Online Appendix

Limited Strategic Thinking and the Cursed Match

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Contents

A Useful Expressions

In this Appendix we provide expressions for some of the key variables of the model, namely $\pi(q', s)$, $\alpha(q, s)$ and $\beta(q', q, s)$.

First, the posterior probability of $q_j = q'$conditional on signal $s_i = s$ is given by:

$$\pi(q', s) \equiv Pr[q_j = q'|s_i = s] = \frac{\delta(q', s)}{\sum_{q''}[\delta(q'', s)]}$$

where the second equality follows by Bayes' rule.

Second, the acceptance probability, defined as the probability of player j proposing conditional on player i's type, is given by:

$$\alpha(q, s) \equiv Pr[a_j = P|q_i = q, s_i = s] = \sum_{q'}\sum_{s'}\pi(q', s)\delta(q, s')\sigma(q', s')$$

Finally, the posterior belief that player j's quality is q', conditional on the observed signal $s_i = s$, on own quality $q_i = q$ and on player j proposing, can be computed as:

$$\beta(q', q, s) = \frac{\sum_{s'}\delta(q, s')\sigma(q', s')}{\alpha(q, s)}\pi(q', s)$$

To derive this expression start with the definition of the posterior belief:

$$\beta(q', q, s) \equiv Pr[q_j = q'|s_i = s, a_j = P, q_i = q]$$

By Bayes' Theorem we can rewrite the posterior probability as:

$$\beta(q', q, s) = \frac{Pr[a_j = P|q_j = q', q_i = q, s_i = s]}{Pr[a_j = P|q_i = q, s_i = s]}Pr[q_j = q'|q_i = q, s_i = s]$$

Getting rid of redundant conditioning variables, we can rewrite the posterior belief as:

$$\beta(q', q, s) = \frac{Pr[a_j = P|q_j = q', q_i = q]}{Pr[a_j = P|q_i = q, s_i = s]}Pr[q_j = q'|s_i = s] \tag{A.1}$$

The probability of player j proposing conditional on the actual qualities of the players is given by:

$$Pr[a_j = P|q_i = q, q_j = q'] = \sum_{z'} Pr[s_j = s'|q_i = q] Pr[a_j = P|q_j = q', s_j = s']$$

Using this we can rewrite equation (A.1) as:

$$\beta(q', q, s) = \frac{\sum_{s'} Pr[s_j = s'|q_i = q] Pr[a_j = P|q_j = q', s_j = s']}{Pr[a_j = P|q_i = q, s_i = s]} Pr[q_j = q'|s_i = s] \tag{A.2}$$

Using our notation we rewrite equation (A.2) as:

$$\beta(q', q, s) = \frac{\sum_{s'} \delta(q, s')\sigma(q', s')}{\alpha(q, s)} \pi(q', s)$$

B Proof of Proposition 1

Proposition 1 has two parts. First, we prove that in game A, in any Bayes-Nash equilibrium: $\sigma(H, m) = 0$ and $\sigma(M, m) = 0$.

By contradiction, assume there is a BNE where $\sigma(H, m) > 0$. In this case, proposing conditional on an h signal is a best response for all types: $\sigma(q, h) = 1 \ \forall q$. Similarly, it is a best response for L-quality players to propose upon receiving an m signal: $\sigma(L, m) = 1$.

For $\sigma(H, m) > 0$ to be part of a BNE, it must be $\Delta(H, m) \geq 0$. This condition implies:

$$\begin{aligned} \alpha(H, m)[v(H, m) - \rho(H)] \geq 0; \\ v(H, m) \geq \rho(H); \\ \sum_{q'} \beta(q', H, m)\mu(q') \geq \rho(H) \end{aligned}$$

Substituting the actual matching and reservation values we get:

$$160\beta(H, H, m) + 80\beta(M, H, m) + 40\beta(L, H, m) \geq 100$$

Because posterior beliefs sum to one, this can be rewritten as:

$$160[1 - \beta(M, H, m) - \beta(L, H, m)] + 80\beta(M, H, m) + 40\beta(L, H, m) \geq 100$$

which yields

$$4\beta(M,H,m) + 6\beta(L,H,m) \leq 3 \tag{B.1}$$

We then compute the two posterior beliefs in condition (B.1) using the expressions provided in Appendix A, the given likelihoods and using the fact that $\sigma(q,h) = 1\ \forall q$ and $\sigma(L,m) = 1$. This yields:

$$\beta(M,H,m) = \frac{1}{4}\frac{1+\sigma(M,m)}{\alpha(H,m)}$$

and

$$\beta(L,H,m) = \frac{1}{4}\frac{1}{\alpha(H,m)}$$

where

$$\alpha(H,m) = \frac{5}{8} + \frac{1}{8}\sigma(H,m) + \frac{1}{4}\sigma(M,m)$$

Using the last three expressions and condition (B.1) gives:

$$\frac{5}{8} + \frac{1}{4}\sigma(M,m) \leq \frac{3}{8}\sigma(H,m)$$

This inequality cannot be satisfied if $\sigma(M,m)$ and $\sigma(H,m)$ are between 0 and 1. Thus, we have reached a contradiction and we have proved that in any BNE of game A it must be: $\sigma(H,m) = 0$.

The next step involves showing that in any BNE: $\sigma(M,m) = 0$. By contradiction assume that $\sigma(M,m) > 0$. Then it must be $\Delta(M,m) \geq 0$. This condition implies:

$$\alpha(M,m)[v(M,m) - \rho(M)] \geq 0;$$

$$v(M,m) \geq \rho(M);$$

$$\sum_{q'} \beta(q',M,m)\mu(q') \geq \rho(M)$$

Substituting the actual matching and reservation values we get:

$$160\beta(H,M,m) + 80\beta(M,M,m) + 40\beta(L,M,m) \geq 75 \tag{B.2}$$

To compute the posterior beliefs in condition (B.2) we use the expressions provided in Appendix A, the given likelihoods and the fact that $\sigma(q, h) = 1\ \forall q$, $\sigma(L, m) = 1$ and $\sigma(H, m) = 0$. This yields:

$$\beta(H, M, m) = 0$$

$$\beta(M, M, m) = \frac{\sigma(M, m)}{\sigma(M, m) + 1/2}$$

$$\beta(L, M, m) = \frac{1/2}{\sigma(M, m) + 1/2}$$

Substituting these expressions in condition (B.2) and solving for $\sigma(M, m)$ we get:

$$\sigma(M, m) \geq \frac{7}{2}$$

which is not possible. Having reached a contradiction, it must be $\sigma(M, m) = 0$.

The second part of Proposition 1 states that in game A the pure-strategy BNE where most types propose is such that: $\mathcal{P}_H = \{h\}, \mathcal{P}_M = \{h\}, \mathcal{P}_L = \{h, m, l\}$. We have already shown that in any pure-strategy BNE $m \notin \mathcal{P}_H$ and $m \notin \mathcal{P}_M$. Moreover, $l \notin \mathcal{P}_H$ and $l \notin \mathcal{P}_M$ because proposing after observing l is not a best response for H- and M-types. We can show that the other strategies are part of a BNE. For type (H, h), P is the best response because: $v(H, h) = \mu(H) = 160 > \rho(H) = 100$. For type (M, h), P or N are both best responses (because H types do not accept m signals). For type (L, s_i), P is the best response for any signal s_i, because $\mu(q) > \rho(L) \forall q$.

C Proof of Proposition 2

In game B, the pure-strategy BNE where most types propose is such that: $\mathcal{P}_H = \{h, m\}, \mathcal{P}_M = \{h, m\}, \mathcal{P}_L = \{h, m, l\}$. To show this first note that in any pure-strategy BNE $l \notin \mathcal{P}_H$ and $l \notin \mathcal{P}_M$ because proposing after observing l is not a best response for H- and M-types. Then we show that the other strategies in this profile are best responses. For type (H, h), P is the best response because: $v(H, h) = \mu(H) = 160 > \rho(H) = 100$. For type (H, m), P is now the best response because: $v(H, m) = 0.25 \times \mu(H) + 0.5 \times \mu(M) + 0.25 \times \mu(L) = 90 > \rho(H) = 80$. For type (M, h), P or N are both best responses (because H types do not accept m signals). For type (M, m), P is the best response because: $v(M, m) = 0.25 \times \mu(H) + 0.5 \times \mu(M) +$

$0.25 \times \mu(L) = 90 > \rho(M) = 75$. For type (L, s), P is the best response for any signal s.

D Derivation of Likelihoods in the *COND* Treatment

In this Appendix we provide expressions for the modified signal likelihoods used in the design of the $COND$ treatment. For each value of $p \in \{0, 0.25, 0.5, 0.75, 1\}$, we calculate the $COND$-task likelihoods in the following way. First, we compute the posterior probability in the BEL-task, denoted $\phi(p)$:

$$\phi(p) \equiv Pr[q_2 = H | s_1 = m, q_1 = M, a_2 = P; BEL\text{-task}]$$

Then we require the posterior belief in the $COND$-task to equal the posterior belief in the BEL-task:

$$Pr[q_2 = H | s_1 = m; COND\text{-task}] = \phi(p) \tag{D.1}$$

To achieve this we only adjust the likelihoods of observing h and m signals when player 2's quality is H, while leaving all other likelihoods unchanged.

Applying Bayes' rule on equation (D.1) we obtain:

$$\frac{Pr[s_1 = m | q_2 = H; COND\text{-task}] \times 1/3}{Pr[s_1 = m | q_2 = H; COND\text{-task}] \times 1/3 + 1 \times 1/3 + 0.5 \times 11/3} = \phi(p)$$

It follows that:

$$Pr[s_1 = m | q_2 = H; COND\text{-task}] = \frac{\frac{3}{2}\phi(p)}{1 - \phi(p)}$$

Since $Pr[s_1 = l | q_2 = H; COND\text{-task}] = 0$, then we also know:

$$Pr[s_1 = h | q_2 = H; COND\text{-task}] = 1 - Pr[s_1 = m | q_2 = H; COND\text{-task}] = \frac{1 - \frac{5}{2}\phi(p)}{1 - \phi(p)}$$

E Empirical Best Responses in the *BASE* Treatment

Proposing is an empirical best response for a type if the expected gain from proposing for that type is positive or zero given the empirical distribution of strategies. If the expected gain from proposing for a type is negative, then not proposing is the empirical best response. To determine for which types proposing is an empirical best responses in the *BASE* Treatment, we compute the expected gain from proposing for each type using the empirical distribution of strategies. The expected gain from proposing for a type, $\Delta(q, s)$, is defined as:

$$\Delta(q,s) \equiv \alpha(q,s) \sum_{q'} \beta(q',q,s)\mu(q') + [1-\alpha(q,s)]\rho(q) - \rho(q)$$

where $\mu(q)$ and $\rho(q)$ are exogenous parameters of the game while

$$\alpha(q,s) \equiv Pr[a_j = P | q_i = q, s_i = s]$$

and

$$\beta(q',q,s) \equiv Pr[q_j = q' | s_i = s, a_j = P, q_i = q]$$

All these terms are defined in Section A. As shown in Appendix A, the probabilities $\alpha(q, s)$ and $\beta(q', q, s)$ can be computed using the exogenous information structure and the (possibly mixed) strategies $\sigma(q, s) \equiv Pr[a_i = P|q_i = q, s_i = s]$. To calibrate these mixed strategies, we use the actual average proposal rates in our *BASE* treatment. For example, the probability that type (H, m) chooses to propose, i.e. $\sigma(H, m)$, in game A, is computed as the average proposal rate for types (H, m) in that game, which is 0.17. Table 1 reports the expected gains from proposing for each type.

Game A

q \ s	h	m	l
H	32	-15	-59
M	15	-3	-34
L	19	17	15

Game B

q \ s	h	m	l
H	61	6	-39
M	48	5	-35
L	44	25	15

Table 1: Expected Gains from Proposing $\Delta(q, s)$ in *BASE*

F Individual Analysis of *BASE* Data

In this appendix we provide a more detailed analysis of individual heterogeneity in the *BASE* treatment. We use individual proposal rates. The proposal rate for a subject is computed as the average proposal frequency across rounds conditional on each possible type (q, s). We then discretize the proposal rates: we define a dummy variable P_{qsG} equal to 1 if a subject's proposal rate is greater than or equal to 50% conditional on type (q, s) in game G. For example, if a subject proposes at least 50% of the rounds when playing type (M, m) in game A, then $P_{MmA} = 1$. If a subject's proposal rate is less than 50% conditional on type (q, s) in game G (and so $P_{MmA} = 0$), then we let $N_{qsG} = 1$.

A complete summary of the distribution of strategies across subjects is not feasible, because the strategy space has 18 dimensions (9 types in each game). Instead we can consider different pairs of types and report the joint frequency distribution of individual strategies for each pair (a contingency table for each pair of types). The main object of interest are the strategies for types (M, m) and (H, m) in games A and B. As mentioned before, all other types have weakly dominated strategies, such as proposing for a (H, l)-type. To summarize the information about these types, we compute whether a subject chooses any weakly dominated strategy in at least one round: in this case we let the dummy variable WD equal 1. If a subject never chooses a weakly dominated strategy then we let the dummy variable $NoWD$ equal 1.

Table 2 reports the distribution of individual proposal decisions. Each entry in the table is the number of subjects who can be classified in a specific proposal decision profile. The number of subjects in each cell is 48, the total number of subjects in the *BASE* treatment. Thus, each cell is in fact a 2-by-2 contingency table. Using this table it is possible to make several qualitative observations about the distribution of strategies. For example, subjects who propose at high rates as (M, m)-types in game A are more likely to propose at high rates as both as (M, m)-types and (H, m)-types in games A and B, relatively to subjects who propose at low rates as (M, m)-types in game A. Subjects who propose at high rates as (M, m)-types in game A are only slightly more likely to choose weakly dominated strategies than subjects who propose at low rates as (M, m)-types in game A. The data suggest there is not a single group of subjects who can account for all deviations from the equilibrium. For example, among the subjects who have high (M, m)-proposal rates in game A (inconsistent with equilibrium), a majority have high (H, m)-proposal rates in game B (consistent with equilibrium). Although only a few subjects can be classified as playing consistently with the equilibria of the games across all types, reassuringly 31 out of 48 subjects never play weakly dominated strategies.

	P_{MmA}	N_{MmA}	P_{MmB}	N_{MmB}	P_{HmA}	N_{HmA}	P_{HmB}	N_{HmB}	WD	$NoWD$
P_{MmA}	38	0	33	5	7	31	28	10	14	24
N_{MmA}	0	10	5	5	0	10	3	7	3	7
P_{MmB}	33	5	38	0	5	33	29	9	14	24
N_{MmB}	5	5	0	10	2	8	2	8	3	7
P_{HmA}	7	0	5	2	7	0	7	0	5	2
N_{HmA}	31	10	33	8	0	41	24	17	12	29
P_{HmB}	28	3	29	2	7	24	31	0	14	17
N_{HmB}	10	7	9	8	0	17	0	17	3	14
WD	14	3	14	3	5	12	14	3	17	0
$NoWD$	24	7	24	7	2	29	17	14	0	31

Table 2: Distribution of Individual Proposal Decisions

It is also useful to examine the joint proposal distribution of a few key types. Table 3 reproduces the joint distribution for types (H, m) and (M, m) in the two games. Each entries is the number of subjects in one category. The sum of all the entries of the table is equal to 48, the total number of subjects. Table 3 shows that a significant number of subjects (21 out of 48) behave in a way consistent with limited strategic thinking, reacting to changes in reservation values when playing (H,m) types but not when playing (M,m) types (i.e. they have high (H,m) proposal rates in game B, low (H,m) proposal rates in game A and high (M,m) proposal rates in both games). This is by far the most frequent type of strategy.

		P_{MmA}		N_{MmA}	
		P_{MmB}	N_{MmB}	P_{MmB}	N_{MmB}
P_{HmA}	P_{HmB}	5	2	0	0
	N_{HmB}	0	0	0	0
N_{HmA}	P_{HmB}	21	0	3	0
	N_{HmB}	7	3	2	5

Table 3: Joint Distribution of Individual Proposal Decisions for Types (H, m) and (M, m)

G Cursed Equilibrium and QRE

Definition of Cursed Equilibrium

The posterior belief of a χ-cursed player is:

$$\beta^c(q', q, s; \chi) \equiv \chi\pi(q', s) + (1-\chi)\beta(q', q, s)$$

The expected match payoff of a cursed player is:

$$v^c(q, s; \chi) = \sum_{q'} \beta^c(q', q, s; \chi)\mu(q')$$

The expected gain from proposing for a cursed player is:

$$\Delta^c(q, s; \chi) \equiv \alpha(q, s)[v^c(q, s; \chi) - \rho(q)]$$

In a cursed equilibrium, each type (q, s) chooses their proposal strategies to maximize $\Delta^c(q, s; \chi)$.

Cursed Equilibrium in the $BASE$ Games

Proposition. *In game A, for $\chi \geq \frac{5}{14}$, there is a cursed equilibrium such that: $\mathcal{P}_H = \{h\}, \mathcal{P}_M = \{h, m\}, \mathcal{P}_L = \{h, m, l\}$.*

To prove this, we check whether this strategy profile satisfies the conditions for a cursed equilibrium. First, proposing is a best response for type (L, s) for all s and for any $\chi \in [0, 1]$.

Next, consider an H-quality type. As before, P is the best response for type (H, h) and N is the best response for type (H, l), for any $\chi \in [0, 1]$. To show that N is the best response of type (H, m), we first compute the cursed posterior beliefs. These are given by:

$$\beta^c(H, H, m) = \frac{1}{7} + \frac{3}{28}\chi$$
$$\beta^c(M, H, m) = \frac{4}{7} - \frac{1}{14}\chi$$
$$\beta^c(L, H, m) = \frac{2}{7} - \frac{1}{28}\chi$$

Then it is possible to show that $\Delta^c(H, m) \geq 0$ only if $\chi \geq 2$. Thus, N is the best response of type (H, m) for any $\chi \in [0, 1]$.

Finally, consider an M-quality type. As before, P is a best response for type (M, h) and N is the best response for type (M, l), for any $\chi \in [0, 1]$. We then check when P is the best response of type (M, m). The cursed posterior beliefs are given by:

$$\begin{aligned} \beta^c(H, M, m) &= \frac{1}{4}\chi \\ \beta^c(M, M, m) &= \frac{2}{3} - \frac{1}{6}\chi \\ \beta^c(L, M, m) &= \frac{1}{3} - \frac{1}{12}\chi \end{aligned}$$

Then it is possible to show that $\Delta^c(M, m) \geq 0$ only if $\chi \geq \frac{5}{14}$. Thus, P is the best response of type (H, m) for $\chi \geq \frac{5}{14}$.

When players are sufficiently cursed, they simply fail to anticipate the acceptance curse. This leads M-quality players to overestimate the likelihood of player j being an H type after observing an m signal. As a result, M-quality players choose to propose conditional on an m signal. Note however that even in the cursed equilibrium H-quality players do not propose conditional on m signals. It is also possible to show that in game B, the BNE identified in section C is a cursed equilibrium for any χ. Thus, failures to anticipate the acceptance curse can results in M-quality players proposing conditional on m signals in both games.

Cursed QRE Definition

To model stochastic decision we use the logit formulation of the quantal-response equilibrium model (see for example Goeree et al., 2016) and combine this with the cursed equilibrium model. A similar approach has been used in Camerer et al. (2016) and Carrillo and Palfrey (2009). In this framework, the probability of choosing action P depends on the perceived gain from proposing according to the following equation:

$$\sigma(q, s) = \left[1 + e^{-\lambda \Delta^c(q,s;\chi)}\right]^{-1}$$

where the parameter $\lambda \geq 0$ measures the responsiveness of decisions to perceived payoffs. When $\lambda = 0$ all actions are played with probability 50% and as $\lambda \to \infty$ the model converges to a cursed equilibrium.

Cursed QRE in the $BASE$ Games

To illustrate the predictions of the Cursed QRE model of our game, we solve the model numerically for different values of λ and χ and plot the results in Figures 1 and 2. The plots show the predicted proposal rates $\sigma(\cdot)$ for types (H, m) and (M, m) in game A and game B. These are the key variables in our empirical analysis. For clarity we do not show the proposal strategies of other types: all these types always have a weakly dominated strategy across both games (such as N for L-quality types) and therefore the comparative statics are less interesting.

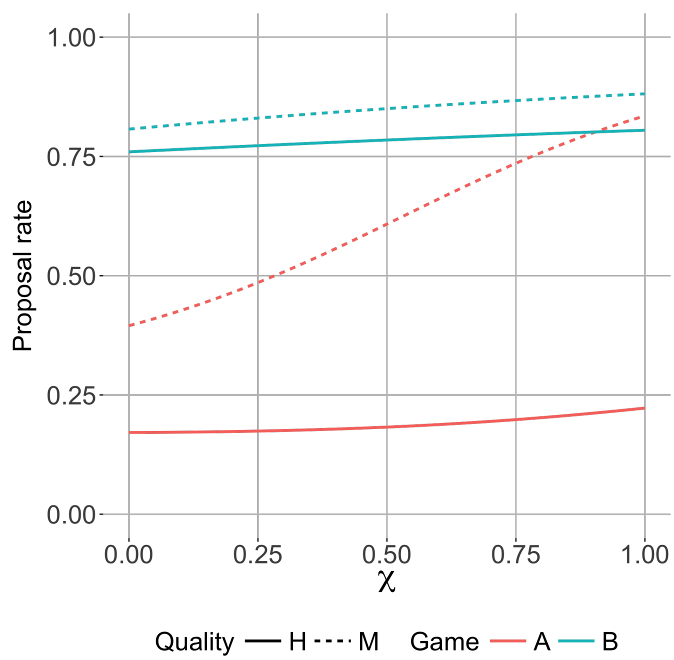


Figure 1: Predicted proposal rates for m signals ($\lambda = 0.15$).

Figure 1 plots the predicted proposal rates against χ, for a medium value of λ. Solid lines represent H-quality types and dashed lines represent M-quality types. The proposal probability $\sigma(H, m)$ is above 50% in game B (solid blue line) and below 50% in game A (solid red line). The intuition for this is consistent with our previous equilibrium analysis: H-quality types are more selective in game A than in game B. Moreover, the behavior of H-quality players is not significantly affected by the χ parameter. The proposal probability $\sigma(M, m)$ in game B (dashed blue line) is above 50% and again does not vary much with χ. This follows from the fact that in this game H-players are not selective and thus ignoring the limited degree of adverse selection present in this environment has only minor effects. The proposal probability $\sigma(M, m)$ is instead highly sensitive to χ in game A (dashed red line). When $\chi = 0$, fully sophisticated players correctly perceive that not proposing is the best response for type (M, m), given that H-players are very selective. As a result, (M, m) types propose less than 50% of the time. As χ increases, the perceived gain from proposing increases and thus the (M, m) proposal rate rises. When $\chi = 1$, the proposal rate of (M, m) types in game A is just a few percentage points below game B.

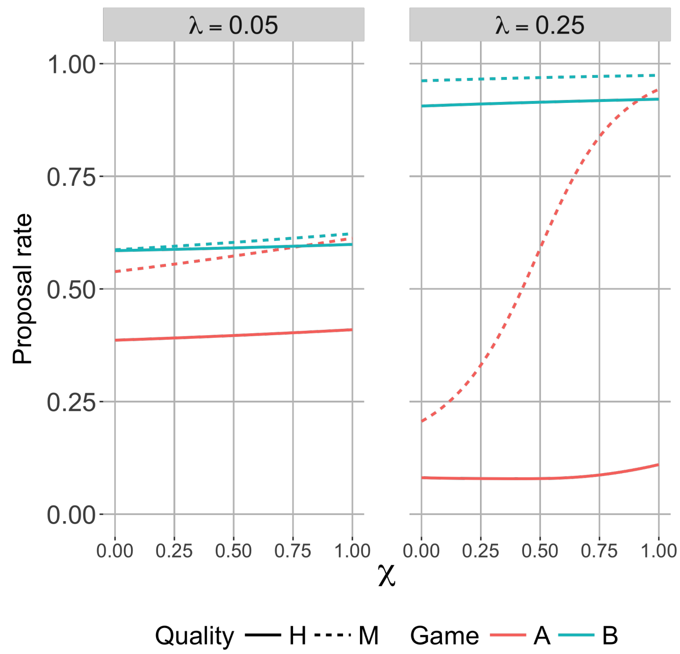


Figure 2: Predicted proposal rates for m signals (low and high λ).

The comparative statics of this model are qualitatively similar for different values of λ. To illustrate this point, Figure 2 plots proposal rates for a lower λ $(= 0.05)$ and a higher λ $(= 0.25)$. By comparing these plots, it is possible to observe several regularities. First, $\sigma(H, m)$ and $\sigma(M, m)$ are lower in game A than in game B. Second, the difference in $\sigma(H, m)$ between games is roughly constant in χ. Third, the difference in $\sigma(M, m)$ across games is decreasing in χ. Figure 2 also helps us to illustrate the main effect of the parameter λ. When λ is lower, the proposal rates become closer to 50% and less responsive to both changes in reservation values and changes in χ.

It is important to note that the parameters λ and χ have different effects on predicted behavior. Our comparative statics exercises suggest a distinctive prediction of cursedness: large values of χ can result in striking differences between the behavior of H- and M-quality players. To make this statement more precise we solve the model numerically and obtain the following result. Consider a profile of proposal probabilities that simultaneously satisfies the following conditions:

1. differences in (H, m) proposal rates between game A and game B are large ($> 25\%$);
2. differences in (M, m) proposal rates between game A and game B are small ($< 5\%$).

In order to rationalize such a profile of proposal probabilities with a cursed QRE model, the value of χ must be large (> 0.5).

H Structural Estimation of Cursed QRE

We denote the three parameters to be estimated by $\theta \equiv [\lambda, \chi^{BASE}, \chi^{BEL}]$.

Each observation, indexed by $n \in \{1, ..., N\}$, is at the round-subject level and consists of variables y_n, q_n, s_n, ω_n. The variable $y_n \in \{0, 1\}$ is the proposal decision of the subject in that round (in BEL and $COND$ we use only active subjects who play the role of player 1) while $q_n \in \{H, M, L\}$ and $s_n \in \{h, m, l\}$ denote the quality and signal of the subject in that round. While in the regressions presented in previous sections we have often restricted attention to rounds in which M- or H-quality players observed m signals, we estimate the structural model using data for all types. The only restriction is that we use data for round 21 to 60, as before.

The variable ω_n is an indicator for the treatment and game/task (recall that there are two games in $BASE$ and five tasks in $BEL/COND$, indexed by p):

$$\omega_n \in \{BASE_A, BASE_B, BEL_{p=0}, ..., BEL_{p=1}, COND_{p=0}, ..., COND_{p=1}\}$$

We use ω_n to link to treatment- and round-specific parameters of the game, such as reservation values, match values, signal likelihoods and decision rules of automated players. We estimate the parameters θ by maximum likelihood. With the notation introduced above, the log-likelihood of our model can be written as:

$$\ell = \sum_n \{y_n \log \sigma(q_n, s_n, \omega_n; \theta) + (1 - y_n) \log[1 - \sigma(q_n, s_n, \omega_n; \theta)]\}$$

where $\sigma()$ is the predicted probability of proposing for observation y_n, q_n, s_n, ω_n, given parameters θ. In $BASE$, we compute $\sigma()$ as a fixed-point solution of the QRE model. In BEL and $COND$, player 2's strategy is given and thus $\sigma()$ can be computed directly. We optimize ℓ numerically.

I Robustness

The main results in the paper were obtained using only data from round 21 to round 60 (allowing for learning). In this appendix we show that the main results are robust to using data from round 1 to round 60.

Proposal rates in BASE

The aggregate proposal rates are summarized in the following tables.

Game A

q \ s	h	m	l
H	0.86	0.19	0.11
M	0.98	0.69	0.05
L	0.99	0.97	0.98

Game B

q \ s	h	m	l
H	0.96	0.60	0.09
M	0.94	0.69	0.12
L	0.95	0.98	0.96

Table 4: Aggregate proposal rates in $BASE$, data from round 1 to 60

The analysis of empirical best responses is unchanged when using data from round 1. Proposing is an empirical best response for types (H, h), (M, h), (L, h), (L, m), (L, l) in both games. Not proposing is an empirical best response for types (H, l) and (M, l) in both games. Proposing is an empirical best response for types (H, m), (M, m) in game B but not in game A.

For each type, we test the hypothesis that the proposal rate is equal to 50% using a one-sided Wilcoxon test where each observation is the group-level average proposal rate. The following tables report the p-values.

Game A

		s		
		h	m	l
q	H	0.016	0.016	0.018
	M	0.013	0.016	0.016
	L	0.013	0.018	0.016

Game B

		s		
		h	m	l
q	H	0.017	0.031	0.017
	M	0.017	0.016	0.016
	L	0.016	0.017	0.016

Table 5: P-values of Wilcoxon tests in *BASE*, data from round 1 to 60

Based on this evidence we have the following:

Result 1 (BASE)**.** *The proposal rates of types for whom proposing is (is not) an empirical best response are above (below) 50%, with only one exception: proposal rates for* (M, m) *types in game A. In this game, proposing is not an empirical best response for type* (M, m) *but these types of players propose more than 50% of the time.*

Using a Wilcoxon test on group-level observations matched between the two games, we cannot reject the null hypothesis of no difference in (M, m) proposal rates between game B and game A (p-value: 0.5). On the contrary, (H, m) proposal rates differ considerably between game A and B. Again using a Wilcoxon test on group-level observations, we reject the null hypothesis of equal means at the 5% significance level (with a p-value of 0.0156).

Restricting attention to observations consisting of an H- or M-quality player receiving an m signal, we estimate the following equation:

$$propose = b_0 + b_1 H + b_2 A + b_3 H \times A + \epsilon \tag{I.1}$$

In this equation, the variable *propose* equals one if the subject chose to propose conditional on an m signal. The variable H equals one if the subject's quality was H (the excluded category is M quality). The variable A equals one if the subject is playing in game A (the excluded category is game B). We estimate equation (I.1) using either a linear probability model or a logit regression and always clustering errors at both the individual and group levels. Table 6 reports the results from regression (I.1). Our estimate of the coefficient on the dummy variable for game A is small and insignificant. Thus, M-quality players do not

	Dependent variable: *propose*	
	Linear	Logit
H	-0.087	-0.381
	(0.056)	(0.245)
A	0.007	0.033
	(0.024)	(0.111)
$H \times A$	-0.421^{***}	-1.911^{***}
	(0.043)	(0.290)
Constant	0.689^{***}	0.798^{***}
	(0.050)	(0.232)
Regression	Linear	Logit
Clustering	Yes	Yes
Observations	1,271	1,271
Log Likelihood	-794.404	-757.990
Akaike Inf. Crit.	1,596.807	1,523.979

Note: This table reports estimates from regression (I.1). The regressions are estimated using only observations of (H, m) and (M, m) types from round 1 to round 60. Standard errors are clustered at individual and group level in parentheses. *p<0.1; **p<0.05; ***p<0.01

Table 6: Proposal decisions in *BASE*

adjust their proposal rate between game A and game B on average. On the other hand, the estimate on the interaction term $H \times A$ is large in magnitude and highly significant, showing that H-types propose at significantly lower rates in game A relative to game B.

Finally, we analyze the change in proposal rates at the individual level. For each subject, we compute the average proposal rates across rounds conditional on the subject's own quality and signal. We then examine how individual (M, m)- and (H, m)-proposal rates change between game A and game B. Using Wilcoxon tests on individual-level observations, we reject the hypothesis that the distributions of changes in individual proposal rates have the same mean (p-value$<$ 0.01), we reject the hypothesis that (H, m)-proposal rates do not change between the two games (p-value$<$ 0.01) and we cannot reject the hypothesis that (M, m)-proposal rates do not change between the two games on average (p-value$=$ 0.88).

Based on this evidence me obtain the following:

Result 2 (BASE)**.** *While proposal rates of* (H, m) *types differ significantly between game A and game B, proposal rates of* (M, m) *types do not.*

Proposal rates in BEL and COND

We estimate regressions of the probability of proposing in *BEL* and *COND*:

$$propose = a_0 + a_1 AdverseSelection + \epsilon \tag{I.2}$$

where $AdverseSelection = (1 - p)$. We estimate equation (I.2) separately for BEL and $COND$. For each treatment we run a linear model and a logit model, always clustering errors at the individual and group levels. The results are reproduced in Table 7. The coefficient on $AdverseSelection$ is negative and highly significant, thus leading to the following:

Result 3. *Proposal rates of* (M, m) *types respond significantly to changes in the degree of adverse selection* $(1 - p)$ *in both* BEL *and* $COND$*.*

	Dependent variable: *propose*			
	BEL		COND	
	Linear	Logit	Linear	Logit
Adverse selection $(1-p)$	-0.559^{***}	-3.024^{***}	-0.546^{***}	-2.509^{***}
	(0.057)	(0.391)	(0.047)	(0.300)
Constant	0.966^{***}	2.499^{***}	0.860^{***}	1.672^{***}
	(0.030)	(0.296)	(0.075)	(0.471)
Regression	Linear	Logit	Linear	Logit
Clustering	Yes	Yes	Yes	Yes
Observations	951	951	868	868
Log Likelihood	-524.368	-498.186	-540.105	-513.657
Akaike Inf. Crit.	1,052.735	1,000.372	1,084.210	1,031.314

Note: This table reports estimates from regression (7). The regressions are estimated using only observations of subjects in the role of a (M, m)-type player 1 from round 1 to round 60. The variable $AdverseSelection$ is given by the round-specific parameter $1-p$. Standard errors are clustered at individual and group level in parentheses. *p<0.1; **p<0.05; ***p<0.01

Table 7: Proposal decisions in BEL and $COND$

We run non parametric tests of differences in (M, m) proposal rates between BEL and $COND$. For each value of the $AdverseSelection$ parameter (i.e. $1-p$), we use a Wilcoxon test to evaluate the null hypothesis that there are no differences in group-level proposal rates between BEL and $COND$. The results are reported in Table 8. Only for two values of our $AdverseSelection$ parameter (0.25 and 0.5) we can reject the null hypothesis at the 5% significance level. We thus have the following result:

Result 4. *The differences in proposal rates of (M, m) types between BEL and $COND$ are small.*

AdverseSelection parameter	0	0.25	0.5	0.75	1
Difference in proposal rates	0.10	0.10	0.14	0.05	0.12
Wilcoxon test p-value	0.09	0.05	0.04	0.24	0.09

Note: This table reports p-values of a one-sided Wilcoxon test of differences in proposal rates between BEL and $COND$ using data from round 1 to round 60. For each value of the *AdverseSelection* parameter, the null hypothesis is that there are no differences in group-level proposal rates between BEL and $COND$. The alternative hypothesis is that proposal rates are higher in BEL than $COND$. For each of these tests, an observation is the average proposal rate in a group. Thus, for each value of *AdverseSelection*, we have 6 observations in BEL and 6 observations in $COND$.

Table 8: Differences in proposal rates between BEL and $COND$

Structural estimation

Parameter	Estimate and s.e.
λ	0.074***
	(0.002)
χ^{BASE}	0.990***
	(0.121)
χ^{BEL}	0.265***
	(0.082)
-2 log Lik.	5257
Observations	5760

Note: This table reports maximum likelihood estimates of the structural model parameters. Asymptotic standard errors are reported in parentheses. *p<0.1; **p<0.05; ***p<0.01

Table 9: Maximum likelihood estimation results

We repeat the structural estimation using data from round 1 to round 60. Structural estimation results are reported in Table 9. As before, we find that subjects behave as if they are nearly fully cursed in $BASE$ since χ^{BASE} is close to 1 (and highly significant). Our estimates also suggest that mistaken beliefs have a large effect on cursedness: we run a (one-sided) likelihood-ratio test of the null hypothesis that $\chi^{BASE} = \chi^{BEL}$ and reject with a p-value of 10^{-12}. We summarize our findings from the structural estimation in the following:

Result 5. *Structural estimation shows that: 1) subjects behave as if they are fully cursed in $BASE$, 2) they behave as if they are cursed to a much lower degree in BEL, implying a large* *role of mistaken beliefs.*

J Experiment Instructions

BASE

This appendix reproduces the instructions for the *BASE* treatment of the experiment.

INSTRUCTIONS

You are about to participate in an experiment in the economics of decision-making. If you follow these instructions carefully, you can earn an amount of money which will be paid to you in cash at the end of the experiment.

Your computer screen will display useful information. Remember that the information on your computer screen is private. To insure best results for yourself and accurate data for the experimenters, please <u>do not communicate</u> with the other participants at any point during the experiment. If you have any questions, or need assistance of any kind, raise your hand and one of the experimenters will come.

PARTS and PAYMENTS

This experiment will consist of four parts. At the end of the experiment, you will be paid 5€, plus earnings based on the points you have earned during the experiment. Your points will be converted to Euros at an exchange rate of 1/6 Euro per point. To sum up, your final payment in Euros is given by the following formula:

$$Your\ points/6 + 5\quad €$$

PART 1

THE BASIC IDEA

In this part, you have to decide whether to form a partnership with other players. The benefit of forming a partnership with another player will depend on the other player's type, which is randomly assigned by the computer. During the experiment, you will not know the type of your potential partners. However, you will receive clues about their types before you decide to form a partnership. If you form a partnership, you receive an amount of points that depends on your partner's type. If you do not form a partnership, you receive an amount of points that depends only on your own type.

ROUNDS

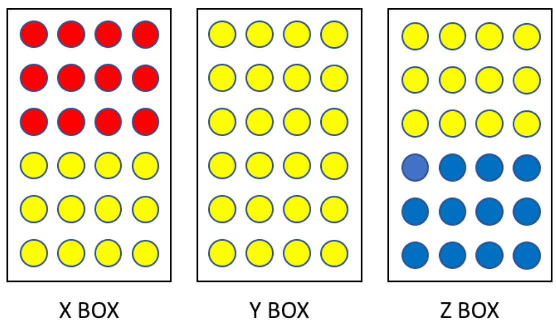
The experiment will be divided into **60 rounds**. In each round, you are randomly paired with another player. Decisions and points you make in one round do not affect other rounds.

PLAYERS AND TYPES

In each round, each participant is randomly assigned a type. A participant's type can be X, Y, or Z. In each round your type is **equally likely** to be X, Y or Z. In each round, you will have an opportunity to form a partnership with another player. The computer will randomly pair you and another player. The way in which pairs are formed is random and does not depend on the players' types. This means that you are **equally likely** to be paired with an X, Y, or Z-type player, independently of your own type.

CLUES

You will not know the type of the participant you are paired with in a round. However, you will receive a clue about your potential partner's type. Clues are determined in the following way. The **computer will digitally draw a random ball from a box containing 24 balls of different colors**. Each ball can be either blue, yellow or red. The number of blue, yellow and red balls in **the box depends on your partner's type**. The boxes used in the experiment are illustrated in the figure below.



If your partner's type is X, the box contains no blue balls, 12 yellow balls and 12 red balls. If your partner's type is Y, the box contains 24 yellow balls but no blue or red balls. If your partner's type is Z, the box contains 12 blue balls, 12 yellow balls and no red balls. To give you a clue about the type of your potential partner, the computer will first determine which box to use given your partner's type. Then it will digitally draw a random ball: each single ball in the box has the same probability of being selected, equal to 1/24. The clue you receive is the color of this randomly drawn ball.

3

FORMING A PARTNERSHIP

After you have received a clue about your potential partner's type, you can decide whether you want to form a partnership or not. **Only if you and the other player agree to form a partnership, a partnership is formed.** For example, if you want to form a partnership but the other player does not, the partnership is not formed.

POINTS

Every time you form a partnership, you earn an amount of points that depends only on the type of the other player. Whenever you do not form a partnership, you earn an amount of point that depends only on your own type. Consider the example illustrated in the following table. In this example, if you form a partnership with an X type you earn 160 points, if you form a partnership with a Y type you earn 80 points and if you form a partnership with a Z type you earn 40 points. If you do not form a partnership and your type is X, you earn 100 points. If you do not form a partnership and your type is Y, you earn 75 points. If you do not form a partnership and your type is Z, you earn 25 points.

Points if you **form** a partnership:			
Partner's type	X	Y	Z
Your points	160	80	40
Points if you do **not form** a partnership:			
Your type	X	Y	Z
Your points	100	75	25

The exact amounts of points you can earn will depend on the game you are playing. There are two versions of this game, called A and B. There will be 30 rounds for each game, but the exact sequence of games will be random. The following table reports the actual amounts of points you can earn in each game. Note that Game A is the example discussed above. The only difference between game A and B is the payoff a type X player receives if he does not form a partnership.

GAME A

Points if you **form** a partnership:			
Partner's type	X	Y	Z
Your points	160	80	40
Points if you do **not form** a partnership:			
Your type	X	Y	Z
Your points	**100**	75	25

GAME B

Points if you **form** a partnership:			
Partner's type	X	Y	Z
Your points	160	80	40
Points if you do **not form** a partnership:			
Your type	X	Y	Z
Your points	**80**	75	25

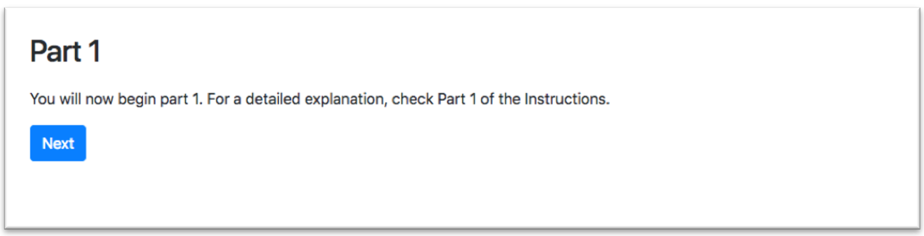
5

PAYMENT

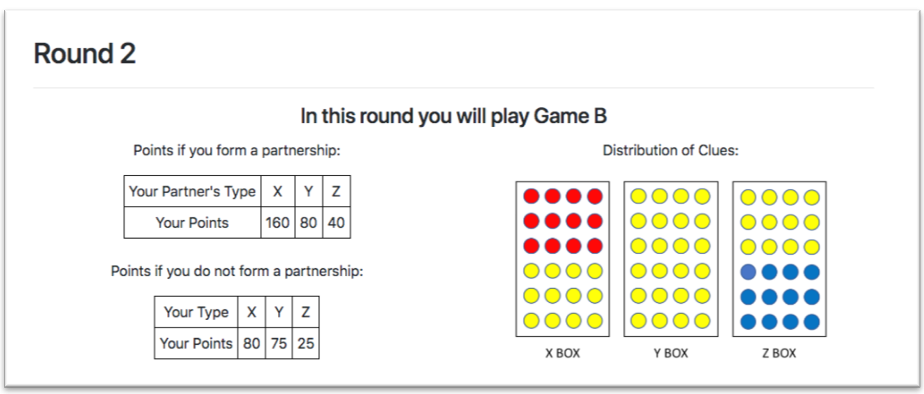
At the end of the experiment, your payment will depend on the points you have earned in this part. In particular, the computer will randomly select one round out of the 60 rounds in part 1. At the end of the experiment, the points you have earned in the selected round will be converted to Euros at an exchange rate of 1/6 Euros per point.

PART 1 APP PAGES

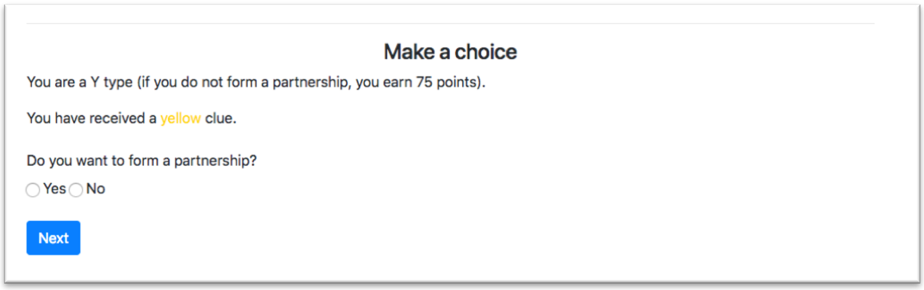
The experiment app will show you several pages, described below. Between a page and the next you may have to wait for other participants to make their choices. At the beginning of Part 1 you will see a page like this.



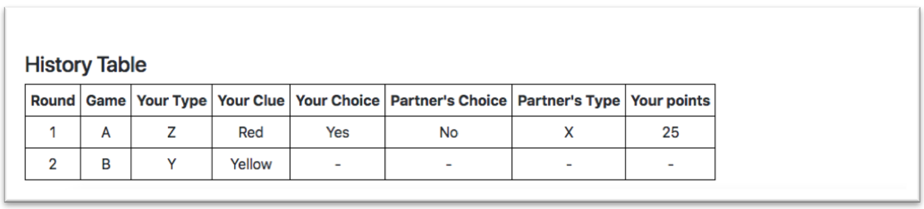
At the beginning of a new round, you will see a page informing you of whether you are playing game A or game B.



In this page, you receive information about your own type. You are also given a clue about your potential partner's type and you decide whether you want to form a partnership or not.



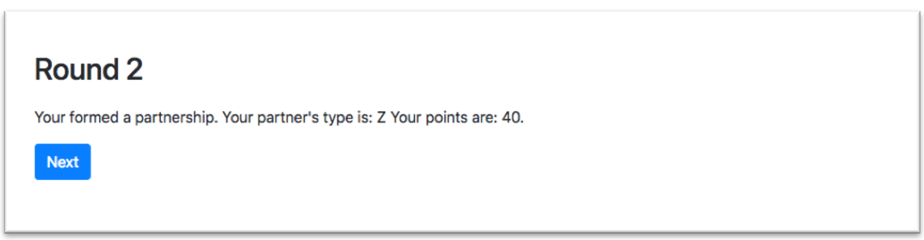
At the bottom of this page you can see a table with a history of all the previous rounds.



History Table

Round	Game	Your Type	Your Clue	Your Choice	Partner's Choice	Partner's Type	Your points
1	A	Z	Red	Yes	No	X	25
2	B	Y	Yellow	-	-	-	-

If you do not click the "next" button on this page, after one minute the app will move you to the next page. In the next page you are told your points in this round and the actual type of your partner.



When you have played the last round of Part 1, you will see a page informing you that this part is over. In this page you will find out the Part 1 paying round. At the bottom of this page you can see the history table summarizing all the rounds.

Part 1 Is Over

Part 1 of the experiment is over. The paying round was round 1. Your payoff in that round is: 25 points.

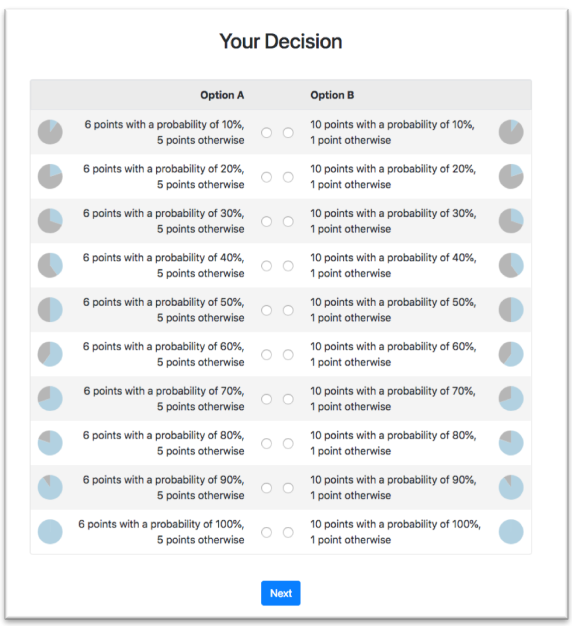
Next

History Table

Round	Game	Your Type	Your Clue	Your Choice	Partner's Choice	Partner's Type	Your points
1	A	Z	Red	Yes	No	X	25
2	B	Y	Yellow	Yes	Yes	Z	40

PART 2

In this part, you will face 10 decisions listed on your screen. In each decision you have to choose between "Option A" and "Option B". If you choose Option A, you will earn either 6 or 5 points. If you choose Option B, you will earn either 10 points or 1 point. After you choose one option, whether you earn the higher payoff or the lower payoff is randomly determined by the computer. Before making a choice, you will know the exact probability of earning the higher payoff rather than the lower payoff in each option. For example, in one decision Option A will give you 6 points with a probability of 30% and 5 points otherwise, while Option B will give you 10 points with a probability of 30% and 1 point otherwise.



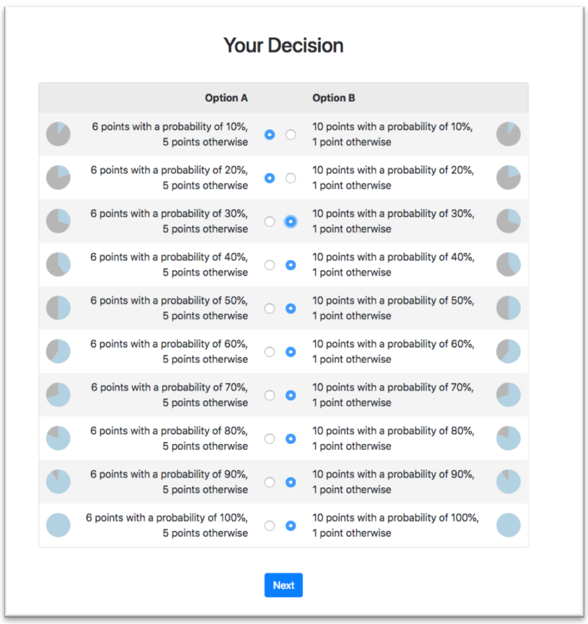
Your Decision

Option A	Option B
6 points with a probability of 10%, 5 points otherwise	10 points with a probability of 10%, 1 point otherwise
6 points with a probability of 20%, 5 points otherwise	10 points with a probability of 20%, 1 point otherwise
6 points with a probability of 30%, 5 points otherwise	10 points with a probability of 30%, 1 point otherwise
6 points with a probability of 40%, 5 points otherwise	10 points with a probability of 40%, 1 point otherwise
6 points with a probability of 50%, 5 points otherwise	10 points with a probability of 50%, 1 point otherwise
6 points with a probability of 60%, 5 points otherwise	10 points with a probability of 60%, 1 point otherwise
6 points with a probability of 70%, 5 points otherwise	10 points with a probability of 70%, 1 point otherwise
6 points with a probability of 80%, 5 points otherwise	10 points with a probability of 80%, 1 point otherwise
6 points with a probability of 90%, 5 points otherwise	10 points with a probability of 90%, 1 point otherwise
6 points with a probability of 100%, 5 points otherwise	10 points with a probability of 100%, 1 point otherwise

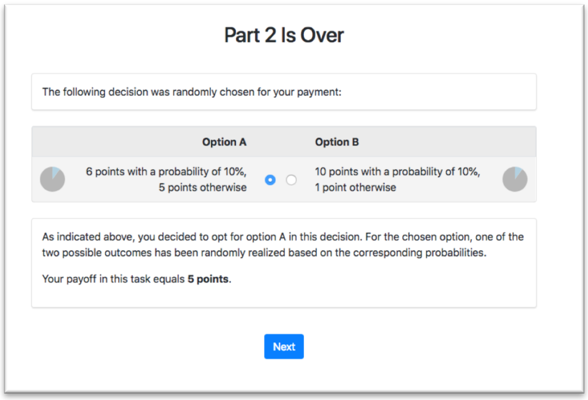
Next

As in this example, in any one of the 10 decisions, the probability you will earn the higher payoff (6 if Option A is chosen or 10 if Option B is chosen) is the same between option A and option B. In the first decision, at the top of the list, the probability you will earn the higher payoff is 10%. As you move down the table, the chances of the higher payoff for each option increase. In fact, for decision 10 in the bottom row, each option pays the highest payoff for sure. So, your choice in decision 10 is simply between 6 points (Option A) or 10 points (Option B).

For each of the ten decisions, you will be asked to choose Option A or Option B by clicking on the appropriate button. The computer will ensure that you switch at most once from Option A to Option B. If you choose Option A in one decision, the computer will automatically select Option A for all the previous decisions. If you choose Option B in one decision, the computer will automatically select Option B for all the following decisions. Once you have made a choice in all decisions, you can click on the Next button to submit your choices.



After you have submitted your choices, one of the 10 decisions will be randomly chosen for your payment. For the option you chose, A or B, in this decision, the computer will randomly determine whether you earn the higher or lower payoff. To determine the outcome of your choice, the computer will digitally draw a random number between 0 and 100. If the random number is below the probability of earning the higher payoff, then you receive the higher payoff. If the random number is above the probability, then you receive the lower payoff. For example, assume you chose Option A in the first decision and this decision is selected for payment. If the computer randomly draws a 60, you will earn 5 points.



At the end of the experiment, the points you have earned in the selected decision will be converted to Euros at an exchange rate of 1/6 Euros per point.

PART 3

In this part, you are asked to answer three questions. For each correct answer, you will receive two points. After you have submitted your answers, you will see the correct answers and the amount of points you have earned. At the end of the experiment, the points you have earned in this part will be converted to Euros at an exchange rate of 1/6 Euros per point.

PART 4

In this part, you are asked to provide some information about yourself (your sex and your undergraduate major). As stated before, your responses are completely confidential and anonymous.

BEL

This appendix reproduces the instructions for the *BEL* treatment of the experiment.

INSTRUCTIONS

You are about to participate in an experiment in the economics of decision-making. If you follow these instructions carefully, you can earn an amount of money which will be paid to you in cash at the end of the experiment.

Your computer screen will display useful information. Remember that the information on your computer screen is private. To insure best results for yourself and accurate data for the experimenters, please do not communicate with the other participants at any point during the experiment. If you have any questions, or need assistance of any kind, raise your hand and one of the experimenters will come.

PARTS and PAYMENTS

This experiment will consist of four parts. At the end of the experiment, you will be paid 5€, plus earnings based on the points you have earned during the experiment. Your points will be converted to Euros at an exchange rate of 1/6 Euro per point. To sum up, your final payment in Euros is given by the following formula:

$$Your\ points/6 + 5 \quad €$$

PART 1

THE BASIC IDEA

In this part, you have to decide whether to form a partnership with other players. The benefit of forming a partnership with another player will depend on the other player's type, which is randomly assigned by the computer. During the experiment, you will not know the type of your potential partners. However, you will receive clues about their types before you decide to form a partnership. If you form a partnership, you receive an amount of points that depends on your partner's type. If you do not form a partnership, you receive an amount of points that depends only on your own type.

ROUNDS

The experiment will be divided into **60 rounds**. In each round, you are randomly paired with another player. Decisions and points you make in one round do not affect other rounds.

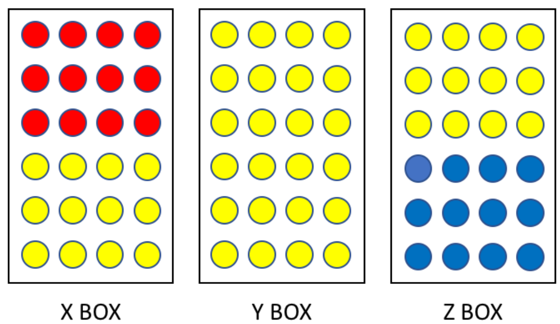
Each round you will be **randomly assigned either an active role or a passive role**. When you are assigned a passive role, you cannot make any decision. An active player is always paired with a passive player.

PLAYERS AND TYPES

In each round, every participant is assigned a type. A participant's type can be X, Y or Z. The type of active players is always Y while the type of passive players will be randomly determined. This means that, in each of your active rounds, you are **equally likely** to be paired with an X, Y or Z type player.

CLUES

When you are active, you will not know the type of the participant you are paired with. However, you will receive a clue about your potential partner's type. Clues are determined in the following way. The **computer will digitally draw a random ball from a box containing 24 balls of different colors**. Each ball can be either blue, yellow or red. The number of blue, yellow and red balls in **the box depends on your partner's type**. The boxes used in the experiment are illustrated in the figure below.



If your partner's type is X, the box contains no blue balls, 12 yellow balls and 12 red balls. If your partner's type is Y, the box contains 24 yellow balls but no blue or red balls. If your partner's type is Z, the box contains 12 blue balls, 12 yellow balls and no red balls. To give you a clue about the type of your potential partner, the computer will first determine which box to use given your partner's type. Then it will digitally draw a random ball: each single ball in the box has the same probability of being selected, equal to 1/24. The clue you receive is the color of this randomly drawn ball.

3

FORMING A PARTNERSHIP

When you are an active player, after you have received a clue about your potential partner's type, you can decide whether you want to form a partnership or not.

The computer will decide on behalf of the passive player whether he agrees to form a partnership or not. Specifically, **if the passive player's type is Z or Y, the computer will always agree to form a partnership. If the type of the passive player is X, the computer will agree to form a partnership with some probability**, for example with 50% probability. There are five versions of this game, called **A, B, C, D** and **E**. There will be 12 rounds for each game but the exact sequence of games will be random. The following table reports the actual probability that the computer will propose to form a partnership on behalf of an X type player in different games.

	Game				
	A	B	C	D	E
Probability computer agrees to form a partnership when passive type is X.	100%	75%	50%	25%	0%
Probability computer agrees to form a partnership when passive type is Y.	100%	100%	100%	100%	100%
Probability computer agrees to form a partnership when type is Z.	100%	100%	100%	100%	100%

To determine the choice for the passive player, the computer will digitally draw a random number between 0 and 100. If the random number is below the probability given in the table above, then the computer will agree to form a partnership. If the random number is above the probability, then the computer will not agree to form a partnership. For example, assume you are playing game D, the passive player's type is X and the computer randomly draws a 40. Then, the computer will not agree to form a partnership (because 40>25).

Only if the active player proposes to form a partnership and the computer acting on the passive player's behalf agrees, then a partnership is formed. For example, if you are an active player and propose to form a partnership but the computer of the passive player does not agree, the partnership is not formed.

POINTS

Every time you form a partnership, you earn an amount of points that depends only on the type of the other player. Whenever you do not form a partnership, you earn an amount of point that depends only on your own type. The actual points you can earn are reported in the following table. If you form a partnership with an X type you earn 160 points, if you form a partnership with a Y type you earn 80 points and if you form a partnership with a Z type you earn 40 points. If you do not form a partnership and your type is X, you earn 100 points. If you do not form a partnership and your type is Y, you earn 75 points. If you do not form a partnership and your type is Z, you earn 25 points.

Points if you **form** a partnership:			
Partner's type	X	Y	Z
Your points	160	80	40

Points if you do **not form** a partnership:			
Your type	X	Y	Z
Your points	100	75	25

5

PAYMENT

At the end of the experiment, your payment will depend on the points you have earned in this part. In particular, the computer will randomly select one round out of the 60 rounds in part 1. At the end of the experiment, the points you have earned in the selected round will be converted to Euros at an exchange rate of 1/6 Euros per point.

PART 1 APP PAGES

The experiment app will show you several pages, described below. Between a page and the next you may have to wait for other participants to make their choices. At the beginning of Part 1 you will see a page like this.

Part 1

You will now begin part 1. For a detailed explanation, check Part 1 of the Instructions.

Next

At the beginning of a new round, you will see a page informing you of whether you are playing game A, B, C, D or E.

Round 2

In this round you will play Game C.

Points if you form a partnership:

Your Partner's Type	X	Y	Z
Your Points	160	80	40

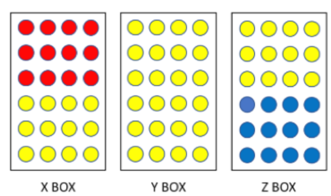
Points if you do not form a partnership:

Your Type	X	Y	Z
Your Points	100	75	25

Probability the passive player proposes to form partnership:

Passive Player's Type	X	Y	Z
Probability	50%	100%	100%

Distribution of clues:



In this page, you are told your type and whether you are an active player or passive player.

7

In this round you are passive.

You are an X type (if you do not form a partnership, you earn 100 points).

Next

If you are an active player in this round, you are also given a clue about your potential partner's type and you decide whether you want to form a partnership or not.

In this round you are active: make a choice.

You are a Y type (if you do not form a partnership, you earn 75 points).

You have received a red clue.

Do you want to form a partnership?

○ Yes ○ No

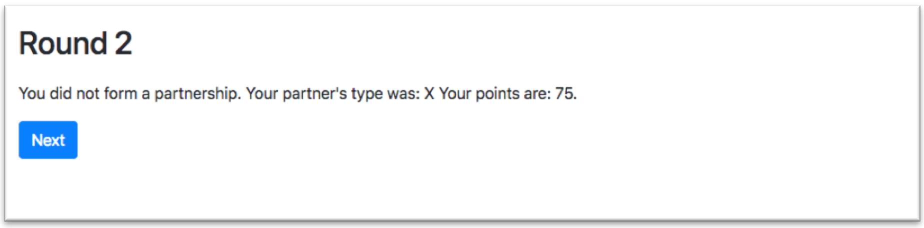
Next

At the bottom of this page you can see a table with a history of all the previous rounds.

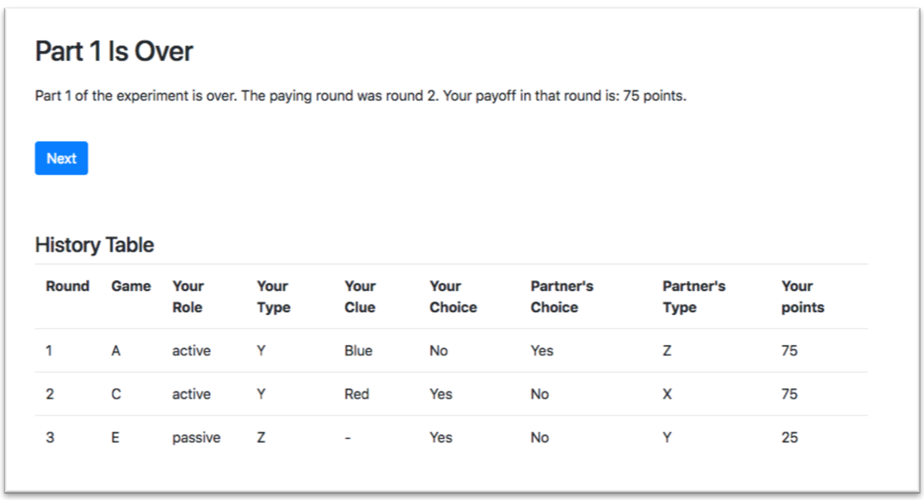
History Table

Round	Game	Your Role	Your Type	Your Clue	Your Choice	Partner's Choice	Partner's Type	Your points
1	A	active	Y	Blue	No	Yes	Z	75
2	C	active	Y	Red	-	-	-	-

If you do not click the "next" button on this page, after one minute the app will move you to the next page. In the next page you are told your points in this round and the actual type of your partner.



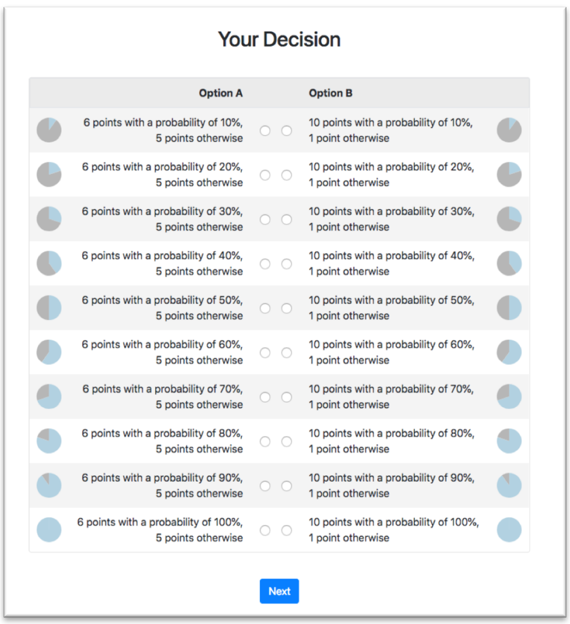
When you have played the last round of Part 1, you will see a page informing you that this part is over. In this page you will find out the Part 1 paying round. At the bottom of this page you can see the history table summarizing all the rounds.



Round	Game	Your Role	Your Type	Your Clue	Your Choice	Partner's Choice	Partner's Type	Your points
1	A	active	Y	Blue	No	Yes	Z	75
2	C	active	Y	Red	Yes	No	X	75
3	E	passive	Z	-	Yes	No	Y	25

PART 2

In this part, you will face 10 decisions listed on your screen. In each decision you have to choose between "Option A" and "Option B". If you choose Option A, you will earn either 6 or 5 points. If you choose Option B, you will earn either 10 points or 1 point. After you choose one option, whether you earn the higher payoff or the lower payoff is randomly determined by the computer. Before making a choice, you will know the exact probability of earning the higher payoff rather than the lower payoff in each option. For example, in one decision Option A will give you 6 points with a probability of 30% and 5 points otherwise, while Option B will give you 10 points with a probability of 30% and 1 point otherwise.



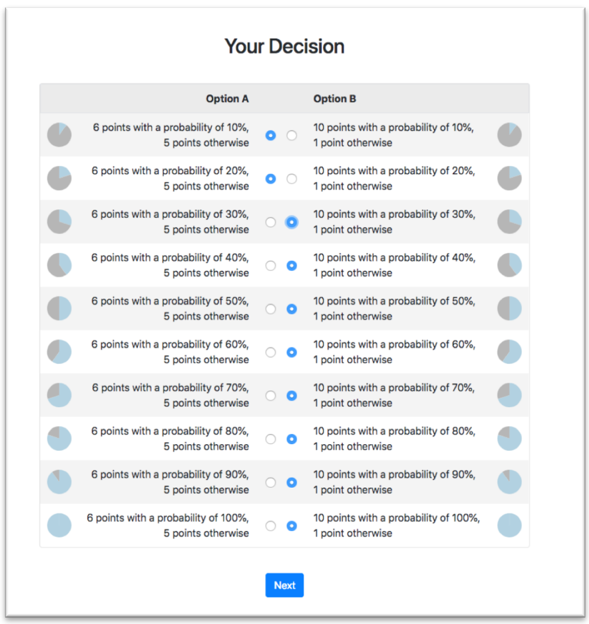
Your Decision

Option A	Option B
6 points with a probability of 10%, 5 points otherwise	10 points with a probability of 10%, 1 point otherwise
6 points with a probability of 20%, 5 points otherwise	10 points with a probability of 20%, 1 point otherwise
6 points with a probability of 30%, 5 points otherwise	10 points with a probability of 30%, 1 point otherwise
6 points with a probability of 40%, 5 points otherwise	10 points with a probability of 40%, 1 point otherwise
6 points with a probability of 50%, 5 points otherwise	10 points with a probability of 50%, 1 point otherwise
6 points with a probability of 60%, 5 points otherwise	10 points with a probability of 60%, 1 point otherwise
6 points with a probability of 70%, 5 points otherwise	10 points with a probability of 70%, 1 point otherwise
6 points with a probability of 80%, 5 points otherwise	10 points with a probability of 80%, 1 point otherwise
6 points with a probability of 90%, 5 points otherwise	10 points with a probability of 90%, 1 point otherwise
6 points with a probability of 100%, 5 points otherwise	10 points with a probability of 100%, 1 point otherwise

Next

As in this example, in any one of the 10 decisions, the probability you will earn the higher payoff (6 if Option A is chosen or 10 if Option B is chosen) is the same between option A and option B. In the first decision, at the top of the list, the probability you will earn the higher payoff is 10%. As you move down the table, the chances of the higher payoff for each option increase. In fact, for decision 10 in the bottom row, each option pays the highest payoff for sure. So, your choice in decision 10 is simply between 6 points (Option A) or 10 points (Option B).

For each of the ten decisions, you will be asked to choose Option A or Option B by clicking on the appropriate button. The computer will ensure that you switch at most once from Option A to Option B. If you choose Option A in one decision, the computer will automatically select Option A for all the previous decisions. If you choose Option B in one decision, the computer will automatically select Option B for all the following decisions. Once you have made a choice in all decisions, you can click on the Next button to submit your choices.

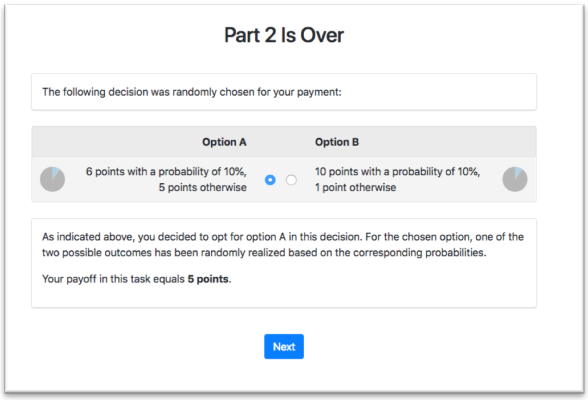


Your Decision

Option A	Option B
6 points with a probability of 10%, 5 points otherwise	10 points with a probability of 10%, 1 point otherwise
6 points with a probability of 20%, 5 points otherwise	10 points with a probability of 20%, 1 point otherwise
6 points with a probability of 30%, 5 points otherwise	10 points with a probability of 30%, 1 point otherwise
6 points with a probability of 40%, 5 points otherwise	10 points with a probability of 40%, 1 point otherwise
6 points with a probability of 50%, 5 points otherwise	10 points with a probability of 50%, 1 point otherwise
6 points with a probability of 60%, 5 points otherwise	10 points with a probability of 60%, 1 point otherwise
6 points with a probability of 70%, 5 points otherwise	10 points with a probability of 70%, 1 point otherwise
6 points with a probability of 80%, 5 points otherwise	10 points with a probability of 80%, 1 point otherwise
6 points with a probability of 90%, 5 points otherwise	10 points with a probability of 90%, 1 point otherwise
6 points with a probability of 100%, 5 points otherwise	10 points with a probability of 100%, 1 point otherwise

Next

After you have submitted your choices, one of the 10 decisions will be randomly chosen for your payment. For the option you chose, A or B, in this decision, the computer will randomly determine whether you earn the higher or lower payoff. To determine the outcome of your choice, the computer will digitally draw a random number between 0 and 100. If the random number is below the probability of earning the higher payoff, then you receive the higher payoff. If the random number is above the probability, then you receive the lower payoff. For example, assume you chose Option A in the first decision and this decision is selected for payment. If the computer randomly draws a 60, you will earn 5 points.



At the end of the experiment, the points you have earned in the selected decision will be converted to Euros at an exchange rate of 1/6 Euros per point.

PART 3

In this part, you are asked to answer three questions. For each correct answer, you will receive two points. After you have submitted your answers, you will see the correct answers and the amount of points you have earned. At the end of the experiment, the points you have earned in this part will be converted to Euros at an exchange rate of 1/6 Euros per point.

PART 4

In this part, you are asked to provide some information about yourself (your sex and your undergraduate major). As stated before, your responses are completely confidential and anonymous.

COND

This appendix reproduces the instructions for the *COND* treatment of the experiment.

INSTRUCTIONS

You are about to participate in an experiment in the economics of decision-making. If you follow these instructions carefully, you can earn an amount of money which will be paid to you in cash at the end of the experiment.

Your computer screen will display useful information. Remember that the information on your computer screen is private. To insure best results for yourself and accurate data for the experimenters, please do not communicate with the other participants at any point during the experiment. If you have any questions, or need assistance of any kind, raise your hand and one of the experimenters will come.

PARTS and PAYMENTS

This experiment will consist of four parts. At the end of the experiment, you will be paid 5€, plus earnings based on the points you have earned during the experiment. Your points will be converted to Euros at an exchange rate of 1/6 Euro per point. To sum up, your final payment in Euros is given by the following formula:

$$Your\ points/6 + 5 \quad €$$

PART 1

THE BASIC IDEA

In this part, you have to decide whether to form a partnership with other players. The benefit of forming a partnership with another player will depend on the other player's type, which is randomly assigned by the computer. During the experiment, you will not know the type of your potential partners. However, you will receive clues about their types before you decide to form a partnership. If you form a partnership, you receive an amount of points that depends on your partner's type. If you do not form a partnership, you receive an amount of points that depends only on your own type.

ROUNDS

The experiment will be divided into **60 rounds**. In each round, you are randomly paired with another player. Decisions and points you make in one round do not affect other rounds.

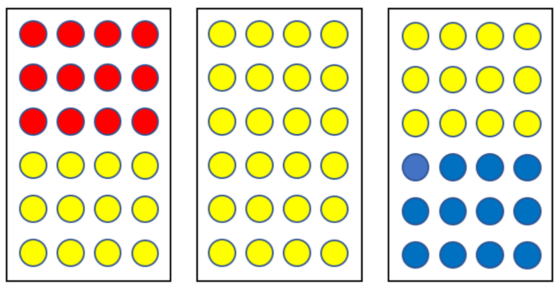
Each round you will be assigned **either an active role or a passive role**. When you are assigned a passive role, you cannot make any decision. An active player is always paired with a passive player.

PLAYERS AND TYPES

In each round, every participant is assigned a type. A participant's type can be X, Y or Z. The type of active players is always Y while the type of passive players will be randomly determined. This means that, in each of your active rounds, you are **equally likely** to be paired with an X, Y or Z type player.

CLUES

When you are active, you will not know the type of the participant you are paired with. However, you will receive a clue about your potential partner's type. Clues are determined in the following way. The **computer will digitally draw a random ball from a box containing 24 balls of different colors**. Each ball can be either blue, yellow or red. The number of blue, yellow and red balls in **the box depends on your partner's type**. For example, consider the boxes illustrated in the figure below.

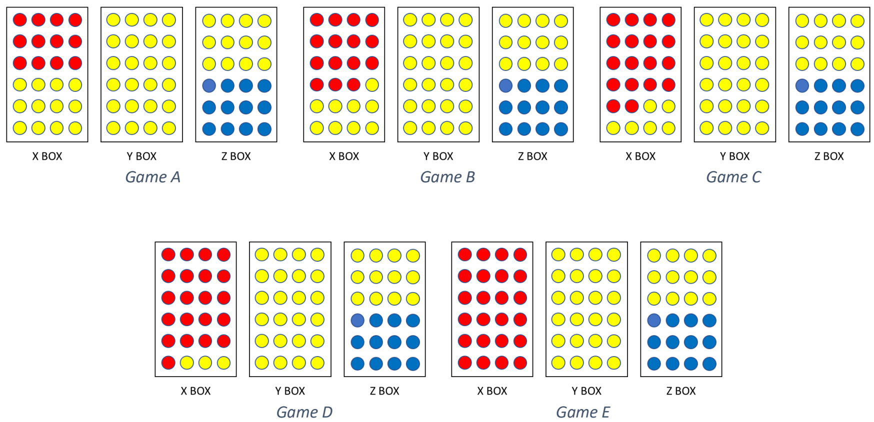


In this example, if your partner's type is X, the box contains no blue balls, 12 yellow balls and 12 red balls. If your partner's type is Y, the box contains 24 yellow balls but no blue or red balls. If your partner's type is Z, the box contains 12 blue balls, 12 yellow balls and no red balls. To give you a clue about the type of your potential partner, the computer will first determine which box to use given your partner's type. Then it will digitally draw a random ball: each single ball in the box has the same probability of being selected, equal to 1/24. The clue you receive is the color of this randomly drawn ball.

The exact composition of the X box will change in each round. There are five versions of this game, called **A, B, C, D** and **E**. There will be 12 rounds for each game but the exact sequence of games will be random. Each game has a different number of yellow and red balls in the X box, as summarized in the following table and illustrated in the figure below.

	Game				
	A	B	C	D	E
Red balls in X box	12	15	18	21	24
Yellow balls in X box	12	9	6	3	0
Blue balls in X box	0	0	0	0	0

3


X BOX
Y BOX
Z BOX
Game A
X BOX
Y BOX
Z BOX
Game B
X BOX
Y BOX
Z BOX
Game C
X BOX
Y BOX
Z BOX
Game D
X BOX
Y BOX
Z BOX
Game E

4

FORMING A PARTNERSHIP

When you are an active player, after you have received a clue about your potential partner's type, you can decide whether you want to form a partnership or not. Note that passive players cannot make any choice. Thus, **a partnership is formed whenever the active player in the pair decides so**.

POINTS

Every time you form a partnership, you earn an amount of points that depends only on the type of the other player. Whenever you do not form a partnership, you earn an amount of point that depends only on your own type. The actual points you can earn are reported in the following table. If you form a partnership with an X type you earn 160 points, if you form a partnership with a Y type you earn 80 points and if you form a partnership with a Z type you earn 40 points. If you do not form a partnership and your type is X, you earn 100 points. If you do not form a partnership and your type is Y, you earn 75 points. If you do not form a partnership and your type is Z, you earn 25 points.

Points if you **form** a partnership:			
Partner's type	X	Y	Z
Your points	160	80	40

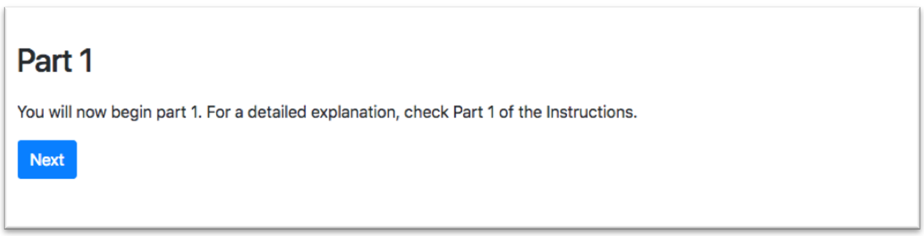
Points if you do **not form** a partnership:			
Your type	X	Y	Z
Your points	100	75	25

PAYMENT

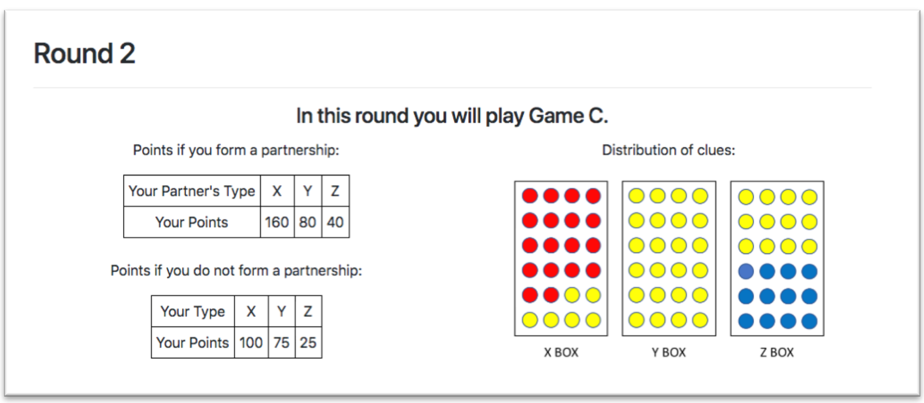
At the end of the experiment, your payment will depend on the points you have earned in this part. In particular, the computer will randomly select one round out of the 60 rounds in part 1. At the end of the experiment, the points you have earned in the selected round will be converted to Euros at an exchange rate of 1/6 Euros per point.

PART 1 APP PAGES

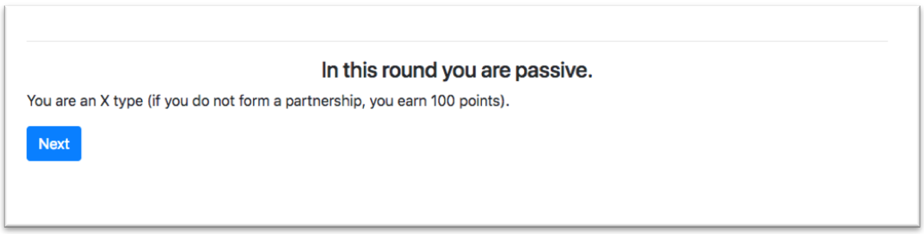
The experiment app will show you several pages, described below. Between a page and the next you may have to wait for other participants to make their choices. At the beginning of Part 1 you will see a page like this.



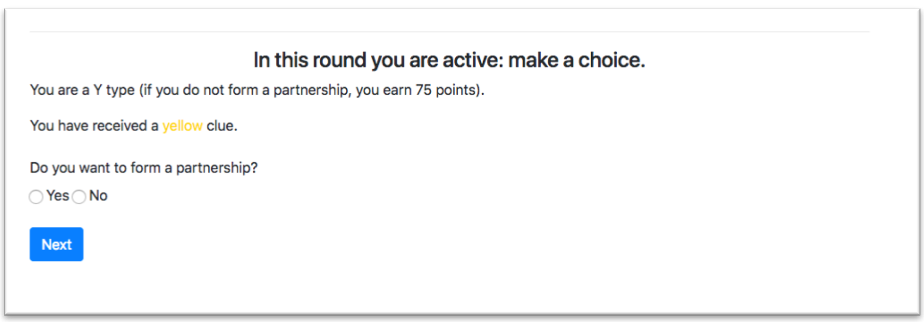
At the beginning of a new round, you will see a page informing you of whether you are playing game A, B, C, D or E.



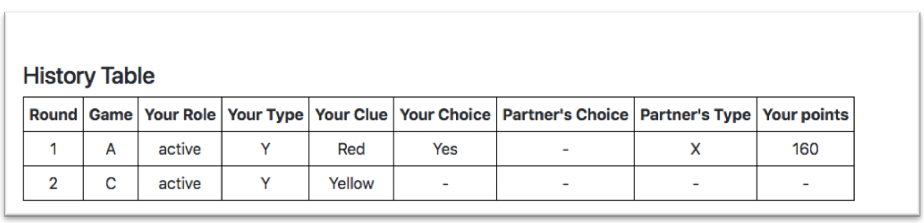
In this page, you are told your type and whether you are an active player or passive player.



If you are an active player in this round, you are also given a clue about your potential partner's type and you decide whether you want to form a partnership or not.



At the bottom of this page you can see a table with a history of all the previous rounds.



History Table

Round	Game	Your Role	Your Type	Your Clue	Your Choice	Partner's Choice	Partner's Type	Your points
1	A	active	Y	Red	Yes	-	X	160
2	C	active	Y	Yellow	-	-	-	-

If you do not click the "next" button on this page, after one minute the app will move you to the next page. In the next page you are told your points in this round and the actual type of your partner.

Round 2

You did not form a partnership. Your partner's type was: X Your points are: 75.

Next

When you have played the last round of Part 1, you will see a page informing you that this part is over. In this page you will find out the Part 1 paying round. At the bottom of this page you can see the history table summarizing all the rounds.

Part 1 Is Over

Part 1 of the experiment is over. The paying round was round 1. Your payoff in that round is: 160 points.

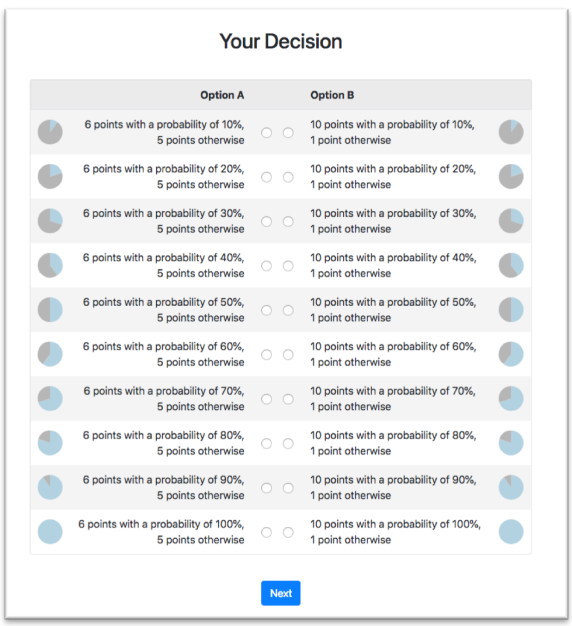
Next

History Table

Round	Game	Your Role	Your Type	Your Clue	Your Choice	Partner's Choice	Partner's Type	Your points
1	A	active	Y	Red	Yes	-	X	160
2	C	active	Y	Yellow	No	-	X	75
3	E	active	Y	Red	Yes	-	X	160

PART 2

In this part, you will face 10 decisions listed on your screen. In each decision you have to choose between "Option A" and "Option B". If you choose Option A, you will earn either 6 or 5 points. If you choose Option B, you will earn either 10 points or 1 point. After you choose one option, whether you earn the higher payoff or the lower payoff is randomly determined by the computer. Before making a choice, you will know the exact probability of earning the higher payoff rather than the lower payoff in each option. For example, in one decision Option A will give you 6 points with a probability of 30% and 5 points otherwise, while Option B will give you 10 points with a probability of 30% and 1 point otherwise.



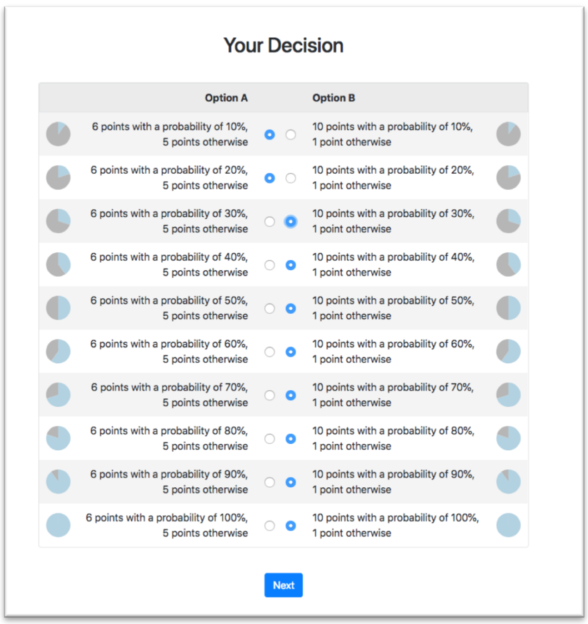
Your Decision

Option A	Option B
6 points with a probability of 10%, 5 points otherwise	10 points with a probability of 10%, 1 point otherwise
6 points with a probability of 20%, 5 points otherwise	10 points with a probability of 20%, 1 point otherwise
6 points with a probability of 30%, 5 points otherwise	10 points with a probability of 30%, 1 point otherwise
6 points with a probability of 40%, 5 points otherwise	10 points with a probability of 40%, 1 point otherwise
6 points with a probability of 50%, 5 points otherwise	10 points with a probability of 50%, 1 point otherwise
6 points with a probability of 60%, 5 points otherwise	10 points with a probability of 60%, 1 point otherwise
6 points with a probability of 70%, 5 points otherwise	10 points with a probability of 70%, 1 point otherwise
6 points with a probability of 80%, 5 points otherwise	10 points with a probability of 80%, 1 point otherwise
6 points with a probability of 90%, 5 points otherwise	10 points with a probability of 90%, 1 point otherwise
6 points with a probability of 100%, 5 points otherwise	10 points with a probability of 100%, 1 point otherwise

Next

As in this example, in any one of the 10 decisions, the probability you will earn the higher payoff (6 if Option A is chosen or 10 if Option B is chosen) is the same between option A and option B. In the first decision, at the top of the list, the probability you will earn the higher payoff is 10%. As you move down the table, the chances of the higher payoff for each option increase. In fact, for decision 10 in the bottom row, each option pays the highest payoff for sure. So, your choice in decision 10 is simply between 6 points (Option A) or 10 points (Option B).

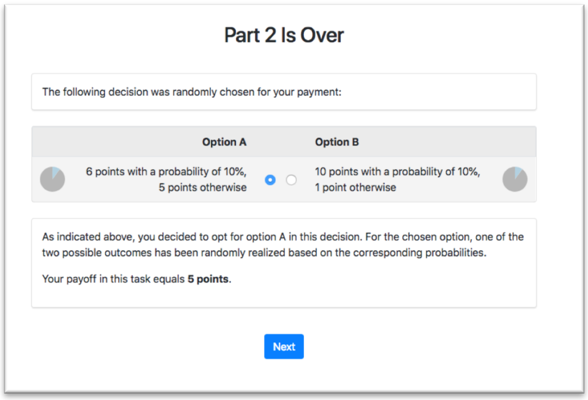
For each of the ten decisions, you will be asked to choose Option A or Option B by clicking on the appropriate button. The computer will ensure that you switch at most once from Option A to Option B. If you choose Option A in one decision, the computer will automatically select Option A for all the previous decisions. If you choose Option B in one decision, the computer will automatically select Option B for all the following decisions. Once you have made a choice in all decisions, you can click on the Next button to submit your choices.


Your Decision

Option A	Option B
6 points with a probability of 10%, 5 points otherwise	10 points with a probability of 10%, 1 point otherwise
6 points with a probability of 20%, 5 points otherwise	10 points with a probability of 20%, 1 point otherwise
6 points with a probability of 30%, 5 points otherwise	10 points with a probability of 30%, 1 point otherwise
6 points with a probability of 40%, 5 points otherwise	10 points with a probability of 40%, 1 point otherwise
6 points with a probability of 50%, 5 points otherwise	10 points with a probability of 50%, 1 point otherwise
6 points with a probability of 60%, 5 points otherwise	10 points with a probability of 60%, 1 point otherwise
6 points with a probability of 70%, 5 points otherwise	10 points with a probability of 70%, 1 point otherwise
6 points with a probability of 80%, 5 points otherwise	10 points with a probability of 80%, 1 point otherwise
6 points with a probability of 90%, 5 points otherwise	10 points with a probability of 90%, 1 point otherwise
6 points with a probability of 100%, 5 points otherwise	10 points with a probability of 100%, 1 point otherwise

Next

After you have submitted your choices, one of the 10 decisions will be randomly chosen for your payment. For the option you chose, A or B, in this decision, the computer will randomly determine whether you earn the higher or lower payoff. To determine the outcome of your choice, the computer will digitally draw a random number between 0 and 100. If the random number is below the probability of earning the higher payoff, then you receive the higher payoff. If the random number is above the probability, then you receive the lower payoff. For example, assume you chose Option A in the first decision and this decision is selected for payment. If the computer randomly draws a 60, you will earn 5 points.



At the end of the experiment, the points you have earned in the selected decision will be converted to Euros at an exchange rate of 1/6 Euros per point.

PART 3

In this part, you are asked to answer three questions. For each correct answer, you will receive two points. After you have submitted your answers, you will see the correct answers and the amount of points you have earned. At the end of the experiment, the points you have earned in this part will be converted to Euros at an exchange rate of 1/6 Euros per point.

PART 4

In this part, you are asked to provide some information about yourself (your sex and your undergraduate major). As stated before, your responses are completely confidential and anonymous.

References

Camerer, Colin, Salvatore Nunnari, and Thomas R. Palfrey, "Quantal response and nonequilibrium beliefs explain overbidding in maximum-value auctions," *Games and Economic Behavior*, 2016, *98*, 243 – 263.

Carrillo, Juan D and Thomas R Palfrey, "The compromise game: two-sided adverse selection in the laboratory," *American Economic Journal: Microeconomics*, 2009, *1* (1), 151–181.

Goeree, Jacob K, Charles A Holt, and Thomas R Palfrey, *Quantal Response Equilibrium: A Stochastic Theory of Games*, Princeton University Press, 2016.