Belief elicitation in experiments: Is there a hedging problem? (Appendix)*

Mariana Blanco[a], Dirk Engelmann[b], Alexander K. Koch[c], Hans-Theo Normann[d]

June 23, 2010

Abstract

This appendix to the paper "Belief elicitation in experiments: Is there a hedging problem?" reports further details of procedures and results, in particular for treatments that are only briefly summarized in the paper. Furthermore, we document in detail questionnaire responses and reproduce the instructions for all treatments.

*Contact: [a] El Rosario University, Casa Pedro Fermín Calle 14 # 4 - 69, Bogotá, Colombia. E-mail: mariana.blanco@urosario.edu.co. [b] Royal Holloway, University of London, Department of Economics, Egham TW20 0EX, United Kingdom; Centre for Experimental Economics, University of Copenhagen; and Economics Institute of the Academy of Sciences of the Czech Republic. E-mail: dirk.engelmann@rhul.ac.uk. [c] School of Economics and Management, Aarhus University, Building 1322, 8000 Aarhus C, Denmark. Email: akoch@econ.au.dk. [d] Duesseldorf Institute for Competition Economics (DICE), Duesseldorf University, 40225 Duesseldorf, Germany; Max-Planck Institute for Research on Collective Goods. E-mail: normann@dice.uni-duesseldorf.de.

Contents

1 Overview of Experiments

In this online appendix, we report on the treatments marked with an asterisk in Table 1, and provide further details on the sequential prisoners' dilemma and coordination game experiments covered in the paper. In total, we had 282 subjects participating in nine different treatments.

Since we ran a relatively large number of treatments, it is incumbent upon us to explain the treatment design in detail and how it evolved. Originally, we came across the hedging problem when considering the design for a sequential prisoners' dilemma experiment with a belief-elicitation stage, a game that is quite typical of the kind of settings in the literature where beliefs are elicited. We decided to tackle the problem fundamentally, by conducting a hedging-proof and a hedging-prone design. To obtain further evidence on the problem we later ran a coordination game experiment, where both the incentives to hedge are stronger and the opportunity for hedging is more transparent.

Sequential Prisoners' Dilemma (SPD) Experiment		**Coordination Game Experiment**	
Royal Holloway, Univ. of London, UK (October 2007 – March 2008)		*LEE, Copenhagen University, Denmark (November 2008 – March 2009)*	
SPDHedge	N=30	*Hedge*	N=40
SPDNoHedge	N=30	*NoHedge*	N=26
		NoHedgeStrong	N=48
		BinaryHedge (binary belief)*	N=26
		BinaryNoHedge (binary belief)*	N=28
		BinaryNoHedgeStrong (binary belief)*	N=26
		SafeHedge (binary belief, safe option)*	N=28

Total number of observations: 282. *This appendix reports details on treatments marked with an asterisk.

Table 1: Overview of experimental treatments.

2 Sequential Prisoner's Dilemma Experiment: Additional Details

2.1 Design: Payoff Table for the Belief Task

The guess task payoff γ_i depends on the accuracy of a subject's guess g_i about the true number t_i of participants among the nine others in the room who have chosen to cooperate in the previous

		True number[a]									
		9	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
	9	15.0	14.8	14.3	13.3	12.0	10.4	8.3	5.9	3.1	0.0
	8	14.8	15.0	14.8	14.3	13.3	12.0	10.4	8.3	5.9	3.1
	7	14.3	14.8	15.0	14.8	14.3	13.3	12.0	10.4	8.3	5.9
	6	13.3	14.3	14.8	15.0	14.8	14.3	13.3	12.0	10.4	8.3
Guess[b]	**5**	12.0	13.3	14.3	14.8	15.0	14.8	14.3	13.3	12.0	10.4
	4	10.4	12.0	13.3	14.3	14.8	15.0	14.8	14.3	13.3	12.0
	3	8.3	10.4	12.0	13.3	14.3	14.8	15.0	14.8	14.3	13.3
	2	5.9	8.3	10.4	12.0	13.3	14.3	14.8	15.0	14.8	14.3
	1	3.1	5.9	8.3	10.4	12.0	13.3	14.3	14.8	15.0	14.8
	0	0.0	3.1	5.9	8.3	10.4	12.0	13.3	14.3	14.8	15.0

[a] The true number among the nine other subjects choosing $a^{SM} = c$. [b] The stated belief about the number choosing $a^{SM} = c$ among the nine other subjects. Payoffs are based on the quadratic scoring rule in (1).

Table 2: Payoff table for the guess task (*SPDHedge*/*SPDNoHedge*).

SM decision task:

$$\gamma_i = 15 \times \left[1 - \left(\frac{t_i - g_i}{9}\right)^2\right], \tag{1}$$

where the scale parameter 15 ensures that the guess and decision task payoffs are of comparable magnitude. Guess task payoffs were rounded to multiples of ECU 0.1 and presented to subjects in the form of a payoff table as in Table 2 (see also the instructions in Section 6.1).

2.2 CRRA Predictions: SPDNoHedge

In the decision task, a rational and selfish subject will always choose defect in the SM role. As discussed in the paper, there are reasons why some subjects may cooperate as SM, so the FM's decision whether to cooperate or defect depends on her belief $p = Prob(a_i^{SM} = c)$ about the probability that she is matched with a SM who cooperates. FM cooperation is a best response for a risk-neutral, rational, and selfish FM if and only if $p \geq 3/7 \approx 43$ percent. The defection range increases with higher degrees of risk aversion, as shown in Table 3. The entries show for each risk aversion coefficient r and belief p the expected-utility maximizing action – based on a comparison of the expected utility for a FM cooperator ($p \cdot 14^{1-r} + (1-p) \cdot 7^{1-r}$) with that for a FM defector

$\mathbf{Prob(a_i^{SM} = c)}$	**CRRA coefficient** r ($u(x) = x^{1-r}$)									
	0	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**
0.428	d	d	d	d	d	d	d	d	d	d
0.433	c	**d**	**d**	**d**	**d**	**d**	**d**	**d**	**d**	**d**
0.438	c	c	**d**	**d**	**d**	**d**	**d**	**d**	**d**	**d**
0.443	c	c	**d**	**d**	**d**	**d**	**d**	**d**	**d**	**d**
0.448	c	c	c	**d**	**d**	**d**	**d**	**d**	**d**	**d**
0.453	c	c	c	**d**	**d**	**d**	**d**	**d**	**d**	**d**
0.458	c	c	c	c	**d**	**d**	**d**	**d**	**d**	**d**
0.463	c	c	c	c	c	**d**	**d**	**d**	**d**	**d**
0.468	c	c	c	c	c	**d**	**d**	**d**	**d**	**d**
0.473	c	c	c	c	c	c	**d**	**d**	**d**	**d**
0.478	c	c	c	c	c	c	**d**	**d**	**d**	**d**
0.483	c	c	c	c	c	c	c	**d**	**d**	**d**
0.488	c	c	c	c	c	c	c	**d**	**d**	**d**
0.493	c	c	c	c	c	c	c	c	**d**	**d**
0.498	c	c	c	c	c	c	c	c	c	**d**
0.503	c	c	c	c	c	c	c	c	c	**d**
0.508	c	c	c	c	c	c	c	c	c	c
0.513	c	c	c	c	c	c	c	c	c	c

Gray shaded area: increase in defection range relative to a risk-neutral individual.

Table 3: Best responses in the FM decision task of *SPDNoHedge*.

(10^{1-r}).[1]

Would a CRRA expected-utility maximizer distort her guess relative to her belief p, by stating a less extreme belief to lower the variance in payoffs from the guess task? Table 4 illustrates that this can only occur for relatively strong risk aversion, and then only for a tiny range of beliefs (note that the scale uses increments of 1/20 of a percentage point). The table shows the guesses that maximize the CRRA expected utilities for different risk aversion coefficients r and beliefs $p = Prob(a_i^{SM} = c)$.

[1]That a subject may end up in the SM role for the decision task does not matter for the payoff comparisons: both payoffs in the FM role are scaled by the same probability 1/2 of being assigned the FM role, and to both payoffs one adds the same expected SM role payoff.

Prob($\mathbf{a_i^{SM}} = \mathbf{c}$)		**CRRA coefficient** r **(**$u(x) = x^{1-r}$**)**									
	Undistorted guess[a]	**0**	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**
0.4995	4	4	4	4	4	4	4	4	4	4	4
0.5	4/5	4/5	4/5	4/5	4/5	4/5	4/5	4/5	4/5	4/5	4/5
0.5005	5	5	5	5	5	5	5	5	5	5	5
⋮											
0.611	5	5	5	5	5	5	5	5	5	5	5
0.6115	6	6	6	6	6	6	**5**	**5**	**5**	**5**	**5**
0.612	6	6	6	6	6	6	6	6	6	6	6
⋮											
0.722	6	6	6	6	6	6	6	6	6	6	6
0.7225	7	**6**[b]	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**
0.723	7	7	7	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**
0.7235	7	7	7	7	7	7	7	**6**	**6**	**6**	**6**
0.724	7	7	7	7	7	7	7	7	7	7	7

Gray shaded area: distorted guess. [a] The undistorted guess π minimizes $|p - \pi/9|$. [b] The guess task payoff table rounds the scoring rule from (1) to multiples of ECU 0.1. Because of this, in the marked case even risk-neutral players would not report the guess closest to their true belief (see Section 2.2).

Table 4: Best responses in the guess task of *SPDNoHedge*.

The expected utility of a person with belief p who states guess π is given by:[2]

$$\sum_{t=0}^{9} \left\{ \underbrace{\binom{9}{t} p^t (1-p)^{9-t}}_{\text{Subjective Prob(true \# SM cooperators}=t)} \times \left[\begin{array}{c} \text{Guess task payoff with guess } \pi \text{ and} \\ \text{true \# of SM cooperators } t \end{array} \right] \right\}.$$

Finally note that because the guess task payoff table rounds the scoring rule from (1) to multiples of ECU 0.1, in extreme cases even risk-neutral players would not report the guess closest to their belief (see Table 4, footnote *b*). This is a known artefact of discretized implementations of scoring rules (for example, Hanson 1996).

[2]The guess task payoff is computed according to Table 2.

Prob($\mathbf{a_i^{SM}} = \mathbf{c}$)	**CRRA coefficient** r **(**$u(x) = x^{1-r}$**)**									
	0	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**
0.428										
0.433						*SPDHedge/SPDNoHedge*:				
0.438						$a^{FM} = d$, $guess = 4$				
0.443										
0.448										
0.453										
0.458						*SPDHedge*:				
0.463						$a^{FM} = c$, $guess = 4$				
0.468										
0.473							*SPDNoHedge:*			
0.478		*SPDHedge/SPDNoHedge*:					$a^{FM} = d$, $guess = 4$			
0.483		$a^{FM} = c$, $guess = 4$								
0.488										
0.493										
0.498										
0.503									A	B
0.508		*SPDHedge/SPDNoHedge*: $a^{FM} = c$, $guess = 5$								
0.513										

A: *SPDHedge:* $a^{FM} = c$, $guess = 4$ / *SPDNoHedge:* $a^{FM} = c$, $guess = 5$.

B: *SPDHedge:* $a^{FM} = c$, $guess = 4$ / *SPDNoHedge:* $a^{FM} = d$, $guess = 5$.

Table 5: Best responses in *SPDHedge* and *SPDNoHedge*.

2.3 CRRA Predictions: SPDHedge

In the paper we address the issue whether in *SPDHedge* a CRRA expected-utility maximizer should engage in hedging. The predictions were given in the form of Table 3 (reproduced here as Table 5), for which we now explain the background details. The table shows combinations of FM action and guess that maximize the CRRA expected utilities for different risk aversion coefficients r and beliefs $p = Prob(a_i^{SM} = c)$. When computing the expected utility of a person, one needs to take into account that in the decision task the subject can end up in the FM or the SM role with equal probability. For example, the expected utility of a FM cooperator with risk aversion coefficient r and belief p, who states guess π, is given by:

$$\underbrace{\left(\sum_{t=0}^{9}\left\{\binom{9}{t} p^t (1-p)^{9-t} \times \left[\begin{array}{c}\text{Guess task payoff with guess } \pi \text{ and}\\ \text{true \# of SM cooperators } t\end{array}\right]\right\}\right)}_{\text{Expected utility from the guess task}}$$

$$+ \quad \underbrace{\left(\frac{1}{2}\left(p\,14^{1-r} + (1-p)\,7^{1-r}\right) + \frac{1}{2}\left[\begin{array}{c}\text{Payoff for decision}\\ \text{in SM role}\end{array}\right]\right)}_{\text{Expected utility from the decision tasks}}$$

The payoff comparisons yield the same results for Table 5, irrespective of the assumptions one makes about the payoff from the SM role.[3]

2.4 Additional Details on the SPD Results

2.4.1 Overview of the SPD Results

In the paper, we focus on the results from the sequential prisoner's dilemma experiment that help address the question whether subjects hedge. Here we provide a brief summary of the overall behavior. Table 6 reports separately for our two treatments how many subjects cooperate/defect as FM/SM (i.e., for each treatment we have four cells: $a^{FM} = a^{SM} = c$, $a^{FM} = a^{SM} = d$, $a^{FM} = c \wedge a^{SM} = d$, $a^{FM} = d \wedge a^{SM} = c$). For each cell the table also reports in italics the average stated beliefs (of how many of the other nine participants in the session are thought to choose $a^{SM} = c$).

In both treatments, roughly half of the subjects cooperate as FM, and roughly half of them also cooperate as SM. FM and SM choices are strongly correlated, more than 80% of subjects either cooperate in both choices or defect in both choices. The differences between treatments

[3]For example, it does not matter whether one assumes that the subject defects and always faces a FM cooperator or that she never faces one.

			SPDHedge			SPDNoHedge		
			FM			FM		
			cooperate	defect	Σ	cooperate	defect	Σ
SM	cooperate	# observations	13	2	15	14	3	17
		average stated beliefs	*6.5*	*5.5*		*6.6*	*3.0*	
SM	defect	# observations	3	12	15	3	10	13
		average stated beliefs	*4.3*	*2.2*		*4.3*	*2.6*	
		Σ	16	14	30	17	13	30

Table 6: Results from *SPDHedge* and *SPDNoHedge*.

are negligible. Most FM choices are consistent with risk-neutral payoff maximization (27 of 30 subjects in *Hedge* and 23 of 30 in *NoHedge*), given their stated belief and assuming standard selfish preferences. A moderate amount of risk aversion can explain the choices of most of the remaining subjects. (Six of these ten state a belief of four and defect, which is consistent for $r = 0.3$, see Table 3. The others defect and state beliefs of five or six.) SM decisions are highly correlated with stated beliefs, which is consistent with a consensus effect.[4] For a detailed analysis of the consensus effect in our sequential prisoner's dilemma game and how this contributes to the explanation of the correlation between FM and SM behavior, see Blanco *et al.* (2009).

2.4.2 Summary of Questionnaire Evidence

Even though according to the CRRA utility predictions there is only a tiny range of parameters for which stating a distorted guess is optimal, there is evidence of such behavior in the non-structured post-experimental questionnaires. According to responses in the questionnaire, the aim to reduce risk within the guess task had an influence on the guess of about 27 percent of subjects in *SPDHedge* and about 33 percent of subjects in *SPDNoHedge* (see Table 7). Examples of questionnaire state-

[4] The frequently made observation that people tend to believe that others will behave similarly to themselves (for example, facing a choice between two options A and B, those who choose A expect a higher rate of choices for A than those who choose B) has been labeled "false consensus effect" (Ross, Greene, and House 1977) in the social psychology literature, and is well established there (Mullen *et al.* 1985). Dawes (1989) argues that the name is inappropriate, because the effect can only be called "false" if subjects treat their own choice differently from information about other subjects. Hence we use the term "consensus effect" – following Engelmann and Strobel (2000). Their experiment with incentivized beliefs provides evidence for a consensus effect, but against a truly false consensus effect.

Treatment	Total ♯ of subjects	Evidence of within-guess task risk reduction	Evidence of a general aversion to risk only	Both categories together
SPDHedge	30 (100%)	8 (26.67%)	5 (16.67%)	13 (43.33%)
SPDNoHedge	30 (100%)	10 (33.33%)	9 (30.00%)	19 (63.33%)

Table 7: Questionnaire evidence: risk aversion and risk reduction within the guess task.

ments are listed in Section 5.1.

3 Coordination Game Experiment: Additional Details

3.1 CRRA Predictions

3.1.1 *NoHedge*/*NoHedgeStrong*

Table 8 shows for the *NoHedge* treatments the expected-utility maximizing guesses conditional on the degree of risk aversion and actual belief. The label $x1$ ($y1$) denotes the"weakest" guess that the matched partner will make decision X (Y), and $x5$ ($y5$) denotes the "strongest" guess (for payoffs see Table 23). The calculations include the show-up fee of DKK 50 (excluding it increases a bit the range of parameter combinations where stating weak beliefs is optimal). Stating weak beliefs (gray shaded area) is only optimal for relatively strong risk aversion and true beliefs close to 0.5.

3.1.2 *Hedge*

Table 9 shows the expected-utility maximizing combinations of actions and guesses conditional on the degree of risk aversion and actual belief. The uppercase letter indicates the action, the lowercase letter the guess. The calculations include the show-up fee of DKK 50 (again, excluding it increases a bit the range of parameter combinations where hedging is optimal). Hedging means stating a guess such that the chosen action is not a best response to the guess, and the decision-guess combination reduces the variance of the overall payoff relative to the combination of stating the true belief and playing the risk-neutral best response. Predicted occurrence of hedging is marked by gray shading in Table 9. Hedging is predicted for much broader sets of risk aversion parameters and true beliefs than weak beliefs are predicted for *NoHedge* treatments. Furthermore, note that predicted guesses in *Hedge* are always at maximal strength, including those in line with hedging.

$\mathbf{Prob(a_i^{SM} = X)}$	**CRRA coefficient** r $(u(x) = x^{1-r})$									
	0	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**
0	y5	y5	y5	y5	y5	y5	y5	y5	y5	y5
0.05	y5	y5	y5	y5	y5	y5	y5	y5	y5	y5
0.1	y5	y5	y5	y5	y5	y5	y5	y5	y5	y5
0.15	y5	y5	y5	y5	y5	y5	y5	y5	y5	y5
0.2	y5	y5	y5	y5	y5	y5	y5	y5	y5	y5
0.25	y5	y5	y5	y5	y5	y5	y5	y5	y5	y5
0.3	y5	y5	y5	y5	y5	y5	y5	y5	y5	y5
0.35	y5	y5	y5	y5	y5	y5	y5	y5	y5	**y4**
0.4	y5	y5	y5	y5	y5	y5	y5	y5	**y4**	**y4**
0.45	y5	y5	y5	y5	y5	y5	y5	**y4**	**y3**	**y3**
0.5	x5/y5	x5/y5	x5/y5	x5/y5	x5/y5	**x4/y4**	**x4/y4**	**x3/y3**	**x3/y3**	**x2/y2**
0.55	x5	x5	x5	x5	x5	x5	x5	**x4**	**x3**	**x3**
0.6	x5	x5	x5	x5	x5	x5	x5	x5	**x4**	**x4**
0.65	x5	x5	x5	x5	x5	x5	x5	x5	x5	**x4**
0.7	x5	x5	x5	x5	x5	x5	x5	x5	x5	x5
0.75	x5	x5	x5	x5	x5	x5	x5	x5	x5	x5
0.8	x5	x5	x5	x5	x5	x5	x5	x5	x5	x5
0.85	x5	x5	x5	x5	x5	x5	x5	x5	x5	x5
0.9	x5	x5	x5	x5	x5	x5	x5	x5	x5	x5
0.95	x5	x5	x5	x5	x5	x5	x5	x5	x5	x5
1	x5	x5	x5	x5	x5	x5	x5	x5	x5	x5

x1 (weakest x-guess) ... x5 (strongest x-guess) etc. Gray shaded area: weak guess optimal (within-guess-task risk reduction).

Table 8: Best responses for the guess task in *NoHedge*.

Prob($\mathbf{a_i^{SM}} = \mathbf{X}$)	**CRRA coefficient** r ($u(x) = x^{1-r}$)									
	0	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**
0	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5
0.05	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5
0.1	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5
0.15	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5
0.2	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5
0.25	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5
0.3	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5
0.35	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	**Xx5**	**Xx5**
0.4	Xy5	Xy5	Xy5	Xy5	Xy5	Xy5	**Xx5**	**Xx5**	**Xx5**	**Xx5**
0.45	Xy5	Xy5	Xy5	**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**
0.5	Xy5/**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**
0.55	Yx5	**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**
0.6	Yx5	Yx5	Yx5	Yx5	**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**	**Xx5**
0.65	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	**Xx5**	**Xx5**	**Xx5**
0.7	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5
0.75	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5
0.8	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5
0.85	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5
0.9	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5
0.95	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5
1	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5

Decision task: X or Y. Guess task: x1 (weakest x-guess) ... x5 (strongest x-guess) etc. Gray shaded area: hedging.

Table 9: Utility-maximizing action-guess combinations in *Hedge*.

Treatment	N	**♯ of X decisions**	**Treatment**	N	**♯ of X decisions**
Hedge	40	21	*BinaryHedge*	26	13
(% of N)		(52.50%)	(% of N)		(50.00%)
NoHedge	26	11	*BinaryNoHedge*	28	12
(% of N)		(42.31%)	(% of N)		(42.86%)
NoHedgeStrong	48	24	*BinaryNoStrong*	26	14
(% of N)		(50.00%)	(% of N)		(53.85%)
			SafeHedge	28	8
			(% of N)		(28.57%)
Total	114	56	Total	108	47
(% of N)		(49.12%)			(43.52%)
Overall average share of X decisions: 46.40%					
Mixed-strategy equilibrium share of X decisions: 53.33%					

Table 10: Share of X decisions.

3.2 Additional Details on the Coordination Game Results

3.2.1 Frequency of X Decisions

As can be seen from Table 10, the average share of X decisions is lower than the mixed-strategy equilibrium prediction. The reason seems to be that many of subjects apply two-level thinking. In questionnaire responses several subjects argue that they thought others will be more likely go for the X decision that yields a higher payoff in case of successful coordination, and hence they themselves chose Y – the best response if the matched partner's decision is X.

3.2.2 Strength of Guesses

Because of the hedging opportunities in *Hedge*, the CRRA predictions are that we should only see extreme guesses (see Section 3.1.2). But only 68 percent of the subjects actually state a guess of strength five, as shown in Table 11. The CRRA prediction for the *NoHedge* treatments (see Section 3.1.1) suggests that we should see few guesses with strength of three or less (as these require very strong risk aversion). However, more than half of the observations in the pooled *NoHedge* data have weak belief statements.

Guess strength	***Hedge***	***NoHedge***	***NoHedgeStrong***	***NoHedge* (pooled)**
1	2 (5.00%)	3 (11.54%)	3 (6.25%)	6 (8.11%)
2	1 (2.50%)	7 (26.92%)	8 (16.67%)	15 (20.27%)
3	6 (15.00%)	3 (11.54%)	17 (35.42%)	20 (27.03%)
4	4 (10.00%)	1 (3.85%)	5 (10.42%)	6 (8.11%)
5	27 (67.50%)	12 (46.15%)	15 (31.25%)	27 (36.49%)

Table 11: Absolute stated strength of guesses.

These two findings are another indication that CRRA predictions should be treated with caution (on this issue, see also the questionnaire evidence in Table 7/Section 5.1, and in the paper, footnote 11 and the discussion in Section 4.4.). Note, however, that the difference in the share of extreme guesses is in line with the prediction of hedging. In *Hedge* some participants appear to reduce risk rather through hedging than by stating weak beliefs – and therefore extreme guesses are much more frequent than in *NoHedge*.

3.2.3 Details Regarding Footnote 18 in the Paper

We provide here the background for the issue discussed in Footnote 18 in the paper. As mentioned in the text, for a small range of parameters one might observe choices in *NoHedge* that look like hedging. Because action X in the decision task gives rise to a higher payoff in the case of successful coordination, not overly risk-averse players will choose X even if they think their matched partner will choose X with a probability slightly higher than 1/2.[5]

Table 12 illustrates this, and how the best response varies with degree of risk aversion. Italics are used in those cells where risk neutral and risk-averse players in *NoHedge* will choose guesses that seemingly contradict their action in the decision task. The gray shaded cells highlight those cases where this occurs with an extreme belief ($Xx5$). By moving to the right from the shaded cells, one can see that risk-averse players may try to reduce the within-task payoff risk in the decision task by playing the "safer" action Y. In the guess task, in contrast, a player will always state as

[5] Such a belief is not unreasonable, as the unique symmetric equilibrium in the decision task (with risk-neutral players) involves mixed strategies, where a player chooses action X with probability 0.533, and Y with probability 0.467. Indeed, responses from the non-structured post-experimental questionnaire suggest that many subjects believed the matched partner to choose with a higher frequency the X action.

$\mathbf{Prob(a_i^{SM} = X)}$	**CRRA coefficient** r **(**$u(x) = x^{1-r}$**)**									
	0	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**
0.5	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*X**x4***	*X**x4***	*X**x3***	*X**x3***	*X**x2***
0.51	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*X**x4***	*X**x3***	Y**x3**	Y**x3**
0.52	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	Yx5	Y**x4**	Y**x3**	Y**x3**	Y**x3**
0.53	*Xx5*	*Xx5*	Yx5	Yx5	Yx5	Yx5	Y**x4**	Y**x4**	Y**x3**	Y**x3**
0.54	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Y**x4**	Y**x4**	Y**x3**	Y**x3**
0.55	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Y**x4**	Y**x3**	Y**x3**
0.56	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Y**x4**	Y**x4**	Y**x3**
0.57	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Y**x4**	Y**x4**	**Yx3**
0.58	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Y**x4**	Y**x4**	Y**x4**
0.59	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Y**x4**	Y**x4**
0.6	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Y**x4**	Y**x4**
0.61	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Y**x4**	Y**x4**
0.62	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Y**x4**
0.63	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Y**x4**
0.64	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Y**x4**
0.65	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Y**x4**
0.66	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5
0.67	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5
0.68	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5
0.69	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5
0.7	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5

Gray shaded area: $Xx5$ action-guess combination. Italics: guess coincides with own decision.

Bold-face: within-task risk reduction in the guess task.

Table 12: Best responses in *NoHedge*.

$\mathbf{Prob(a_i^{SM} = X)}$	**CRRA coefficient** r ($u(x) = x^{1-r}$)									
	0	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**
0.5	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*
0.51	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*
0.52	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*
0.53	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*
0.54	Yx5	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*
0.55	Yx5	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*
0.56	Yx5	Yx5	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*
0.57	Yx5	Yx5	Yx5	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*
0.58	Yx5	Yx5	Yx5	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*
0.59	Yx5	Yx5	Yx5	Yx5	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*
0.6	Yx5	Yx5	Yx5	Yx5	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*
0.61	Yx5	Yx5	Yx5	Yx5	Yx5	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*
0.62	Yx5	Yx5	Yx5	Yx5	Yx5	*Xx5*	*Xx5*	*Xx5*	*Xx5*	*Xx5*
0.63	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	*Xx5*	*Xx5*	*Xx5*	*Xx5*
0.64	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	*Xx5*	*Xx5*	*Xx5*
0.65	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	*Xx5*	*Xx5*	*Xx5*
0.66	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	*Xx5*	*Xx5*
0.67	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	*Xx5*	*Xx5*
0.68	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	*Xx5*
0.69	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5
0.7	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5	Yx5

Gray shaded area: $Xx5$ action-guess combination. Italics: guess coincides with own decision.

Table 13: Best responses in *Hedge*.

	NoHedge			BinaryNoHedge		
		Strong	**(pooled)**		***Strong***	**(pooled)**
N	26	48	74	28	26	54
Lottery-ticket hedgers[a]	2	2	4	2	4	6
(% of N)	(7.69%)	(4.17%)	(5.41%)	(7.14%)	(15.38%)	(11.11%)
Of which $Xx/Xx5$ or $Xx4$ play	0	2	2	2	3	5
Of which $Yy/Yy5$ or $Yy4$ play	1	0	1	0	1	1

[a] The subject gave a lottery-ticket hedging explanation in the non-structured post-experimental questionnaire and played $Xx\cdot$ or $Yy\cdot$ (see also Section 5.3 in the paper).

Table 14: Classification as "lottery-ticket hedgers" according to questionnaire responses.

guess that decision which he considers to be the more likely one for the matched player. So some hedging-like choices in the range of beliefs below 0.533 disappear if the player is *more* risk averse. The bold-face entries in Table 12 mark instances where a sufficiently risk-averse subject will reduce risk by stating a weaker belief. Overall, we see that risk aversion narrows the range of hedging-like $Xx5$ action-guess combinations.

In *Hedge*, in contrast, risk aversion expands the area where we see $Xx5$ action-guess combinations, as shown in Table 13 (again shaded in gray). Moreover, for the range of risk aversion coefficients up to 0.9, guesses are always extreme. The reason is that the payoff rule for the guess task makes it costly in terms of expected payoff to move away from extreme beliefs. Instead, a risk-averse player can simply reduce risk via the hedging opportunity: distorting the action (by playing X where the single-task best-response of that player to his beliefs would have been Y in *NoHedge*) allows to insure more cheaply against the risk from an extreme belief statement.

In sum, while a CRRA utility model does not rule out $Xx5$ action-guess combinations in *NoHedge* altogether, they are predicted to be much more likely in *Hedge* (if subjects do recognize the hedging opportunities).

3.2.4 Summary of Questionnaire Evidence

The paper reports results based on responses to the non-structured post-experimental questionnaire. Table 14 reports details on apparently ambiguity-aversion driven "pseudo-hedging". Four of the 74 *NoHedge* (pooled) subjects can be classified as "lottery-ticket hedgers" according to their questionnaire responses (see also Section 5.3 of the paper). Examples of such questionnaire statements are listed in Section 5.2.3. For further evidence from the related treatments with a binary guess task see Sections 4.3.1 and 5.3.3.

4 Coordination Game Treatments With Binary Guess Task

4.1 Design and Procedures

Design and procedures are as for the coordination game treatments reported in the paper. The only difference is that the guess task now asks for a binary choice, and treatment *SafeHedge* adds a third, 'safe guess' option to the hedging-prone setting of *BinaryHedge* (for payoffs see Table 15). Again, there was a DKK 50 show-up fee. Sessions lasted for roughly 45 minutes with average earnings of DKK 141 (*BinaryHedge*: DKK 139, *BinaryNoHedge*: DKK 140, *BinaryNoHedgeStrong*: DKK 146, *SafeHedge*: DKK 135. At the time, one US dollar was approximately DKK 6).

4.2 CRRA Predictions

4.2.1 *BinaryNoHedge*

The predictions for *BinaryNoHedge* correspond to those for *NoHedge*, except that there is no degree of strength element in the guess. That is, if the matched player is thought to be more likely to play X, the optimal guess is x, and it is y otherwise. As noted in Section 3.2.3 and illustrated in Table 12, there is a slight complication for the optimal action in the decision task. Because action X in the decision task gives rise to a higher payoff in case of successful coordination, not too risk-averse players will choose X even if they think their matched partner will choose X with a probability slightly higher than 1/2.

		Actual choice of matched player k			
		X	**Y**		
Guess	**x**	15	0	}	*BinaryHedge*/*BinaryNoHedge*
of	**y**	0	15	}	& *SafeHedge*
player i	**x or y**	5	5	←	'safe guess' (in *SafeHedge* only)

Table 15: Payoff table for player i in the guess task (binary guess)

4.2.2 *BinaryHedge*

One can see from Table 16 that even for moderate risk aversion there is a broad range of beliefs where hedging occurs in *BinaryHedge*. (The grid is wide enough so that the small area does not show up where the complication mentioned in the previous paragraph would be relevant.)

4.2.3 *SafeHedge*

In *SafeHedge*, subjects can choose a 'safe guess' rather than risking all or nothing with an x or y guess. For a player with CRRA utility function, one can easily show that the 'safe guess' should not be chosen. The reason is that the hedging strategy (X, x) guarantees a high minimum payout of 15, whereas the 'safe guess' yields only a minimum of 5. So the CRRA prediction is identical to *BinaryHedge* – in particular, that no one will choose the 'safe guess'.

4.3 Results

4.3.1 Evidence of Hedging

A summary of results is given in Table 17. Around 46 percent of the *BinaryHedge* subjects played consistent with a hedging strategy. Roughly half of these subjects explained afterwards how hedging works in their responses in the non-structured post-experimental questionnaire. Another 10 percent of the subjects recognized the hedging opportunity and explained it, but chose not to use it (some stated that they rather played a best response against others' hedging). Note that this pattern is not driven by the economics student subjects. So we conclude that, if we push people by using a sufficiently simple setup, they do spot the opportunities for hedging and these opportunities often bias choices.

At first glance, the procedure for making the design hedging-proof does not seem to have much of an effect: around 41 percent still play either Xx or Yy in the pooled *BinaryNoHedge* sessions. And Table 18 shows that the frequency of Xx or Yy choices is not significantly different in *BinaryHedge*. (As for the *NoHedge* treatments reported in the paper, our "strong" instructions do reduce the share of nonhedgers from 50 percent to 31 percent, but this difference is not significant [two-sided Fisher exact test, p=0.176, Boschloo test, p=0.151].)[6] What drives the lack of an effect on decisions? Unsurprisingly, there is considerable noise in the binary coordination game data: half of the possible decision-guess combinations correspond to a hedging strategy. Evidence that subjects' behavior in

[6]As in the paper we report throughout alongside the commonly used Fisher exact test also the uniformly more powerful Boschloo test (see Boschloo (1970) and Schlag's (2010) survey).

$\mathbf{Prob(a_i = X)}$	**CRRA coefficient** r $(u(x) = x^{1-r})$									
	0	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**0.8**	**0.9**
0	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy
0.05	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy
0.1	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy
0.15	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy
0.2	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy
0.25	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy
0.3	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy
0.35	Xy	Xy	Xy	Xy	Xy	Xy	Xy	Xy	**Xx**	**Xx**
0.4	Xy	Xy	Xy	Xy	Xy	Xy	**Xx**	**Xx**	**Xx**	**Xx**
0.45	Xy	Xy	Xy	**Xx**	**Xx**	**Xx**	**Xx**	**Xx**	**Xx**	**Xx**
0.5	Xy/**Xx**	**Xx**	**Xx**	**Xx**	**Xx**	**Xx**	**Xx**	**Xx**	**Xx**	**Xx**
0.55	Yx	**Xx**	**Xx**	**Xx**	**Xx**	**Xx**	**Xx**	**Xx**	**Xx**	**Xx**
0.6	Yx	Yx	Yx	Yx	**Xx**	**Xx**	**Xx**	**Xx**	**Xx**	**Xx**
0.65	Yx	Yx	Yx	Yx	Yx	Yx	Yx	**Xx**	**Xx**	**Xx**
0.7	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx
0.75	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx
0.8	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx
0.85	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx
0.9	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx
0.95	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx
1	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx	Yx

Gray shaded area: hedging.

Table 16: Best responses in *BinaryHedge*.

Treatment	N	Xx or Yy played[a]	Safe guess	Hedging possibility stated[b]		
				only	& Economist	& (Xx or Yy)
BinaryHedge	26	12 (46.15%)	-	9 (34.62%)	2 (7.69%)	6 (23.08%)
BinaryNoHedge	28	14 (50.00%)	-	0 (0.00%)	0 (0.00%)	0 (0.00%)
BinaryNoHedge-Strong	26	8 (30.77%)	-	2 (7.69%)	0 (0.00%)	2 (7.69%)
BinaryNoHedge (pooled)	54	22 (40.74%)	-	2 (3.70%)	0 (0.00%)	2 (3.70%)
SafeHedge	28	4 (14.29%)	5 (17.86%)	4 (14.29%)	2 (7.14 %)	1 (3.57%)

[a] "(Pseudo-)hedgers". [b] The subject explain in the non-structured post-experimental questionnaire that there is a hedging opportunity.

Table 17: Overview of results from the coordination game treatments with binary guess task.

this treatment is noisy comes also from the *NoHedge*/*Hedge* data – where subjects stated a degree of certainty of their guess that allowed to separate the noise more clearly from hedging, because hedgers should state extreme guesses there.

In line with this explanation, a closer look at the incidence of subjects recognizing the hedging opportunity does show a strong effect: while in *BinaryHedge* around 35 percent explain how one can hedge, only 4 percent of subjects in the pooled *BinaryNoHedge* (falsely) identify a hedging opportunity. This difference is significant (see Table 19). Furthermore, the questionnaire responses offer some hint at another mechanism (other than noise) that may drive the "pseudo-hedging" we observe: we classify six of the 54 *BinaryNoHedge* (pooled) subjects as "lottery-ticket hedgers" (see Table 14 and Section 5.3.3; for further details see Section 5.3 of the paper).

The *SafeHedge* treatment adds an interesting element to the above findings. It differs from *BinaryHedge* only in that there is a 'safe guess', which is, however, inferior to the hedging strategy for a risk-averse player with standard preferences. While almost half of the *BinaryHedge* subjects play Xx or Yy, and around a third explain the hedging opportunity in their questionnaire responses, this changes completely when there is a 'safe guess' option. In *SafeHedge*, the incidence of Xx or Yy play and of questionnaire responses stating the hedging possibility each drop to around 14 percent

	BinaryHedge		BinaryNoHedge		
				Strong	**(pooled)**
"(Pseudo-)hedgers"[a]	12	**vs**	14	8	22
"Non-hedgers"[b]	14		14	18	32
N	26		28	26	54
Fisher exact test (two-sided p-value)			0.793	0.393	0.810
Boschloo test (two-sided p-value)			0.787	0.286	0.790

[a] Xx or Yy choices. [b] All other choices.

Table 18: Tests for differences in play (*BinaryHedge*/*BinaryNoHedge*).

(only 1 of the subjects who according to the questionnaire recognized the hedging opportunity, actually used it). The difference in choices is significant, and that in statements also is significant according to the Boschloo test (see Tables 19 and 20). So where before many subjects were able to spot the hedging opportunities, with a safe guess option these opportunities apparently become harder to identify. One possible explanation is that many risk-averse subjects simply stop looking for better ways of reducing risk, once they found an easy way of doing it. This is supported by the observation that the total number of subjects who reduce risk in some way (by either hedging or choosing the safe guess) is not significantly different in *SafeHedge* and *BinaryHedge* (see column (2) in Table 20).

4.3.2 Frequency of X Decisions

As in the case of the other coordination game treatments, the average share of X decisions is lower than the mixed-strategy equilibrium prediction (see Table 10). Again, the reason is that many subjects expect their counterparts to choose X in the decision task because it yields a higher payoff in case of successful coordination, and for that reason in the decision task they themselves choose Y – the best response against X.

4.3.3 Summary of Questionnaire Evidence

Our discussion above already summarized the evidence from responses to the non-structured post-experimental questionnaire. Examples of such questionnaire statements are listed in Section 5.3.

	BinaryHedge		SafeHedge	BinaryNoHedge		
					Strong	**(pooled)**
Hedging possibility stated[a]	9	**vs**	4	0	2	2
Not stated	17		24	28	24	52
N	26		28	28	26	54
Fisher exact test (two-sided p-value)			0.114	<0.001	0.038	<0.001
Boschloo test (two-sided p-value)			0.097	<0.001	0.019	<0.001

[a] The subject explains in the non-structured post-experimental questionnaire that there is a hedging opportunity.

Table 19: Test for differences in questionnaire responses (*BinaryHedge*/*SafeHedge*/*BinaryNoHedge*).

	BinaryHedge		**SafeHedge**		
			(1)	(2)	(3)
"(Pseudo-)hedgers"[a]	12	**vs**	4	9	4
"Non-hedgers"[b]	14		24	19	19
N	26		28	28	23
Fisher exact test (two-sided p-value)			0.016	0.403	0.039
Boschloo test (two-sided p-value)			0.012	0.355	0.027

[a] Xx or Yy choices (including safe guesses in (2); dropping the five safe guess observations in (3)). [b] All other choices.

Table 20: Test for differences in play (*BinaryHedge*/*SafeHedge*).

5 Questionnaire Evidence

In this section we report excerpts from responses to the non-structured questionnaire at the end of each session (obvious spelling mistakes in answers were corrected). Subjects reported their field of study and gender, and were asked to write short answers to the following questions:

1. Please explain how you made your choices.
2. What factors did influence your decision? What information did you use?
3. Did you think about the tasks one at a time or did you consider them jointly?

5.1 SPD: Questionnaire Evidence

5.1.1 Examples of Risk Reduction Within the Guess Task

For an overview see Table 7.

- “With the guess I just aimed for somewhere in the middle as it seemed to be the best bet for getting a decent amount of payout.” (*SPDHedge*, Non-Economist)

  Played $a^{FM} = d$, $a^{SM} = c$, $guess = 6$.

- “In the guess task, I chose 5 as I knew that by choosing 4 or 5, it was more likely that you would earn more than by choosing any of the other numbers.” (*SPDHedge*, Non-Economist)

  Played $a^{FM} = d$, $a^{SM} = c$, $guess = 5$.

- “Thought there would be 7 people but I put 6 in the end as I would like to take a safer position.” (*SPDHedge*, Non-Economist)

  Played $a^{FM} = c$, $a^{SM} = c$, $guess = 6$.

- “For the guess game, I tried to eliminate some of the risk by choosing the middle ground rather than one of the extremes.” (*SPDHedge*, Economist)

  Played $a^{FM} = d$, $a^{SM} = d$, $guess = 4$.

- “[...] guessing the middle numbers were lower risk [...] people would ‘guess’ a lower risk number rather than the number they actually thought.” (*SPDHedge*, Non-Economist)

  Played $a^{FM} = c$, $a^{SM} = c$, $guess = 4$.

- "For the guess task. I chose the middle ground of '5' as this had the highest lower payoff amount." (*SPDNoHedge*, Non-Economist)

  Played $a^{FM} = c$, $a^{SM} = c$, $guess = 5$.

- "In the Guess Task I made my choice based on the distribution of the payoffs. Although I assumed that more that 5 people would choose left I guessed 5, as the loss for being slightly off the right number was small. On the other hand there was little to gain for guessing the number exactly right and much too lose for being very far off." (*SPDNoHedge*, Economist)

  Played $a^{FM} = c$, $a^{SM} = c$, $guess = 5$.

- "I also considered that 4 and 5 were the surest for a low risk medium payment but gambled that we all felt we wanted most money split amongst ourselves so 9 was the best choice." (*SPDNoHedge*, Non-Economist)

  Played $a^{FM} = c$, $a^{SM} = c$, $guess = 9$. (Comment: An example of stating the risk reduction possibility, but not actually using it.)

- "For the guess task, 5 is the best choice in my opinion since the numbers range from 10 to 15 ECU, and none of the others do." (*SPDNoHedge*, Non-Economist)

  Played $a^{FM} = d$, $a^{SM} = d$, $guess = 5$.

- "I chose 4 on the guess task because none of the payoffs were below 10.4." (*SPDNoHedge*, Economist)

  Played $a^{FM} = d$, $a^{SM} = d$, $guess = 4$.

- "Guess - Made decision that majority of people would rather have the £17 than the £14 so would choose right. Therefore a small amount of people would choose left. Decision - Chose IN on the 'off-chance' that I would be paired with someone who chose LEFT therefore getting £14 instead of £10 - Chose RIGHT as I would rather have £17 than £14. The Guess sheet made it clear that choosing a guess around a mid range such as mine of 3 would result in a higher mean payout that an extreme such as 0 or 9, also, 4 suited my thoughts on the way people would guess." (*SPDNoHedge*, Non-Economist)

  Played $a^{FM} = c$, $a^{SM} = d$, $guess = 4$.

- "For the Guess Task the number of people was decided according to the maximum amount of money I could get in case of a total error. That's why I chose the middle point in the table as a reference, this is, 5 people would say 'LEFT'." (*SPDNoHedge*, Non-Economist)

Played $a^{FM} = c$, $a^{SM} = c$, $guess = 5$.

- "Choosing 4 or 5 is more rational because the minimum and maximum of earning is 10.4 and 12. Rationally, B persons should choose right which gives them £17. I could not risk and choose 0, so I decided to go for 4." (*SPDNoHedge*, Non-Economist)

  Played $a^{FM} = d$, $a^{SM} = d$, $guess = 4$.

5.1.2 Examples of Evidence of General Risk Aversion

Statements from subjects whose comments were not already listed as examples for risk reduction within the guess task. For an overview see Table 7.

- "I made my choice based upon the least risky approach." (*SPDHedge*, Non-Economist)

  Played $a^{FM} = d$, $a^{SM} = d$, $guess = 2$.

- "Didn't want to take a risk." (*SPDHedge*, Non-Economist)

  Played $a^{FM} = c$, $a^{SM} = c$, $guess = 8$.

- "[...] to choose the safest solution for all participants." (*SPDHedge*, Non-Economist)

  Played $a^{FM} = c$, $a^{SM} = c$, $guess = 4$.

- "I was trying to secure myself in either outcome but at the same time estimated how much can I lose and how much can I gain." (*SPDHedge*, Economist)

  Played $a^{FM} = c$, $a^{SM} = c$, $guess = 5$.

- "Playing safe." (*SPDNoHedge*, Non-Economist)

  Played $a^{FM} = d$, $a^{SM} = d$, $guess = 4$.

- "My decision was based on the the least amount of money I can produce securely." (*SPDNoHedge*, Non-Economist)

  Played $a^{FM} = d$, $a^{SM} = d$, $guess = 3$.

- "Since I am a risk-averse, I would not choose option IN, as there is a risk for me being worse off by 3 ECU. I expected 0 out of 9 participants chose LEFT, because I perceive people to be selfish and would rather be much better off from others." (*SPDNoHedge*, Economist)

  Played $a^{FM} = d$, $a^{SM} = c$, $guess = 0$.

- "The main factor was earning a secure amount of money rather than choosing a risky option which could have earned me more but also less."

  (*SPDNoHedge*, Non-Economist)

  Played $a^{FM} = d$, $a^{SM} = c$, $guess = 4$.

- "I chose the move that give me a safe return. I don't need to get a highest amount, but don't want to have a lowest amount. So I pick the one that give me a medium amount" (*SPDNoHedge*, Economist)

  Played $a^{FM} = d$, $a^{SM} = c$, $guess = 5$.

- "I looked at the potential gain with the associated risk and thus always chose the safe option." (*SPDNoHedge*, Economist)

  Played $a^{FM} = d$, $a^{SM} = d$, $guess = 2$.

5.2 Coordination Game With Degree of Certainty of Beliefs: Questionnaire Evidence

For further examples from the treatments with binary beliefs see Section 5.3.

5.2.1 Examples of Recognition of Hedging Opportunity

- "The only way to be sure to win, was to bet opposite in the decision task of that in the guess task. I didn't want to gamble." (*Hedge*, Non-Economist)

  Hedged with choice $Yy5$.

- "After analysing the charts and the rules, I saw that there were 2 ways to get the most of the experiment, there was the safe route, in which I would choose X,X5 / Y,Y5 and get an estimated 150DKK +/-10DKK. The other route would be to gamble and choose a non pair, for example X,Y5, where the result of the experiment would then be either 50DKK or 250DKK. I chose the safe route, and tossed a coin whether I should take X or Y, since the difference was insignificant to me. [...] If I were to gamble in this experiment, the gain would have to be higher than the potential loss in a 50/50 situation. I simply didn't think the payoff was worth it if I gambled." (*Hedge*, Non-Economist)

  Hedged with choice $Yy5$.

- "I made my choice on the basis of how much I could earn and the certainty of what I could earn. I could have maximized my profit by choosing X and the Y5, but by doing that I could also have gone home with almost nothing if my partner also had chosen X. [...] Therefore I took the decision out of my partners hands by choosing Y, and Y5." (*Hedge*, Non-Economist)

  Hedged with choice $Yy5$.

- "[...]'play it safe' was better then taking a chance. This way X and X5 got me the safest amount." (*Hedge*, Non-Economist)

  Hedged with choice $Xx5$.

- "I chose X and guessed strongly that the other participant chose the same. This way I would assured either 155 kr or 162 kr. I am risk averse, and realise that my payoff could have been above 300 with (I think 50/50 % chance)." (*Hedge*, Economist)

  Hedged with choice $Xx5$.

- "You can either make the sure bet of choosing X or Y combined with a strong guess on the same for your partner (for example, choose X and X5). This will give you a safe "medium win". The big bucks, however, are possible when choosing for instance X and Y5, but this is a win all or loose all situation, depending on the choice of your partner. There is the extra psychological fact that choosing X gives you a marginally higher win, when your partner chooses Y. So, I choose Y believing that my partner wanted maximize his/her profits by choosing X. The choice of X4 was a mere 'so at least I get 1 ECU out of it'-decision..." (*Hedge*, Non-Economist)

  Played $Yx4$. (Comment: evidence of within-guess-task risk reduction, despite recognizing hedging opportunity. Something not captured by CRRA utility.)

- "Based on a security strategy in which I maximised my guaranteed income from the experiment - X, X5." (*Hedge*, Economist)

  Hedged with choice $Xx5$.

- "In the decision task, I was hoping the other participant would chose X because of the higher payoff, so I chose Y. I saw the guess task as a kind of insurance of the decision task, but chose not to take the insurance because of the higher payoff with a 50% probability." (*Hedge*, Economist)

  Played $Yx5$.

- "I wanna make sure I can earn some of money. So I chose X and X5. If you do that, regardless of what was the decision of my pair participants, I can guarantee I make money. So I can avoid the case I earn no money." (*Hedge*, Non-Economist)

  Hedged with choice $Xx5$.

5.2.2 Cases Where Subjects (Probably) Falsely Thought They Could Hedge

- "I did a mistake. I had a wonderful plan, but... decided to choose one, and guess the same because if my guess on decision task is wrong, than, I thought, my guess task gonna be right and I will earn at least in one task. But, unfortunately..." [...] as I said, I made I mistake and got confused." (*NoHedge*, Non-Economist)

  Played $Yx5$. (Comment: this might have been meant by "mistake".)

- "For the decision-task I figured most people would opt for less money (Y), since they would then take into account the basic egoism of everyone. So I choose X. For the guess-task I choose X2, since if the other choose X and no money was potentially earned in the decision-task, at least some money would be made in the guess-task. Actually I thought there would be more than one set of tasks. If I knew there was only one, I might have gambled more. But choosing X2 instead of X1 was a last second gambling." (*NoHedge*, Non-Economist)

  Played $Xx2$. (Comment: obviously confused about other aspects of the experiment, too.)

5.2.3 Cases of "Lottery-ticket Hedging"

For an overview see Table 14. For further examples from the binary guess task treatments, see Section 5.3.3.

- "I took a guess about what the other participant would choose for the decision task and made a choice. I thought the other one would choose X, so I chose Y even though it had a lower outcome for me. For the guess task I would not risk it again completely so I pick x4 [seemed to mean y4] to get a possible payout from at least one of the tasks." (*NoHedge*, Non-Economist)

  Played $Yy4$.

- "I choose rather randomly between X and Y in the Decision task, but then choose in the Guess Task the opposite, so as to be more sure of a payoff. So I choose X and then X for the other participant as well. I choose not to be strong in my choice, since I would rather have a low payoff than maybe nothing at all. The fact that the payoff was from only one of the Tasks made me not be strong in my Guess decision." (*NoHedge*, Economist)

Played $Xx2$.

- "I strongly wanted to choose Y at first, but then reversed my thinking - in recognition that other people would feel the same way. So I decided to go all-in and go for the big pot. I chose X, knowing that many would go for Y to be "sure" of least 14 than nothing. And then I chose X5 so as to still make it a 50% chance of getting a lot of money, should the other participant go for X anyway. BUT: I must admit that chance had influence, too. At first, I thought of many different options - but then I just decided to take a chance." (*NoHedgeStrong*, Non-Economist)

  Played $Xx5$.

- "In the decision task I hoped that most people would end up choosing Y because they expected others to choose X. In the guess task I was thinking that if I lost in the decision task I would win by choosing X now. Even though I knew it was randomly picked from where we got our money. It was boring to play safe there...:o)." (*NoHedgeStrong*, Non-Economist)

  Played $Xx5$.

5.2.4 Example That Our Remedy Against Hedging Had Bite

- "[..] since it was a one off game it can be risky to game on a high pay off I firstly considered them individually but then together. I felt that I could possible hedge my bet if I was wrong with one I would be right with the other but since I was only paid for the one game this strategy would have the potential to backfire so I stayed with looking at the games individually and concentrated on the mental position of the opposition hence feeling that they would go for a higher payout." (*NoHedgeStrong*, Non-Economist)

  Played $Xx2$.

5.3 Coordination Game With Binary Guess Task: Questionnaire Evidence

5.3.1 Examples of Recognition of Hedging Opportunity

- "I hoped that my partner chose X, as choosing X in both questions provide that highest ensured payout." (*SafeHedge*, Non-Economist)

  Played Yx. (Comment: best reply against hedging strategy.)

- "In my view it was obvious that each and everyone would logically go for option X, since this equalled the highest possible income for the decision task. So the obvious choice for me then would be option Y, since of course we had to pick different options to get any money. It was then to decide whether I am getting paired with someone who understood the pattern as well as I do, so to make a reasonable choice based on this assumption. I believed that I would be paired with someone just going for the highest possible income (option X) thus I chose Y. I could have of course backed up my income in terms of then choosing Y in the guessing task. however, I wanted to go all or nothing." (*SafeHedge*, Economist)

  Played Yx. (Comment: best reply against hedging strategy.)

- "Choosing and guess both X for tasks and will ensure that I have at least 15ECU. Other decisions could end up getting nothing. Although the maximum gain comes from choosing X and guessing Y, I wouldn't want to guess what my opponent thinks." (*SafeHedge*, Non-Economist)

  Hedged by playing Xx.

- "I thought at the opposite part was either smart and would choose to max his profit by choosing X, then I would choose Y and and guess X. But I thought that I might be paired with a less bright one, and I should therefore choose Y, and guess X. But since I am risk adverse, I chose to pick X, and guess X." (*BinaryHedge*, Economist)

  Hedged by playing Xx.

- "I was not a gambler. I would be sure to earn something, so I answered X in both tasks. I didn't know what the other participants would do, so I only had 50% chance to win if I gambled. Therefore I played safe, and answered X in both tasks." (*BinaryHedge*, Non-Economist)

  Hedged by playing Xx.

- "I figured there would be most people deciding on X. The reason is this: If you decide to play it safe, you will choose the same as decision and guess. So "play safe" is either YY or XX. I figured that the people playing safe would be wise enough to choose XX - because this would yield either 15 or 16, instead of either 15 or 14. Then I thought, there would also be the ones that feel like gambling. They could either choose XY or YX. XY would be the greedy choice, YX would be the choice based on these above mentioned criteria. My guess is that XX is played by 50%, XY is played by 20%, YX is played by 30%. So, if these assumptions are correct, chances that the other player plays X is 70%. So, there would be good reason to gamble on that, which I choose to do. Unfortunately I was unlucky..." (*BinaryHedge*, Non-Economist)

Played Yx. (Comment: best reply against hedging strategy.)

- "Choosing X and X you are always right at least in one of the choices." (*BinaryHedge*, Non-Economist)

  Hedged by playing Xx.

- "I chose double X because I don't want to take risk, I know that if I chose that then I would get 162 kr. or 155 kr." (*BinaryHedge*, Economist)

  Hedged by playing Xx.

- "Playing safe, if you choose X always are you gonna win some money." (*BinaryHedge*, Non-Economist)

  Hedged by playing Xx.

- "Choosing x,x would give the highest sure payoff of at least 15 ecu, since either one or the other is correct. Choosing x,y could give 31 but also 0, since they could be both correct or both wrong y,x is almost the same risk as x,y, besides the highest earning would be less (only 29). I thought that others would have calculated "secure" earnings and "highest" ones as I did, so they would probably go for x,x or x,y. Thinking about this, I decided to take the chance and choose y,x, that, if others had actually calculated as I thought, would give me 29. I thought a lot of people would choose either x,x or x,y, so this decision felt almost as secure as x,x, but with higher earnings." (*BinaryHedge*, Non-Economist)

  Played Yx. (Comment: best reply against hedging strategy.)

- "I chose Y in both the decision and the guess task, because I thought at least one of them would give me some points [...] I wanted to get points and therefore played it safe." (*BinaryHedge*, Non-Economist)

  Hedged by playing Yy.

- "Assumed it was more likely that the other person would choose X rather than Y, as the earning was slightly higher. I therefore choose Y to get the 14. After having made the decision to choose Y, it would be unwise to make my Guess Y as well (my total outcome would then be either 14 or 15 Euro). A better alternative of "safeguarding" would be to choose X and guess Y, which would give an outcome of 15 or 16 Euro. Instead I choose to gamble, making my decision Y, guessing X (getting either 0 or 29 Euro) and rationed that there would be a higher chance for that gamble, than for the "Decision X, guess Y", which would give 0 or 31 Euro." (*BinaryHedge*, Non-Economist)

Played Yx. (Comment: clear hedging explanation, decides for gamble.)

5.3.2 Cases Where Subjects (Probably) Falsely Thought They Could Hedge

- "I thought that the other person would go for the safe option – that s/he would prefer to get 14 ECU, believing that I will choose X. That is why I chose X. With the guess task it was different. I couldn't be sure the other person will go for the safe decision, and so I chose X in case s/he also chose X in the previous task." (*BinaryNoHedgeStrong*, Non-Economist)

  Played Xx. (Comment: no clear discussion of hedging, but logic of the argument seems related.)

- "I made the choice, because it was guaranteed payment. Choosing a guess that corresponds with my decision gives a chance for twice as much pay (plus minus 2 ecu), but also give the chance of no payment (except the 50 [show-up fee]). 50% chance. I chose the secured payment." (*BinaryNoHedgeStrong*, Non-Economist)

  Played Yy.

5.3.3 Cases of "Lottery-ticket Hedging"

For an overview see Table 14. For further examples from the coordination game treatments with degree of certainty of beliefs, see Section 5.2.3.

- "I took a 50% chance of getting a pay-out, as I guessed most people would choose X in the decision task, so I took X and guessed the other participant would do the same." (*BinaryNoHedge*, Non-Economist)

  Played Xx.

- "Made sure to get [it] right in one task and let the computer decide wether I would get the winnings." (*BinaryNoHedge*, Non-Economist)

  Played Xx.

- "I chose the option that would allow me to pass with 100% certainty to the second level with a possibility to earn something. Those were XX or YY. If I would have chosen XY or YX I could have 100% or no chance at all of earning." (*BinaryNoHedgeStrong*, Economist)

  Played Yy.

- "I thought that I couldn't predict the other person's choice so, I just took the decision with the highest value. Thinking that the odds of making the right decision where 50%. I considered them [the tasks] jointly. No matter what the other person choose I would get one pay off. And then just hope that the computer choose that one." (*BinaryNoHedgeStrong*, Non-Economist)

  Played Xx.

- "I looked at the payoffs. Because you don't know what decision the other person will be taking I chose X which have the highest payoff, if I was so lucky that the other person chose Y. The second time I thought that if in the first question the other person also chose X, I have to guess that in the second question to have a possibility of getting pay off." (*BinaryNoHedgeStrong*, Non-Economist)

  Played Xx.

- "I treated my opponent as being random and choose X in the decision game in order to maximize my payoff there and X in the guessing game in order to 'hedge' my bet. I would rather have a 50% chance of winning either 14 or 16 than trusting my idea about the other person's behavior and bet it all on them also choosing (X,X) - they might have been thinking the same as me. (*BinaryNoHedgeStrong*, Economist)

  Played Xx. (Comment: mentions 'hedging', but logic of the argument is that of lottery-ticket hedging.)

5.3.4 Examples That Our Remedy Against Hedging Had Bite

- "The probability to get money was 50% in every choice, so my choice was rather random. Choice XX or YY guaranteed positive result in one of tasks, but the computer was supposed to choose one of them randomly. XY or YX could give positive result in both tasks (= sure money) or negative in both. Questionaire from the beginning was some helpful, but it was not decisive" (*BinaryNoHedge*, Non-Economist)

  Played Yx.

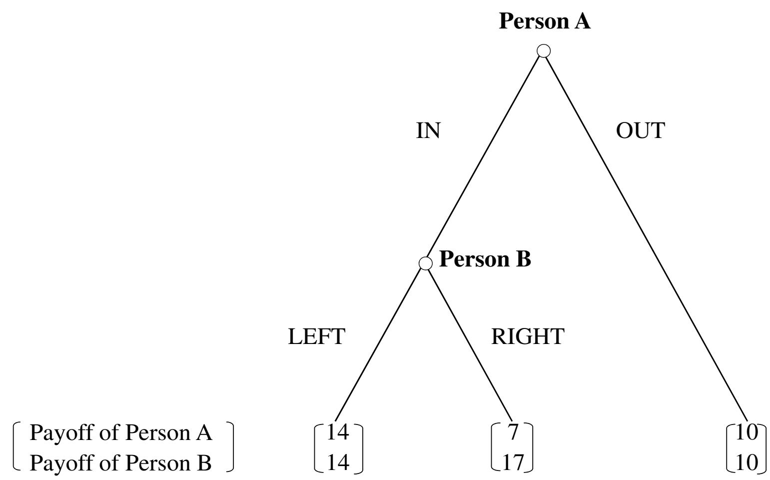

Figure 1: Situation underlying the experiment.

- "Flipped the number I received. But would have chosen the same anyway. Hoped the other person would maximize expected payoff by clicking X and therefore "sacrificed" my own payoff, though this didn't work very well. [Considered tasks] Jointly, but because I had a 50/50 chance of receiving either payoff, I played differently. Otherwise I would have diversified by choosing Y,X ." (*BinaryNoHedgeStrong*, Non-Economist)

  Played Yx. (Comment: Probably "choosing Y,X" was meant to be "choosing Xx")

6 Instructions

6.1 Instructions for the Sequential Prisoner's Dilemma Experiment

You are now taking part in an experiment. If you read the following instructions carefully, you can, depending on your and other participants' decisions, earn a considerable amount of money. It is therefore important that you take your time to understand the instructions. Please do not communicate with the other participants during the experiment. If you have any questions, please raise your hand and ask us. All the information you provide will be treated anonymously.

At the end of the experiment your earnings will be converted from Experimental Currency Units (ECU) to Pounds Sterling at a rate of [*SPDHedge*: ECU 2 = £ 1/ *SPDNoHedge*: ECU 1 = £ 1], and paid to you in cash. Your earnings will also be treated confidentially.

Situation underlying the experiment: We start by explaining the situation underlying the experiment, which is represented in Figure 1. There are two people involved, Person A and Person B. Person A can choose between two options: IN or OUT. If Person A picks OUT, Person B has no choice to make, and both Person A and B get ECU 10 each. If Person A picks IN, Person B then has a choice between two options: LEFT or RIGHT. If LEFT is chosen, both Person A and B get ECU 14 each. If RIGHT is chosen, Person A gets ECU 7 and Person B gets ECU 17.

Overview of the experiment: The experiment consists of three parts. You and the other participants will each make decisions both in the role of Person A and of Person B. Additionally, we will ask you to make a guess how the other participants in the room decided. At the end of the experiment, the computer will randomly assign you either the role of Person A or the role of Person B, and will also randomly match you and the other participants in pairs. Note that you will have to make your decisions without knowing the role that you will ultimately be assigned. Also, at the time when you make your decisions, you will not know the decision made by the participant matched to you. Below, we will explain how your payment from the experiment is determined. But let us first have a closer look at your tasks in the order that they will appear.

1. *Decision Task B*: You have the role of Person B in the situation described in Figure 1. Given that Person A chose IN: Do you choose LEFT or RIGHT?

2. *Guess Task*: There are 10 participants in the room, you and 9 other participants. All of them also did the above Decision Task B. How many of the 9 other participants do you think chose LEFT?

3. *Decision Task A*: Now you have the role of Person A. Do you choose IN or OUT?

Payments: [*SPDHedge*: At the end of the experiment you will be paid both for the Decision Tasks and for the Guess Task. Your overall payoff will be converted at a rate of ECU 2 = £ 1. Payoffs for the individual tasks are determined as follows.]

[*SPDNoHedge*: At the end of the experiment, the computer will randomly decide whether your payment will be based on the Decision Tasks or the Guess Task. Each type of tasks is equally likely to be the one determining your payoff, and will be the same for all subjects. (This means whenever you are paid based on the Decision Tasks, also all other participants are paid based on the Decision Tasks; and whenever you are paid for the Guess Task, this is also the case for all other participants.) Your overall payoff will be converted at a rate of ECU 1 = £ 1. Depending on the random draw of the computer, payoffs are determined as follows.]

		Actual number of the other participants choosing LEFT									
		9	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
	9	15.0	14.8	14.3	13.3	12.0	10.4	8.3	5.9	3.1	0.0
	8	14.8	15.0	14.8	14.3	13.3	12.0	10.4	8.3	5.9	3.1
Your Guess:	**7**	14.3	14.8	15.0	14.8	14.3	13.3	12.0	10.4	8.3	5.9
number of	**6**	13.3	14.3	14.8	15.0	14.8	14.3	13.3	12.0	10.4	8.3
the other	**5**	12.0	13.3	14.3	14.8	15.0	14.8	14.3	13.3	12.0	10.4
participants	**4**	10.4	12.0	13.3	14.3	14.8	15.0	14.8	14.3	13.3	12.0
choosing	**3**	8.3	10.4	12.0	13.3	14.3	14.8	15.0	14.8	14.3	13.3
LEFT	**2**	5.9	8.3	10.4	12.0	13.3	14.3	14.8	15.0	14.8	14.3
	1	3.1	5.9	8.3	10.4	12.0	13.3	14.3	14.8	15.0	14.8
	0	0.0	3.1	5.9	8.3	10.4	12.0	13.3	14.3	14.8	15.0

Table 21: Payoffs for the Guess Task (in ECU).

[The following paragraph was preceded by the subtitle Payoff for the Decision Task *in the instructions for* SPDHedge *and by the subtitle* Payoff if the random draw of the computer selects the Decision Tasks *in the instructions for* SPDNoHedge.*]* As mentioned, the computer will randomly and anonymously pair you with another participant in the room. One of you will randomly be assigned the role of Person A, and the other one will be assigned the role of Person B. The computer will then take your and the other participant's relevant Decision Task choices to compute your payoffs as shown in Figure 1.

[*SPDHedge*: *Payoff for the Guess Task:* In addition to the payoff for the Decision Tasks, you receive a payoff for the Guess Task, which depends...]

[*SPDNoHedge*: *Payoff if the random draw of the computer selects the Guess Task:* The payoff for the Guess Task depends] on the accuracy of your guess. The better your guess, the higher will be your payoff. Take a look at Table 1 (on a separate page) [corresponds to Table 21]. The table shows how your guess and the actual choices of the other participants determine your payoff.

- You can see that a perfect guess earns you ECU 15. For example, if your guess was 6, and if there are actually 6 people who chose LEFT in Decision Task B, you get ECU 15.

- If your guess is completely off the mark you earn nothing. This occurs if you guess that 9 other participants chose LEFT, while none of them did so; or if you guess that none of the

		Choice of the other participant matched with you	
		X	**Y**
Your choice	**X**	(0,0)	(16,14)
	Y	(14,16)	(0,0)

Table 22: Payoffs for the Decision Task (in ECU).

other participants chose LEFT, while all of them did so.

- Otherwise, your payoff depends on how close to accurate your guess was. For example, if 6 out of the other 9 participants chose LEFT, and your guess was that 3 participants would do so, you earn ECU 13.30.

Before starting with the actual experiment, we will ask you to answer a few control questions. Then we will go through the three parts of the experiment. There will be plenty of time before each decision to ask questions. At the end of the experiment we ask you to answer a few questions. These answers will not affect your final payment.

Are there any questions? If so, please raise your hand.

6.2 Instructions for the Coordination Game Experiment

You are now ... [as in instructions for sequential prisoner's dilemma experiment in Section 6.1]. For coming to the experiment today you receive a show-up fee of DKK 50, which will be added to your earnings from the experiment. Your earnings will be treated confidentially.

THE EXPERIMENT: The experiment consists of two tasks, a Decision Task and a Guess Task. [*All Hedge treatments*: At the end of the experiment you will be paid for both the Decision Task and the Guess Task. Your overall payoff will be converted at a rate of ECU 1 = DKK 7.] [*All NoHedge treatments:* At the end of the experiment, the computer will randomly decide whether your payment will be based on the Decision Task or on the Guess Task. Each type of task is equally likely to be the one determining your payoff. Your payoff will be converted at a rate of ECU 1 = DKK 14.] Payoffs for the individual tasks are determined as follows.

THE DECISION TASK: Have a look at Table 1 [corresponds to Table 22], which describes the payoff (in ECU) from this task. The computer will randomly match you with another participant in the room. You make a choice between two options, X or Y.

- *Suppose you choose X.* Then if the other participant matched with you also chooses X, your payoff and that of the other participant are zero. If the other participant chooses Y, your payoff is ECU 16 and the other participant receives ECU 14.

- *Suppose you choose Y.* Then if the other participant matched with you also chooses Y, your payoff and that of the other participant are zero. If the other participant chooses X, your payoff is ECU 14 and the other participant receives ECU 16.

THE GUESS TASK: For this task you stay matched with the **same** other participant as in the Decision Task, and make a guess about how this participant decides in the **Decision Task**. That is, you make a guess whether he or she chooses option X or option Y. Your payoff for the Guess Task depends on the accuracy of your guess. Have a look at Table 2. [corresponds to: Table 24 for the *Binary Beliefs Experiment*, to Table 25 for the *Safe Guess Experiment*, and to Table 23 for *Hedge/NoHedge*.]

[*Hedge/NoHedge*: You also choose the strength of your guess on a scale from 1 (weak) to 5 (strong). For example, if you want to state that the other participant chooses X rather than Y you can pick "X1". If you want to make a stronger statement you can pick "X2", "X3", "X4", or the strongest statement "X5". Similarly if you want to state that the other participant chooses Y rather than X you can pick "Y1" up to "Y5". Your payoff for the Guess Task depends on the accuracy and strength of your guess. The stronger your guess the higher your payoff if you are right, and the lower your payoff if you are wrong.]

The payoff of the other participant does not depend on your choice in the Guess Task.

[*Hedge/NoHedge*: A few examples:

- *Suppose you pick option "Y1".* Then if the other participant actually chooses Y in the Decision Task your payoff is ECU 7, and if the other participant chooses X your payoff is ECU 4.

- *Suppose you pick option "Y2".* Then if the other participant actually chooses Y in the Decision Task your payoff is ECU 9, and if the other participant chooses X your payoff is ECU 3.

- *Suppose you pick option "X4".* Then if the other participant actually chooses X in the Decision Task your payoff is ECU 13, and if the other participant chooses Y your payoff is ECU 1.

- *Suppose you pick option "X5".* Then if the other participant actually chooses X in the Decision Task your payoff is ECU 15, and if the other participant chooses Y your payoff is ECU 0.]

[*Binary Beliefs/Safe Guess Treatments*:

Your payoff		Actual choice in the Decision Task of the participant matched with you	
		X	**Y**
	Rather X than Y		
Your guess about the choice in the Decision Task of the participant matched with you	*X5: strongly X*	15	0
	X4	13	1
	X3	11	2
	X2	9	3
	X1: weakly X	7	4
	Rather Y than X		
	Y1: weakly Y	4	7
	Y2	3	9
	Y3	2	11
	Y4	1	13
	Y5: strongly Y	0	15

Table 23: Payoffs for the Guess Task (in ECU).

Your payoff		Actual choice in the Decision Task of the participant matched with you	
		X	**Y**
Your guess about the choice in the Decision Task of the participant matched with you	**X**	15	0
	Y	0	15

Table 24: Payoffs for the Guess Task (in ECU).

Your payoff		Actual choice in the Decision Task of the participant matched with you	
		X	**Y**
Your guess about the choice in the Decision Task of the participant matched with you	**X**	15	0
	Y	0	15
	X or Y	5	5

Table 25: Payoffs for the Guess Task (in ECU).

- If you guess that the other participant chooses X in the Decision Task, then you get ECU 15 if you are right and nothing if you are wrong.
- If you guess that the other participant chooses Y in the Decision Task, then you get ECU 15 if you are right and nothing if you are wrong.]

[*Safe Guess Treatment*:

- If you guess that the other participant chooses X or Y in the Decision Task, then you get ECU 5 regardless of whether the other participant chooses X or Y.]

Note that you will make only one choice in each task and that you will make both choices **only once**.

[*All Hedge treatments*: Remember that you will be paid the payoff from both the Decision Task and the Guess Task and that for both tasks you are matched with the **same** other participant. Note that you have to make your choices without knowing what this other participant is doing and without communicating with him or her.]

[*All NoHedge treatments*: Remember that for both tasks you are matched with the **same** other participant. Note that you have to make your choices without knowing what this other participant is doing and without communicating with him or her.]

[*All NoHedgeStrong treatments:* Remember also that your payoff in both tasks depends on the **same** decision of that other participant. Note that you have to make your choices without knowing what this other participant is doing and without communicating with him or her. Remember that at the end of the experiment the computer will randomly decide whether you will be paid for the Decision Task or for the Guess Task. As only one of the tasks will be the basis for your earnings, you cannot compensate low earnings on one task with high earnings on the other task. Only what you do in the task that will actually be paid counts. So if the random draw at the end picks the Decision Task for payment, it will not help you if you made a good guess in the Guess Task. And if the random draw picks the Guess Task, it will not help you if you chose the decision for which you would have earned money in the Decision Task. You should therefore treat each task as if it was your only task and try to make the best possible decision in this task.]

Before starting with the actual experiment, we will ask you to answer a few control questions on the computer screen. At the end of the experiment we ask you to answer a few questions. These answers will not affect your final payment.

Are there any questions? If so, please raise your hand.

References

Blanco, M., D. Engelmann, A. K. Koch, and H.-T. Normann (2009): "Preferences and Beliefs in a Sequential Social Dilemma: A Within-subjects Analysis," Institute for the Study of Labor (IZA) Discussion Paper No. 4624.

Boschloo, R. D. (1970): "Raised Conditional Level of Significance for the 2x2-Table when Testing the Equality of Two Probabilities," *Statistica Neerlandica*, 24, 1–35.

Dawes, R. M. (1989): "Statistical Criteria for Establishing a Truly False Consensus Effect," *Journal of Experimental Social Psychology*, 25, 1–17.

Engelmann, D., and M. Strobel (2000): "The False Consensus Effect Disappears if Representative Information and Monetary Incentives are Given," *Experimental Economics*, 3(3), 241–260.

Hanson, R. (1996): "Correction to McKelvey and Page, "Public and Private Information: An Experimental Study of Information Pooling," *Econometrica*, 64, 1223–1224.

Mullen, B., J. L. Atkins, D. S. Champion, C. Edwards, S. Hardly, D., J. E., and M. Vanderklok (1985): "The False Consensus Effect: A Meta-Analysis of 155 Hypothesis Tests," *Journal of Experimental Social Psychology*, 21, 262–283.

Ross, L., D. Greene, and P. House (1977): "The False Consensus Effect: An Egocentric Bias in Social Perception and Attribution Processes," *Journal of Experimental Social Psychology*, 13(3), 279–301.

Schlag, K. H. (2010): "New and Old Results not only for Experimental Game Theory," mimeo, Universitat Pompeu Fabra.