ONLINE APPENDIX: SUPPLEMENARY MATERIAL

A1. Instructions

Whether Game 1 or 2 is played first is randomly chosen by the computer. Here we only present instructions where Game 1 is played first.

Welcome!

You are about to take part in an economic experiment. You are not allowed to talk to other participants during the experiment. If you have a cell phone, please switch it off. If you have a question at any time, please raise your hand and someone will come to help you. Please do not ask your question aloud. If the question is relevant for all participants, we will repeat it and answer it aloud. If you violate these rules, we must exclude you from the experiment and from payment.

All the information you provide, the decisions you make, as well as the amount of your gains from this experiment will remain strictly confidential and anonymous.

Participation in this experiment will earn you money. Your earnings will depend on your decisions and may also be affected by the decisions made by others.

The experiment consists of five parts. You will receive specific instructions for each part as the experiment goes on. At the end of the experiment, only one part out of Parts 1 to 4 will be chosen at random to determine your final payoff for the experiment, where each of these four parts has the same chance to be randomly drawn. Within each part, you make several decisions. If a part is randomly chosen for payment, one of those decisions will be drawn for payment by another random mechanism of the computer, where each decision has the same chance to be randomly drawn. Hence, only one of your decisions will affect your final payoff, but it could be *any*one of your decisions. For showing up in time, you additionally obtain 5 Euros.

The fifth part does not offer you the chance to earn money.

Specific Instructions for Part 1

In this part of the experiment, you will face **22 lotteries**. 11 of them pay either 15 or 20 Euros. The others pay either 5 or 25 Euros. For both payoff types, the probability to get the higher of the two possible payoffs varies from 0 to 100% in steps of 10%.

For each of the 22 lotteries, we ask you the following **question**:

- Which amount (in Euro) would you prefer to receive with certainty instead of letting the lottery determine your payoff?

You need to enter your answers for these questions in the columns “Opt-out value for lottery that pays either 15 or 20 Euros” and “Opt-out value for lottery that pays either 5 or 25 Euros”, respectively. You can state any value **from 0 to 30 Euros**, with up to two decimals. Your answers to these questions will determine your candidate payoff for this part of the experiment with **the following two-step procedure**:

If this part is selected for payoff, the computer will randomly select one of the 22 lotteries. Second, the computer will randomly draw an amount from 0.00 to 30.00 Euros with two decimals (each value in the interval is equally likely).

- If the randomly drawn amount is larger than or equal to your stated “Opt-out value” for the selected lottery, your payoff is the amount drawn by the computer.
- If the amount drawn by the computer is smaller than your stated “Opt-out value” for the selected lottery, your payoff will be determined by the rules of this lottery. This means, you will get the higher of the two possible payoffs with the probability p stated in the left column. You will get the lower of the two possible payoffs with the remaining probability $1 - p$.

Example:

- Suppose that the computer selects the lottery that pays either 15 or 20 Euros with a probability of receiving the higher payoff $p = 90\%$. Suppose that your stated “Opt-out value” for this lottery is equal to 17.50.

  If the amount drawn by the computer is at least 17.50, you will receive this amount. So, if the drawn amount is 26.09, you receive 26.09 Euros.

  If the number drawn by the computer is smaller than your opt-out-value, say 9.79, your payoff for this part is determined by the selected lottery. Here, you will receive 20 Euros with probability $p = 90\%$. With probability $1 - p = 10\%$, you will receive 15 Euros.

You will see those 22 lotteries listed on your screen as described in the Table below. Once you state both of your “Opt-out values” for each of the 22 lotteries given in the Table below, you need to confirm these answers by clicking on the “CONFIRM” button. You can change these “Opt-out values” as long as you have not confirmed them.

22 lotteries in Part 1

Probability with which the computer selects the higher payoff	Opt-out values for lottery that pays either 15 or 20 Euros	Opt-out values for lottery that pays either 5 or 25 Euros
0%		
10%		
20%		
30%		
40%		
50%		
60%		
70%		
80%		
90%		
100%		

Before beginning the actual Part 1, you will perform the same task with five different lotteries. This phase is for practice purposes and will not influence your payoff. You will also receive feedback about the random selections of the computer in this practice round and about the consequence of the two-step procedure using your stated opt-out values. Note that in the real experiment, you will not be informed about these outcomes before the end of the experiment.

Specific Instructions for Part 2

In this part of the experiment, you will face **2 lotteries**. One of them pays either 15 or 20 Euros. The other pays either 5 or 25 Euros. Note that these are the same payoffs offered by the lotteries as in the previous part. But now, you will not be informed about the probability with which the computer chooses the higher payoff.

The computer is programmed in such a way, that the probability with which the higher payoff is paid is one of the probabilities stated in Part 1, i.e.: 0, 10%, 20%, …, 100%. The computer selects this probability before you submit your decision for this part. Each of these 11 probabilities might be the one applied to the lotteries in this part, but they are not equally likely. This means, some probabilities are more likely to be drawn than others. However, you will not receive any further information about the precise random mechanism.

For each of the two lotteries, we ask you the following **question**.

- Which amount (in Euro) would you prefer to receive with certainty instead of letting the lottery determine your payoff?

You need to enter your answers for these questions in the boxes “Opt-out value for lottery that pays either 15 or 20 Euros” and “Opt-out value for lottery that pays either 5 or 25 Euros”, respectively. You can state any value **from 0.00 to 30.00 Euros**, with up to two decimals. Your answers to these questions will determine your payoff for this part of the experiment with **the following two-step procedure**:

If this part is selected for payoffs, the computer will randomly select one of the two lotteries. Second, the computer will randomly draw an amount from 0.00 to 30.00 (each amount in the interval is equally likely).

- If the randomly drawn amount is larger than or equal to your stated “Opt-out value” for the selected lottery, your payoff is the amount drawn by the computer.
- If the amount drawn by the computer is smaller than your stated “Opt-out value” for the selected lottery, your payoff will be determined by the rules of the chosen lottery. This means, you will get either of the two possible payoffs 15 or 20 Euros if the lottery that pays either 15 or 20 is selected and 5 or 25 Euros if the lottery that pays either 5 or 25 is selected.

Once you stated the two “Opt-out values”, we will ask you about your guess how likely it is that the computer selects the higher payoff. We are asking your guess for the following question:

- **Out of 10 draws, how many times does the computer select the higher payoff?**

If your guess exactly matches the true number of draws that the computer selects the higher payoff, your payoff from this decision will be 20 Euros. If your guess is not exactly accurate, then you may receive 20 or 10 Euros. The likelihood to receive the high payoff (20 €) is higher, the closer your guess is to the expected number of draws. This means the more accurate your guess is, the higher your payoff from this decision will be. You can look up the precise mechanism rewarding your stated beliefs by clicking on the button “more information.” The mechanism makes sure that it is in your best interest to state your true belief about the expected number of draws.[1]

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[1] The computer interface contains a button opening a pop-up window with specific description of this procedure: *If this decision is selected for final payment, your gain will be determined according to the following procedure. First, the computer calculates DIFF: the difference between your answer and the correct answer, and then computes its square value: DIFF2=DIFF*DIFF. Second, the computer randomly draws an integer number between 0 and 100 (each realization being equally likely).*

If the value of DIFF2 is below that random integer, your payoff equals 20 euros; otherwise, your payoff equals 10 euros.

Summary and Payoff Procedure for Part 2:
In this part of the experiment, you will first state your “Opt-out values” for the two lotteries. Second, you will state your guess about the likelihood that the computer selects the higher payoff.
A random mechanism will decide how your candidate payoff for this part of the experiment will be determined. **2 out of 3 times**, it will be determined based on the two-step procedure which uses your stated “Opt-out values” as described in Part 1. **1 out of 3 times**, it will be determined based on the accuracy of your stated guess.

A1.3. STRATEGICUNCERTAINTY treatment

Specific Instructions for Part 3

In this part, you are randomly matched with another participant in this session. We will never inform you about the identity of this other participant. You and this other participant will each choose between two Actions L and R.

The payoffs (in Euro) for you and the other participant are presented in the Table below: in each cell, the first amount is your payoff, and the second amount is the other participant’s payoff. These payoffs can be summarized as follows:

- If you and the participant you are matched with both choose L, you both receive **20 Euros**;
- If you choose L and the participant you are matched with chooses R, then you receive **15 Euros** and the other participant receives **5 Euros**;
- If you and the participant you are matched with both choose R, you both receive **25 Euros**;
- If you choose R and the participant you are matched with chooses L, then you receive **5 Euros** and the other participant receives **15 Euros**.

Decision situation in Part 3 and associated payoffs in Euro.

<table>
<tr><td rowspan="4">Your decision</td><td></td><td colspan="2">The other participant’s decision</td></tr>
<tr><td></td><td>L</td><td>R</td></tr>
<tr><td>L</td><td>20 €, 20 €</td><td>15 €, 5 €</td></tr>
<tr><td>R</td><td>5 €, 15 €</td><td>25 €, 25 €</td></tr>
</table>

First, you and the other participant will **decide between Actions L and R.** We call this “**Decision 1**”.

If this part is selected for payoffs, with 1/3 probability, your payoff as well as the other participant's payoff are determined by your and the other participant's Decision 1 as described above.

Once you made your Decision 1 (and before payoffs are determined), we ask you to state two "Opt-out values" similar to the ones in Parts 1 and 2. The precise questions are the following:

- **If the computer replaces your decision with Action L**, which amount (in Euro) would you prefer to receive with certainty instead of continuing with Action L?
- **If the computer replaces your decision with Action R**, which amount (in Euro) would you prefer to receive with certainty instead of continuing with Action R?

Just as in Parts 1 and 2, you need to **state an amount from 0.00 to 30.00 Euros** for both questions above. You need to enter your answers for these questions in the columns "Opt-out value for Action L" and "Opt-out value for Action R", respectively. You can state any value **from 0.00 to 30.00 Euros**, up to two decimals. Your answers to these questions will determine your payoff for this part of the experiment with **the following two-step procedure**: If Part 3 is selected for payoffs, with 1/3 probability, your payoff will be determined based on the two-step procedure which uses your stated "Opt-out values". In this case, the computer will randomly select one of the two actions L or R for you. Second, the computer will randomly draw an amount from 0.00 to 30.00 Euros (each amount in the interval is equally likely).

- If the randomly drawn amount is larger than or equal to your stated "Opt-out value" for the action selected by the computer, your payoff is the amount drawn by the computer.
- If the amount drawn by the computer is smaller than your stated "Opt-out value" for the action selected by the computer, your payoff will be determined by this action and the action chosen in "Decision 1" by the participant you are matched with.

Example: Suppose the computer replaces your action by R and draws the amount 21.24. If your opt-out value for Action R is smaller than 21.24, you receive 21.24 Euros. If your opt-out value is larger, your payoff depends on the other participant's Decision 1. If the other participant has chosen L, you receive 5 Euros. If the other participant has chosen R, you receive 25 Euros.

Once you stated the two "Opt-out values", we will ask you about your guess how likely it is that the other participants in this room choose Action R. We are asking your guess for the following question:

- **How many of the other 10 participants in this session choose Action R?**

The payoff for your guess will be determined in the same way as in Part 2.
If your guess exactly matches the true number of choices for Action R, your payoff from this decision will be 20 Euros. If your guess is not exactly accurate, then you may receive 20 or 10 Euros. The likelihood to receive the high payoff (20 €) is higher, the closer your guess is to the expected number of draws. This means the more accurate your guess is, the higher your payoff from this decision will be. You can look up the precise mechanism rewarding your stated beliefs

by clicking on the button “more information.” The mechanism makes sure that it is in your interest to state your true belief about the expected number of draws.

Finally, you need to confirm your decisions by clicking on the “CONFIRM” button. You can change your decisions as long as you have not confirmed them.

Summary and Payoff Procedure for Part 3:
In this part of the experiment, you will answer **four questions**. First, you will state your preferred action (either L or R) for Decision 1. Second, you will state the two “Opt-out values” in case the computer replaces your decision by L or R. Third, you will state your guess on how many out of 10 randomly drawn other participants would choose Action R as their preferred action.

Another random mechanism will decide how your candidate payoff for this part of the experiment will be determined. **1 out of 3 times**, it will be determined based on yours and the other participant’s preferred action. **1 out of 3 times**, it will be determined based on the two-step procedure that uses your stated “Opt-out values”. **1 out of 3 times**, it will be determined based on the accuracy of your stated guess.

Specific Instructions for Part 4

In Part 4, you will make exactly the same decisions as in Part 3. You are matched with another participant (possibly different from Part 3). The only difference compared to Part 3 is in the payoffs that you and the other participant receive depending on your choices between Action L and Action R.

The payoffs (in Euro) for you and the other participant are presented in the table below: in each cell, the first amount is your payoff, and the second amount is the other participant’s payoff. These payoffs can be summarized as follows:

- If you and the participant you are matched with both choose L, you both receive **5 Euros**;
- If you choose L and the participant you are matched with chooses R, then you receive **25 Euros** and the other participant receives **20 Euros**;
- If you and the participant you are matched with both choose R, you both receive **15 Euros**;
- If you choose R and the participant you are matched with chooses L, then you receive **20 Euros** and the other participant receives **25 Euros**.

Decision situation in Part 4 and associated payoffs.

		The other participant's decision	
		L	R
Your decision	L	5 €, 5 €	25 €, 20 €
	R	20 €, 25 €	15 €, 15 €

Summary and Payoff Procedure:

You will answer the same four questions as in Part 3 and your candidate payoff for this part of the experiment will be determined based on the same mechanism.

A1.4. COMPLETION AND QUESTIONNAIRES

You have completed the first four parts of the experiment. In each part, the payoff resulting from one of your decisions is chosen as the candidate payoff for that part of the experiment. One of these four candidate payoffs will be selected as your final payoff by a random mechanism (each candidate payoff is equally likely to be your final payoff).

Before announcing your final payoff, we ask you to answer a series of questions (Part 5). You will answer these questions using the interface on your computer screen. Please follow the specific instructions on your screen to answer these questions.

A2. Example of Comprehension quiz for the StrategicUncertainty treatment

(inserted on screens before Parts 3 and 4; information will be adapted to the games used in the respective parts)

Before making your decisions for Part 3, please answer the following questions:

1. You will interact with another, randomly matched, participant;
   - True
   - False

Answer: True

2. In the decision situation of Part 3, if you choose L and the other participant chooses R, your associated payoff is
   - 5 €
   - 15 €
   - 20 €
   - 25 €

Answer (Game 1): 15 €

Answer (Game 2): 25 €

3. In the decision situation of Part 3, if you choose R and the other participant chooses L, your associated payoff is
   - 5 €
   - 15 €
   - 20 €
   - 25 €

Answer (Game 1): 5 €

Answer (Game 2): 20 €

A3. Additional tables and figures

Table A1. Seemingly unrelated regressions with treatment order effects

Dep. variable:	α_i^k	δ_i^k	α_i^k	δ_i^k	α_i^k	δ_i^k	α_i^k	δ_i^k
Sample:	(1)		(2)		(3)		(4)	
Indep. Variable	$\hat{a}$	$\hat{d}$	$\hat{a}$	$\hat{d}$	$\hat{a}$	$\hat{d}$	$\hat{a}$	$\hat{d}$
$1[k=S]$	.031	-.661	-.087	880.34*	.113	-2.089	-.048	88.012
	(.099)	(1.190)	(.057)	(531.73)	(.146)	(1.681)	(.067)	(79.483)
$1[k=E]$	.363**	-.623	.349**	742.04	.539**	-1.850	.541**	22.871
	(.151)	(1.190)	(.147)	(533.36)	(.228)	(1.707)	(.218)	(27.070)
$StagFirst$	-.014	.730	-.020	663.03	-.093	-.429	-.097	11.172
	(.079)	(1.861)	(.082)	(766.11)	(.099)	(2.892)	(.100)	(198.11)
$StagFirst * 1[k=S]$	-.158	-1.216	-.086	147.57	-.211	.324	-.110	330.39
	(.159)	(3.120)	(.148)	(845.60)	(.266)	(4.707)	(.250)	(554.20)
$StagFirst * 1[k=E]$	-.037	-2.136	-.284	-168.900	.089	-1.236	-.406	344.64
	(.329)	(3.129)	(.215)	(637.31)	(.591)	(4.871)	(.354)	(317.72)
Constant	-.114**	.045	-.099*	-1092.19	-.064	.964	-.056	-166.60
	(.055)	(.718)	(.056)	(710.73)	(.057)	(.984)	(.059)	(154.77)
Observations (clusters)	624 (208)		561 (187)		354 (118)		321 (107)	
Chow test	0.702	0.448	0.466	0.232	0.552	0.483	0.317	0.493
Joint Chow test	0.627		0.269		0.483		0.299	

Note. $StagFirst$ is a binary variable set to 1 if the stag-hunt game is played before the entry game, and to 0 otherwise. $1[k=T]$ is a binary variable set to 1 for condition T, and to 0 otherwise. Standard errors are clustered at the subject level and reported in parentheses. In all models, we exclude cases with indefinite δ_i^k as well as those with estimated r_i outside the range (-100,100). Specifications (1) and (3) use neglog transformation of δ_i^k. In specifications (2) and (4), estimated r_i is trimmed to the range [-3,3]. Specifications (1) and (2)/(3) and (4) use unrestricted/restricted sample. The last two rows provide the resulting p-values from Chow tests that is the joint insignificance of all the coefficients in front of the dummy $StagFirst$ for the specific parameter and for the entire SUR model. Significance levels: * p<0.1 ** p<0.05 *** p<0.01.

Table A2. Nonparametric comparisons of strategic uncertainty attitudes across treatments

Sample:	Restricted (N=125)		Unrestricted (N=223)	
Comparison/Parameter	α_i^k	δ_i^k	α_i^k	δ_i^k
Ambiguity - Stag hunt	0.005	0.275	<0.001	0.734
Ambiguity – Entry	<0.001	0.203	0.007	0.497
Stag hunt – Entry	<0.001	0.779	<0.001	0.441

Note. Columns 2-5 provide p-values from two-sided sign tests.

A4. Individual underpinnings of attitudes towards uncertainty

In this online appendix, we explore individual underpinnings of attitudes towards uncertainty. We use a seemingly unrelated regression model to estimate six simultaneous equations. Each of the six individual preference parameters $y_i \in \{\alpha_i^A, \alpha_i^S, \alpha_i^E, \delta_i^A, \delta_i^S, \delta_i^E\}$ is regressed on a set of individual characteristics:

$$y_i = b_{y,0} + b_{y,1}\widehat{s_i} + b_{y,2}Raven\_Score_i + b_{y,3}RMET\_Score_i + b_{y,4}SSS\_Score_i +$$
$$+\sum k\, c_{y,k}SocDemInf_i^k + w_i,$$

where:

- $\widehat{s_i}$ is the individual noise parameter estimated by ML from the RISK treatment data;

- $Raven\_Score_i$ is the Raven test score;

- $RMET\_Score_i$ is the Reading the Mind in the Eyes Test score;

- SSS_Score_i is the total score on the Sensation Seeking Scale (SSS);

- $SocDemInf_i^k$ is a set of k basic socio-demographic variables: age, gender (*Female* is an indicator variable that takes the value one for female subjects) and major (*Econ_Buss* and *Engineer* are also indicator variables that take the value one when subjects' major is economics or business and engineering, respectively);

- and w_i is the residual.

Table A3 reports the estimated results. Although there is no systematic association between any of the explanatory variables and the six parameters of interest, we do reject a joint hypothesis of coefficient nullity across the three α regressions with $p < 0.001$; we do not so, however, for the three δ regressions. This suggests that the heterogeneity in pessimism (α) observed in our (restricted) experimental sample is partially transmitted by individual differences which, however, cannot account for the heterogeneity in the general preferences towards uncertainty (δ). However, we also note that this result should be handled with care, since it is not entirely confirmed in unrestricted sample estimations. Estimates provided in Table A4 point to a weak statistical link between our set of explanatory variables and the six parameters of interest.

Table A3. Seemingly unrelated regressions with individual characteristics: restricted sample

	α_i^A	α_i^S	α_i^E	δ_i^A	δ_i^S	δ_i^E
$\widehat{\sigma_i}$	-.031	-.147	-.068	.630	-.028	-.202
	(.029)	(.127)	(.168)	(.589)	(.640)	(.669)
Raven_Score	-.019	-.123	-.068	-.332	.214	.219
	(.015)	(.086)	(.063)	(.744)	(.739)	(.762)
RMET_Score	.005	-.003	-.020	-.453	.724	.820
	(.016)	(.016)	(.023)	(.517)	(.513)	(.546)
SSS_total	.015	.035	-.010	.505*	-.292	-.324
	(.010)	(.031)	(.059)	(.277)	(.284)	(.286)
Female	-.163*	.418	.704*	-.202	-2.595	-2.604
	(.098)	(.314)	(.419)	(2.283)	(2.322)	(2.362)
Age	.002	-.006	-.015	.001	-.062	-.081
	(.005)	(.014)	(.018)	(.192)	(.191)	(.199)
Econ_Buss	-.030	-.032	.757	-.636	-3.485	-4.612
	(.146)	(.172)	(1.174)	(4.264)	(4.568)	(4.478)
Engineer	.097	.202	-.323	1.726	-4.353**	-4.614**
	(.090)	(.274)	(.406)	(2.181)	(2.215)	(2.286)
Constant	-.284	1.037	2.307*	1.668	-8.631	-9.287
	(.294)	(.941)	(1.339)	(7.534)	(7.870)	(8.216)
Joint insignificance (*p*-value):	0.336	0.716	0.005	0.359	0.690	0.672

Note. Standard errors are clustered at the subject level and reported in parentheses. Data correspond to specification (3) in Table 6 (N=118). Parameter δ_i^k is neglog-transformed. Significance levels: * p<0.1, ** p<0.05, *** p<0.01. Joint insignificance of coefficients for the three α (δ) regressions: $p<0.001$ ($p=0.707$). Joint insignificance of coefficients across the six models: $p<0.001$.

Table A4. Seemingly unrelated regressions with individual characteristics: unrestricted sample

	α_i^A	α_i^S	α_i^E	δ_i^A	δ_i^S	δ_i^E
$\widehat{\sigma}_i$	-.035*	-.057	-.049	-.078	-.178	-.229
	(.021)	(.065)	(.083)	(.465)	(.477)	(.476)
Raven_Score	-.021	-.051	-.016	-.160	-.109	-.080
	(.013)	(.049)	(.037)	(.477)	(.477)	(.474)
RMET_Score	.010	-.008	-.025*	-.174	.456	.543
	(.013)	(.012)	(.015)	(.346)	(.334)	(.351)
SSS_total	.014*	.023	-.019	.138	.044	.008
	(.007)	(.020)	(.036)	(.217)	(.225)	(.214)
Female	-.091	.257	.454*	-1.250	-1.668	-1.663
	(.082)	(.194)	(.266)	(1.824)	(1.867)	(1.822)
Age	.000	.002	-.009	.022	-.099	-.127
	(.005)	(.010)	(.013)	(.166)	(.163)	(.170)
Econ_Buss	.070	.014	.386	-1.533	-2.293	-3.399
	(.110)	(.137)	(.679)	(2.790)	(2.875)	(2.861)
Engineer	.112	.039	-.297	-.438	-1.100	-2.335
	(.083)	(.177)	(.249)	(1.622)	(1.639)	(1.636)
Constant	-.350	.088	1.667*	3.591	-6.278	-6.582
	(.298)	(.590)	(.901)	(6.233)	(6.369)	(6.248)
Joint insignificance (*p*-value):	0.087	0.001	0.023	0.729	0.870	0.839

Note. Standard errors are clustered at the subject level and reported in parentheses. Data correspond to specification (1) in Table 6 (N=208). Parameter δ_i^k is neglog-transformed. Significance levels: * p<0.1, ** p<0.05, *** p<0.01. Joint insignificance of coefficients for the three α (δ) regressions: p<0.001 (p=0.606). Joint insignificance of coefficients across the six models: p<0.001.

A5. Screenshots

Figure A4. Screen used in RISK treatment

Figure A5. Screen used in STRATEGICUNCERTAINTY treatment (stag-hunt game)