NORGES HANDELSHØYSKOLE

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What makes people refuse to lie?

Understanding pure lie aversion

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Abstract

In this paper, I examine pure lie aversion in a controlled experiment. When both the liar and the person that is being lied to benefits from the lie, why do some people still refuse to lie? I use treatments to capture pure lie aversion and examine the role of context, content and the effect when using intuition. Pure lie aversion is presumably present in all lies, which means my findings may be applicable to a wide range of real-world settings.

Keywords: Pareto white lies, pure lie aversion, social preferences, experiment

Preface

This thesis is the result of about half a year's worth of work on a dataset collected from an experiment conducted at NHH. A lot of the work is perhaps not visible in the final draft, but I feel confident that the important patterns in the data have been uncovered, and I hope, presented in a coherent manner.

During the writing of this thesis, it has been my goal to make it accessible and easy to read without simplifying the content. I hope you enjoy reading it.

Acknowledgements

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Any mistakes herein are entirely my own.

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1 Introduction

1.1 Motivation

"Everybody lies." – Gregory House – House MD (Shore, 2004, ep. 101)

Communication in today's society is vital. In order to communicate effectively, knowing who one can believe and who one should mistrust is important. It is therefore useful to know who might have a propensity to tell the truth. Although lies are commonly told (DePaulo et al., 1996), it is not always clear what makes people lie. And inversely, it is not always clear what makes people abstain from lying. In order to get a clearer picture of why people make the decision to lie or not, I have looked at pure lie aversion in a controlled experiment.

Pure lie aversion is a person's innate reluctance to lie, when there are no incentives to promote truth-telling. If one abstains from lying in situations where everyone benefits from the lie, one clearly demonstrates one's pure lie aversion. In other situations, there might be something to lose from lying, which makes it more difficult to measure why a person did or did not lie. I assume the pure lie aversion may still be present in such lies, but it is more complex to try to extract and measure them, and that makes them less suitable for measuring pure lie aversion.

There can be many reasons why people abstain from lying. Some emphasize the normative notion of telling the truth. Others are more concerned with the morals of their actions, as opposed to the outcome of their actions. A better understanding of these mind-sets can give us a better basis for decision-making.

The mutual beneficial lie is labeled Pareto white lie by Erat & Gneezy (2011). If you are not willing to tell a Pareto white lie, you must have a reason separate from any consequentialist reward, like money. The word consequentialism means "the view that the value of an action derives solely from the value of its consequences" (The American Heritage Dictionary of the English Language, 4th ed., 2000).

The application of this lie-aversion can be found in many areas. Should a government in crisis lie about how bad its financial situation is, knowing that its reports will set the tone for the economy? In such a situation, it may be beneficial for everyone if the government describe reality through rose-tinted glasses, as this may shape the reality that follows in a positive way. Or consider the supervisor giving performance feedback to an employee (Erat & Gneezy, 2011). Knowing that harsh, but truthful criticism may lower the employee's future performance; does the supervisor lie in his feedback?

I seek to increase the knowledge on how people act in these situations. By putting participants in a setting where they can tell a Pareto white lie, I hope to gain more insight on how they make this decision. In addition, we (the experimenters) have tried to affect people subtly before they make the decision to lie or not. It is to my knowledge the first time anyone has done this in regards to Pareto white lies, and it will be interesting to see how the different dimensions affect the participants.

Erat & Gneezy (2011) present a model for defining different types of lies. They define white lies as lies that benefit the person(s) lied to. Thus it often has a paternalistic flair, where the liar "knows best" and means to do what's best for the other party. This type of lie is typically told more often in a close relationship where the liar sides with the person to whom he or she lies (DePaulo & Kashy, 1998).

One might think of the situation where the wife asks the husband "Do these jeans make me look fat?" Even if the husband does think the jeans make his wife rounder, many men would probably tell a white lie in this situation. Such white lies are told to spare the other person's feelings, and create a stronger bond between the liar and the person being lied to (DePaulo & Kashy, 1998).

This experiment has used some of the same methods as Erat & Gneezy (2011), but extended it into several treatments. The treatments used different priming on the participants to see what, if anything, affected their lying. These dimensions are non-economical in nature, which allows us to change only the setting of the decision, not the payment. This means we can change only one variable across the treatments, which strengthens the robustness of the results.

The dimensions that we looked at are market-, intuition- and personal dimensions. My expectation is that the control treatment (from now on called the neutral treatment) will

closely resemble the findings of Erat & Gneezy's Pareto white lie treatment (2011). I expect the market treatment to increase the lying compared to the neutral treatment, and the intuition and personal treatments to decrease lying.

I will be looking into two potential reasons for differences in lying:

1. *The differences stem from the treatment effects.*
2. *The differences stem from personal properties.*

The treatment effects will be discussed thoroughly in the Experiment Design-section. Personal properties are for example sex, IQ and personality, which are registered during the experiment. It could be that the differences in lying come from both, none or one of these reasons, and I will be looking closer at this in the Summary of Findings-section.

1.2 Main Findings

The main findings show that there are no large effects to be found from personal properties. Men do not lie more than women in general, high IQ does not mean that one is more prone to lying, etc. As for the treatment effects, they have a big impact for women in some of the treatments. The women in the experiment lie about twice as much in a market setting, compared to a personal setting. For men, the lying does not vary significantly across treatments. There is a significant portion of the participants who refuse to lie regardless of the payoff. These findings are consistent with previous findings that establish a pure lie aversion independent of social preferences for outcome (Erat & Gneezy, 2011). It also supports previous research which finds that money depersonalizes participants (Vohs, Mead, & Goode, 2006).

2 Literature Review

Erat & Gneezy's paper (2011) has been important for my experiment. They define white lies as beneficial for the person that is being lied to. Those white lies that help both the liar and the person being lied to are called Pareto white lies, while those lies that help the person being lied to at the expense of the person telling the lie are called Altruistic white lies. A lie that negatively affects the other part is defined as a black lie and can be either beneficial for the liar or not. Based on these four types of lies, Erat & Gneezy make the framework depicted in Figure 1.

Erat & Gneezy (2011) find that in a Pareto white lie situation, 35% of the participants in their experiment choose not to lie. The rationale behind refusing to lie in a Pareto white lie treatment is that it incurs a "moral cost" to lie, which is more costly than the monetary payment one receives from lying. If a person strongly believes it is wrong to lie no matter what, their moral cost can be indefinitely high.

Figure 1 Taxonomy of Lies Based on Change in Payoffs

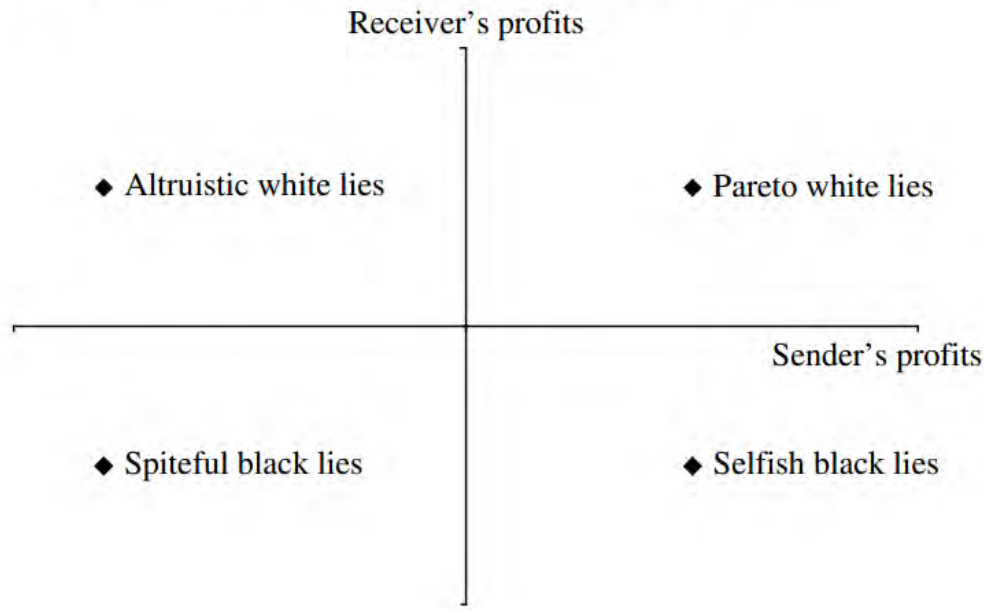

Figure 1 shows Erat & Gneezy's (2011) taxonomy of lies based on change in payoff. They look at four different dimensions, while I will be looking more closely at Pareto white lies.

The Pareto white lie treatment is only one of Erat & Gneezy's treatments. In the altruistic white lie treatment, the participant takes a small cost in order to increase the other participant's payment by a lot more if they lie. Here, 33% choose to lie, indicating a form of self-sacrifice for the greater good. Erat & Gneezy (2011) also find that women are more considerate of the other part's payoff, and also more likely to tell an altruistic lie. As they find large differences between men and women, I will also be looking closely at the male/female differences in my experiment.

An important difference between this thesis and Erat & Gneezy's paper is what was changed in the treatments. Erat & Gneezy changes the economic incentives, which affects the consequences of lying. They then look at how this change affected the participants' choices. Perhaps unsurprisingly, participants lied more when they received more money for lying. In this thesis, non-economical dimensions are changed in the treatments. I will be looking at how context, content and intuition play a role in decision-making. The context is divided into two settings; market and non-market while content is divided into personal and non-personal.

The first dimension that will be examined is context. To exemplify context differences, this treatment will focus on a market setting with buying and selling. An article that is interesting because of its relevance to this treatment is Vohs, Mead & Goode (2006), which looks at the psychological impact money has. Specifically, it looks at how money can change people's motivation and behavior. They find that participants primed with money isolate themselves, use longer time before asking for help, and are less likely to help others. They also preferred to play and work alone, and put more physical distance between themselves and others.

It is intriguing how seemingly insignificant differences made huge impacts in their experiments. In one instance, they had a poster of money on the wall. In another, they had money as the screen-saver on a computer. The control groups of these treatments had a different poster and a different screen-saver, and this small change made significant differences in the output that was measured afterwards.

In the market treatment of this experiment, people were asked to write about a situation where they benefited from buying or selling a good or a service. Assuming priming with money leads to more isolation, participants primed with this stimulus should be less attached to the person they are paired with. With less attachment, I believe they were more prone to

maximize their own payoff. As a result, I expected this treatment to show the highest percentage of liars.

The second dimension examined in the experiment is the role of intuition in pure lie aversion. An article of Rand, Greene & Nowak (in prep) is relevant to this. It explores whether humans inherently are altruistic, or if altruism is learned as part of our education and upbringing. They used a public goods game where each participant chooses how much they would like to contribute to a common pool. When all participants had chosen whether to contribute or not, they were paid evenly from the common pool. Usually there is a multiplier before the re-distribution, to make contributions profitable. If everyone contributes, everyone will be better off. At the individual level, it is better to be a free-rider and not contribute while still getting paid from the common pool everyone else contributed to.

They found that participants who decide faster give more to the common pool, while participants that use a longer time decide to give less. If they force the participants to decide quickly or slowly, they contribute more and less, respectively. Rand, Greene & Nowak (in prep) argue that this means intuitive processes, where one does not have a lot of time to think, support cooperation. On the other hand, it could be that the increased focus on intuition makes the participants more likely to take the cost associated with telling the truth. It is not clear how many will lie here, and this will be discussed further in the Experiment Design-section.

In contrast with Rand, Greene & Nowak (in prep), this experiment did not measure how long the participants used to make a decision. Our fear was that this would have induced more mistakes. From observing the experiment, it was clear that several participants spent a considerable amount of time to properly understand what they were supposed to do. Pressuring them even more might have led to more mistakes.

The last treatment looks at how the content of the lie influences pure lie aversion. DePaulo & Kashy (1998) look into how much people lie in close versus less close relationships. In general, they find that people lie less to those whom they have a close relationship with. This could be because people fear that their lies are more likely to be discovered by someone who knows them, but it can also be that you wish to lie less to people who are closer to you.

Chakravarty, Ma & Maximino (2011) look at a sender-receiver game, similar to mine. Their primary interest is to see if the bond to a friend versus the bond to a stranger affects lying.

They find that “a friendship tie seems to increase the moral cost of lying and strengthen the individual’s preferences for telling the truth” (p. 30). If the friendship tie is anything like a closeness tie bound by sharing personal information, my results should be similar, meaning there should be a lower percentage of lies in the personal treatment.

Another finding of Chakravarty, Ma & Maximino (2011) is that more pro-social individuals are less likely to lie. Erat & Gneezy (2011) find that women are more pro-social than men because they are more willing to decrease their payment to increase the other participant’s payment (Altruistic white lie, Figure 1). DePaulo, Epstein and Wyer (as cited in DePaulo, Kashy, Kirkendol, Wyer & Epstein, 1996) suggest that women tell more lies intended to benefit other people. Based on this information, it will be interesting to see if women are less likely to lie in general or at least in the personal treatment.

3 Data Collection

The experiment was conducted in a building adjacent to the student dormitories, a five minute walk from the Norwegian School of Economics (NHH). This is a well-known building to NHH students, and it is easily accessible. All desks, chairs and dividers were set up the day before. On the day of the experiment, all computers and their power supplies were set up.

The participants were recruited among first year students at NHH. Participation was voluntary.

In terms of compensation, there was both attendance compensation and participation compensation. For those who did not show up in time for the experiment, there was no compensation. In the event that we had to turn participants away, they would get just the attendance compensation.

The leader of the experiment was situated in one end of the room, and used a microphone to ensure that all participants were able to hear her. At the beginning of the experiment, the leader explained the experiment. This included ensuring the anonymity of all participants and information about the rules for the experiment.

To ensure anonymity double-blind treatments were utilized in the experiment. This means that neither the participants nor the experimenters knew who was in which trial, and the experimenters did not know about the choices of the participants.

The payments were prepared in a separate room by a separate set of experiment assistants. When they were done preparing the payments, the experiment assistants who were attending to the participants came to pick up the payments, carried it outside, and gave them to the participants after they had finished the experiment. All participants were given payment codes that corresponded to their prepared payment. By making some experiment assistants prepare the payments and a different set of experiment assistants hand out the payments, no experiment assistants knew who received which payment.

After the experiment the participants were asked to fill out an IQ-test (which was not explicitly described to them as an IQ-test). The participants were also asked to fill out a Big Five personality test, a model commonly used to understand the relationship between personality and behavior (Poropat, 2009). It was made clear to the participants that the results of these tests would not affect their payment in any way.

Finally, after registering a few details about themselves (age, sex etc.), the participants were free to collect their payment and leave.

4 Experiment Design

In the experiment, pairs of anonymous senders and receivers were formed, and the sender was informed of the result of a dice roll. The sender was then presented with the payment-matrix in Table 1. Only the sender received this information, and both parties were made aware of this fact. The sender then had to choose one of six messages to send to the receiver. Each message said that “x” was the outcome of the dice roll, where x was one through six. The only information the receiver got regarding the dice roll was the message from the sender. Based on the message from the sender, the receiver had to decide which number he wanted to choose as the outcome of the dice roll; from one to six.

Table 1 Payment Matrix

Receiver chooses the same number as the dice-roll	Receiver choose a different number from the dice-roll
(20 , 20)	(30 , 30)

Table 1 shows the payment matrix for the sender and the receiver. If the sender told the truth and the receiver chose the reported number, they both received 20 NOK each. If the sender lied and the receiver chose the reported number, both received 30 NOK.

It is the choice of the receiver that decides the payment to both participants. If the sender lies and the receiver chooses the reported number, both parties get a higher payment (c, Table 2). If the sender tells the truth and the reported number is chosen, both receive a lower payment (a). Should the receiver choose something other than the reported number when the sender tells the truth, they both receive the higher payment (b). In the case where the sender lies and the receiver does not choose the reported number, it is most likely they will randomly receive a higher payment (d). Of course, only the sender knew all this. The receiver did not get any information about the payment matrix.

Table 2 Payment Dependent on Participants' Choices

		Receiver	
		Choose the reported number	*Does not choose the reported number*
Sender	*Tells the truth*	*a) (20 , 20)*	*b) (5/5)*(30 , 30)*
	Lies	*c) (30 , 30)*	*d) (4/5)*(30 , 30) + (1/5)*(20 , 20)*

Table 2 shows the expected payment, depending on whether the sender lies and whether the receiver chooses the reported number. Only the sender has this information. Both participants receive 20 NOK in the lower payment, and 30 NOK in the higher payment (about 3.5 USD and 5.3 USD respectively at the time of writing). In addition, there was a small fee for the receiver to defect from the sender's message of 2 NOK (or 0.35 USD).

The receiver did not know about the different payments, only about his own fee for defecting, which was 2 NOK. With this fee in place, the receiver could only reduce, not increase his payment. It could be that his defection could possibly earn him more money in sum, but he knew for certain that it would cost him to defect. Therefore the rational choice is to choose the reported number in order to avoid the fee.

The expected outcome was for the receivers to choose the reported number in the majority of cases, as they have nothing else to base their decision on. There may be some receivers who choose a different number, as they think the senders are trying to deceive them for some reason.

Erat & Gneezy (2011, p. 3) discuss "sophisticated deception". If the sender thinks the receiver will not choose the reported number in the message, the sender may try to trick him by telling a lie in order for him to pick the true outcome and vica versa. This is probably not likely for several reasons. Firstly, the cost connected to defecting will push the receivers towards choosing the reported number. Secondly, even if the sender believes the receiver needs to be deceived, it is more likely that the receiver will miss the sender's intended outcome. In the case where the sender wants the receiver to be deceived into choosing the real outcome, the odds are 1 in 5.

If the sender wants to trick the receiver to choose anything other than the actual outcome, he has to tell the receiver the real outcome. This is also a risky proposition, or at least one where the sender has to be absolutely sure the receiver will deceive him. Thus, it is not likely that many receivers will choose something other than what they were told from the sender. Sophisticated deception will not be discussed further, and I will assume the senders will expect the receivers to follow their message.

So far, the experiment is similar to Erat & Gneezy's (2011) Pareto white lie treatment. However, while they manipulated the payment matrix across their treatments, we changed non-economic variables, while keeping the payment matrix identical. The participants are divided into four treatments, the control group and the three treatment groups. The first treatment is the neutral treatment, the second is the market treatment, the third is the intuition treatment and the fourth is the personal treatment.

There are several factors that play into the sender's decision. I assume everyone wants to maximize their payoff. Likewise, I assume participants want to increase the other party's

payoff as well. In this experiment these two factors will always pull in the same direction, as they both get the same payment. Additionally, the sender has to consider his cost of lying. For some, it may be negligible, but for others, it may be very high. These considerations must be weighed against each other to decide if the participant wants to lie or not.

One also has to consider the treatment effects on the cost of lying. I expect more participants in the personal treatment to assume a higher cost of lying than for the market treatment, for instance. Consequently, I expect to see more participants lie in the market treatment than in the personal treatment.

One of the biggest strengths of the experimental design is that one can compare groups where ideally only one variable is different, and see how this single change affects the outcome. If there are significant differences in the output of the participants, the only logical reason for the difference would be in the induced change; the different treatment groups (from here on referred to as "treatments"). For this reason we (the experimenters) have tried to make the treatments as similar as possible. The variable that changed over the different treatments was the topic of a text the participants were asked to write, with one exception in the personal treatment, which will be explained later.

There were four treatments, all consisted of both senders and receivers. However, there were four senders for every receiver, which meant that each receiver responded to four different senders. In order to decouple the sender and receiver roles, no participants were given both roles. All receivers were given the neutral topic in their priming, just like the neutral treatment. They did not get to make a decision on whether to lie or not, but were to respond to the senders instead.

When I use the term priming, I will be referring to Kolb & Whisaw's (2003) definition: "Priming in psychology occurs when an earlier stimulus influences response to a later stimulus." We tried to change the proportion of those senders who chose to lie by varying the topic of a text the participants were asked to write. Each participant had five minutes to write their texts, and the topic of the texts was different across the treatments.

4.1 Neutral Treatment

In the first treatment, the participants were asked to write a text about how it is to live in Bergen. This was chosen as the benchmark; the neutral treatment. As all participants were living in Bergen, it should affect the participants similarly. After they had written the text, they got the choice of whether to lie or not.

It might seem strange to give the benchmark treatment a topic to write about at all, but this was done in order for the treatments to be as similar as possible. If this was not done, it could be the writing and the cognitive activity it entails that affected the participants in the different treatments, which makes the control group poorly suited as a benchmark.

4.2 Market Treatment

In the second treatment the participants were asked to describe a situation where they benefited from buying or selling a good or a service. This was intended to make the participants more sensitive to the market context.

Vohs, Mead & Goode (2006) show that participants primed with money are more independent and less likely to volunteer to help others. In light of this, I expect the participants in this market treatment to care more about themselves, and lie in order to get a higher payment.

4.3 Intuition Treatment

The third treatment was based on intuition. The participants were asked to write about a situation where they benefitted from trusting their intuition.

The findings of Rand, Greene & Nowak (in prep) show how participants who make intuitive choices are more likely to cooperate. Cooperation in their experiment happens by incurring a personal cost in order to benefit others. Similarly, I would expect more of the participants in

this experiment to be willing to incur the cost of telling the truth – by receiving a lower payment. If the participants believe this is the right thing to do, they will be more willing to incur the cost of doing what is right in this treatment.

There are several aspects that could affect the decision. Some have social preferences for outcome, which means they want the higher payment. This would entice them to lie. Additionally, if they care about the outcome of the receiver they would like to maximize this as well. Again, such a notion would pull them towards lying more.

However, if the participants are not consequentialists, they would perhaps avoid lying because they think it's wrong. If they do think lying is wrong, a priming of their intuition would then make them less likely to lie.

Kahneman (2011) writes about intuitive mental short-cuts called heuristics. He writes "..when faced with a difficult question, we often answer an easier one instead, usually without noticing the substitution" (p. 12). In the complex situation the participants were in, it is possible that they answered the simpler question "is it ok to lie?" If the participants in the intuition treatment were more likely to rely on heuristics, it could make them lie less.

4.4 Personal Treatment

The fourth treatment emphasizes on the content of the lie, specifically the attachment from a randomly generated personal history. This is the only treatment where more than one variable was changed. The senders were told the outcome of the dice roll *before* they wrote their text. The senders in the personal treatment were the only ones who knew the outcome at this stage in the experiment. They were then asked to write a text about situations that were related to the number the dice rolled.

The priming effect in itself is not meant to evoke any particular emotions in this treatment, it is meant to be neutral. The reason we asked the participants to write about a number was to give the participants a randomly assigned personal history. This was chosen instead of personal information, like aesthetic characteristics, because such information could potentially identify the sender to the other participants and to us experimenters. The senders

in this treatment sent a message saying "The outcome from the roll of the 6-sided die *and the number I've written a text on* was X" where X could be any number between one and six.

When the sender now decided whether or not to lie, he suddenly had something personal at stake; he had invested time into this number. This is the effect we wanted to measure in this treatment.

The senders' message also reflected the personal involvement by emphasizing that they had written about the number. It will be interesting to see if the slightly modified message from the senders in this treatment affects the rate of receivers who chooses the reported number.

I expect the cost incurred for lying about something personal is higher than for other topics, and that this yields lower proportion of lies in the personal treatment.

This expectation is supported by DePaulo & Kashy (1998) and Chakravaty, Ma & Maximiano (2011), who find that participants lie less to people to whom they feel closer, because of a greater feeling of discomfort when lying to them. If the more personal lie in this treatment really is conceived as personal, it is expected that the participants will tell fewer lies in this treatment.

5 Analysis

5.1 Descriptive Statistics

186 students participated in the experiment. See table 3 for averages of Sex, Age, Score on the IQ-test, Study Program, proportions of liars and receivers who chose the reported number. Age, Sex, IQ-score and Study Program all seem to be similarly distributed across the treatments, as it should be for randomly selected participants.

Table 3 Descriptive Statistics

	Neutral treatment	Market treatment	Intuition treatment	Personal treatment
Age	20.944	20.600	20.778	20.622
Sex (1=male, 2=female)	1.500	1.457	1.444	1.405
Points on the IQ-test (out of 26 possible)	21.972	21.971	21.639	22.459
Study Program	1.028	1.029	1.000	1.000
Decides to lie	0.722	0.829	0.639	0.568
Chose the reported number	0.750	0.600	0.889	0.892
Number of senders	36	35	36	37

Table 3 shows descriptive statistics of participants over treatments. Age is in average years. The average of the sex is denoted in a number between 1 and 2, where 1 is only males and 2 is only females. The score on the IQ-test is measured in how many correct tasks the participants answered. Study Program is 1 if the participant is a bachelor student, 2 if the participant is a master student. Both senders' lies and receivers who chose the reported number are in percent factors. The total number of senders is 144. The difference between the total of 186 and the number of senders is because of the 42 receivers. The receivers are part of the treatments, but as each receiver responded to four senders, they cannot easily be incorporated into this descriptive table.

Many of the numbers in Table 3 are as expected; the participants are just over the age of 20 in average, almost perfectly divided between the genders and almost everyone is in the bachelor program. The average score on the IQ-test was relatively high, as one might expect from participants who attend NHH. The test was of the WAIS-IV type (Wechsler, 2008).

Next is a set of three figures that show the share of participants who lied divided by treatment. The first interesting finding is the proportion of liars in the neutral treatment, Figure 2. The proportion is 72%, which is close to the findings of Erat and Gneezy (2011, p. 3) who find a proportion of 65%. As the experiments are similar, and it is encouraging to see that the results are similar as well.

The average of lies in the market and intuition treatments are about as expected. There is an increase in proportion of liars in the market treatment, just like expected from the evidence found in Vohs, Mead & Goode (2006). The impact is slightly larger for women, but not significantly so.

The most interesting results are from the personal treatment. For men, the proportion of liars is a little lower than in the neutral treatment, at 68% compared to 72%. This is counter to my

expectations. It could be that men did not consider the priming as personal, or that there is something else that the design of the experiment cannot explain.

For women, the result is drastically different; only 40% lie. That is less than half of the women's market treatment, and almost half of the men in the same treatment. This result indicates that women have a much stronger aversion to lying when it comes to personal subjects than men do.

In Figure 2 the share of participants who lied is sorted by treatments. In the neutral treatment, 72% of the participants lied. This will act as the baseline which the other treatments are measured against. For the market treatment, the proportion of liars is higher, at about 83%. The intuition and personal treatments are lower, at 64% and 57% respectively. These results seem to correspond with the expectations, showing a large discrepancy between the market and personal treatment especially.

Figure 2 Share of Participants Who Lied

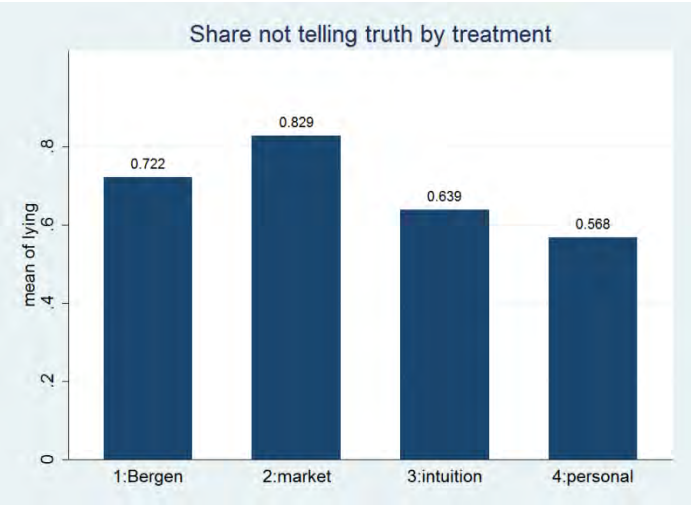

Figure 2 shows the share of participants who were not telling the truth. The receivers do not get the option of telling a lie, and are naturally not included in these graphs. The figure shows the expected tendency; that the market treatment has the most liars and the personal treatment has the fewest.

Figure 3 Share of Men Who Lied

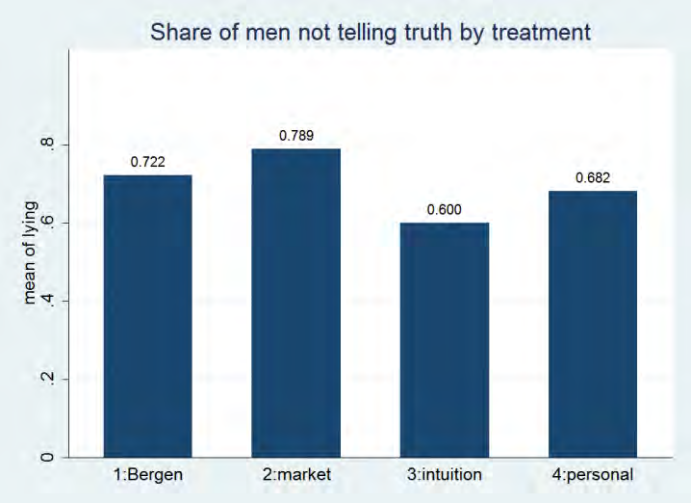

Figure 3 shows the share of men who lied. It seems that except for the personal treatment, the pattern is similar to that of all participants.

Figure 4 Share of Women Who Lied

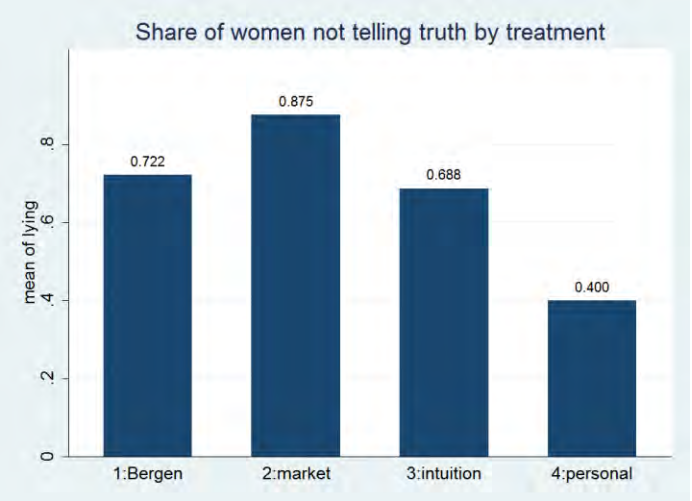

Figure 4 shows the share of women who lied. The intuition treatment is almost at the same level as the neutral treatment. However, the market and personal treatments are more extreme than what is found for all participants. The personal treatment has less than half the liars compared to the market treatment.

In addition to the distribution for all participants, the distribution for each gender can be seen in Figure 3 and 4. The proportion of women who tell lies is a little higher than for men in the market and intuition treatment.

The results for men are a little puzzling when comparing them to women and the combined results. The largest difference is that men lie about as much in the personal treatment as in the neutral treatment. In sum, men lie approximately the same in all treatments. There doesn't seem to be many differences between the sexes apart from the response in the personal treatment.

In order to see if the observed differences for all participants are statistically significant, two-tailed t-tests with the null hypothesis that "column" is equal to "row" were conducted. The significance tests are presented in Table 4.

Table 4 Significance of the Differences Between the Treatments

Significance all	Treatment 1	Treatment 2	Treatment 3	Treatment 4
Treatment 1	-	0.2903	0.4554	0.1723
Treatment 2	-	-	0.0728*	0.0159**
Treatment 3	-	-	-	0.5401
Treatment 4	-	-	-	-

** p<0.10, ** p<0.05, *** p<0.01.*

Table 4 shows significant differences in means for the participants. Numbers are p-values for two-tailed t-tests (which compares means) of whether row is equal to column. A number higher than 0.1 is not considered sufficient to reject the null hypothesis; that the two means are equal. A number lower than 0.1 indicates that one can reject the null hypothesis and be confident that the means are different, and that this is more than a mere coincidence. The market treatment is significantly different from the intuition and the personal treatment.

The market treatment is significantly different from the intuition treatment on a 10%-level and from the personal treatment on a 5%-level. This is hardly surprising, considering the difference seen in Figure 2. It does, however, mean that no treatment was significantly different from the neutral treatment when using the "strict" two-tailed t-test. However, it was necessary to use it here, because it was not obvious if treatment 3 or 4 had fewer liars for instance. A two-tailed t-test can check for this.

The Treatment Effects

In order to evaluate the different treatments' dimensions on the sender's decision, hypotheses are created to reject or fail to reject that there are differences between the treatments, and that they go in the direction that is expected. The hypotheses are as follows:

H0: No differences in lying between the treatments.

H1: There are more lies in the market treatment.

H2: There are fewer lies in the intuition treatment.

H3: There are fewer lies in the personal treatment.

To test these hypotheses, one-tailed t-test were used to see if the differences are significant. Two-tailed t-tests were also used in order to make sure that the results do not go in the opposite direction than expected. These are not shown, as they have already been reported in Table 4. None of the treatment effects go in the opposite direction of what was expected, and one-tailed t-tests are therefore suitable. Naturally, there is no test for the neutral treatment as it is the benchmark for the other treatments.

Market Treatment

In the market treatment, increased lying is expected. The hypotheses are:

H0: There are no differences between the neutral- and market treatment.
H1: There are more lies in the market treatment.

The one-tailed p-value is 0.1451, and the null hypothesis cannot be rejected. This means there is no statistical backing for saying that there is a difference between the neutral and the market treatment. If there were more observations, it could make the differences significant but with the present sample this is not the case.

Intuition Treatment

In this treatment it was expected that the participants would lie less than in the neutral treatment.

H0: There are no differences between the neutral- and intuition treatment.
H2: There are fewer lies in the intuition treatment.

The p-value from the one-tailed t-test is 0.2277 and there is nothing that indicates the two treatments are different. The null hypothesis still stands.

Personal Treatment

Fewer lies was expected in this treatment:

H0: There are no differences between the neutral- and personal treatment.
H3: There are fewer lies in the personal treatment.

The p-value from the one-tailed t-test is 0.0862, which means the result is significant, and the null hypothesis can be rejected on a 10%-level. This means that if one is willing to accept the results with “just” 91% probability that the results are not random, one can say that there is a difference between the neutral and personal treatment.

Summing Up Treatment Effects

There was one significant result in the personal treatment, which went in the expected direction. The market- and intuition treatment effects were not significant, but their sign is as expected from Figure 2. It could be that the reason these effects are not significant, is because of the relatively small sample size. A larger sample would most likely give significant results. In the absence of a larger sample, one can look at the direction of the coefficients. And all the coefficients point in the expected direction, which is promising.

The Effect of Personal Properties

In Table 5, the participants are divided by those who lied, and those who chose the reported number. The majority of receivers chose the reported number, and the majority of senders decided to lie, as expected.

In the neutral-, market- and intuition treatments the message from the sender was the same, but it was slightly different in the personal treatment. In the first three treatments, the

Table 5 Proportion of Who Lied and Who Chose the Reported Number

	Did not choose the reported number	Chose the reported number
Decided to lie	0.677	0.690
	(21)	(78)
Decided to tell the truth	0.323	0.310
	(10)	(35)
Observations	31	113

Table 5 shows the percentage factors of participants divided by row that either lied or told the truth. Divided by column are those who either chose the reported number or not. The numbers in parentheses are the absolute numbers, 144 in total, which does not include the receivers, as they responded to four senders each. As predicted, most receivers chose the reported number, and most senders lied.

message from the sender was:

> *"The outcome from the roll of the 6-sided die was X."*

In the fourth treatment, the message from the sender was:

> *"The outcome from the roll of the 6-sided die and the number I've written a text on was X."*

This change had a sizable impact on the fraction of receivers that chose the reported number. The proportion who followed the instructions in treatment 4 was about 89%, compared to an average of 75% in the other treatments. This difference is significant, and shows that the personal message makes it more trustworthy.

5.2 Regression Analysis

In addition to the descriptive statistics, regressions were used to see how the various personal properties affected lying. These included gender, IQ and the Big Five personality traits; extraversion, agreeableness, openness, neuroticism and conscientiousness. IQ is measured by how many correct tasks the participants completed, out of 26 in total. Female is a dummy variable which is 1 if the participant is female and 0 if the participant is male. The Big Five variables are simply the participants' score in the Big Five factors.

Table 6 Fraction Who Chose the Reported Number - Treatments 1-3 vs. 4

	Neutral-, market- and intuition treatments average	Personal treatment average
Chose the reported number	0.748	0.892
Observations	107	37

Table 6 shows the difference in how many receivers follows the senders' message in percentage factors. The neutral-, market- and intuition treatments are averaged as their messages to the receiver are exactly the same. In the personal treatment, the senders' message is slightly changed. From the receivers' point of view, nothing else changed. Other than this variation, receivers did not receive any different information across the treatments.

When dummy variables are used, only one of the two outcomes will be used as an explanatory variable in the regression. For example is Female included, but Male is not. With Male included, the model would create a dummy variable trap (Verbeek, 2008), which would give perfect multicollinearity. Perfect multicollinearity breaches one of the underlying assumptions of the regression model, and is therefore unsuitable for the results of the model.

Table 7 Selected Personal Property Variables Regressed on Lie

	Specification 1 Lie	Specification 2 Lie	Specification 3 Lie	Specification 4 Lie
IQ	0.0124 (0.0196)			0.0103 (0.0200)
Female		-0.0193 (0.0783)		0.0204 (0.0893)
Extraversion			0.0974 (0.0680)	0.0991 (0.0688)
Agreeableness			-0.0981 (0.0912)	-0.0992 (0.0957)
Conscientiousness			-0.0507 (0.0980)	-0.0514 (0.101)
Neuroticism			-0.0457 (0.0768)	-0.0479 (0.0820)
Openness			-0.0786 (0.0832)	-0.0782 (0.0834)
Constant term	0.414 (0.434)	0.696*** (0.0521)	0.736*** (0.0829)	0.500 (0.450)
N	144	144	144	144
R^2	0.003	0.000	0.035	0.038

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7 shows four specifications on personal property-variables. The regressions were first run on IQ, then Female, then the Big Five personality traits and finally all of them together. Other than two of the constant terms, none of the explanatory variables were significant in any of the specifications.

Some of the personal property-variables were not included in the regressions. Notably absent are Age and Study Program. The treatment effects were also excluded because this table was made to measure personal properties only. Age and Study Program were excluded because they had very little variability. As such, they are poorly suited to provide explanatory power because a few observations will be responsible for the deviation from the vast majority of observations. For example, there were two out of 186 participants that were not bachelor students. It seems unreasonable that those two master students would in a meaningful way explain lying differently from the bachelor students.

In Table 7, none of the explanatory variables other than two of the constant terms were significant. The model's goodness of fit, R^2, is also rather low for all specifications, which also points towards a poorly specified model. A low goodness of fit does not necessarily mean the model should not be used, but it does mean the model cannot explain much of the observed variance. In some cases, it is very difficult to explain the observed variance, and it can then be difficult getting a high goodness of fit, regardless of the specification.

It seems IQ, gender and personal properties from the Big Five personality test cannot explain lying in to a significant degree, neither separately nor together. This could potentially be solved by having a larger sample of participants.

Although the personal properties did not show significant effects, there might be gender effects in the different treatments. To check for this, the regressions in Table 8 were used, where Lie is regressed on Female. The constant term in these specifications will be the same as the average of lying for men in the different treatments, seen in Figure 3. The female-coefficient will be the gender-effect.

In Treatment 2 and Treatment 3 the Female-coefficient is not significant. Furthermore, the models' goodness of fit, R^2, is very small as well. In Treatment 4, the goodness of fit is higher, and the coefficient for Female is significant. As suspected, there does seem to be a difference between men and women in the personal treatment, and the difference is rather large, roughly a 40% decrease in lying in the personal treatment if the participant is female.

Table 8 Females' Effect on Lie by Treatments

	Treatment 2 Lie	Treatment 3 Lie	Treatment 4 Lie
Female	0.0855	0.0875	-0.282*
	(0.129)	(0.164)	(0.165)
Constant term	0.789***	0.600***	0.682***
	(0.0963)	(0.113)	(0.102)
N	35	36	37
R^2	0.013	0.008	0.078

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8 shows three regressions with Lie as the dependent variable and Female as the independent variable. The regressions are done in the market-, intuition- and personal treatments. These specifications can shed light on any differences in lying by gender in each treatment. The only specification where Female is significant is in the personal treatment.

6 Summary of Findings

This thesis is based on an experiment which looked at Pareto white lies with priming. The priming was used to make the participants sensitive to content, context and intuition. We (the experimenters) wanted to see if and how these dimensions affected the participant's choice of whether to lie or not. The lie was of the type where both the person being lied to as well as the liar earned more when the lie was told. If the participants refused to lie in that situation, there was something other than the consequential thinking that made him tell the truth. In consequential terms, the best choice is to lie, because the consequence is that both parties earn more.

From the beginning of this thesis, two explanations for the differences in lying were proposed: Either they can stem from innate differences that are defined by personal properties, or they stem from the treatment effects. There are certainly differences between the treatments, as shown in Table 4. However, with the current sample, only the personal treatment seems to be significantly different from the neutral treatment. A larger sample would most likely help mitigate this.

There are some other treatment effects that are significant with the current sample, however; it is clear that the market treatment is different from the intuition and personal treatments. The differences between the treatment outputs are large, especially when one considers what drives the differences; a different topic on a text written before deciding to lie or not.

For women the effect of personal properties turned out to be very large in the personal treatment. The content of the lie was much more sensitive for females than males, who lied about as much in the personal treatment as in the neutral treatment. For other personal properties, there were less interesting findings, but again, sample size may have something to do with this.

Many of my findings correspond well with others'. I find about the same rate of participants who refuse to lie as Erat & Gneezy (2011) (they: 35%, we: 31.2%[1]). As predicted from Vohs, Mead & Goode (2006), our participants lied more in context of the market treatment, although not significantly so. And as predicted from DePaulo & Kashy (1998) and Chakravarty, Ma & Maximiano (2011), the female participants lied significantly less in the personal treatment.

6.1 Implications

While Erat & Gneezy (2011) looked solely at economic incentives and how changing the payment matrix affected behavior, this experiment has looked at non-economic dimensions like content, context, and the role of intuition. Money has a prominent place in the role as motivator in economic literature, but most of our communication happens without monetary incentives. Therefore the results of this experiment have potentially larger implications.

The non-economic dimensions examined here are relevant for example in situations where there is no possibility of having an enforceable contract. With no contract, how will people act and react? Knowing more about what influences the pure lie aversion can help answer

[1] Average for all senders, in all four treatments.

such questions. The non-economic influence in the treatments can give a deeper understanding for specific dimensions related to lying.

The results can be applied to monitoring and control (Erat & Gneezy, 2011, p. 7), social interactions and communication in general, behavior in a market setting, wherever there is an opportunity for Pareto white lies, or even lies in general that contain some degree of pure lie aversion. For example, pure lie aversion seems to be present only to a small degree when buying and selling. Such information is important for example when one is buying used goods, which suggest people should be careful of the quality of the product they are interested in.

Lastly, more information on this topic expands our understanding of pure lie aversion in the field of experimental economics. In order to have an alternative to traditional economic theory, research such as this is important to unravel specific details on behavior. If humans do not act as *homo economicus*, it is important to find out how we act in order to have a good alternative theory on human behavior in an economic setting.

6.2 Validity

Internal validity

In theory, only one factor is changed at a time in a controlled experiment, while ideally keeping all other factors constant. In practice, this is almost impossible in the social sciences. It is therefore a good idea to look at the potential shortcomings of the experiments, and see if there are any reasons why the results may or may not be believable.

First it is important to point out that the reason why it is so hard to change only one variable, is because there are so many elements that are out of the hands of the experimenters. Some elements cannot be controlled, like what each participant is thinking during the experiment. These types of elements are often called noise (Tamhane, 2009, p. 6).

If there is a lot of noise, it could lessen the trust we have in the results. How does one know what noise pull in which direction? There is no way of knowing. However, if it is random,

there should be noise pulling in both directions. Even more importantly, since all participants did the same actions during the experiment, there is nothing to suggest that noise factors pulled in any particular direction, according to treatment. All participants were divided into four treatments randomly. The noise that is present should therefore be uniformly distributed across the treatments, and not affect the treatment-to-treatment comparisons.

External validity

In controlled experiments, one usually would like to infer the results from a sample to the whole population. For this experiment, inference would mean to draw conclusions about the whole population from the results in the experiment. In order to do this, some strict rules need to be upheld.

One rule that this experiment might not uphold, is that of random sampling. Participants should be chosen at complete random in order to be able to run inference to the whole population. A common problem in controlled experiments is that one cannot always randomly sample participants. The students that participated in this experiment, though surely from varied backgrounds, all chose to go to NHH, and they also chose to participate in this experiment. This self-selection means that there may be some properties that the students have that are stronger than for the whole population. For example, one could imagine that students at NHH are more competitive than the average person of their age, or that people around the age of 20 are less concerned with ethics than the average person.

If there is self-selection in the sample, the inferred results for the whole population would be skewed, meaning they would not accurately describe the population. It would not be surprising if self-selection has played a part in this experiment. However, this may not be detrimental for the external validity. Just as participants are divided randomly in the treatments to make the treatment effects comparable, any skewedness caused by self-selection may influence the quantitative data (the size of the coefficients for example), but it seems unreasonable that it would affect the qualitative data (the sign of the coefficients and the relative sizes between them).

Therefore, it could be that the results from this experiment are universal. It is not difficult to imagine that the results found in this thesis are general traits for humans. Of course, to be able to ascertain this is not something that can be done in one controlled experiment, but given time and more research, it could very well be the case. Because of this, I felt it was important to include an Implications-section.

6.3 Future Research

After Erat & Gneezy (2011), there will most likely be several papers that look closer at the role of pure lie aversion, how it can be measured and how it can be affected. While we looked at three specific dimensions, there are still many others that can yield interesting results that can be beneficial for the field of experimental economics.

One practical example where this view can be used is in monitoring and control (Erat & Gneezy, 2011, p. 7), examplified with the manager who has to give feedback to an employee and who has the potential to influence the employee's future performance through his feedback. A closer look at an principal-agent setting in practice could be an interesting avenue for future research.

It will also be interesting to see if other researchers will conduct experiments similar to ours, and if they include a larger sample. There were several results in this experiment that were statistically insignificant, which can be mitigated by having a larger sample. It could be that the sizes of the coefficients are very small even if they are statistically significant. And while that may seem plausible for some of the personal properties, it seems less plausible for the treatment effects. The reason is that our experiment turned out to have large effects between some of the treatments. A larger sample might have given more insight regarding men's treatment effects as well, which could be an interesting topic for future research.

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8 Appendix

The appendix shows the screens the participants saw during the experiment. Variables are not defined in numbers, but in programming language. It should be easy enough to understand nonetheless. a1 and a2 were replaced with 20 NOK, while b1 and b2 were replaced with 30 NOK. In place of {{form.as_table}} were the six choices the senders could send to the receiver.

The following are the instructions given to the senders:

{% extends "base.html" %} {% block title %} Instructions {% endblock %} {% block content %}

Instructions

{% if personal %}

You are now randomly matched with another participant. Neither of you will know the identity of the other. The participant you are matched with will not be informed that the outcome of the die roll was {{ secret }}. However, he or she will be told that you have been informed of the outcome of the die roll.

{% else %}

You are now randomly matched with another participant. Neither of you will know the identity of the other.

The computer has rolled a 6-sided die, and obtained the outcome {{ secret }}. The participant you are matched with will not be informed that the outcome of the die roll was {{ secret }}. However, he or she will be told that you have been informed of the outcome of the die roll.

{% endif %}

We now ask you to send a message to the other participant about the outcome of the roll of the dice. There are six possible messages:

{{ form.as_table }}

(This table is only an illustration, you choose which message to send on the next screen.)

Your message will be shown to the other participant, and then he or she will be asked to choose a number between 1 and 6. The other participant's choice will determine the payments in this part of the experiment.

***A:** If he or she chooses the actual outcome of the roll of the dice, {{ secret }}, then you will receive {{ a1 }} and he or she will receive {{ a2 }}.*

***B:** If he or she chooses a number different from the actual outcome of the roll of the dice, you will receive {{ b1 }} and he or she will receive {{ b2 }}.*

Importantly, only you will be informed of the particular monetary values in A and B. However, the other participant will be told that you have been informed of the monetary values in A and B.

The other participant has been told that if he or she chooses a different number than the number in your message, his or her payment will be reduced with {{ revise }} NOK.

At the end of the experiment, you will be informed of the outcome from this part of the experiment.

Please raise your hand if you have questions.

Top of Form

Go to next page to send your message

Bottom of Form
{% endblock %}

The following instructions was given to the receivers:

{% extends "base.html" %} {% block title %} Instructions {% endblock %} {% block content %}

Instructions

{% if personal %} {% else %} {% endif %}

In this part of the experiment, you are randomly matched with another participant. Neither of you will know the identity of the other. You will face a sequence of such situations, and in each case you are matched with a new participant. The situations are completely independent, so you should focus on each of them separately.

Before starting this part of the experiment, the computer has rolled a 6-sided die for the other participant. The participant you are matched with has been told about the outcome of the roll, but we will not tell you about the outcome. {% if personal %} The participant was also told to spend five minutes describing situations that are related to the number that was the outcome of his or her roll. {% endif %}

After being informed of the roll of the die, the other participant has sent a message to you. There are six possible messages:

{{ form.as_table }}

Your task is to choose a number between 1 and 6. The message you receive is the only information you will have regarding the roll of the die. Your choice of a number will determine the payments in this situation according to two different payment schemes, A and B, known only to the other participant.

*If you choose the same number as the number that came up in the roll of the die, both of you will be paid according to the payment scheme **A**.*

*If you choose a number different than the number that came up in the roll of the die, both of you will be paid according to the payment scheme **B**.*

*Note: If you choose a **different** number than **the number in the message** of the other participant, your payment will be reduced with {{ revise }} NOK.*

Please raise your hand if you have questions.

Top of Form

Go to next page to make your first choice

Bottom of Form

{% endblock %}

The following message was given to the receiver after the sender had made their decision.

{% extends "base.html" %} {% block title %} Make your choice{% endblock %} {% block content %}

Situation {{ sitnr }}: Choose a number

In this situation, the other participant's message is:

Message: "The outcome from the roll of the 6-sided die {% if personal %} and the number I've written a text on {% endif %} was {{ message }}".

Please make your choice of number:

Top of Form

{{ form.as_table }}

Submit choice

Bottom of Form

*Note: If you choose a **different** number than **the number in the message** of the other participant, your payment will be reduced with {{ revise }} NOK.*

{% endblock %}

Below is the wording of the four different treatments.

{% extends "base.html" %} {% block content %} {% if Bergen %}

Life in Bergen

In this part of the experiment, we would first like you to spend five minutes describing how it is to live in Bergen. {% endif %} {% if intuition %}

Trusted my intuition

In this part of the experiment, we would first like you to spend five minutes describing a situation where you benefitted from trusting your intuition.

{% endif %} {% if market %}

A great trade

In this part of the experiment, we would first like you to spend five minutes describing a situation where you benefitted from buying or selling a good or a service.

{% endif %} {% if personal %}

Practical task

*In this part of the experiment, the computer has rolled a 6-sided die and obtained the outcome **{{ secret }}**. Please spend five minutes describing situations that are related to the number {{ secret }}.*

{% endif %}

Please work carefully and continuously on the text. After five minutes, your text will automatically be submitted and you will be taken to the next screen.

Top of Form

{{ form.as_table }}

Bottom of Form

{% endblock %}