 ECU is in both cases 50%.

If you press the Pause-button, the screen will be frozen for 20 seconds. For every pause you take, you receive 4 ECU.

Your payoff and the payoff of NRA are:

| |
|---|
| Your payoff in Stage 2 = 5 ECU * number of correctly decoded letters + 4 ECU * number of pauses |
| With 50% probability your contribution to NRA = 0 ECU * number of correctly decoded letters |
| With 50% probability your contribution to NRA = 7 ECU * number of correctly decoded letters |

*[This paragraph only in the SI treatment]* Before the main part of the experiment begins, you can decide if you want to find out whether NRA gets 0 ECU or 7 ECU for every correctly decoded letter. You find it out, if you press Yes-button. If you do not want to find out about the contribution to NRA, press "No".

Subsequently to the experiment, the contributions of all the participants will be added up and transferred to “National Rifle Association“. We will transfer the money after the experiment. You can give us your email address and we will send you the proof of the donation.
If you have any questions, please raise your hand.