Discussion Papers
Department of Economics
University of Copenhagen

No. 13-09

Deciding for Others Reduces Loss Aversion*

Ola Andersson, Håkan J. Holm, Jean-Robert Tyran & Erik Wengström

Øster Farimagsgade 5, Building 26, DK-1353 Copenhagen K., Denmark
Tel.: +45 35 32 30 01 – Fax: +45 35 32 30 00
http://www.econ.ku.dk

ISSN: 1601-2461 (E)

Deciding for Others Reduces Loss Aversion*

Ola Andersson[†], Håkan J. Holm[‡], Jean-Robert Tyran[§] and Erik Wengström[**]

September 2013

Abstract:

We study risk taking on behalf of others, both with and without potential losses. A large-scale incentivized experiment is conducted with subjects randomly drawn from the Danish population. On average, decision makers take the same risks for other people as for themselves when losses are excluded. In contrast, when losses are possible, decisions on behalf of others are more risky. Using structural estimation, we show that this increase in risk stems from a decrease in loss aversion when others are affected by their choices.

Keywords: Risk taking; loss aversion; experiment

JEL Codes: C91; D03; D81; G02

---

[*] We are grateful to Ulrik H. Nielsen for effective research assistance and to the Carlsberg Foundation for generous financial support. The Swedish authors thank the Swedish Competition Authority for funding. Earlier versions of the paper have been presented at 5th and 6th Nordic Conference on Behavioral and Experimental Economics in Helsinki 2010 and Lund 2011, the CNEE Workshop in Copenhagen, EEA-ESEM in Gothenburg and the University of Innsbruck, University of Oslo, the Research Institute of Industrial Economics and the Royal Institute of Technology in Stockholm. We are grateful for comments by session participants on these occasions.

[†] Research Institute of Industrial Economics (IFN). E-mail: ola.andersson@ifn.se

[‡] Lund University. E-mail: hj.holm@nek.lu.se

[§] University of Vienna and University of Copenhagen. E-mail: jean-robert.tyran@univie.ac.at

[**] Lund University and University of Copenhagen. E-mail: erik.wengstrom@nek.lu.se

1. Introduction

Loss aversion (i.e. the tendency to evaluate outcomes relative to a reference point and be more sensitive to negative departures from this reference point than positive ones) is one of the most well established departures from the expected utility model and it is commonly viewed as an irrational bias. In a survey on loss aversion, Camerer (2005, p.132) states that "loss aversion is often an exaggerated emotional reaction of fear, an adapted response to the prospect of genuine, damaging, survival-threatening loss…Many of the losses people fear the most are not life threatening, but there is no telling that to an emotional system that is overadapted to conveying fear signals." Loss aversion has been linked to many empirical findings in economics and finance including the equity premium puzzle (Benartzi and Thaler 1995), selling behavior on housing markets (Genesove and Mayer 2001) and labor supply decisions (Camerer et al. 2007; Fehr and Goette 2007; Crawford and Meng 2011). Recent evidence from professional golf players on the PGA Tour suggests that not even experience, competition and high stakes seem to extinguish this bias (Pope and Schweitzer 2011).

In this paper, we argue that making decisions on behalf of others reduces loss aversion. We report experimental evidence from situations with no monetary conflict of interest between the decision maker and the other stakeholders. We administer our experiment to a large subject group randomly drawn from the general Danish population. When choosing between risky prospects with positive outcomes, the decision makers' choices on behalf of others are indistinguishable from choices made on their own behalf. In contrast, when the payoff domain includes losses, we find increased risk taking on behalf of others. Using structural estimation techniques, we find no difference in risk aversion, but significantly lower loss aversion when decisions are made on behalf of others.

The dual-process model of decision making provides one interpretation of why loss aversion is lower when decisions are made on behalf of others. According to this model, decisions are driven by an interplay of emotional (affective/hot) and cognitive (deliberative/cold) processes (Kahneman 2003; Loewenstein and O'Donoghue 2004; Rustichini 2008).[1] It seems plausible that individual decisions and decisions on behalf of others differ with respect to the relative importance of the two systems. Recent neuroeconomic evidence from intertemporal choice situations confirms this view by showing that individuals are less affectively engaged when making decisions for others (Albrecht et al. 2010).

Taking a broader perspective, risk-taking on behalf of others is present in many situations. Examples abound and include behavior related to financial investments, management, hiring, traffic and contagious diseases. Indeed, in the wake of the recent financial crisis, actors in the financial sector were accused of excessive risk taking on behalf of others, which spurred a public debate. This underlines the importance of understanding risk taking on behalf of others in general. To this end, the current paper adds to a small but emerging experimental literature on this topic.

The outline of the paper is as follows. In section 2, we discuss related literature and in section 3 we describe our experimental design. Results are provided in section 4 and section 5 concludes.

[1] Ashraf, Camerer and Loewenstein (2005) put loss aversion in the context of the two-system perspective and ascribe loss aversion to be driven more by affective than deliberate decision making. Sokol-Hessner et al. (2012) provide fMRI evidence that loss aversion is connected to activity in the parts of the brain that are related to affective information processing.

2. Related literature on risky decision making on behalf of others

Despite the obvious importance of studying risk taking on behalf of others, there exist only a handful experimental studies on the topic and the results are mixed.[2] Sutter (2009) and Chakravarty et al. (2011) find increased risk taking on behalf of others and Eriksen and Kvaløy (2010) find the opposite result. Bolton and Ockenfels (2010) find no effect and Pahlke et al. (2010) find increased risk taking in the positive domain and decreased risk taking in the negative domain. Yet, the designs of these studies differ in various respects, which make comparisons of results difficult. For instance, Eriksen and Kvaløy (2010) and Sutter (2009) use an investment game, Bolton and Ockenfels (2010) use binary decisions and Chakravarty et al. (2011) a multiple price list.

We believe our paper makes several contributions to this emerging literature.[3] Most importantly, except Pahlke et al. (2010), the previous studies only investigate one payoff domain and hence shed little light on the issue of loss aversion. In contrast to Pahlke et al. (2010), we fit a structural model of choice to our data that enables us to jointly estimate parameters for risk aversion and loss aversion. Hence, our empirical strategy permits us to distinguish effects on risk aversion from effects on loss aversion. In addition, we allow decisions errors to be heterogeneous, which is important as error propensities may be treatment dependent.

[2] This research area should not be confused with the abundant literature on individual risk-preferences. One prominent line of this research is dedicated to the structural estimation of such preferences (see e.g. Holt and Laury 2002; Harrison et al. 2007; von Gaudecker et al. 2011).

[3] There is also a literature focusing on distributive preferences for allocation rules (of which some are risky) in different social contexts (see e.g., Cettolin and Riedl 2011; Rohde and Rohde 2011; Linde and Sonnemans 2012, Cappelen, et al. 2013).

Another departure from the previous literature is that we employ a full two-by-two design, in which either the decision maker is paid, one receiver is paid, both are paid or none is paid. This design enables us to obtain proper benchmarks in order to tease out what is driving behavior.

A final contribution of our study is that we employ a “virtual lab” approach by running our experiment over the internet with a large and heterogeneous sample. All previous studies used samples of students and it is well known that student groups may differ from each other with respect to social preferences (see e.g., Fehr et al. 2006) and risk preferences (see e.g., von Gaudecker et al. 2012).

3. A virtual lab approach

By applying a ”virtual lab” approach we are able to reach a heterogeneous subject pool while maintaining a high level of experimental control. We use the iLEE (Internet Laboratory for Experimental Economics) platform developed at the University of Copenhagen.[4] The platform follows the routines and procedures of standard laboratory experiments (no cheating, incentives, randomization, instructions etc). The main difference is the fact that participants make their choices at home in front of the computer. One could argue that this constitutes a more natural environment than the typical experimental laboratory, since today, many economic decisions and transactions such as e-banking and online shopping are made in this environment. Still, when it comes to the elicitation of risk preferences, earlier research indicates that estimation results do not depend on whether

[4] See http://www.econ.ku.dk/cee/iLEE/iLEE_home.htm for a detailed description of the iLEE platform. The platform has been used for numerous studies on different topics, see Thöni et al. (2012) for an example.

preferences are elicited using standard laboratory experiments or via internet experiments.[5]

3.1 Recruitment and subject pool

Subjects were recruited in collaboration with Statistics Denmark (the statistics agency of Denmark). In 2008, Statistics Denmark drew a random sample of 22.027 individuals from the Danish population (aged 18-80) and subsequently sent out hardy copy invitation letter to the selected individuals via regular mail. The letter explained that all receivers were randomly selected from the Danish population, that the earnings from the experiment will be paid out via electronic bank transfer, and that choices are fully anonymous. The receivers were asked to log on to the iLEE webpage using a personal identification code. Anonymity was maintained through the personal identification code, which only Statistics Denmark could decode. Once logged on to the iLEE webpage, the subjects got detailed instructions about the experiment. In addition they also had access to e-mail and telephone support.[6]

Of the invited individuals 2,291 participated and completed a first wave of experiments. These participants have since then been subsequently been re-invited three times over the years 2008-2011 (approximately one year apart) to take part in new experiments. Our primary data in this paper comes from the third wave of experiments, although we will also use measures and

[5] See for example von Gaudecker et al. (2012), who estimate risk preferences both for a student sample in the lab and the general population using the internet-based CentERpanel (a platform that bears close resemblance with the iLEE). They find that the broad population are on average more risk averse and display much more heterogeneity than the student population. However, von Gaudecker et al. (2012) show that these results are driven by socio-economic differences between samples rather than whether the experiments were implemented in the lab or over the internet.

[6] The participants could log out at any time and then log in again to continue where they had left off.

socioeconomic information provided in the first wave. In total, 740 individuals completed our risk task as decision makers.[7]

3.2 The experimental design

The subjects choose between risky lotteries in a version of the well-established multiple price list (MPL) format. Each subject makes choices in 4 MPLs which differ by whether they include the possibility of incurring losses (two MPL do, as explained below). Each subject is assigned to one treatment condition in which decisions may have payoff consequences for others (henceforth denoted as receivers). In particular, we conducted the following four treatments:

1. **Individual**: Individual decision with payment to the decision maker.
2. **Hypothetical**: Individual decision without payment.
3. **Both**: Both the decision maker and the receiver are paid.
4. **Other**: Only the receiver is paid.

Each subject was randomly allocated to one of the four treatments, and in Both and Other they were assigned to be either a decision maker or a receiver. Each decision maker went through a sequence of the four different lottery screens displayed in Table 2. Screens 1 and 3 involve the possibility of losses (denoted Loss henceforth), whereas screens 2 and 4 exclude the possibility of losses (denoted NoLoss henceforth). The general structure of each MPL is the same: each lottery screen involves ten decisions between two gambles called the Left gamble and the Right gamble. Each gamble has two different outcomes that occur with probability one half. The Left gamble is constant whereas the payoffs of the Right gamble are increasing.

[7] Table A1 in Appendix A compares our two samples with the Danish population with respect to age, gender and education. Our samples are representative with respect to age and gender, but we have an overrepresentation of highly educated people compared to the Danish population.

The order of screens was randomized and subjects received no information about the outcome of the lottery until all decisions were made. After the experiment, one decision problem was randomly selected to be played out and participants were paid according to the outcome of that gamble. See Appendix D for further details about the experiment including a sample of screenshots.

Table 1. Payoff configurations

	Screen 1 (Loss)				**Screen 2 (NoLoss)**			
	Left Gamble		Right Gamble		Left Gamble		Right Gamble	
	Heads	Tails	Heads	Tails	Heads	Tails	Heads	Tails
Decision 1	11	65	-25	65	49	70	12	70
Decision 2	11	65	-25	90	49	70	12	90
Decision 3	11	65	-25	100	49	70	12	110
Decision 4	11	65	-25	110	49	70	12	120
Decision 5	11	65	-25	120	49	70	12	130
Decision 6	11	65	-25	135	49	70	12	140
Decision 7	11	65	-25	150	49	70	12	150
Decision 8	11	65	-25	175	49	70	12	175
Decision 9	11	65	-25	220	49	70	12	220
Decision 10	11	65	-25	370	49	70	12	350
	Screen 3 (Loss)				**Screen 4 (NoLoss)**			
	Left Gamble		Right Gamble		Left Gamble		Right Gamble	
	Heads	Tails	Heads	Tails	Heads	Tails	Heads	Tails
Decision 1	-9	40	-51	40	72	86	20	80
Decision 2	-9	40	-51	80	72	86	20	100
Decision 3	-9	40	-51	90	72	86	20	120
Decision 4	-9	40	-51	100	72	86	20	130
Decision 5	-9	40	-51	115	72	86	20	150
Decision 6	-9	40	-51	135	72	86	20	160
Decision 7	-9	40	-51	160	72	86	20	180
Decision 8	-9	40	-51	190	72	86	20	200
Decision 9	-9	40	-51	220	72	86	20	230
Decision 10	-9	40	-51	280	72	86	20	290

The choice to keep the probability fixed at $p = 0.5$ and vary only the payoffs at each screen has several advantages (similar procedures have been used by e.g., Binswanger 1980 and Tanaka et al. 2010). Using 50-50 gambles makes the procedure easy to understand. This is especially important in our study, since we targeted a very heterogeneous population. We believe that even though people may have problems interpreting probabilities, the situation in which two outcomes have the same chance of occurring is quite comprehensible also for our subjects. This approach appears to get support from Dave et al. (2010) who find that people with a low level of numeracy may have problems to understand MPL formats with varying probabilities. By keeping probabilities fixed, we disregard potential effects from probability weighting (Quiggin 1982; Fehr-Duda and Epper 2012).

Our treatments are motivated by our interest in understanding how the risk exposure of a passive receiver affects decision makers' behavior. Indeed, comparing Other with Individual is the main objective for this study, but it should be stressed that this is not straightforward as two things change simultaneously between these two treatments. In particular, the individual incentives are removed when going from Individual to Other, at the same time as the payoff consequences for the receivers are introduced. We therefore ran the Hypothetical and Both treatments. By comparing Hypothetical and Other, we can test how the risk exposure of the passive receiver affects behavior when the decision maker has no individual incentives. Comparing Individual and Both addresses the effect of the risk exposure of the passive receiver while keeping the decisions maker's individual incentives constant. By having these different treatments, it is possible to study "ceteris paribus" changes and thereby reach conclusions about potential causal mechanisms.

4. Results

In this section, we analyze the data in two steps. First, we compare summary measures of risky choices across treatments. Second, we estimate a structural model of choice that allows us to distinguish between treatment effects on risk aversion and loss aversion.

4.1 Descriptive statistics

In total 740 subjects completed the experiment. We exclude subjects whose decision times were among the fastest 10% of the sample because it is highly likely that these just clicked through the screens without paying attention to the content. The remaining 668 decision makers are evenly spread across the four treatments (Individual: 166; Hypothetical: 155; Both: 176; Other: 171). We begin to analyze the data by studying how many times subjects chose the safe lottery (Nrsafe), i.e., the Left lottery. Figure 1a shows the average Nrsafe in the two MPL without losses (NoLoss) and Figure 1b the average Nrsafe in the two MPL where losses can occur (Loss) by treatment, along with the 95 percent confidence intervals.

Figure 1a shows that the treatment variation had only a small, if any, effect on risk taking when the decision situation involves only gambles without losses. This impression is confirmed by Mann-Whitney tests, which are insignificant (see Appendix B for test details).

Figure 1b shows substantial variation between treatments when losses are possible. Indeed, compared to Individual all other treatments display more risk taking behavior. The most stark difference is between Individual and Hypothetical (Mann-Whitney test: p-value = 0.008).

There is also a difference between Other and Individual (Mann-Whitney test: p-value = 0.071). The difference between Individual and Both is not statistically significant although it lies just above the 10% level (Mann-Whitney test: p-value = 0.107). In summary, when losses are possible subjects seem to take more risk with other peoples' money.[8] To infer that this change is driven by differences in loss aversion between treatments, we will now employ structural estimation techniques. This allows us to estimate separate treatment effects on risk aversion and loss aversion.

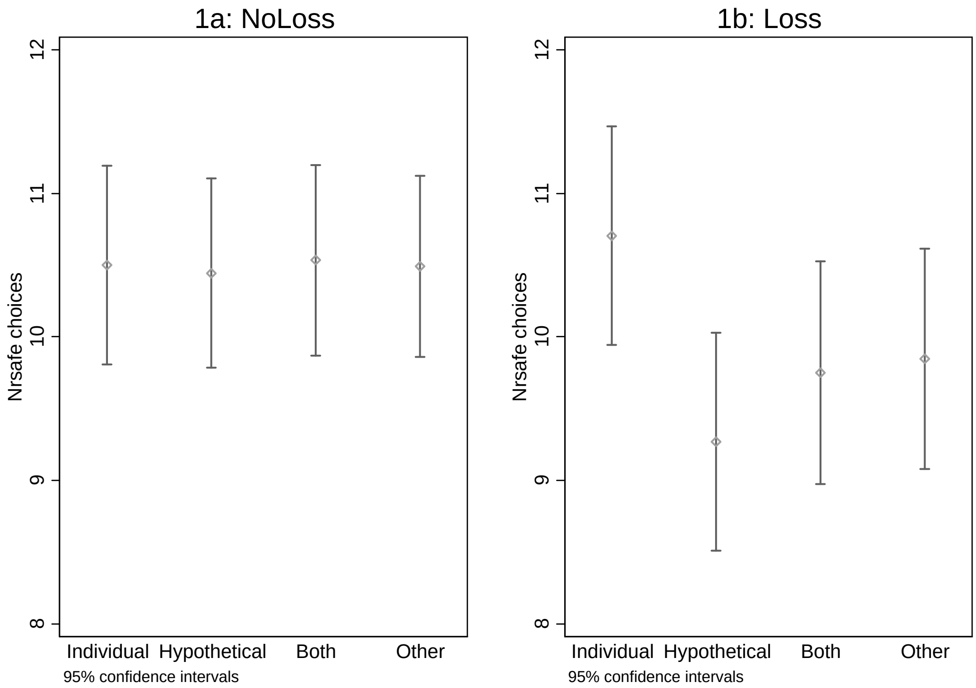


Figure 1: Average Nrsafe by treatment with 95% confidence intervals

[8] It should also be mentioned that there is no evidence that subjects are minimizing the receivers expected payoff in the Other treatment as suggested by the theory of inequality aversion (Fehr and Schmidt 1999).

4.2 Structural estimation

We estimate a structural model under the assumption that individuals have constant relative risk aversion (CRRA) and display loss aversion.[9] That is, the utility function has the following form

$$u(x) = \begin{cases} \dfrac{x^{1-\gamma}}{1-\gamma} & \text{if } x \geq 0 \\ -\lambda \dfrac{(-x)^{1-\gamma}}{1-\gamma} & \text{if } x < 0, \end{cases} \tag{1}$$

where γ is the coefficient of relative risk aversion and λ is the loss aversion parameter.[10] Using the utility function in (1) the expected utility of a lottery A is given by

$$EU(A) = \sum_{a \in A} p(a)u(a)\,. \tag{2}$$

We define the difference in expected utility between the lotteries Left (L) and Right (R) as

$$\Delta EU = EU(L) - EU(R).$$

Acknowledging the stochastic nature of the decision making process, we assume that individuals evaluate differences in expected utility with some noise. More specifically, we utilize the Fechner errors structure that was popularized by Hey and Orme (1994) which states that the L lottery will be chosen if

$$\Delta EU + \tau\varepsilon > 0, \text{ where } \varepsilon \sim N(0,1), \tag{3}$$

---

[9] Using the CRRA utility function is the main approach in the structural literature (see e.g. Andersen et al. 2008 who also use subjects that are randomly sampled from the Danish population).

[10] Even though prospect theory suggests that the risk aversion parameter γ should be distinct over the two domains, we estimate the same risk aversion parameter for both domains since this is required to identify the loss aversion parameter in our model (see Köbberling and Wakker 2005).

where τ is a structural noise parameter. Following Wilcox (2011) we normalize ΔEU by dividing with $\mu > 0$, which is defined as the difference between the maximum utility and the minimum utility over all prizes in each lottery pair. We can then write the likelihood function as

$$L = \begin{cases} \Phi\left(\frac{\Delta EU}{\tau\mu}\right) & if\ Left \\ 1 - \Phi\left(\frac{\Delta EU}{\tau\mu}\right) & if\ Right, \end{cases} \quad (4)$$

where Φ is the distribution function of the standard normal. We estimate (4) using maximum likelihood methods. The parameters of interest to be estimated are γ (reflecting risk preferences), λ (reflecting loss aversion) andτ(reflecting noise). We estimate average effects, allowing for heterogeneity through the covariates, and cluster standard errors at the individual level.[11]

Table 2 presents the results. In Model 1, we let the preference parameters γ and λ depend on treatment and a set of control variables. It is clear from the coefficients of the treatment dummies that the main effects go through the loss aversion parameter. As compared to the baseline Individual treatment, the Hypothetical, Both and Other treatments are all associated with lower loss aversion. These results are confirmed in Model 2, where we also allow for heterogeneity in the noise parameter τ.[12] In the regressions, we control for gender, age, education, cognitive ability and cognitive reflection in all specifications since these have shown to be important determinants of risky behavior in previous studies (e.g., Dohmen et al. 2010; Andersson et al.

[11] We thus allow for heteroskedasticity between and within individuals, and for autocorrelation within individuals.

[12] In Andersson et al. (2013a) we discuss and show the importance of allowing heterogeneous noise in the estimations. Not controlling for such heterogeneity might lead to biased inference on the relationship between covariates and preference parameters.

2013a).[13] We confirm previous studies showing that females are more risk and loss averse and that age, education, are closely linked to noisy decision making (Dave et al. 2010; Gaudecker et al. 2011). In particular, we corroborate the main results of Andersson et al. (2013a) on that measures of cognitive ability is not related to the curvature of utility function but is strongly related to the noise parameter.

In Appendix C we show that our results are essentially identical if we restrict the set of covariates. We also show that the results are unchanged if we extend the econometric model with a tremble parameter which captures the idea that subjects may tremble and choose one of the lotteries at random. That is, in addition to the Fechner error that depends on the utility difference of the lotteries, subjects have a constant probability of choosing randomly between the lotteries. See Appendix C for details and estimation results.

[13] Cognitive ability is measured using a progressive matrices test and cognitive reflection is measured using the cognitive reflection test proposed by Frederick (2005). Both tasks were performed in the first wave of iLEE experiments about two years before our risk task. See Andersson et al. 2013a for more information about the tests.

Table 2: Structural estimation

	Model 1			Model 2		
	γ	λ	τ	γ	λ	τ
Hypothetical	-0.027	-0.379**		-0.032	-0.278*	0.008
	[0.056]	[0.189]		[0.044]	[0.144]	[0.013]
Both	0.035	-0.383***		0.033	-0.328**	0.017
	[0.044]	[0.148]		[0.044]	[0.146]	[0.014]
Other	0.028	-0.424***		0.004	-0.332**	0.012
	[0.043]	[0.139]		[0.035]	[0.137]	[0.014]
Female	0.093***	0.270**		0.080**	0.305***	0.012
	[0.033]	[0.109]		[0.033]	[0.105]	[0.009]
Age (35-44)	0.037	0.034		0.018	-0.012	0.011
	[0.042]	[0.151]		[0.051]	[0.137]	[0.013]
Age (45-54)	0.109**	-0.295**		0.072	-0.214	0.020
	[0.045]	[0.150]		[0.045]	[0.132]	[0.013]
Age (55-64)	0.198***	-0.101		0.141***	0.027	0.069***
	[0.043]	[0.153]		[0.050]	[0.176]	[0.022]
Age (65-)	0.073	-0.346*		-0.035	-0.213	0.102***
	[0.069]	[0.202]		[0.150]	[0.354]	[0.034]
Education 1	0.040	-0.005		0.069	-0.121	-0.033
	[0.065]	[0.243]		[0.051]	[0.196]	[0.024]
Education 2	0.015	0.071		0.034	0.020	-0.019
	[0.058]	[0.226]		[0.048]	[0.200]	[0.023]
Education 3	-0.002	-0.226		0.043	-0.241	-0.056**
	[0.089]	[0.278]		[0.054]	[0.197]	[0.023]
Cognitive ability	-0.006	0.018		0.001	0.006	-0.007***
	[0.006]	[0.022]		[0.008]	[0.022]	[0.002]
Cognitive reflection	0.001	0.020		0.013	-0.059	-0.020***
	[0.016]	[0.065]		[0.015]	[0.066]	[0.007]
Constant	0.078	1.575***	0.191***	0.031	1.714***	0.260***
	[0.091]	[0.363]	[0.007]	[0.090]	[0.336]	[0.032]
Observations	25,680	25,680	25,680	25,680	25,680	25,680

Notes: Individual is the baseline treatment. Education1 refers to participants degrees from high school and vocational school, Education2 represents tertiary education up to 4 years and Education3 tertiary education of at least 4 year. Participants with basic schooling (up to 10 years of schooling) are our baseline category. Cognitive ability is measured using a progressive matrices test (the variable ranges between 0 and 19). Cognitive reflection ranges between 0 and 3 and indicate the number of correct answers to the cognitive reflection test proposed by Frederick (2005). See Andersson et al. 2013a for more details about these tests. Robust standard errors in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

To get a sense of the magnitude of the drop in loss aversion, consider a generalized version of the lottery pairs in Screen 1. A subject make choices between the Left gamble which gives 11 or 65 DKK with equal probability and the Right gamble which gives -25 or x with equal probably. Which is then the smallest integer x, that will make a subject prefer the Right lottery? For a subject in the Individual sample with average preference parameters, x is equal to 140, whereas x is equal to 128 in the Other treatment.[14] Another way of quantifying the size of the effect is to measure the impact in terms of Certainty Equivalents (CE). To exemplify, consider Decision 6 on Screen 1, in which $x=135$. The average subject of the Individual treatment will then choose the Left gamble and the subject of the Other treatment will chose the Right gamble. The CE of the Other subject is 39.2 DKK for the Right lottery. If such an individual, instead would have chosen the Left Gamble the CE would have been 36.2 DKK. That is, if we take the average parameters of the Other treatment as a base line, adding the loss aversion bias would reduce the CE with 3 kronor or 8 percent.

4.3 Discussion

We think that the decrease in loss aversion is due to two distinct mechanisms. Firstly, that behavior in Hypothetical displays less loss aversion indicates the existence of a "hypothetical bias". The observation that there is a "hypothetical bias" in risky decision making is not new (see e.g., Battalio et al. 1990; Holt and Laury 2002 and 2005; Harrison 2007), but there is little previous evidence from choices in the mixed domain. The hypothetical bias also offers an explanation of the decrease in loss aversion in Other, but it cannot explain the decrease in the Both treatments. One plausible explanation is that, in contrast to risk aversion, loss aversion is generally viewed as a bias and being responsible for someone else's payoff may motivate people to move away from such biases.

[14] We use the risk- and loss aversion parameters from the estimation in Model 2 in Table 2. For the median subject, the predicted parameters are γ=0.159 and λ=1.519 in the Individual treatment and γ=0.163 and λ=1.187 in the Other treatment.

A potential insight for such de-biasing effect can be found in the group identity literature. It has shown that group identity can be induced by very weak signals (see Charness, et al. 2007, Sutter 2009, Chen and Li 2009, Charness and Sutter 2012). Sutter (2009) has shown that, when group identity is sufficiently strong, individual decisions that affect other group members, become more risky compared to purely individual decisions. These results are in line with ours and we further highlight that this increase in risk taking is mainly driven by a decrease in loss aversion.[15]

A deeper question is *why* subjects display less loss aversion when taking decisions on behalf of others. We believe the dual-process model (Kahneman 2003; Loewenstein and O'Donoghue 2004; Rustichini 2008), in which decisions are driven by an interplay of emotional (affective/hot) and cognitive (deliberative/cold) processes, is useful to consider. Ashraf, Camerer and Loewenstein (2005) consider loss aversion to be driven more by affective than deliberate decision making and recent neuroeconomic evidence supports this interpretation. In two studies of loss aversion, using lottery choices, subjects in a treatment group are asked to "think like a trader" (Sokol-Hessner et al. 2009 and Sokol-Hessner et al. 2013). Compared to a control group that was not instructed to do so the participants displayed significantly lower degree of loss aversion. By measuring skin conductance Sokol-Hessner et al. (2009) relates the moderation of loss aversion to a decrease in arousal connected to negative outcomes. Sokol-Hessner et al. (2013) go on to show, using fMRI, that the

[15] A recent study by Pahlke et al. (2012) reports that being accountable for the decisions on behalf of someone else can affect the degree of loss aversion. In addition to a treatment with risk taking on behalf of others they run an accountability treatment in which a fraction of the decision makers had to meet face-to-face with the receivers to explain their decisions. When prospects contain both positive and negative payoffs, such an accountability requirement increases risk taking on behalf of others. They do not find a similar effect for purely positive or purely negative outcomes. Our study differs in that we compare individual decision making to decision making on behalf of others, whereas Phalke et al. (2012) only consider decision making on behalf of others.

moderation of loss aversion is correlated with a decrease in amygdala activity, which is known to be crucial for affective information processing. We conjecture that the same mechanism is at work in our experiment. In particular, in our Both and Other treatment we (implicitly) ask decision makers to take a different perspective by letting them make decisions on behalf of others and it is likely that this induces the same dampening of activity in amygdala.[16] Further support for this interpretation comes from Albrecht et al. (2010), who present fMRI evidence from intertemporal decisions tasks. The results indicate that decision makers show less affective engagement when decisions are made on behalf of others.

5. Conclusion

This paper investigates experimentally how people take risks on behalf of others, which is an issue of general importance. The experimental method is well suited for addressing this question since it allows for investigations of controlled variation in incentives while holding constant the multitude of contextual factors that surround these decisions outside the lab.

When losses are excluded, subjects choose about the same risk exposure when they decide for themselves, for some other person or for themselves together with another person.[17] When losses are possible, we find that decision makers are less loss averse when they also decide for someone else. Loss aversion is generally viewed as a bias, and decision making on behalf of others reduces this bias and bring decisions closer to rationality. The mechanism

[16] If this conjecture holds then it might also offer an explanation to the group identity effects discussed earlier.

[17] The absence of conflicts of interests seems to be crucial for the moral imperative to be effective. In a companion paper (Andersson et al. 2013b) we investigate behavior when the decision maker is facing hedged payoff schemes or has to compete for reimbursement. Under those circumstances we find evidence for increased risk taking on behalf of others also in gambles with positive outcomes.

behind this effect may be that people make more "dispassionate" choices when they put themselves into the shoes of others. This interpretation is in line with recent findings in neuroeconomics (e.g., Sokol-Hessner et al. 2009, 2012).

It should be stressed that loss aversion is costly because people shy away from profitable investments. The reason is that losses loom large in people's minds when making choices on their own. But when making choices on behalf of others, losses are less salient and people therefore make more rational choices. In terms of policy implications, our results suggest that representative decision making is not necessarily a bad thing, for domains without losses conscientious decision making is observed and for domains with losses it can help to reduce a well-known bias.

References

Andersen, Steffen, Glenn W. Harrison, Morten I. Lau and E. Elisabet Rutstrom, 2008, "Eliciting Risk and Time Preferences," *Econometrica*, 76(3), 583–618.

Andersson, Ola, Jean-Robert Tyran, Erik Wengström and Håkan J. Holm, 2013a, "Risk Aversion Relates to Cognitive Ability: Fact or Fiction," IFN Working Paper Series No 964, Research Institute of Industrial Economics (IFN).

Andersson Ola, Håkan J. Holm, Jean-Robert Tyran and Erik Wengström, 2013b, "Incentive Contracts, Social Preferences and Risk Taking on Behalf of Others," Mimeo.

Albrecht, Konstanze, Kirsten G. Volz, Matthias Sutter, David I. Laibson and D. Yves von Cramon, 2010, "What is for Me is not for You: Brain Correlates of Intertemporal Choice for Self and Other," *Social Cognitive and Affective Neuroscience*, 6.

Ashraf, Nava, Colin F. Camerer and George Loewenstein, 2005, "Adam Smith, Behavioral Economist," *Journal of Economic Perspectives*, 19(3), 131–45.

Battalio, Raymond C., John C. Kagel and Komain Jiranyakul, 1990, "Testing Between Alternative Models of Choice Under Uncertainty: Some Initial Results," *Journal of Risk and Uncertainty*, 3(1), 25–50.

Benartzi, Shlomo and Richard H. Thaler, 1995, "Myopic Loss Aversion and the Equity Premium Puzzle," *Quarterly Journal of Economics*, 110(1), 73 – 92.

Binswanger, Hans P., 1980, "Attitudes toward Risk: Experimental Measurement in Rural India," *American Journal Agricultural Economics*, 62(3), 395–407.

Bleichrodt, Han, José Luis Pinto and Peter P. Wakker, 2001, "Making Descriptive Use of Prospect Theory to Improve the Prescriptive Use of Expected Utility," *Management Science*, 47(11), 1498−1514.

Booij, Adam, Bernard M. S. van Praag and Gijs van de Kuilen, 2010, "A Parametric Analysis of Prospect Theory's Functionals for the General Population," *Theory and Decision*, 68(12), 115–48.

Bolton, Gary and Axel Ockenfels, 2010, "Betrayal Aversion: Evidence from Brazil, China, Oman, Switzerland, Turkey, and the United States: Comment," *American Economic Review*, 100(1), 628–33.

Cappelen, Alexander W., James Konow, Erik Ø. Sørenssen and Bertil Tungodden, 2013, "Just Luck: An Experimental Study of Risk Taking and Fairness," *American Economic Review*, 103(4), 1398–1413.

Camerer, Colin F., 2005, "Three Cheers--Psychological, Theoretical, Empirical--For Loss Aversion," *Journal of Marketing Research*, 42(2), 129–33.

Camerer, Colin F., Linda Babcock, George Loewenstein and Richard Thaler, 1997, "Labor Supply of New York City Cabdrivers: One Day at a Time", *The Quarterly Journal of Economics*, 112 (2), 407–441.

Cettolin Elena and Arno Riedl, 2011, "Fairness and Uncertainty," Maastricht University, unpublished manuscript.

Chakravarty, Sujoy, Glenn Harrison, Ernan E. Haruvy and Elisabet Rutström, 2011, "Are You Risk Averse over Other Peoples' Money?" *Southern Economic Journal*, 77(4), 901–13.

Charness, Gary and Matthias Sutter, 2012, "Groups Make Better Self-Interested Decisions," *Journal of Economic Perspectives*, 26(3), 157–76.

Charness, Gary and Matthew Rabin, 2002, "Understanding Social Preferences with Simple Tests," *The Quarterly Journal of Economics*, 117(3), 817–69.

Charness, Gary, Luca Rigotti and Aldo Rustichini, 2007, "Individual Behavior and Group Membership," *American Economic Review*, 97(4), 1340–1352.

Chen, Yan and Sherry Li, 2009, "Group Identity and Social Preferences," *American Economic Review*, 99(1), 431–57.

Crawford, Vincent P. and Juanjuan Meng, 2011, "New York City Cab Drivers' Labor Supply Revisited: Reference-Dependent Preferences with Rational-Expectations Targets for Hours and Income," *American Economic Review*, 101(5), 1912–32.

Dave, Chetan, Catherine Eckel, Cathleen Johnson and Christian Rojas, 2010, "Eliciting Risk Preferences: When is Simple Better?" *Journal of Risk and Uncertainty*, 41(3), 219–43.

Dohmen, Thomas, Armin Falk, David Huffman and Uwe Sunde, 2010, "Are Risk Aversion and Impatience Related to Cognitive Ability?" *American Economic Review*, 100(3), 1238–60.

Eriksen, Kristoffer W. and Ola Kvaløy, 2010, “Myopic Investment Management,” *Review of Finance*, 14(3), 521–542.

Fehr, Ernst and Armin Falk, 2002, “Psychological Foundations of Incentives,” *European Economic Review*, 46(4-5), 687–724.

Fehr, Ernst and Klaus M. Schmidt, 1999, “A Theory of Fairness, Competition, and Cooperation,” *Quarterly Journal of Economics*, 114(3), 817–68.

Fehr, Ernst and Lorenz Goette, 2007, “Do Workers Work More If Wages Are High? Evidence from a Randomized Field Experiment,” *American Economic Review*, 97(1), 298–317.

Fehr, Ernst, Michael Naef and Klaus Schmidt, 2006, “Inequality Aversion, Efficiency, and Maximin Preferences in Simple Distribution Experiments: Comment,” *American Economic Review*, 96(5), 1912–17.

Fehr-Duda, Helga and Thomas Epper, 2012, “Probability and Risk: Foundations and Economic Implications of Probability-Dependent Risk Preferences,” *Annual Review of Economics*, 4(1), 567–93.

Frederick, Shane, 2005, “Cognitive Reflection and Decision Making.” *Journal of Economic Perspectives* 19(4): 25–42.

von Gaudecker, Hans-Martin, Arthur van Soest and Erik Wengström, 2011, “Heterogeneity in Risky Choice Behavior in a Broad Population,” *American Economic Review*, 101(2), 664–94.

von Gaudecker, Hans-Martin, Arthur van Soest and Erik Wengström, 2012, "Experts in Experiments: How Selection Matters for Estimated Distributions of Risk Preferences", *Journal of Risk and Uncertainty*, 45(2), 159–90.

Genesove, David and Christopher Mayer, 2001, “Loss Aversion and Seller Behavior: Evidence from the Housing Market,” *Quarterly Journal of Economics*, 116(4), 1233–60.

Harrison, Glenn W., 2007, "Hypothetical Bias over Uncertain Outcomes," In John A. List (Ed.), Using Experimental Methods in Environmental and Resource Economics, Elgar, Northampton, MA.

Harrison, Glenn W., Morten Igel Lau and E. Elisabet Rutstrom, 2007, "Estimating Risk Attitudes in Denmark: a Field Experiment," *Scandinavian Journal of Economics*, 109(2), 341–68.

Hart, Oliver and Bengt Holmström, 1987, "The Theory of Contracts", In Truman Bewley (ed.), Advances in Ecoonomic Theory, Cambridge: Cambridge University Press.

Hey, John D. and Chris Orme, 1994, "Investigating Generalizations of Expected Utility Theory Using Experimental Data," *Econometrica*, 62(6), 1291–1326.

Holt, Charles A. and Susan K. Laury, 2002, "Risk Aversion and Incentive Effects," *American Economic Review*, 92(5), 1644–55.

Holt, Charles A. and Susan K. Laury, 2005, "Risk Aversion and Incentive Effects: New Data without Order Effects," *American Economic Review*, 95(3), 902–4.

Hoppe, Eva I. and Patrick W. Schmitz, 2013, "Contracting under Incomplete Information and Social Preferences: An Experimental Study," *Review of Economic Studies* (forthcoming).

Kahneman, Daniel, 2003, "A Perspective on Judgment and Choice: Mapping Bounded Rationality." *American Psychologist* 58(9), 697–720.

Kahneman, Daniel and Amos Tversky, 1979, "Prospect Theory: An Analysis of Decision under Risk," *Econometrica*, 47(2), 263–91.

Köbberling, Veronika and Peter P. Wakker, 2005, "An Index of Loss Aversion," *Journal of Economic Theory*, 122(1), 119–31.

Lévy-Garboua, Louis, Claude Meidinger and Benoît Rapoport, 2006, Chapter 7 The Formation of Social Preferences: Some Lessons from Psychology and Biology, In: Serge-Christophe Kolm and Jean Mercier Ythier, Editor(s), Handbook on the Economics of Giving, Reciprocity and Altruism, Amsterdam: Elsevier 2006.

Linde, Jona and Joep Sonnemans, 2012, "Social Comparison and Risky Choices", *Journal of Risk and Uncertainty*, 44(1), 45–72.

Loewenstein, George and Ted O'Donoghue, 2004, "Animal Spirits: Affective and Deliberative Processes in Economic Behavior," Mimeo.

Pahlke, Julius, Sebastian Strasser and Ferdinand Vieider, 2010, "Responsibility Effects in Decision Making under Risk," Munich Discussion Paper 2010-37, Department of Economics, University of Munich.

Pahlke, Julius, Sebastian Strasser and Ferdinand Vieider, 2012, "Risk-Taking for Others under Accountability," *Economics Letters*, 114(1), 102–5.

Pope, Devin G. and Maurice E. Schweitzer, 2011, "Is Tiger Woods Loss Averse? Persistent Bias in the Face of Experience, Competition, and High Stakes," *American Economic Review*, 101(1), 129–57.

Quiggin, John, 1982, "A Theory of Anticipated Utility," *Journal of Economic Behavior & Organization*, 3(4), 323–43.

Rohde, Ingrid and Kirsten Rohde, 2011, "Risk Attitudes in a Social Context," *Journal of Risk and Uncertainty*, 43(3), 205–25.

Rustichini, Aldo, 2008, "Dual or Unitary System? Two Alternative Models of Decision Making," *Cognitive, Affective, & Behavioral Neuroscience*, 8(4), 355–62.

Rutström, Elisabet and Nathaniel Wilcox, 2009, "Stated Beliefs versus Inferred Beliefs: a Methodological Inquiry and an Experimental Test," *Games and Economic Behavior*, 67(2), 616–32.

Schoemaker, Paul J.H., 1990, "Are Risk-Attitudes Related across Domains and Response Modes?" *Management Science*, 36(12), 1451–63.

Sokol-Hessner, Peter, Ming Hsu, Nina G. Curley, Mauricio R. Delgado, Colin F. Camerer and Elizabeth A. Phelps, 2009, "Thinking Like a Trader Selectively Reduces Individuals' Loss Aversion," *Proceedings of the National Academy of Sciences*, 106(13), 5035–40.

Sokol-Hessner, Peter, Colin F. Camerer and Elizabeth A. Phelps, 2013, "Emotion Regulation Reduces Loss Aversion and Decreases Amygdala Responses to Losses," *Social Cognitive and Affective Neuroscience*, 8(3), 341–50.

Sutter, Matthias, 2009, "Individual Behavior and Group Membership: Comment," *American Economic Review*, 99(5), 2247–57.

Tanaka, Tomomi, Colin F. Camerer and Quang Nguyen, 2010, "Risk and Time Preferences: Linking Experimental and Household Survey Data from Vietnam," *American Economic Review*, 100(1), 557–71.

Thöni, Christian, Jean-Robert Tyran and Erik Wengström, 2012, "Microfoundations of Social Capital", *Journal of Public Economics*, 96(7-8), 7–8, 635–43.

Wilcox, Nathaniel T. 2011. "Stochastically More Risk Averse: A Contextual Theory of Stochastic Discrete Choice under Risk," *Journal of Econometrics*, 162 (1), 89–104.

Appendix

This document contains additional material to accompany "Deciding for Others Reduces Loss Aversion" by Ola Andersson, Håkan J. Holm, Jean-Robert Tyran and Erik Wengström. Section A compares our sample to the Danish population with respect to key socio demographic variables. Section B contains additional descriptions of our data and Section C presents results from a series of structural estimations. Details of the experimental design including screenshots are provided in Section D.

A. Comparison with the Danish population

Table A1: Representativeness of sample

Gender	**Experimental population**	**Danish population**
Female	46.6%	50.2%
Male	53.4%	49.8%
Age		
18-29 years	14.7%	18.5%
30-44 years	27.2%	29.1%
45-59 years	37.2%	27.0%
60-80 years	20.9%	25.3%
Education (highest completed)		
Basic education (up to 10 years)	9.6%	26.3%
High school or vocational education	24.5%	45.4%
Medium tertiary education	46.1%	21.1%
Long tertiary education	19.9%	7.1%

* For gender and age, the data in the column Danish population summarizes individuals between 18-80 years of age. For education, the population is restricted to individuals between 20-69 years of age.

B. Additional statistical analysis

In this appendix, we provide some additional descriptions and analysis of our data. Table B1 reports the average number of safe choices by treatment and screen type. Table B2 contains *p*-values of the Mann-Whitney U-test on Nrsafe between treatments.

Table B1: Average number of safe choices (n=668)

	Individual	Hypothetical	Both	Other
All Screens	21.205	19.716	20.284	20.339
Loss	10.705	9.271	9.750	9.848
NoLoss	10.500	10.445	10.534	10.491

Table B2: Mann-Whitney p-values between treatments tests. (n=668)

	Individual	**Hypothetical**	**Both**
All Screens			
Hypothetical	0.067		
Both	0.350	0.412	
Other	0.578	0.201	0.691
Loss Screens			
Hypothetical	0.008		
Both	0.071	0.416	
Other	0.107	0.324	0.803
NoLoss Screens			
Hypothetical	0.973		
Both	0.948	0.951	
Other	0.957	0.900	0.976

C. Additional structural estimation results

In Table C1 we present structural estimation results based on a restricted set of covariates. The main results presented in the text continue to hold also for this specification. Table C2 and Table C3 contains estimation results based on an alternative error model. We have added a tremble probability ω to the contextual utility specification. The tremble parameter captures the idea that subjects err and choose one of the lotteries at random. That is, in contrast to the contextual error, the probability of making a mistake due to trembles is independent of the utility difference between the lotteries. The probability of choosing the left lottery is given by:

$$\Pr(L) = (1 - \omega)\Phi\left(\frac{\Delta EU}{\tau\mu}\right) + \frac{\omega}{2}.$$

The treatment effects presented in Tables C2-C3 are nearly identical to those presented in Table 2 of the paper.

Table C1: Structural estimation, Contextual utility restricted set of covariates

	Model 1			Model 2		
	γ	λ	τ	γ	λ	τ
Hypothetical	-0.0293	-0.390**		-0.0289	-0.330**	0.00465
	[0.0443]	[0.152]		[0.0408]	[0.139]	[0.0152]
Both	0.0283	-0.369**		0.0131	-0.289**	0.0191
	[0.0414]	[0.154]		[0.0333]	[0.145]	[0.0154]
Other	0.0253	-0.412**		-0.00521	-0.292*	0.0186
	[0.0495]	[0.166]		[0.0547]	[0.166]	[0.0152]
Female	0.0924***	0.278**		0.0762***	0.287***	0.0113
	[0.0345]	[0.110]		[0.0281]	[0.0965]	[0.0112]
Age (35-44)	0.0263	0.0729		0.0123	0.0870	0.0177
	[0.0598]	[0.191]		[0.0502]	[0.157]	[0.0149]
Age (45-54)	0.110**	-0.294*		0.0664**	-0.183	0.0300**
	[0.0474]	[0.162]		[0.0301]	[0.121]	[0.0134]
Age (55-64)	0.203***	-0.125		0.115***	0.130	0.0999***
	[0.0419]	[0.156]		[0.0394]	[0.185]	[0.0215]
Age (65-)	0.0838*	-0.399**		-0.0816	-0.108	0.149***
	[0.0485]	[0.165]		[0.118]	[0.288]	[0.0320]
Constant	0.0403	1.752***	0.191***	0.125***	1.528***	0.121***
	[0.0465]	[0.171]	[0.00658]	[0.0346]	[0.131]	[0.0131]
Observations	25,680	25,680	25,680	25,680	25,680	25,680

Notes: Individual is the baseline treatment. Robust standard errors in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table C2: Structural estimation, contextual utility and trembles, restricted set of covariates

	γ	λ	ω	τ
Hypothetical	-0.0156	-0.326***	-0.00832	
	[0.0243]	[0.106]	[0.0320]	
Both	0.0282	-0.295**	0.0297	
	[0.0355]	[0.128]	[0.0338]	
Other	-0.000931	-0.259**	0.0429	
	[0.0292]	[0.125]	[0.0370]	
Female	0.0844***	0.217**	0.0251	
	[0.0221]	[0.0935]	[0.0258]	
Age (35-44)	0.00197	0.0984	0.0475	
	[0.0344]	[0.137]	[0.0328]	
Age (45-54)	0.0602***	-0.145	0.0749**	
	[0.0226]	[0.0999]	[0.0313]	
Age (55-64)	0.109***	0.104	0.245***	
	[0.0308]	[0.162]	[0.0445]	
Age (65-)	-0.0342	-0.148	0.303***	
	[0.0546]	[0.156]	[0.0492]	
Constant	0.125***	1.527***	0.0283	0.114***
	[0.0241]	[0.104]	[0.0271]	[0.00431]
Observations	25,680	25,680	25,680	25,680

Notes: Individual is the baseline treatment. Robust standard errors in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table C3: Structural estimation, contextual utility and trembles

	γ	λ	ω	τ
Hypothetical	-0.0199	-0.292**	0.00442	
	[0.0413]	[0.143]	[0.0333]	
Both	0.0451	-0.335***	0.0262	
	[0.0320]	[0.111]	[0.0333]	
Other	0.000561	-0.280**	0.0352	
	[0.0323]	[0.111]	[0.0343]	
Female	0.0963***	0.198**	0.00248	
	[0.0329]	[0.0979]	[0.0208]	
Age (35-44)	0.00611	0.0487	0.0501*	
	[0.0328]	[0.117]	[0.0296]	
Age (45-54)	0.0629*	-0.161	0.0553**	
	[0.0327]	[0.119]	[0.0263]	
Age (55-64)	0.123***	0.0699	0.179***	
	[0.0456]	[0.145]	[0.0454]	
Age (65-)	-0.0159	-0.188	0.216***	
	[0.117]	[0.316]	[0.0537]	
Education 1	0.0511	-0.0790	-0.0804	
	[0.0805]	[0.285]	[0.0570]	
Education 2	0.0236	0.0279	-0.0360	
	[0.0753]	[0.271]	[0.0549]	
Education 3	0.0115	-0.160	-0.107*	
	[0.0922]	[0.277]	[0.0565]	
Cognitive ability	-0.000373	0.00567	-0.0165***	
	[0.00686]	[0.0190]	[0.00415]	
Cognitive reflection	0.00733	-0.0262	-0.0477***	
	[0.0191]	[0.0713]	[0.0145]	
Constant	0.0752	1.604***	0.366***	0.111***
	[0.105]	[0.358]	[0.0780]	[0.00535]
Observations	25,680	25,680	25,680	25,680

Notes: Individual is the baseline treatment. Education1 refers to participants degrees from high school and vocational school, Education2 represents tertiary education up to 4 years and Education3 tertiary education of at least 4 year. Participants with basic schooling (up to 10 years of schooling) are our baseline category. Cognitive ability is measured using a progressive matrices test (the variable ranges between 0 and 19). Cognitive reflection ranges between 0 and 3 and indicate the number of correct answers to the cognitive reflection test proposed by Frederick (2005). See Andersson et al. 2013a for more details about these tests. Robust standard errors in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

D. Experimental design and screenshots

In this appendix, we provide additional details about the design of the experiment.

Description

In short, participants repeatedly choose between a pair of lotteries ("left" vs. "right"). Each lottery has two possible outcomes which are equally likely (explained to subjects as a coin toss). Lotteries are presented in tables in which there are 10 choices to make (see Table 2 of the main text for the different payoff configurations used). In total, there are 4 tables which were presented in random order. The structure of the tables is such that the "left" option is relatively safe (possible payoffs are similar) and payoffs of the left option do not vary across choices (i.e. within a table). In the "right" option, the low payoff is held constant within a table but the high payoff varies systematically. Participants are paid according to one of the choices. Losses were possible in this module. Losses, if any, were deducted from gains in other modules. Payoffs across modules were calibrated such that it was not possible for subjects to incur losses over the entire iLEE3 wave.

There are four treatments:

- **Individual**: The decision maker´s (DM) choice only affects payoff of the DM.
- **Hypothetical**. DM is asked to make choices as if she was paid, but no payment is actually made.
- **Both**: DM choice affects DM and one other participant. Half of the participants are "receivers", the other half are DM. The DM makes the choices in the four tables, the receivers do not make choices.
- **Other:** DM choice does not affect DM payoff but does affect the payoff of one other participant. Half the subjects are DM, the other half are receivers.

The allocation to the treatments was randomized. Roles are assigned ex ante in treatments Both and Other, i.e. receivers do not make choices and are directly routed to the next module.

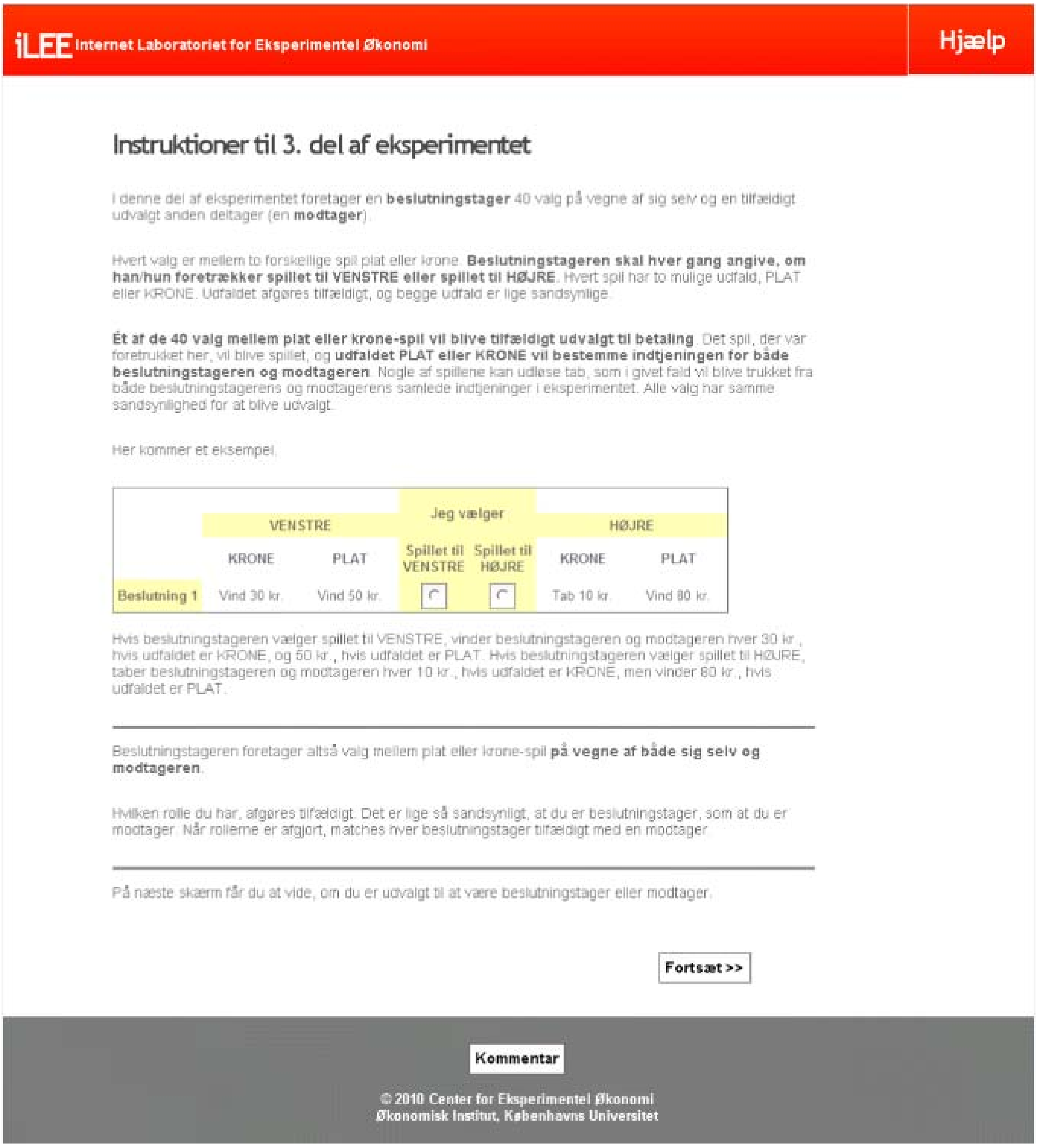
One of the choices in one of the tables was chosen at random to be payoff relevant, and a random draw determined the earnings of the participant(s). Matching occurred within the treatments (four DM had to be matched twice because there were more receivers than decision makers). Average earnings were DKK 45.5 in this module (average also includes DM in Hypothetical and Other who did not receive any payment from this module).

The screens were presented in the order shown below.

(a) Instructions: Two screens. **Instructions1:** Informs the subjects that they have to make 10 choices each in four tables. A sample choice is presented, and the payoffs for DM and the receiver are explained. **Instructions2:** Provides the information on whether participants are assigned the role of DM or receiver (Note: only for treatment Both and Other).

(b) Decision screens: Four tables are presented in random order. All 10 choices must be answered by either clicking the left or right button to proceed.

Sample Instruction screen 1 (treatment Both)



iLEE Internet Laboratoriet for Eksperimentel Økonomi

Hjælp

Instruktioner til 3. del af eksperimentet

I denne del af eksperimentet foretager en **beslutningstager** 40 valg på vegne af sig selv og en tilfældigt udvalgt anden deltager (en **modtager**).

Hvert valg er mellem to forskellige spil plat eller krone. **Beslutningstageren skal hver gang angive, om han/hun foretrækker spillet til VENSTRE eller spillet til HØJRE**. Hvert spil har to mulige udfald, PLAT eller KRONE. Udfaldet afgøres tilfældigt, og begge udfald er lige sandsynlige.

Ét af de 40 valg mellem plat eller krone-spil vil blive tilfældigt udvalgt til betaling. Det spil, der var foretrukket her, vil blive spillet, og **udfaldet PLAT eller KRONE vil bestemme indtjeningen for både beslutningstageren og modtageren**. Nogle af spillene kan udløse tab, som i givet fald vil blive trukket fra både beslutningstagerens og modtagerens samlede indtjeninger i eksperimentet. Alle valg har samme sandsynlighed for at blive udvalgt.

Her kommer et eksempel.

	VENSTRE		Jeg vælger		HØJRE	
	KRONE	PLAT	Spillet til VENSTRE	Spillet til HØJRE	KRONE	PLAT
Beslutning 1	Vind 30 kr.	Vind 50 kr.	○	○	Tab 10 kr.	Vind 80 kr.

Hvis beslutningstageren vælger spillet til VENSTRE, vinder beslutningstageren og modtageren hver 30 kr., hvis udfaldet er KRONE, og 50 kr., hvis udfaldet er PLAT. Hvis beslutningstageren vælger spillet til HØJRE, taber beslutningstageren og modtageren hver 10 kr., hvis udfaldet er KRONE, men vinder 80 kr., hvis udfaldet er PLAT.

Beslutningstageren foretager altså valg mellem plat eller krone-spil **på vegne af både sig selv og modtageren**.

Hvilken rolle du har, afgøres tilfældigt. Det er lige så sandsynligt, at du er beslutningstager, som at du er modtager. Når rollerne er afgjort, matches hver beslutningstager tilfældigt med en modtager.

På næste skærm får du at vide, om du er udvalgt til at være beslutningstager eller modtager.

Fortsæt >>

Kommentar

© 2010 Center for Eksperimentel Økonomi
Økonomisk Institut, Københavns Universitet

Translation of Instruction screen 1 (treatment Both)

In this part of the experiment a **decision maker** will make 40 choices for himself/herself and another random participant (a **receiver**).

Each choice is between two different games of heads or tails. **The decision maker each time has to indicate if he/she prefers the game to the LEFT or the game to the RIGHT**. Each game has two possible outcomes, head or tail. The outcome is random and with equal probabilities.

One of the 40 choices between the two different games of heads or tails will be chosen randomly for payment. The game, which the decision maker chooses to play, will be played and the payment for both the decision maker and the receiver will depend on the outcome from either HEAD or TAIL. Some of the games can result in negative payment. In the case that a game with negative payment has been chosen for payment, the amount will be drawn from both the account of the decision maker and the receiver. All choices have equal probabilities to be selected for payment.

Here is one example.

	LEFT		I choose		RIGHT	
	HEAD	TAIL	The game to the LEFT	The game to RIGHT	HEAD	TAIL
1st decision	Win 30 kr.	Win 50 kr.	◯	◯	Lose 10 kr.	Win 80 kr.

If the decision maker chooses the game to the LEFT the decision maker and the receiver will each win 30 kr., if the outcome is HEAD, and 50 kr., if the outcome is TAIL. If the decision maker chooses the game to the RIGHT the decision maker and the receiver each lose 10 kr., if the outcome is HEAD, but win 80 kr., if the outcome is TAIL.

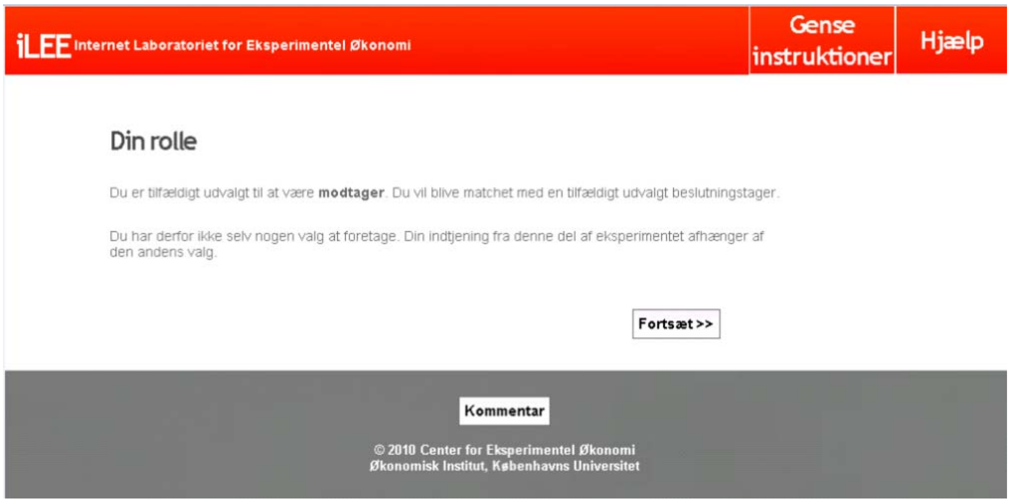
The decision maker therefore chooses the game **on behalf of himself/herself and the receiver**.

Which role, decision maker or receiver, you will get will be determined randomly. You are as likely to become the decision maker as you are to become the receiver. When the roles have been determined, each decision maker will be matched randomly with a receiver.

On the next screen you will be informed whether you have been chosen to become a decision maker or a receiver.

Continue >>

Sample Instruction screen 2 (treatment Both)



Translation of Instruction screen 2 (treatment Both)

Your role

You have randomly been chosen to be a **receiver**. You will be matched with a random chosen decision maker.

You therefore have no choices to make. Your payment from this part of the experiment will depend on the choices of the other participant.

Continue >>

Dine valg mellem plat eller krone-spil (3/4)

	VENSTRE		Jeg vælger		HØJRE	
	KRONE	PLAT	Spillet til VENSTRE	Spillet til HØJRE	KRONE	PLAT
Beslutning 1	Tab 9 kr.	Vind 40 kr.			Tab 51 kr.	Vind 40 kr.
Beslutning 2	Tab 9 kr.	Vind 40 kr.			Tab 51 kr.	Vind 80 kr.
Beslutning 3	Tab 9 kr.	Vind 40 kr.			Tab 51 kr.	Vind 90 kr.
Beslutning 4	Tab 9 kr.	Vind 40 kr.			Tab 51 kr.	Vind 110 kr.
Beslutning 5	Tab 9 kr.	Vind 40 kr.			Tab 51 kr.	Vind 130 kr.
Beslutning 6	Tab 9 kr.	Vind 40 kr.			Tab 51 kr.	Vind 150 kr.
Beslutning 7	Tab 9 kr.	Vind 40 kr.			Tab 51 kr.	Vind 170 kr.
Beslutning 8	Tab 9 kr.	Vind 40 kr.			Tab 51 kr.	Vind 190 kr.
Beslutning 9	Tab 9 kr.	Vind 40 kr.			Tab 51 kr.	Vind 220 kr.
Beslutning 10	Tab 9 kr.	Vind 40 kr.			Tab 51 kr.	Vind 280 kr.

Indsend beslutninger

Translation of Decision screen (treatment Both)

Your choices in the heads or tails game

	Left		I choose			Right
	Head	Tail	The game to the left	The game to the right	Head	Tail
Decision 1	Lose 9 kr	Win 40 kr			Lose 51 kr	Win 40 kr