Online Appendix: A Road to Efficiency through Communication and Commitment

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A. Proofs

Similar to the proof in Calcagno et al. (2014), our proof of Proposition 1 relies on a backward-induction argument. In the first step of the proof, we show that the Pareto-dominant equilibrium profile $\bar{\mathbf{e}}$ is absorbing in the revision game. If all players choose the maximal effort, then, for any following subgame, the unique subgame perfect equilibrium is for all players to play $\bar{\mathbf{e}}$. More formally, we show that, at a certain period, it is true that if all other players are preparing $\bar{e}_{-i}$, player i will prepare $\bar{e}_i$ if they have a revision opportunity. In the period immediately before, if all other players are preparing $\bar{e}_{-i}$, player i will prepare $\bar{e}_i$ if they have a revision opportunity.

If only two players are present, this would constitute the whole argument because one player would always be in the position to induce the other player to prepare the maximum effort. However, $n > 2$ complicates the matter, as the unraveling argument is not trivial. We show that the condition $(n-2)K < (n-1)$ is sufficient to have a lower bound on players' payoff of choosing the efficient action converging to the efficient payoff. Thus, at the end of the countdown, all players prepare the maximal effort with probability $1 - \varepsilon$.

PROOF:
Let $\underline{v}_i^t(k)$ be the infimum of player i's payoff at t in subgame perfect equilibrium strategies and histories such that there are at least k players who prepare the action $\bar{\mathbf{e}}$, and no player receives a revision opportunity at t. By mathematical induction with respect to $k = n, n-1, ..., 0$, we show that $\lim_{t \to -\infty} \underline{v}_i^t(k) = \pi_i(\bar{\mathbf{e}}), \forall i$. Step 1 below shows the proof for $k = n$.
Step 1 Consider the final period. All $-i$ players are preparing the profile $\bar{e}_{-i}$ and i has a revision opportunity. It is optimal for player i to prepare $\bar{e}_i$, as this leads to a higher payoff than any other possible effort choice ($\bar{\mathbf{e}}$ is the Pareto-dominant profile and is an equilibrium).

Now, for the inductive step, consider any period τ after t. If all $-i$ players are preparing the profile $\bar{e}_{-i}$ and i has a revision opportunity, it is optimal for player i to prepare $\bar{e}_i$. Consider also that, at the period immediately before t, $t-1$, all $-i$ players are preparing the profile $\bar{e}_{-i}$ and i has a revision opportunity. If player i prepares $\bar{e}$, then they are guaranteed payoff $\pi_i(\bar{\mathbf{e}})$. If player i prepares any other action e, their expected payoff can be bounded by $(1-(1-\frac{p}{n})^{-t})\pi_i(\bar{\mathbf{e}}) + (1-\frac{p}{n})^{-t}(\pi_i(\bar{\mathbf{e}}) - \alpha) < \pi_i(\bar{\mathbf{e}})\ \forall t$, where the bound is obtained by considering that (i) $\pi_i(\bar{\mathbf{e}}) - \alpha$ is the second-best payoff for player i, (ii) with probability $(1-\frac{p}{n})^{-t}$ player i gets no revision opportunity before the deadline, and (iii) all other players continue to exert maximal effort. This concludes step 1.
Step 2 (inductive argument) Suppose that $\lim_{t \to -\infty} \underline{v}_i^t(k+1) = \pi_i(\bar{\mathbf{e}}),\ \forall i$, with $k+1 \leq n$,; we will show that $\lim_{t \to -\infty} \underline{v}_i^t(k) = \pi_i(\bar{\mathbf{e}}),\ \forall i$.

Consider an arbitrary $\varepsilon > 0$. Since $\lim_{t \to -\infty} \underline{v}_i^t(k+1) = \pi_i(\bar{\mathbf{e}}),\ \forall i$, a finite T_0 must exist such that $\forall t \leq T_0$, $\underline{v}_i^t(k+1) \geq \pi_i(\bar{\mathbf{e}}) - \varepsilon\ \forall i$. Consider that k players prepare $\bar{\mathbf{e}}$ at a time t before the said T_0, that is, $t = T_0 + \tau_1$ with $\tau_1 \leq 0$. Then, if player j who is not preparing $\bar{\mathbf{e}}$ at time t can move first by T_0, they yield at least $\pi_j(\bar{\mathbf{e}}) - \varepsilon$ by preparing $\bar{e}_j$. This outcome implies that each player i will at least yield $\pi_i(\bar{\mathbf{e}}) - K\varepsilon$. Therefore, we can define a lower bound for a player's utility if k

players are preparing $\mathbf{\bar{e}}$ at time t:

$$\underline{v}_i^t(k) \geq \frac{1}{n}(1-(1-p)^{\tau_1})(\pi_i(\mathbf{\bar{e}})-K\varepsilon)+(1-\frac{1}{n}(1-(1-p)^{\tau_1}))\underline{\pi_i(e)}\ \forall i,$$

where $\frac{1}{n}(1-(1-p)^{\tau_1})$ is the probability that there is a revision and a particular player j who is not preparing $\bar{e}$ at that time is the first to get a revision before time T_0. We also assume that if such a move does not occur, the worst possible payoff will happen.

If τ_1 is a sufficiently long time interval, then there exists finite T_1 such that for all $\tau_2 \leq 0$, if the period is far removed from the deadline; $t = T_0 + T_1 + \tau_2 \leq T_0 + T_1$, then $\underline{v}_i^t(k) \geq \frac{1}{n}\overline{\pi_i(e)} + (1-\frac{1}{n})\underline{\pi_i(e)} - K\varepsilon\ \forall i$. Introducing a bit of notation, we can define $\alpha_1 = \frac{1}{n}$, and $\underline{v}_i^t(k) \geq \alpha_1\pi_i(\mathbf{\bar{e}}) + (1-\alpha_1)\underline{\pi_i(e)} - K\varepsilon\ \forall i$

For $t = T_0 + T_1 + \tau_2$ we express the lower bound on i's payoff $\underline{v}_i^t(k)$ in different cases:

1) If j moves first by $T_0 + T_1$, then a lower bound on player $i's$ payoff depends on whether or not j is preparing $\bar{e}_j$.
   - If j is not preparing $\bar{e}_j$ at time t, then a lower bound on player $i's$ payoff is $\pi_i(\mathbf{\bar{e}}) - K\varepsilon$ as before.
   - If j is preparing $\bar{e}_j$ at time t they will move first by $T_0 + T_1$; then, a lower bound on player $j's$ payoff is given by $\frac{1}{n}\pi_j(\mathbf{\bar{e}}) + (1-\frac{1}{n})\underline{\pi_j(e)} - K\varepsilon$ by the same reasoning as before. Using the formula in Definition 1 to obtain a lower bound on player i's payoff, we have: $\frac{\pi_i(\mathbf{\bar{e}})-\pi_i(\mathbf{e})}{\pi_i(\mathbf{\bar{e}})-\pi_i(\underline{\mathbf{e}})} \leq K\frac{\pi_j(\mathbf{\bar{e}})-(\frac{1}{n}\pi_j(\mathbf{\bar{e}})+(1-\frac{1}{n})\underline{\pi_j(e)}-K\varepsilon)}{\pi_j(\mathbf{\bar{e}})-\pi_j(\underline{\mathbf{e}})}$. Hence, for player i, a lower bound on their payoff is given by $(1-K(1-\frac{1}{n}))\pi_i(\mathbf{\bar{e}}) + K(1-\frac{1}{n})\underline{\pi_i(e)} - K^3\varepsilon$.

2) If i will move first by $T_0 + T_1$, then a lower bound depends on whether or not they are preparing $\bar{e}_i$.
   - If they are one of the k preparing $\bar{e}$, then a lower bound is given by $\frac{1}{n}\pi_i(\mathbf{\bar{e}})+(1-\frac{1}{n})\underline{\pi_i(e)} - K\varepsilon$.
   - If they are not one of the k preparing $\bar{e}$, by doing a revision, they can guarantee, by the inductive hypothesis, at least $\pi_i(\mathbf{\bar{e}}) - \varepsilon$.

In total, player i's payoff satisfies:

$$\begin{aligned}\underline{v}_i^t(k) \geq\ & \frac{1}{n}(1-(1-p)^{\tau_2})(\pi_i(\mathbf{\bar{e}})-K\varepsilon)\\ &+(\frac{1}{n}(1-(1-p)^{\tau_2})+(1-p)^{\tau_2})(\frac{1}{n}\pi_i(\mathbf{\bar{e}})+(1-\frac{1}{n})\underline{\pi_i(e)}-K\varepsilon)\\ &+(1-\frac{2}{n})((1-(1-p)^{\tau_2}))(1-K(1-\frac{1}{n}))\pi_i(\mathbf{\bar{e}})+K(1-\frac{1}{n})\underline{\pi_i(e)}-K^3\varepsilon),\ \forall i\end{aligned}$$

Taking a sufficiently long τ_2, there exists a finite T_2 such that at $t = T_0 + T_1 + T_2 + \tau_3$ with $\tau_3 \leq 0$, we have that

$$\begin{aligned}\underline{v}_i^t(k) \geq\ & (\frac{1}{n}+\frac{1}{n^2}+(1-\frac{2}{n})(1-K(1-\frac{1}{n})))\pi_i(\mathbf{\bar{e}})\\ &+(1-\frac{1}{n}+\frac{1}{n^2}+(1-\frac{2}{n})(1-K(1-\frac{1}{n})))\underline{\pi_i(e)}-K^3\varepsilon,\ \forall i\end{aligned}$$

defining $\alpha_2 = \frac{1}{n}+\frac{1}{n^2}+(1-\frac{2}{n})(1-K(1-\frac{1}{n}))$, we have the second step $\underline{v}_i^t(k) \geq \alpha_2\pi_i(\mathbf{\bar{e}}) + (1-\alpha_2)\underline{\pi_i(e)} - K^3\varepsilon\ \forall i$.

Recursively, for each $M = 1, 2, ...$, there exists $T_0, T_1, ...$ such that $t \leq T_0 + T_1 + ... + T_M$,

$$\underline{v}_i^t(k) \geq \alpha_M \pi_i(\bar{\mathbf{e}}) + (1-\alpha_M)\underline{\pi_i(e)} - K^{2M-1}\varepsilon \ \forall i.$$

with $\alpha_M = \frac{1}{n} + \frac{1}{n}\alpha_{M-1} + (1-\frac{2}{n})(1-K(1-\alpha_{M-1}))$. We can express the coefficient as a linear expansion, $\alpha_M = A + B\alpha_{M-1}$ with $A = \frac{1}{n}(n-1-K(n-2))$ and $B = \frac{1}{n}(1+K(n-2))$.

The condition in Proposition 1 guarantees that, in the α_M coefficient above, both A and B are strictly between zero and one. Furthermore, note that $A + B = 1$. This is sufficient to show that α_M is monotonically increasing and converges to 1. Taking a large enough T yields the result.

B. Numerical solution of the discrete time revision game

In this section, we explain the backward-induction procedure to solve the game for the specific parameters given in our experiment. We consider a particular payoff specification following our experimental setup: a triple of linear coefficients $\gamma,\ \alpha,\ $ and β; a given number of players n; a given set of actions E; a pre-play length T; and a given revision probability, p. We solve the game for the expected payoff of every player at any time $-t \in \{-T, -(T-1), ..., -1, 0\}$, for every strategy profile. We also obtain the transition probability from any strategy profile to any other strategy profile between any two periods.

At the deadline ($t = 0$):

We construct an n-tuple vector with dimension $|E|^n$, called V_0. Each line of V_0 has the payoff of each player if a particular strategy profile, e, is played.

Before the deadline, $t \in [-T, 0)$:

Consider a given vector V_{t+1}. An n-tuple of V_{t+1} has the expected payoff of all players at time $t+1$ if that particular strategy profile is prepared (given that all players maximize their payoff if they have a revision in the future). We proceed backward inductively, given the vector V_{t+1}, we construct V_t in the following way. First, for any strategy profile, we can compute how a player would revise their effort choice. That is, if player i had a revision opportunity, which effort would they choose, given that their expected payoffs of different action profiles are given by the vector V_{t+1}. This gives us the auxiliary matrix V_t^{rev}, a $|E|^n \times n$ matrix of n-tuples. Each element of the matrix gives us the payoff of all players if the strategy line were in place, and the player column had a revision opportunity at time t. The vector V_t is obtained by $(1-p) \times V_{t+1} + \frac{p}{n} \times V_t^{rev} \times \mathbf{1}_{n\times 1}$, where the first term is obtained when no one has a revision (and, thus, the strategy profile is unchanged), and the second term is the expected value of the payoff for each player given that someone has received a revision opportunity. We can iterate this process until V_{-T}.

Using the numerical solution to verify the proposition:

For a particular set of parameters, $\gamma,\ \alpha,\ \beta,\ n,\ |E|,\ T,\ p$, we say that Proposition 1 holds if, for a finite $\bar{T}(\gamma,\ \alpha,\ \ \beta,\ n,\ \ |E|,\ p) < T$, when a player has a revision opportunity, they choose $\bar{e}_i$ independent of the effort profile in place. That is, for all $t > \bar{T}$, playing $\bar{e}_i$ dominates any other effort choice, and all elements of the matrix V_t^{rev} are equal to $\pi_i(\bar{\mathbf{e}})$. For the first part of Proposition 1, note that for any given $\varepsilon > 0$, if $T' \geq \bar{T} + \tau$, then the profile $\bar{\mathbf{e}}$ is played with probability larger than $1-\varepsilon$. The integer τ is defined as the minimum interval of time such that the probability that all players have at least one revision opportunity in that interval is larger than $1-\varepsilon$; that is, τ is the smaller integer that solves $\left(1 - (1-\frac{p}{n})^\tau\right)^n \leq 1-\varepsilon$. We can see that the time interval needed, τ, increases with the number of players and decreases with the probability of a revision being awarded. For the second part of Proposition 1, it is sufficient that $T' \geq \bar{T}$. Note that the condition specified on the propositions is sufficient, but not necessary for the particular payoff parameters used in this paper.

Going beyond the proposition:

As a byproduct of the construction of V_t from V_{t+1}, we also obtain a transition matrix, M_t, with dimensions $|E|^n \times |E|^n$, that specifies for any strategy profile today the probability that each profile will be chosen in the next period. For any given set of parameters, given a distribution of effort profiles at time $-T$, $e(-T)$, we can calculate the final distribution of efforts, at time 0, for any length of the pre-play phase, $e(-T) \times \prod_{s=-T}^{0} M_s$.

The two plots in Figure B.1 highlight how the probability of a revision, p, changes the expected results of the game. We focus on two key dimensions: (i) the number of periods needed for $\bar{e}$ to be the dominant effort choice independent of the profile in place, $\bar{T}$; and (ii) the probability of the profile $\bar{\mathbf{e}}$ being chosen at the end of the countdown, given that $T = 60$ and the game was started with a profile chosen at random.

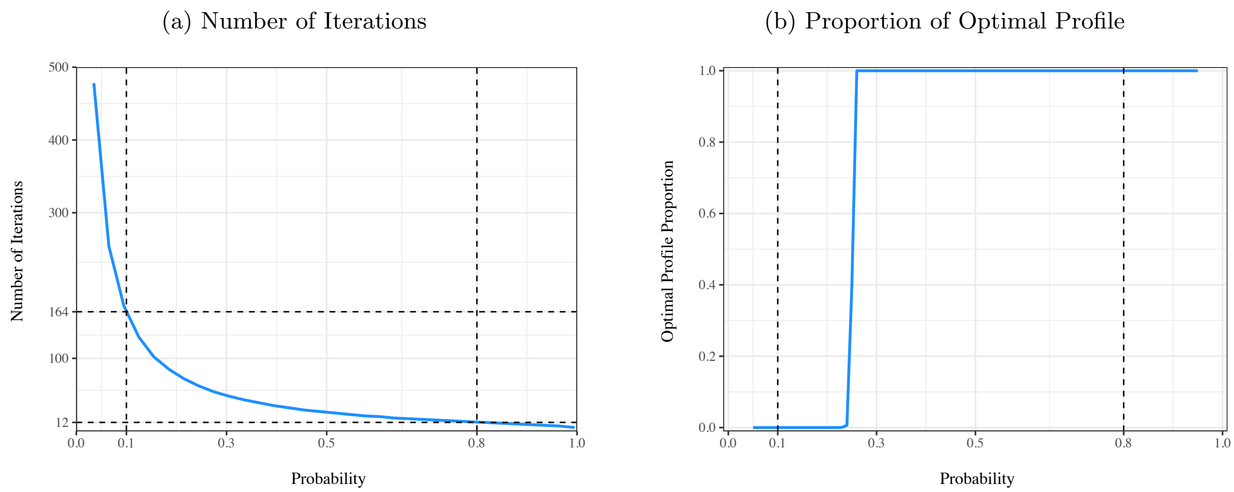


Figure B.1. Numerical Solution Outputs

Finally, we redo the numerical analysis above for payoff parameters in treatment RM-VHBB. We find that with revision opportunities arriving with 80% chance, 14 interactions are sufficient for the uniqueness results to hold. Since the pre-play phase lasts 60 seconds, the theory predicts a unique revision outcome in the revision game and, hence, RM-VHBB results should be similar to those in RM.

C. Evaluating the exact predictions for all treatments

In our paper, we highlight the exact theoretical predictions given the environment implemented in the RM treatment. In Section IV.B, we test these exact predictions. We now discuss exact predictions for other treatments. Given the multiplicity of equilibria displayed in many of the treatments (i.e. Baseline, S-CT, R-CT, R-R-CT, I-RM, and S-RM), we concentrate on predictions that hold for all pure strategy equilibria. For that, we focus on variables other than the effort profile chosen; instead, we concentrate on full coordination and on the actual revision process. Below, we describe exact theoretical predictions for all treatments and provide empirical tests for each one.

Coordination

In all treatments, the theoretical prediction is that all groups should be fully coordinated at the payoff relevant choice.[1] In Table C.1, we present the frequency of fully coordinated groups as well as the equilibrium deviation for the payoff relevant choices of each treatment.

Furthermore, for treatments with uncertainty regarding future revisions, we can go beyond predicting full coordination at the payoff relevant moment. The theoretical prediction is that full coordination should occur from the initial choices. This implies that, for I-RM, S-RM, RM, and RM-VHBB all groups should be fully coordinated from the initial choice

Table C.1—Exact predictions and empirical evidence

	Empirical Evidence					Prediction		
Treatment	$FC(PR)$	$ED(PR)$	$FC(I)$	$ED(I)$	NRF	FC	ED	NRF
Baseline	2.5	1.49	NA	NA	NA	100	0	NA
S-CT	27.5	0.86	NA	NA	NA	100	0	NA
R-CT	31.9	0.97	NA	NA	NA	100	0	NA
R-R-CT	36.2	0.96	NA	NA	NA	100	0	NA
I-RM	38.8	0.78	38.8	0.97	46.3	100	0	100
S-RM	46.2	0.69	30.0	1.29	25.0	100	0	100
R-RM	60.0	0.58	NA	NA	NA	100	0	NA
RM	66.2	0.49	50.6	1.04	42.5	100	0	100
RM-VHBB	61.3	0.40	45.0	1.08	42.5	100	0	100
Van Huyck, Battalio and Beil (1990) (B)	0	1.46	NA	NA	NA	100	0	NA
Blume and Ortmann (2007) (B)	12.5	1.74	NA	NA	NA	100	0	NA
Blume and Ortmann (2007) (C)	26.6	1.17	NA	NA	NA	100	0	NA
Deck and Nikiforakis (2012) (NT)[2]	37.0	0.87	NA	NA	NA	100	0	NA
Weber (2006) (B)	1.7	1.5	NA	NA	NA	100	0	NA

Note: FC and ED stand for the percentage of fully coordinated groups and the average equilibrium deviation. NRF presents the frequency of no revision cases. That is, out of all groups and all rounds, in what fraction of cases did groups not revise (every member of a group kept their initial choice till the end of the phase). Finally, PR and I indicate whether the choice is payoff relevant or initial choice. B next to other papers stands for their baseline treatment results. C in Blume and Ortmann (2007) is for the communication treatment in the minimum effort game.

[1] For R-RM, the prediction is that, with probability high enough the group should be fully coordinated. The exception of R-RM follows from the randomness introduced by exogenous initial choices and random revision opportunities. For instance, it is a possibility that the initial effort profile will not display full coordination and that no player has any revision opportunity throughout the 60 seconds.

[2] For Deck and Nikiforakis (2012), we have the data from the Neighbourhood Treatment (NT), and the calculations in Table C.1 are for that treatment only.

Revising Effort Choices

The randomness and asynchronicity of the revision opportunity allow us to obtain additional predictions regarding the revision of effort choices. In the I-RM, RM, and RM-VHBB no player should ever revise their effort along the equilibrium path of any revision equilibrium. In any revision equilibrium of these games, players choose an initial effort configuration that is fully coordinated (in RM and RM-VHBB we can further pin down a unique profile, the efficient effort profile) and never revise their strategy. Please note that, since revisions are randomly and asynchronously awarded, they are not a feature of the equilibrium path of a revision equilibrium. Furthermore, for S-RM, revisions might be a part of the equilibrium path in a revision equilibrium. However, in any pure strategy revision equilibrium, at each revision opportunity either all players jointly revise their effort choices to a profile in which all choose the same effort or no player revises their effort choice and they remain all choosing the same effort level. Hence, one theoretical prediction is that a revision should only be used by a player to change her effort choice if all other players also use that same revision opportunity to change their effort choices.

In Table C.1, we provide a test of these predictions. For the treatments I-RM, RM, and RM-VHBB we display the frequency of rounds in which a group does not utilize any revision. For the treatment S-RM, we display the frequency of rounds in which a group either does not utilize any revision or, if a subject utilizes that revision to change her effort choice, then all subjects utilize the same revision opportunity.

Taken together, these tests highlight the lack of support for the exact predictions obtained from the theory, in all treatments. In the paper, when evaluating the predictions for RM, we state that the lack of support for exact theoretical predictions is, in some sense, expected given the specificity of such predictions and the simplicity of the equilibrium concepts used. To further substantiate this claim, we also evaluate the empirical support for exact theoretical predictions given the environment implemented in the lab in other papers in the literature.

Evaluating the exact predictions in the literature[3]

We now proceed to test exact theoretical predictions using data from similar papers in the literature (see Table C.1). The introduction of incremental commitment implying the selection of a unique outcome as the subgame perfect equilibrium outcome of the extended game is a novel point of our work, hence we must go beyond theoretical predictions about the effort profile. However, there are alternative dimensions that are clearly pinned down by the theory, even on papers that implement cheap talk communication. Following the same intuition as above, we focus on the prediction that all groups should be fully coordinated in the payoff-relevant choice. We note that the prediction that, in all Nash equilibria of the normal form game, a group's effort profile should be fully coordinated holds for simultaneous play minimum effort games. Furthermore, that prediction cannot be altered by pre-play cheap talk communication.

[3]We would like to thank the authors of the following papers for making their data available for the calculations in the current paper: Weber (2006), Blume and Ortmann (2007), and Deck and Nikiforakis (2012).

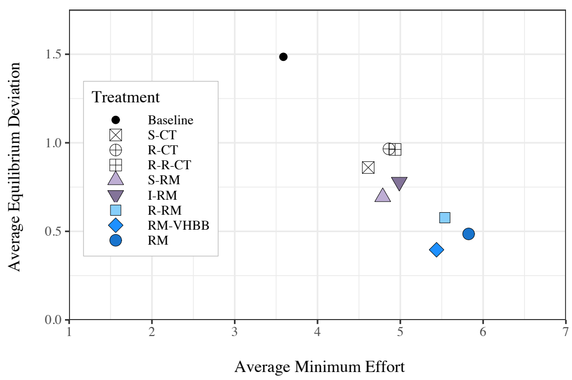
D. Additional Tables, Figures and Discussions

In this section, we provide more details on the overall performance of all treatments, details on non-parametric tests, additional regression analyses, as well as some analyses of the behavior over 60 seconds and 10 rounds.

D.1. Overall performance of all treatments

Figure D.1 presents two graphs highlighting the overall performance of all treatments on four dimensions: minimum effort, equilibrium deviation, average effort, and frequency of coordination on median action.

(a) Minimum effort and eqbm deviation



(b) Average effort and coordination

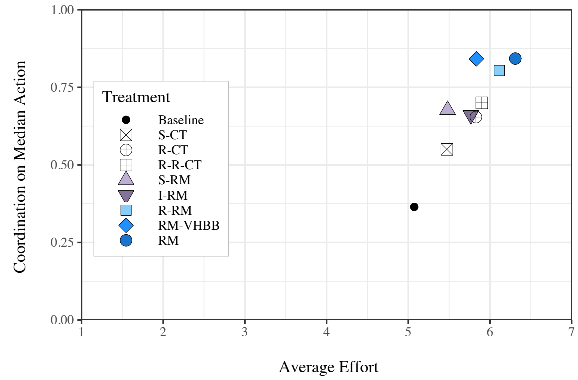


Figure D.1. Overall performance of all treatments

D.2. Non-parametric test results

Table D.1 includes average values of the main five measures used throughout the paper. Table D.2 presents the test results of non-parametric MWU test p-values between RM and other treatments in the paper. We use group average in a round as a unit of observation for all the tests in Table D.2.

Figures D.2, D.3, D.4, and D.5, include empirical CDFs (ECDFs) of each comparison listed in Table D.2. The figures include ECDFs, as well as, the p-value of a non-parametric test, Kolmogorov-Smirnov test, that compares the cumulative distributions of two comparison samples.

Table D.1—Average values for focal variables

	Payoff	Minimum Effort	Freq 7s	Fully Coord	Eqbm Dev
Baseline	6.946	3.587	0.269	0.025	1.485
S-CT	8.836	4.612	0.442	0.275	0.860
R-CT	9.194	4.862	0.555	0.319	0.966
R-R-CT	9.315	4.938	0.598	0.362	0.963
I-RM	9.468	4.987	0.569	0.388	0.779
S-RM	9.183	4.787	0.490	0.463	0.694
R-RM	10.429	5.537	0.713	0.600	0.577
RM	10.926	5.825	0.780	0.662	0.485
RM-VHBB	11.042	5.438	0.590	0.613	0.396

Table D.2—MWU test p-values (group average as a unit of observation)

RM vs.	Payoff	Minimum Effort	Freq 7s	Fully Coord	Eqbm Dev	# of obs.
S-CT	0.000	0.000	0.000	0.000	0.000	160, 80
R-CT	0.000	0.000	0.000	0.000	0.000	160, 160
R-R-CT	0.000	0.000	0.000	0.000	0.000	160, 80
I-RM	0.000	0.000	0.000	0.000	0.000	160, 80
S-RM	0.000	0.000	0.000	0.003	0.006	160, 80
R-RM	0.173	0.169	0.151	0.343	0.319	160, 80
RM-VHBB	0.260	0.061	0.003	0.447	0.772	160, 80

Figure D.2. ECDFs for relevant measures

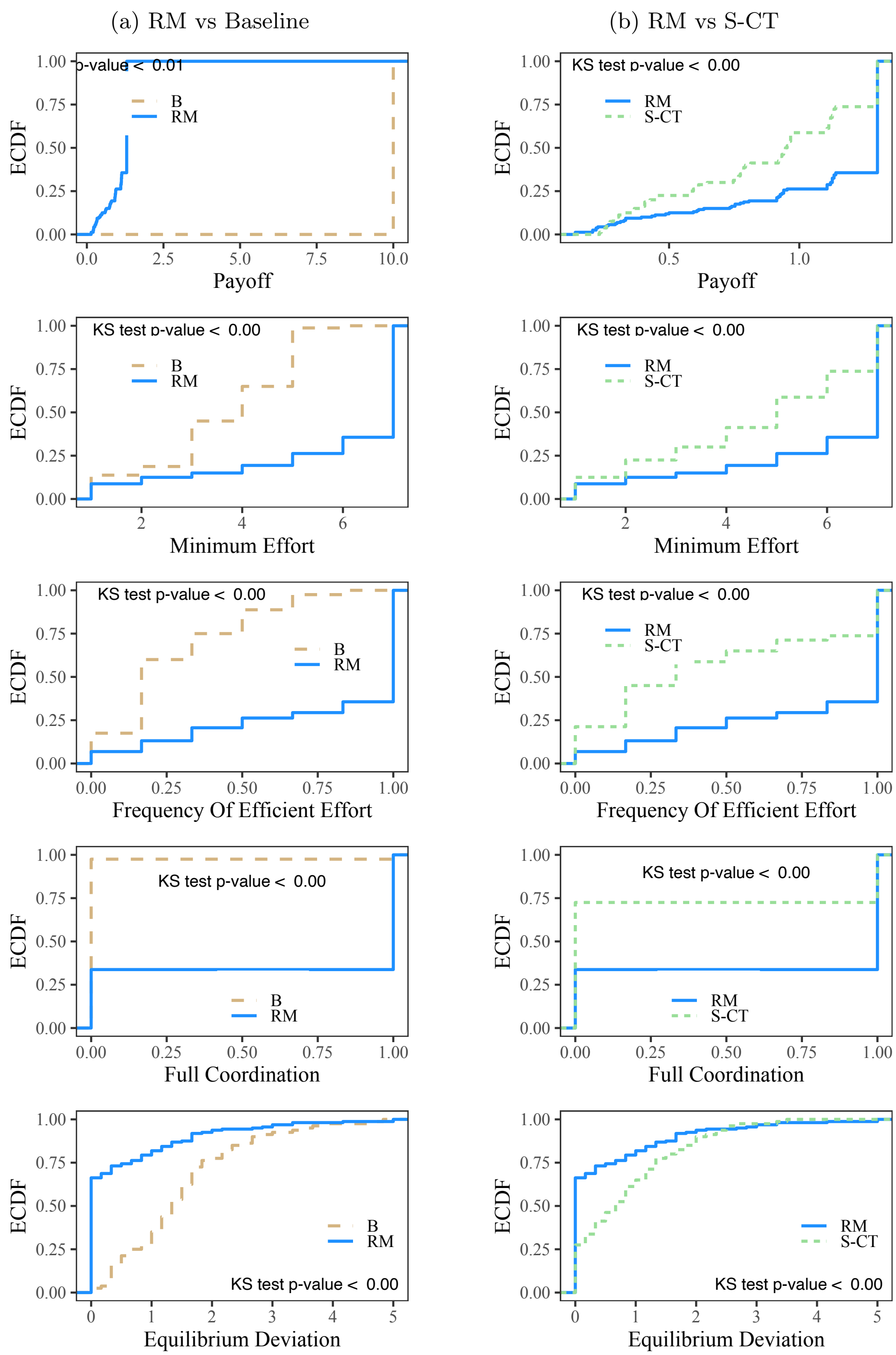


Figure D.3. ECDFs for relevant measures

(a) RM vs I-RM

(b) RM vs S-RM

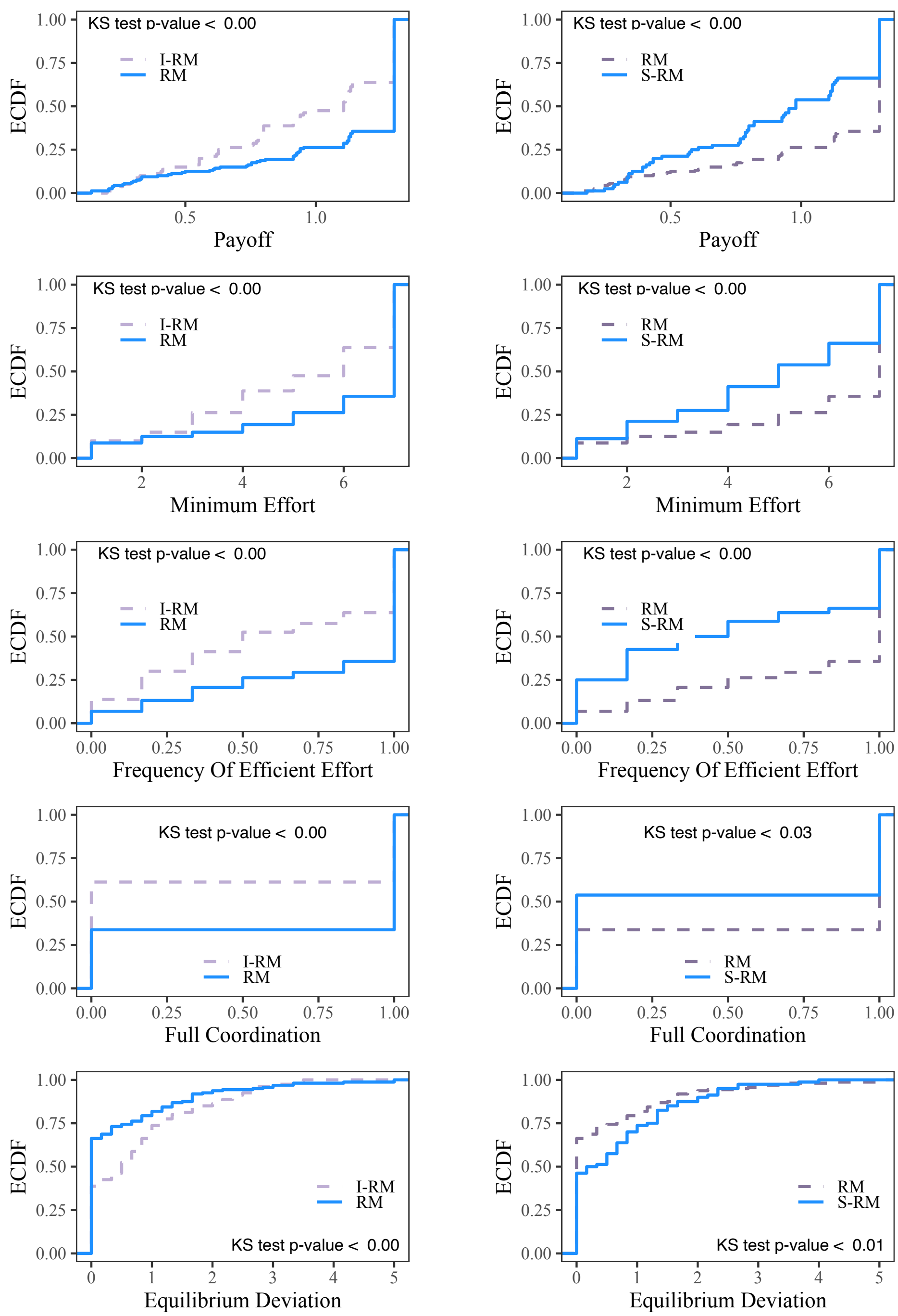


Figure D.4. ECDFs for relevant measures

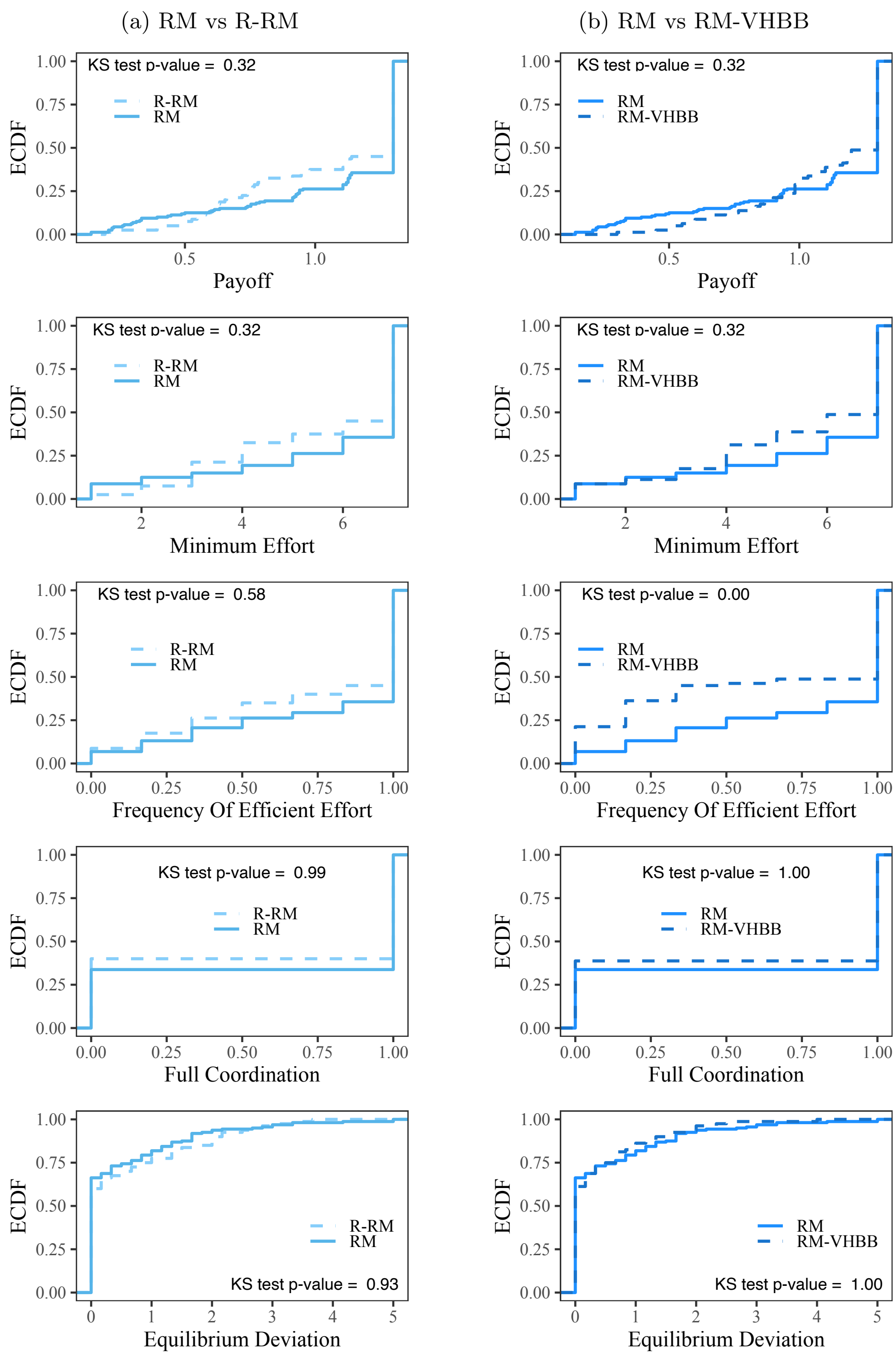
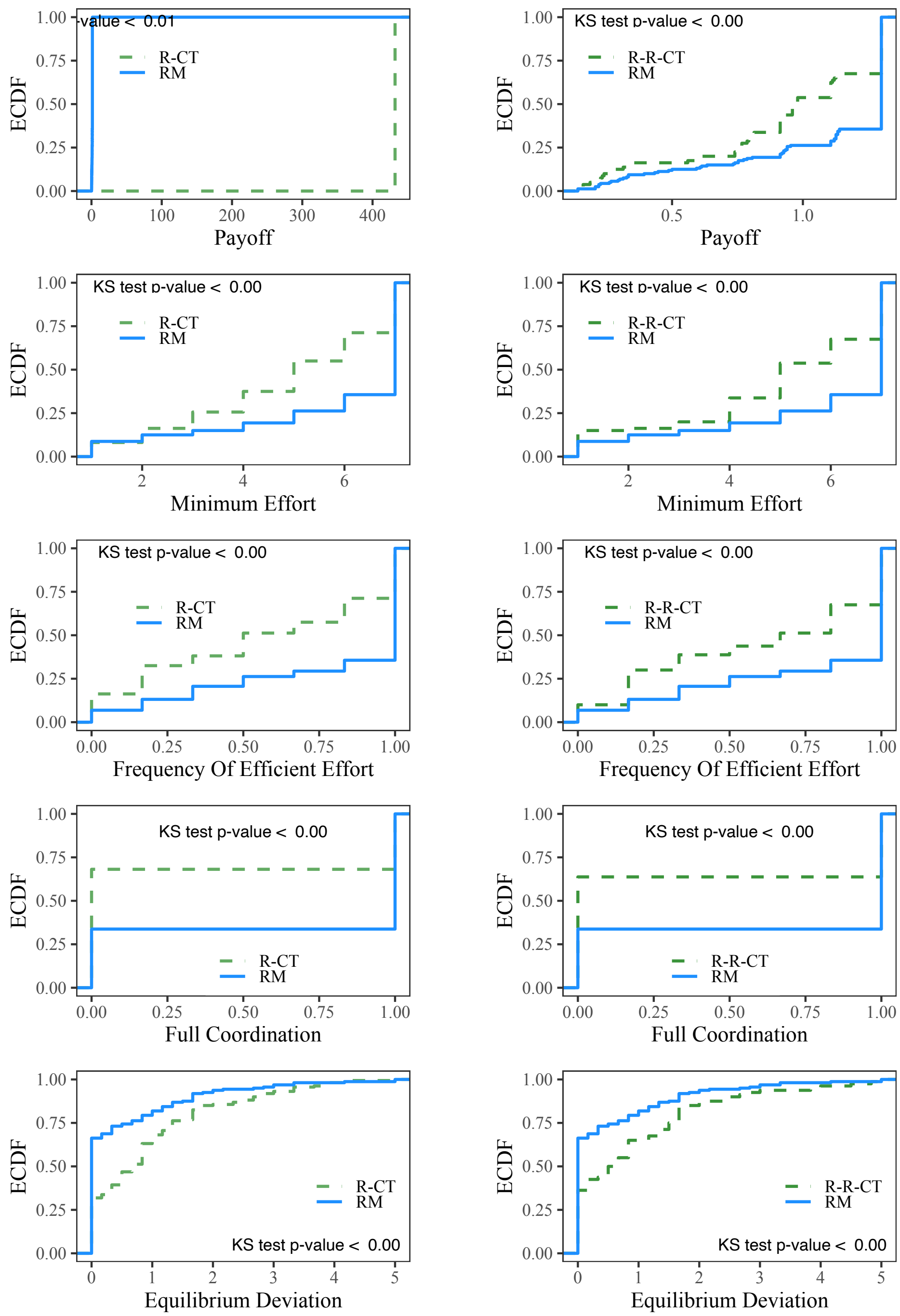


Figure D.5. ECDFs for relevant measures

(a) RM vs R-CT

(b) RM vs R-R-CT



D.3. Additional regression analyses

In this section, we include additional regression analyses. First, we present regressions with combined cheap-talk treatments and then combined revision mechanism treatments.

Table D.3—Regression Analysis (S-CT and R-CT as reference)

	Dependent variable:				
	Payoffs	*Minimum Effort*	*Freq Efficient Effort*	*Full Coordination*	*Eqbm Deviation*
Baseline	-0.198**	-1.190**	-0.249***	-0.279***	0.536**
	(0.088)	(0.524)	(0.073)	(0.068)	(0.221)
Revision Mechanism	0.184**	1.050**	0.263***	0.358***	-0.447***
	(0.080)	(0.468)	(0.095)	(0.104)	(0.160)
Constant	0.777***	4.780***	0.517***	0.304***	0.549
	(0.168)	(0.309)	(0.066)	(0.066)	(0.441)
Quiz	0.002				0.010
	(0.022)				(0.040)
R^2	0.141	0.138	0.204	0.215	0.0586
Observations	2880	480	480	480	2880
Demographics	Yes	NA	NA	NA	Yes

Note: *Standard errors clustered at the group level are in parentheses;* $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.
Reference category is S-CT and R-CT combined;
Payoffs variable is a subject payoff in a round. *Minimum Effort, Freq Efficient Effort, Full Coordination* are a group level measures and subject demographic information is not applicable. *Eqbm Deviation* is a subject level variable.

Table D.4—Regression Analysis (RMs vs CTs)

	Dependent variable:				
	Payoffs	*Minimum Effort*	*Freq Efficient Effort*	*Full Coordination*	*Eqbm Deviation*
Baseline	-0.209**	-1.230**	-0.269***	-0.294***	0.529**
	(0.085)	(0.502)	(0.061)	(0.055)	(0.219)
RMs	0.169***	0.837**	0.178**	0.316***	-0.457***
	(0.059)	(0.343)	(0.073)	(0.072)	(0.130)
Constant	0.837***	4.820***	0.538***	0.319***	0.504
	(0.161)	(0.272)	(0.053)	(0.053)	(0.401)
Quiz	-0.0002				0.021
	(0.022)				(0.039)
R^2	0.122	0.102	0.126	0.173	0.0552
Observations	4320	720	720	720	4320
Demographics	Yes	NA	NA	NA	Yes

Note: *Standard errors clustered at the group level are in parentheses;* $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$.
Reference category is CTs, combining S-CT, R-CT, and R-R-CT; RMs combine RM, R-RM, and RM-VHBB;
Payoffs variable is a subject payoff in a round. *Minimum Effort, Freq Efficient Effort, Full Coordination* are a group level measures and subject demographic information is not applicable. *Eqbm Deviation* is a subject level variable.

Tables D.5 and D.6 present regression analyses for all treatments and round variable.

D.4. Equilibrium deviation and message to action dynamics

Figure D.6a presents equilibrium deviation over 60 seconds (for 10 rounds) for 3 treatments. As we described in the main text, the main difference between RM and cheap-talk treatments is in the last 5-10 seconds. Figure D.6b shows the movement from 60th second message in R-CT and

Table D.5—Regression Analysis (all treatments)

	Dependent variable:				
	Payoffs	*Minimum Effort*	*Freq Efficient Effort*	*Full Coordination*	*Eqbm Deviation*
Baseline	-0.177	-1.020	-0.173	-0.250**	0.602**
	(0.127)	(0.744)	(0.124)	(0.115)	(0.269)
Revision Mechanism	0.211*	1.210*	0.339**	0.388***	-0.383*
	(0.121)	(0.706)	(0.138)	(0.139)	(0.224)
Revision Mechanism VHBB	0.221**	0.825	0.148	0.338***	-0.486**
	(0.109)	(0.661)	(0.154)	(0.130)	(0.205)
Random Revision Mechanism	0.159	0.925	0.271*	0.325**	-0.289
	(0.122)	(0.713)	(0.153)	(0.143)	(0.232)
Infrequent Revision Mechanism	0.067	0.375	0.127	0.113	-0.076
	(0.150)	(0.874)	(0.167)	(0.162)	(0.294)
Synchronous Revision Mechanism	0.037	0.175	0.048	0.188	-0.189
	(0.127)	(0.743)	(0.144)	(0.154)	(0.254)
Revision Cheap Talk	0.039	0.250	0.114	0.044	0.100
	(0.120)	(0.702)	(0.143)	(0.139)	(0.232)
Richer Revision Cheap Talk	0.047	0.325	0.156	0.088	0.084
	(0.148)	(0.842)	(0.140)	(0.138)	(0.342)
Constant	0.779***	4.610***	0.442***	0.275**	0.420
	(0.158)	(0.613)	(0.121)	(0.114)	(0.391)
Quiz	0.002				0.026
	(0.019)				(0.037)
R^2	0.104	0.0881	0.129	0.145	0.048
Observations	5280	880	880	880	5280
Demographics	Yes	NA	NA	NA	Yes

Note: *Standard errors clustered at the group level are in parentheses; *p <0.1; **p <0.05; ***p <0.01.*
Reference category is standard cheap talk S-CT;
Payoffs variable is a subject payoff in a round. *Minimum Effort, Freq Efficient Effort, Full Coordination* are a group level measures and subject demographic information is not applicable. *Eqbm Deviation* is subject level variable.

R-R-CT to the payoff relevant efforts. It is worth noting how similar the results are for R-CT and R-R-CT.

Table D.6—Regression analysis (all treatments and round variable)

	Dependent variable:				
	Payoffs	*Minimum Effort*	*Freq Efficient Effort*	*Full Coordination*	*Eqbm Deviation*
Baseline	-0.177	-1.020	-0.173	-0.250**	0.602**
	(0.127)	(0.744)	(0.124)	(0.115)	(0.269)
Revision Mechanism	0.211*	1.210*	0.339**	0.388***	-0.383*
	(0.121)	(0.707)	(0.138)	(0.140)	(0.224)
Revision Mechanism VHBB	0.221**	0.825	0.148	0.338***	-0.486**
	(0.109)	(0.661)	(0.154)	(0.130)	(0.205)
Random Revision Mechanism	0.159	0.925	0.271*	0.325**	-0.289
	(0.122)	(0.713)	(0.153)	(0.143)	(0.232)
Infrequent Revision Mechanism	0.067	0.375	0.127	0.113	-0.076
	(0.150)	(0.874)	(0.167)	(0.162)	(0.295)
Synchronous Revision Mechanism	0.037	0.175	0.048	0.188	-0.189
	(0.127)	(0.743)	(0.144)	(0.154)	(0.254)
Revision Cheap Talk	0.039	0.250	0.114	0.044	0.100
	(0.120)	(0.703)	(0.143)	(0.139)	(0.232)
Richer Revision Cheap Talk	0.047	0.325	0.156	0.088	0.084
	(0.148)	(0.843)	(0.140)	(0.138)	(0.342)
Round	0.031***	0.178***	0.023***	0.047***	-0.097***
	(0.004)	(0.024)	(0.005)	(0.006)	(0.012)
Constant	0.608***	3.630***	0.317***	0.018	0.952**
	(0.159)	(0.623)	(0.120)	(0.114)	(0.392)
Quiz	0.002				0.026
	(0.019)				(0.037)
R^2	0.166	0.15	0.156	0.219	0.0866
Observations	5280	880	880	880	5280
Demographics	Yes	NA	NA	NA	Yes

Note: *Standard errors clustered at the group level are in parentheses; *p <0.1; **p <0.05; ***p <0.01.*
Reference category is standard cheap talk S-CT;
Payoffs variable is a subject payoff in a round. *Minimum Effort, Freq Efficient Effort, Full Coordination* are a group level measures and subject demographic information is not applicable. *Eqbm Deviation* is a subject level variable.

(a) Eqbm. deviation of revised efforts

(b) Average effort and full coordination

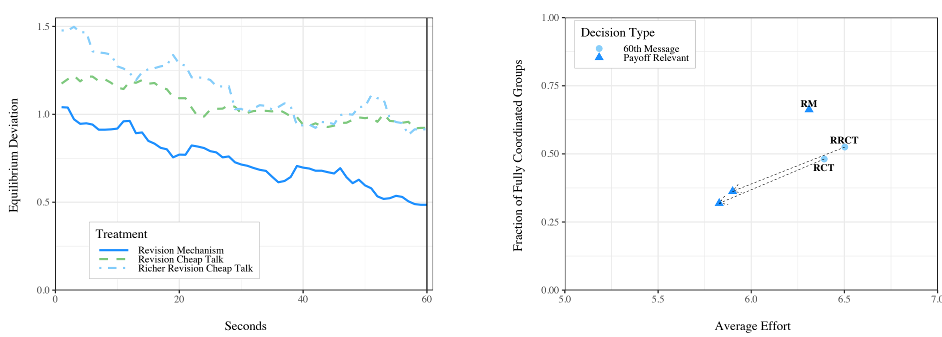


Figure D.6. Equilibrium Deviation over Time

D.5. Dynamics over 60 seconds and 10 rounds

In this section we include some graphs highlighting subjects' behavior over 60 second pre-play phase (averaged over all 10 rounds). Then, we present the behavior over 10 rounds separately.

(a) Average effort (b) Minimum Effort

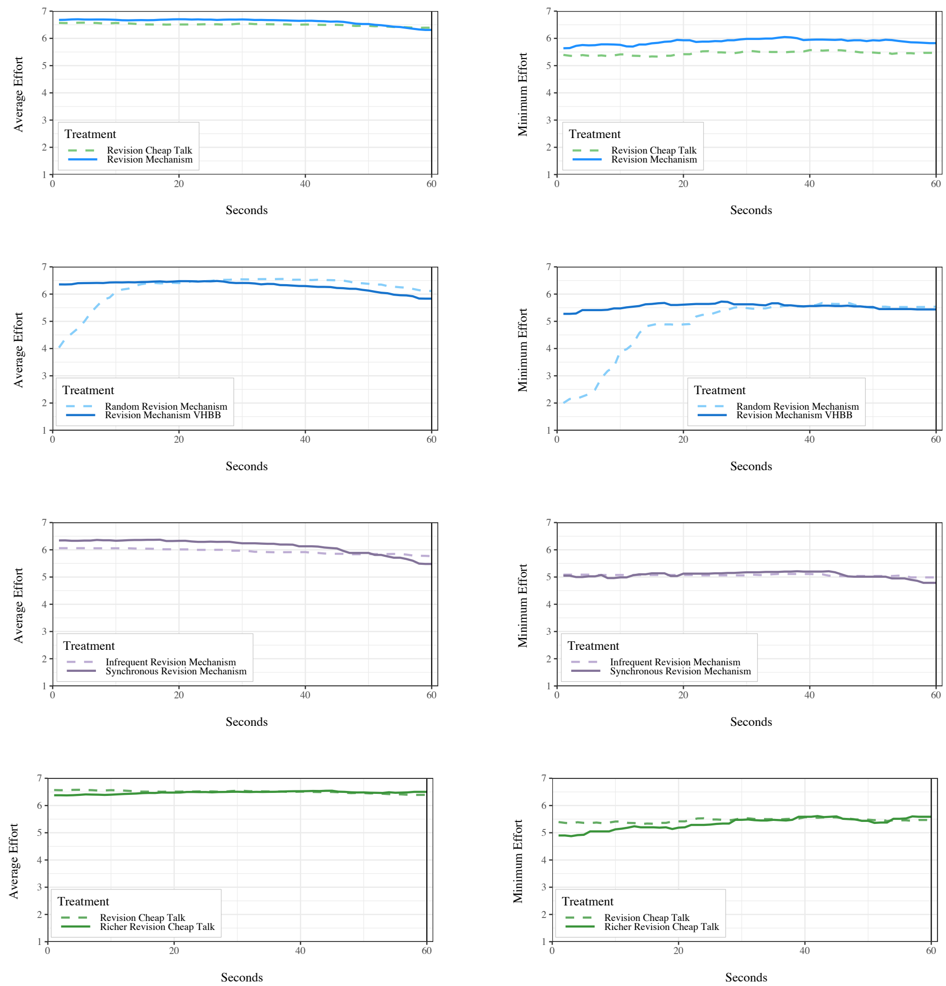
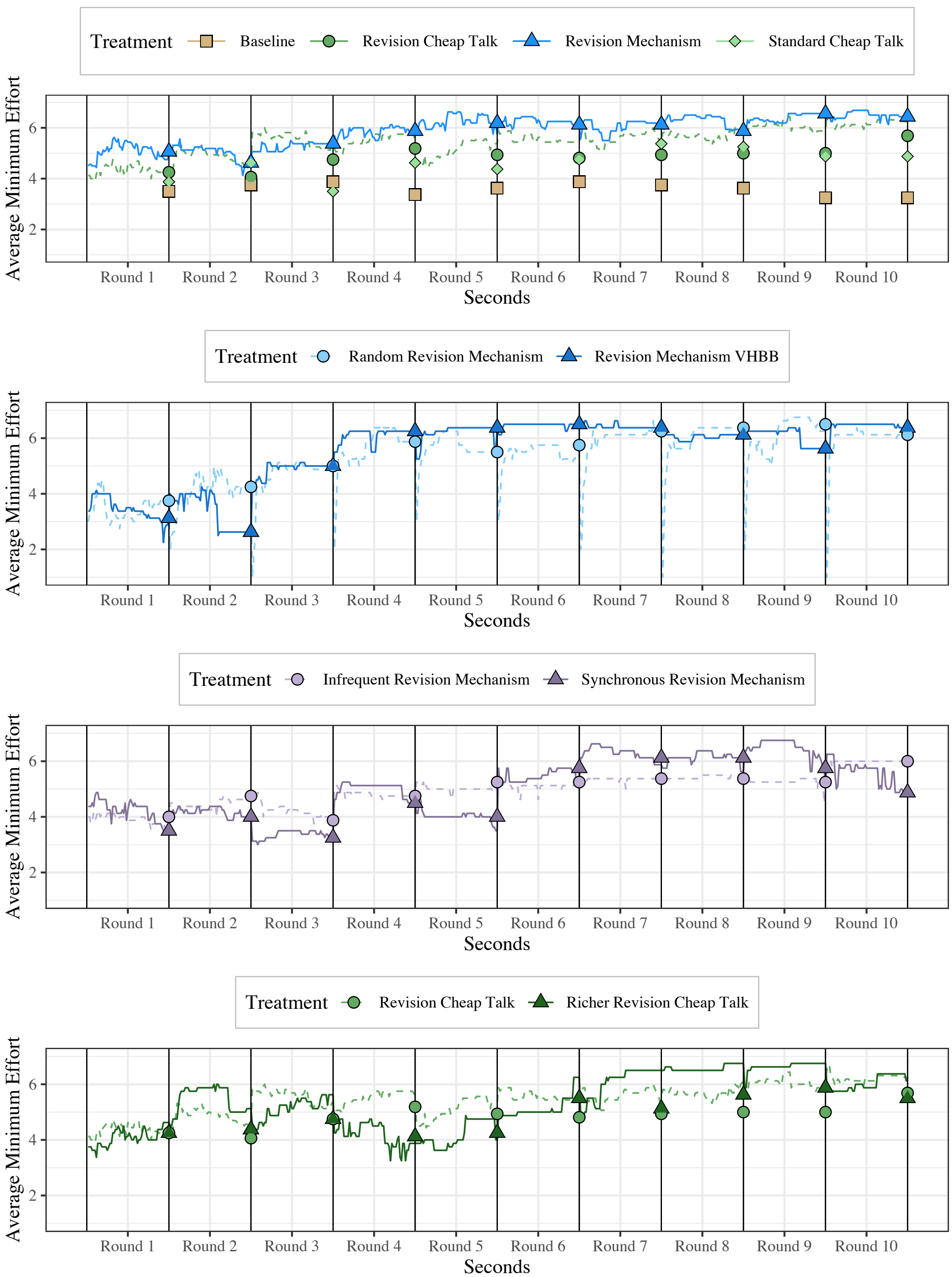


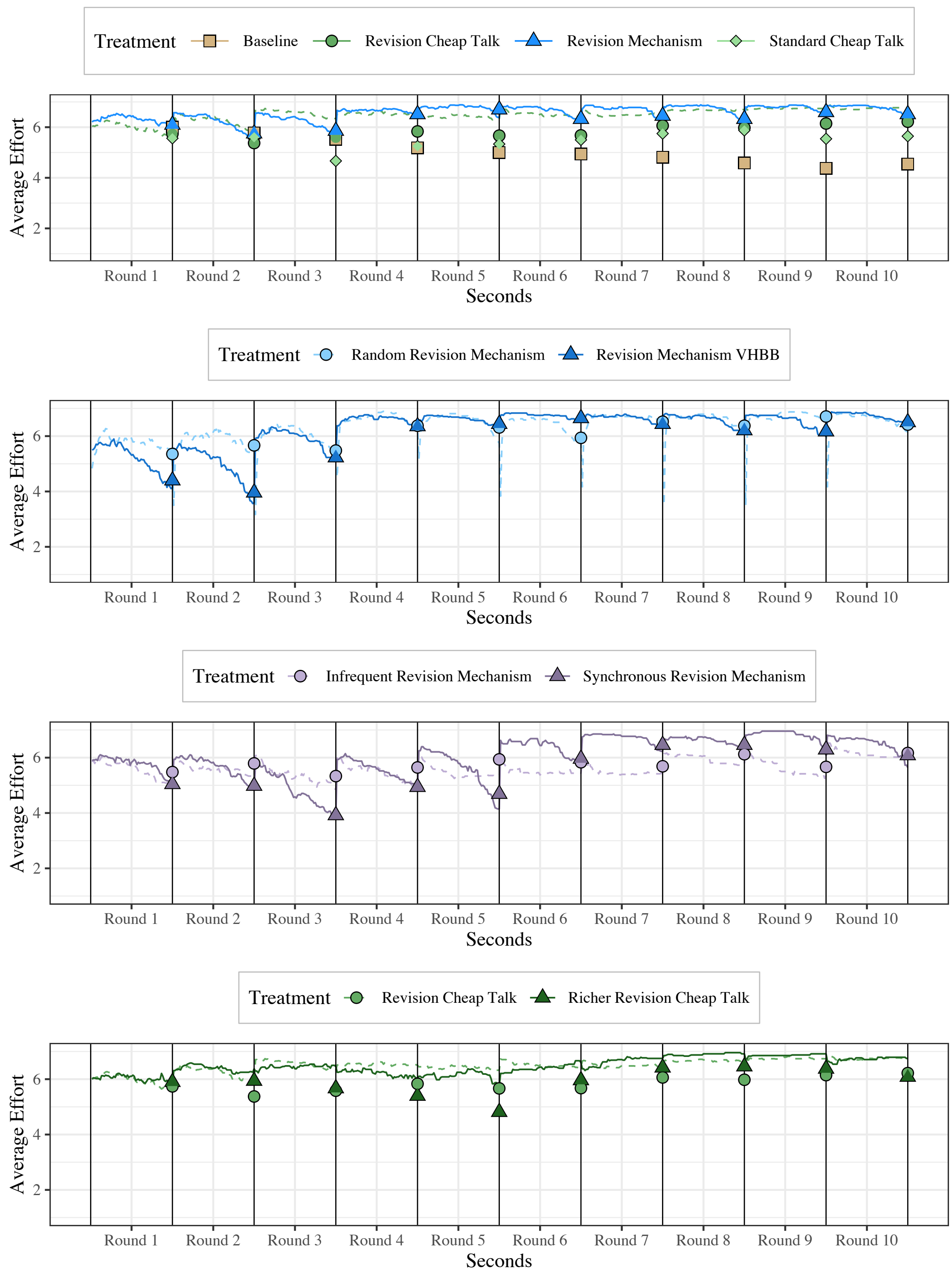
Figure D.7. Average and minimum effort over 60 seconds

Figure D.8. Average minimum effort over 60 seconds and 10 rounds



For **B, S-CT, R-CT, and R-R-CT,** the 60th second points on the graph represent the payoff relevant choices.

Figure D.9. Average effort over 60 seconds and 10 rounds



For **B, S-CT, R-CT, and R-R-CT,** the 60th second points on the graph represent the payoff relevant choices.

D.6. I-RM vs RM—revised efforts, posted efforts, and initial choices

(a) Average effort (b) Minimum Effort

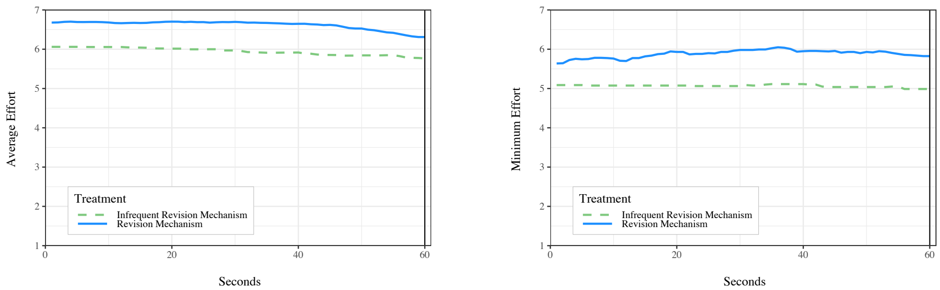


Figure D.10. Average effort over 60 seconds

(a) Average effort (b) Minimum Effort

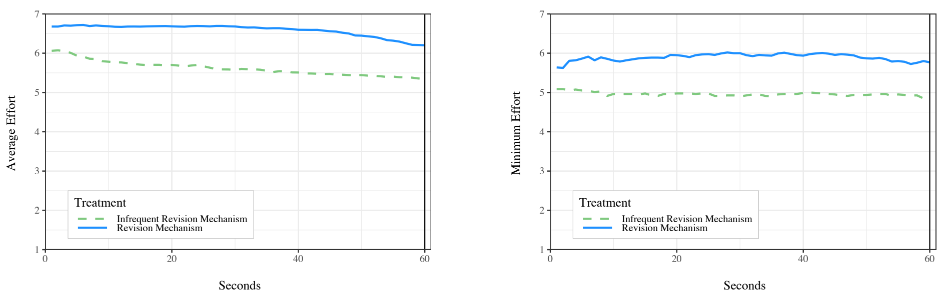


Figure D.11. Average and minimum effort over 60 seconds (instant choice data)

Treatment/Effort	1	2	3	4	5	6	7
RM	1.3	0.7	0.4	1.6	4.4	5.9	85.7
I-RM	3.1	1.9	2.9	9.0	7.3	12.7	63.1

Table D.7—Initial choice frequency distribution

E. Revised effort vs posted effort

In our paper, actions can be changed only when a revision opportunity is awarded. Thus, in any instant, two different data points exist per player: (i) the effort the player is currently committed to, which all the other players are observing, and (ii) the effort currently selected by the player. Only after a revision opportunity is awarded can the selected effort choice become the effort to which the player is committed.

Let us evaluate the robustness of our experimental design by examining whether our choices of the time-interval length and the revision probability had an impact on the choices. We therefore compare the last-instant intended efforts with the efforts played out. If the time interval were too short or the revisions too infrequent, the players' intended actions would differ from the posted actions, even in the last instant, and subjects would have been constrained in their choice process. However, we cannot reject the hypothesis of equal distributions of actions ($p > 0.1$), which indicates the choice of interval length and revision frequency did not bind players' behaviors, thus aligning our experimental design with the conditions of the main proposition.

F. Instructions: Baseline

Instructions

This is an experiment in decision making. Funds have been provided to run this experiment. If you follow instructions and make good decisions you may earn a substantial amount of money, that will be paid to you in CASH at the end of the experiment. What you earn depends partly on your decisions and partly on the decisions of others.

The entire session will take place through computer terminals, and all interactions between you will be done through the computers. Please, do not talk or communicate in any way during the session. Please, turn off your phones now.

You will be randomly divided in groups of **6** persons, and will make a sequence of **10** decisions as a part of that group. After 10 periods, all groups will be disband and the phase will end. This will be the end of the experiment.

Task Description

Each period, you and every member of your group will pick a number: **1, 2, 3, 4, 5, 6 or 7**. Your choice and the smallest number chosen in your group (**including yours**) will determine your payoff in that period. Table 1 presents your payoffs in all possible scenarios. For example, if you choose number 5 and the smallest number chosen in your group is 4 you will get 78 Cents ($.78).

		Smallest Number Chosen						
		7	6	5	4	3	2	1
Your Choice	7	1.30	1.10	0.90	0.70	0.50	0.30	0.10
	6	—	1.14	0.94	0.74	0.54	0.34	0.14
	5	—	—	0.98	0.78	0.58	0.38	0.18
	4	—	—	—	0.82	0.62	0.42	0.22
	3	—	—	—	—	0.66	0.46	0.26
	2	—	—	—	—	—	0.50	0.30
	1	—	—	—	—	—	—	0.34

Table 1 – Payoff from different actions

Payoffs

Your **final payoff** will be the sum of payoffs from all 10 periods plus the show up fee.

What exactly is going to happen now?

1. You will take a short quiz to help you understand the payoff matrix. If you have questions, please, raise your hand and we will come up to you.
2. Once everyone has finished the quiz the experiment will start. You will see a screen with buttons: 1, 2, 3, 4, 5, 6 and 7.
3. To choose a number on a screen simply put your cursor on the chosen number. The button will light up in green color.
4. Once you have chosen a number you can press the OK button to confirm your choice.
5. After all your group members have chosen their number you will see a screen with the following information. You will see what was *your choice* and the *minimum number chosen* in your group.
6. Number chosen by you and minimum number chosen in your group will determine you payoff in that period.
7. Once you are done observing the information screen press *continue* and the next period will start.

G. Instructions: Standard Cheap Talk

Instructions

This is an experiment in decision making. Funds have been provided to run this experiment. If you follow instructions and make good decisions you may earn a substantial amount of money, that will be paid to you in CASH at the end of the experiment. What you earn depends partly on your decisions and partly on the decisions of others.

The entire session will take place through computer terminals, and all interactions between you will be done through the computers. Please, do not talk or communicate in any way during the session. Please, turn off your phones now.

You will be randomly divided in groups of **6** persons, and will make a sequence of **10** decisions as a part of that group. After 10 periods, all groups will be disband and the phase will end. This will be the end of the experiment.

Task Description

Each period, you and every member of your group will choose an integer: **1, 2, 3, 4, 5, 6 or 7**. Your choice and the smallest number chosen in your group (**including yours**) will determine your payoff in that period. Table 1 presents your payoffs in all possible scenarios. For example, if you choose number 5 and the smallest number chosen in your group is 4 you will get 78 Cents ($.78).

		Smallest Number Chosen						
		7	6	5	4	3	2	1
Your Choice	7	1.30	1.10	0.90	0.70	0.50	0.30	0.10
	6	—	1.14	0.94	0.74	0.54	0.34	0.14
	5	—	—	0.98	0.78	0.58	0.38	0.18
	4	—	—	—	0.82	0.62	0.42	0.22
	3	—	—	—	—	0.66	0.46	0.26
	2	—	—	—	—	—	0.50	0.30
	1	—	—	—	—	—	—	0.34

Table 1 – Payoff from different actions

1-minute Countdown

Graph Description

Before the 1-minute countdown, you and every member of your group have to choose a number to be posted on the graph: **1, 2, 3, 4, 5, 6 or 7**. Once every member of your group have made their initial choice of their **graph-number**, the 1-minute countdown begins.

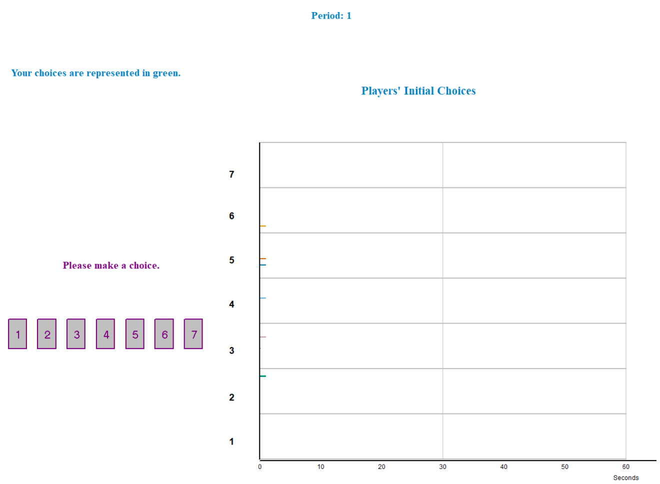


Figure 1 – Screen-shot of one possible scenario, as soon as the 1-minute countdown begins.

When the 1-minute countdown begins your screen will appear as in Figure 1. In Figure 1, we have placed time in seconds on the horizontal axes and the initial number chosen by each of your group members on the vertical axes.

The graph-numbers chosen by you and your cohort are placed along the vertical line above the zero second mark. You will see the graph-number of every participant in your group. For instance, in Figure 1, we see that 2 players have chosen number 5, 1 player has 2, 1 player's graph number is 3, 1 player's number is 4, and 1 player's number is 6. Your graph-number is always represented in the graph with the color green, and those of others by other colors.

Choice

After the graph appears on your screen, you will have to choose a number. **This number combined with the smallest number chosen in your group will determine you payoff in the period.** During the 1 minute, you will be able to change your chosen number at any time by placing your cursor on your desired number to the left of the screen. When you choose a number, it will light up as the number 2 now is. Your chosen number will **not** be displayed in the graph.

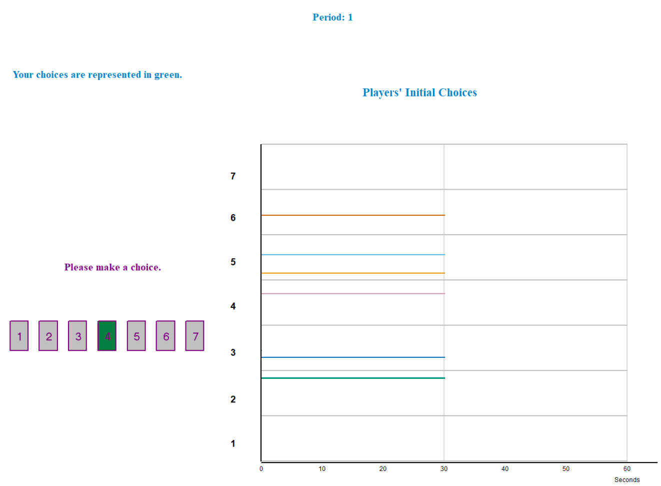


Figure 2 – Screen-shot of one possible scenario, after 30 seconds have passed.

When 30 seconds have passed your screen will appear as in Figure 2. You can still see the graph-numbers chosen by all players. Also, you can see on the left side of the screen that player GREEN is currently choosing the number 4 (it is lit up in green).

Note that only the number lit up in green at the end of 1-minute countdown is relevant for your payoff; numbers chosen during the 1-minute countdown or the graph-number DO NOT affect your payoff.

Final Payoffs

At the end of the 1 minute countdown, you will receive a payoff that depends on the number you have chosen (the number lit in green at the end of the countdown) and on the smallest number chosen by a player in your group. *Only the numbers selected at the* **end** *of the countdown matter for your payoff.* The numbers selected before do not matter at all for your payoff.

Your **final payoff** will be the sum of payoffs from all 10 periods plus the show up fee.

H. Instructions: Revision Mechanism

Instructions

This is an experiment in decision making. Funds have been provided to run this experiment. If you follow instructions and make good decisions you may earn a substantial amount of money, that will be paid to you in CASH VOUCHERS at the end of the experiment. What you earn depends partly on your decisions and partly on the decisions of others.

The entire session will take place through computer terminals, and all interactions between you will be done through the computers. Please, do not talk or communicate in any way during the session. Please, turn off your phones now.

You will be randomly divided in groups of **6** persons, and will make a sequence of **10** decisions as a part of that group. After 10 periods, all groups will be disband and the phase will end. This will be the end of the experiment.

Task Description

Each period, you and every member of your group will choose an integer: **1, 2, 3, 4, 5, 6 or 7**. Your choice and the smallest number chosen in your group (**including yours**) will determine your payoff in that period. Table 1 presents your payoffs in all possible scenarios. For example, if you choose number 5 and the smallest number chosen in your group is 4 you will get 78 Cents ($.78).

		Smallest Number Chosen						
		7	6	5	4	3	2	1
Your Choice	7	1.30	1.10	0.90	0.70	0.50	0.30	0.10
	6	—	1.14	0.94	0.74	0.54	0.34	0.14
	5	—	—	0.98	0.78	0.58	0.38	0.18
	4	—	—	—	0.82	0.62	0.42	0.22
	3	—	—	—	—	0.66	0.46	0.26
	2	—	—	—	—	—	0.50	0.30
	1	—	—	—	—	—	—	0.34

Table 1 – Payoff from different actions

Once you and all the members of your group have chosen a number, a 1-minute countdown will begin.

1-minute Countdown

1. *Graph Description*

   Before the 1-minute countdown, you and every member of your group have chosen a number: **1, 2, 3, 4, 5, 6 or 7**. Once every member of your group has made their initial choice, the 1-minute countdown begins.

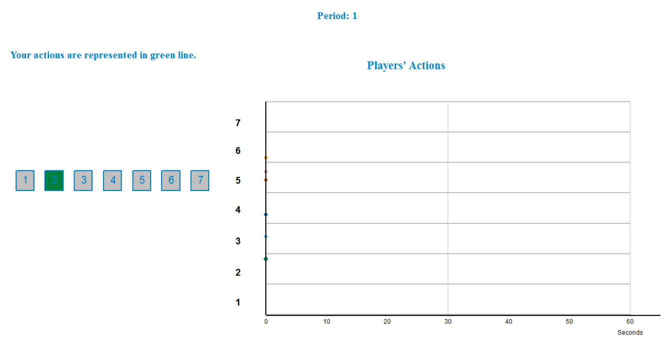


Figure 1 – Screen-shot of one possible scenario, as soon as the 1-minute countdown begins.

   When the 1-minute countdown begins your screen will appear as in Figure 1. In Figure 1, we have placed time in seconds on the horizontal axes and the number chosen by each of your group members on the vertical axes.

   The initially picked numbers chosen by you and your cohort are place along the vertical line above the zero second mark. You will see the number posted of every participant in your group. For instance, in Figure 1, we see that 2 players have chosen number 5, 1 player has chosen 2, 1 player has chosen 3, 1 player has chosen 4 and 1 player has chosen 6. Your choice is always represented in the graph with the color green, and those of others by other colors. As you can see the player has CHOSEN NUMBER 2.

   As time continues, during the 1 minute, you will be able to change your chosen number at any time by placing your cursor on your desired number to the left of the screen. When you choose a number, it will light up as the number 2 now is.

2. *Revision Opportunities*

   However, the fact that you have changed your choice DOES NOT imply that the number on the graph will change. The number on the graph will only change if a **revision opportunity** is awarded to you. A revision opportunity is awarded at random times.

   Every second a revision opportunity will be awarded to the group with 80% chance. When a revision opportunity is awarded to the group, it will be given to one of the 6 group members, with equal probability of $\frac{1}{6}$. So the chance of any other member of your group having a revision opportunity and being able to change the posted number and send the message is exactly equal to yours: $p = .8 \times \frac{1}{6} \approx 13\%$.

If you had changed the number chosen, and received a revision opportunity, your number on the graph will change (the GREEN line will shift). If a revision opportunity is awarded to you, but you had not previously changed your chosen number, the number on the graph will **not** change. Let's call the number which appears on the graph your NUMBER POSTED on the graph.

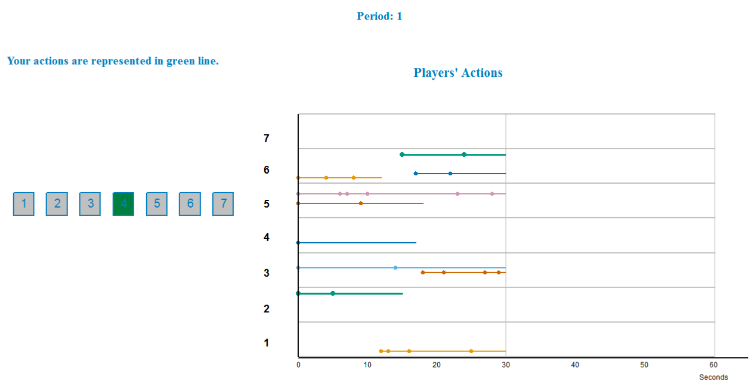


Figure 2 – Screen-shot of one possible scenario, after 30 seconds have passed

When 30 seconds have passed your screen will appear as in Figure 2. You can see how many times any member of your group changed the number posted (*the line changes*) as well as whether a revision opportunity was awarded (*a dot on the line*). For instance, player PURPLE has not changed the number posted (which is 5) despite having received 5 revision opportunities (5 dot's on light purple line). On the other hand, player BROWN initially chose number 5, but after about 20 seconds the posted number became 3. Player GREEN has changed the number posted once. Let's take a closer look at player GREEN's actions:

(a) GREEN initially chose to post 2.

(b) Then, around 4th second, a revision opportunity arrived, but the number posted by player GREEN did not change.

(c) At 15th second, a revision opportunity arrived and the number posted changed to 6. Note that this was only possible because he had changed the number chosen prior to the arrival of revision opportunity.

(d) At 25th second, revision opportunity arrived, but the number posted didn't change.

Finally, note that player GREEN has chosen the number 4 (it is lit up in green), but given that no revision opportunity has arrived, the NUMBER POSTED on the graph is still 6.

When 1-minute has passed your screen will appear as in Figure 3. You can see the number posted of every participant in your group. *Only the numbers posted at the* **end** of the countdown matter for your payoff. The numbers posted before do not matter at all for your payoff. For instance, GREEN's payoff depends only on his **last** number posted, and on THE SMALLEST NUMBER POSTED by his group members **at the end of the countdown**.

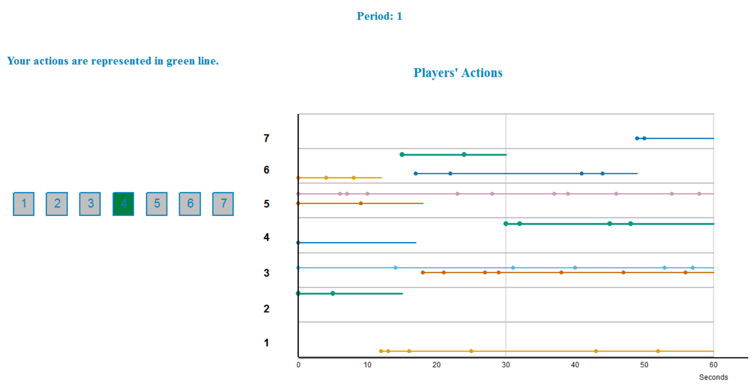


Figure 3 – Screen-shot of one possible scenario, after 60 seconds have passed

3. *Final Payoffs*

   Your **final payoff** will be the sum of payoffs from all 10 periods plus the show up fee.

The following probability facts and calculations may be useful:

1. Each player is expected to receive $.8 \times \frac{1}{6} \times 60 =$ **8 revision** opportunities during the 1-minute countdown.
2. The chance of a player receiving **no revision** opportunity during the 1-minute countdown is approximately $(1 - .8 \times \frac{1}{6})^{60} \approx 0.000$, which is **approximately 0.**
3. For any **10 second interval**, the chance of receiving at least one revision opportunity is of **approximately 75%.**
4. For any **20 second interval**, the chance of receiving at least one revision opportunity is of **approximately 95%.**

I. Instructions: Random Revision Mechanism

Instructions

This is an experiment in decision making. Funds have been provided to run this experiment. If you follow instructions and make good decisions you may earn a substantial amount of money, that will be paid to you in CASH VOUCHERS at the end of the experiment. What you earn depends partly on your decisions and partly on the decisions of others.

The entire session will take place through computer terminals, and all interactions between you will be done through the computers. Please, do not talk or communicate in any way during the session. Please, turn off your phones now.

You will be randomly divided in groups of **6** persons, and will make a sequence of **10** decisions as a part of that group. After 10 periods, all groups will be disband and the phase will end. This will be the end of the experiment.

Task Description

Each period, you and every member of your group will choose an integer: **1, 2, 3, 4, 5, 6 or 7**. Your choice and the smallest number chosen in your group (**including yours**) will determine your payoff in that period. Table 1 presents your payoffs in all possible scenarios. For example, if you choose number 5 and the smallest number chosen in your group is 4 you will get 78 Cents ($.78).

		Smallest Number Chosen						
		7	6	5	4	3	2	1
Your Choice	7	1.30	1.10	0.90	0.70	0.50	0.30	0.10
	6	—	1.14	0.94	0.74	0.54	0.34	0.14
	5	—	—	0.98	0.78	0.58	0.38	0.18
	4	—	—	—	0.82	0.62	0.42	0.22
	3	—	—	—	—	0.66	0.46	0.26
	2	—	—	—	—	—	0.50	0.30
	1	—	—	—	—	—	—	0.34

Table 1 – Payoff from different actions

1-minute Countdown

1. *Graph Description*

   Every round computer will randomly choose your initial number: **1, 2, 3, 4, 5, 6 or 7**. Once every member of your group has seen their initial choice, the 1-minute countdown begins.

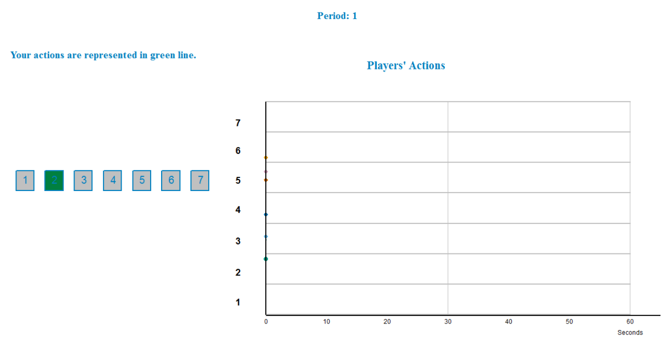


Figure 1 – Screen-shot of one possible scenario, as soon as the 1-minute countdown begins.

   When the 1-minute countdown begins your screen will appear as in Figure 1. In Figure 1, we have placed time in seconds on the horizontal axes and the number chosen for each of your group members on the vertical axes.

   The initially picked numbers for you by the computer are place along the vertical line above the zero second mark. You will see the number posted of every participant in your group. For instance, in Figure 1, we see that 2 players' initial number is 5, 1 player's initial number is 2, 1 player's initial number is 3, 1 player's initial number is 4 and 1 player's initial number is 6. Your choice is always represented in the graph with the color green, and those of others by other colors. As you can see the player's initial number is 2.

   As time continues, during the 1 minute, you will be able to change initial number chosen by the computer at any time by placing your cursor on your desired number to the left of the screen. When you choose a number, it will light up as the number 2 now is.

2. *Revision Opportunities*

   However, the fact that you have changed your choice DOES NOT imply that the number on the graph will change. The number on the graph will only change if a **revision opportunity** is awarded to you. A revision opportunity is awarded at random times.

   Every second a revision opportunity will be awarded to the group with 80% chance. When a revision opportunity is awarded to the group, it will be given to one of the 6 group members, with equal probability of $\frac{1}{6}$. So the chance of any other member of your group having a revision opportunity and being able to change the posted number is exactly equal to yours: $p = .8 \times \frac{1}{6} \approx 13\%$.

If you had changed the number chosen, and received a revision opportunity, your number on the graph will change (the GREEN line will shift). If a revision opportunity is awarded to you, but you had not previously changed your chosen number, the number on the graph will **not** change. Let's call the number that you have chosen (the one that is lit up) which appears on the graph, your NUMBER POSTED on the graph.

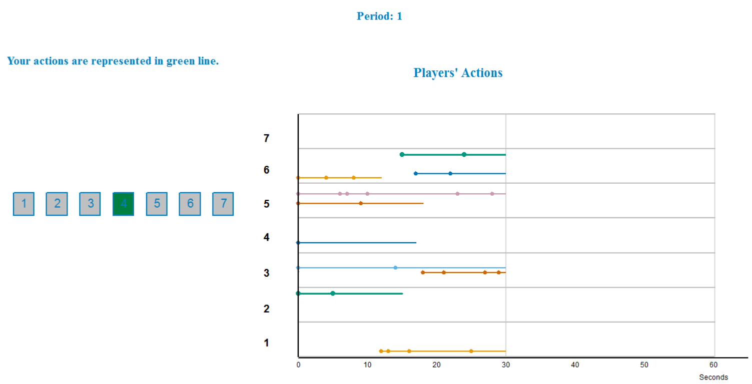


Figure 2 – Screen-shot of one possible scenario, after 1 minute has passed.

When 30 seconds have passed your screen will appear as in Figure 2. You can see how many times any member of your group changed the number posted (the line changes) as well as whether a revision opportunity was awarded (*a dot on the line*). For instance, player PURPLE has not changed the number posted (which is 5) despite having received 5 revision opportunities (5 dot's on light purple line). On the other hand, player ORANGE initially chosen number by the computer was 5, but after about 20 seconds the posted number became 3. Player GREEN has changed the number posted once. Let's take a closer look at player GREEN's actions:

(a) GREEN's initially chosen number by the computer was 2.

(b) Then, in the 4th second, a revision opportunity arrived, but the number posted by player GREEN did not change.

(c) In second 15, a revision opportunity arrived and the number posted changed to 6. Note that this was only possible because he had changed the number chosen prior to the arrival of revision opportunity.

(d) In second 25, revision opportunity arrived, but the number posted didn't change.

Finally, note that player GREEN has chosen the number 4 (it is lit up in green), but given that no revision opportunity has arrived, the NUMBER POSTED on the graph is still 6.

3. *Final Payoffs*

   At the end of the 1 minute countdown, you will receive a payoff that depends on your number posted and on the smallest number posted by a player in your group. *Only the numbers posted at the* **end** of the countdown matter for your payoff. The numbers posted before do not matter at all for your payoff. Your **final payoff** will be the sum of payoffs from all 10 periods plus the show up fee.

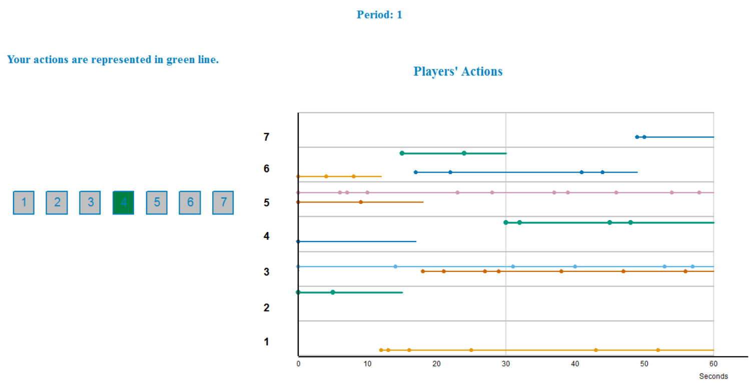


Figure 3 – Screen-shot of one possible scenario, after the 1-minute countdown has finished.

When 1-minutes have passed your screen will appear as in Figure 3. You can see the number posted of every participant in your group. Note that only the number posted as the countdown ends matter for your payoff. For instance, GREEN's payoff depends only on his **last** number posted, and on THE MINIMUM NUMBER POSTED by his group members **at the end of the countdown**.

The following probability facts and calculations may be useful:

1. Each player is expected to receive $.8 \times \frac{1}{6} \times 60 = \mathbf{8}$ **revision** opportunities during the 1-minute countdown.

2. The chance of a player receiving **no revision** opportunity during the 1-minute countdown is approximately $(1 - .8 \times \frac{1}{6})^{60} \approx 0.000$, which is **approximately 0.**

3. For any **10 second interval**, the chance of receiving at least one revision opportunity is of **approximately 75%.**

4. For any **20 second interval**, the chance of receiving at least one revision opportunity is of **approximately 95%.**

J. Instructions: Revision Mechanism VHBB payoffs

Instructions

This is an experiment in decision making. Funds have been provided to run this experiment. If you follow instructions and make good decisions you may earn a substantial amount of money, that will be paid to you in CASH at the end of the experiment. What you earn depends partly on your decisions and partly on the decisions of others.

The entire session will take place through computer terminals, and all interactions between you will be done through the computers. Please, do not talk or communicate in any way during the session. Please, turn off your phones now.

You will be randomly divided in groups of **6** persons, and will make a sequence of **10** decisions as a part of that group. After 10 periods, all groups will be disband and the phase will end. This will be the end of the experiment.

Task Description

Each period, you and every member of your group will choose an integer: **1, 2, 3, 4, 5, 6 or 7**. Your choice and the smallest number chosen in your group (**including yours**) will determine your payoff in that period. Table 1 presents your payoffs in all possible scenarios. For example, if you choose number 5 and the smallest number chosen in your group is 4 you will get 90 Cents ($.90).

		Smallest Number Chosen						
		7	6	5	4	3	2	1
	7	1.30	1.10	0.90	0.70	0.50	0.30	0.10
	6	—	1.20	1.00	0.80	0.60	0.40	0.20
	5	—	—	1.10	0.90	0.70	0.50	0.30
Your Choice	4	—	—	—	1.00	0.80	0.60	0.40
	3	—	—	—	—	0.90	0.70	0.50
	2	—	—	—	—	—	0.80	0.60
	1	—	—	—	—	—	—	0.70

Table 1 – Payoff from different actions

Once you and all the members of your group have chosen a number, a 1-minute countdown will begin.

1-minute Countdown

1. *Graph Description*

   Before the 1-minute countdown, you and every member of your group have chosen a number: **1, 2, 3, 4, 5, 6 or 7**. Once every member of your group has made their initial choice, the 1-minute countdown begins.

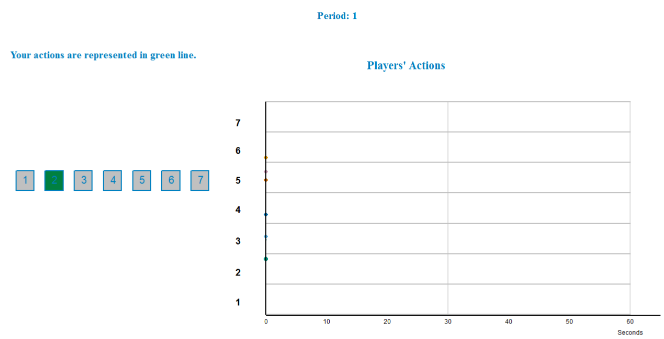
   

   Figure 1 – Screen-shot of one possible scenario, as soon as the 1-minute countdown begins.

   When the 1-minute countdown begins your screen will appear as in Figure 1. In Figure 1, we have placed time in seconds on the horizontal axes and the number chosen by each of your group members on the vertical axes.

   The initially picked numbers chosen by you and your cohort are place along the vertical line above the zero second mark. You will see the number posted of every participant in your group. For instance, in Figure 1, we see that 2 players have chosen number 5, 1 player has chosen 2, 1 player has chosen 3, 1 player has chosen 4 and 1 player has chosen 6. Your choice is always represented in the graph with the color green, and those of others by other colors. As you can see the player has CHOSEN NUMBER 2.

   As time continues, during the 1 minute, you will be able to change your chosen number at any time by placing your cursor on your desired number to the left of the screen. When you choose a number, it will light up as the number 2 now is.

2. *Revision Opportunities*

   However, the fact that you have changed your choice DOES NOT imply that the number on the graph will change. The number on the graph will only change if a **revision opportunity** is awarded to you. A revision opportunity is awarded at random times.

   Every second a revision opportunity will be awarded to the group with 80% chance. When a revision opportunity is awarded to the group, it will be given to one of the 6 group members, with equal probability of $\frac{1}{6}$. So the chance of any other member of your group having a revision opportunity and being able to change the posted number and send the message is exactly equal to yours: $p = .8 \times \frac{1}{6} \approx 13\%$.

If you had changed the number chosen, and received a revision opportunity, your number on the graph will change (the GREEN line will shift). If a revision opportunity is awarded to you, but you had not previously changed your chosen number, the number on the graph will **not** change. Let's call the number which appears on the graph your NUMBER POSTED on the graph.

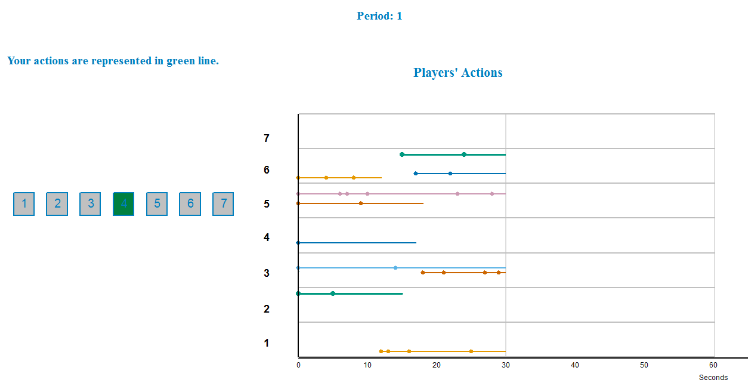


Figure 2 – Screen-shot of one possible scenario, after 30 seconds have passed

When 30 seconds have passed your screen will appear as in Figure 2. You can see how many times any member of your group changed the number posted (*the line changes*) as well as whether a revision opportunity was awarded (*a dot on the line*). For instance, player PURPLE has not changed the number posted (which is 5) despite having received 5 revision opportunities (5 dot's on light purple line). On the other hand, player BROWN initially chose number 5, but after about 20 seconds the posted number became 3. Player GREEN has changed the number posted once. Let's take a closer look at player GREEN's actions:

(a) GREEN initially chose to post 2.

(b) Then, around 4th second, a revision opportunity arrived, but the number posted by player GREEN did not change.

(c) At 15th second, a revision opportunity arrived and the number posted changed to 6. Note that this was only possible because he had changed the number chosen prior to the arrival of revision opportunity.

(d) At 25th second, revision opportunity arrived, but the number posted didn't change.

Finally, note that player GREEN has chosen the number 4 (it is lit up in green), but given that no revision opportunity has arrived, the NUMBER POSTED on the graph is still 6.

When 1-minute has passed your screen will appear as in Figure 3. You can see the number posted of every participant in your group. *Only the numbers posted at the* **end** of the countdown matter for your payoff. The numbers posted before do not matter at all for your payoff. For instance, GREEN's payoff depends only on his **last** number posted, and on the smallest number posted by his group members **at the end of the countdown**.

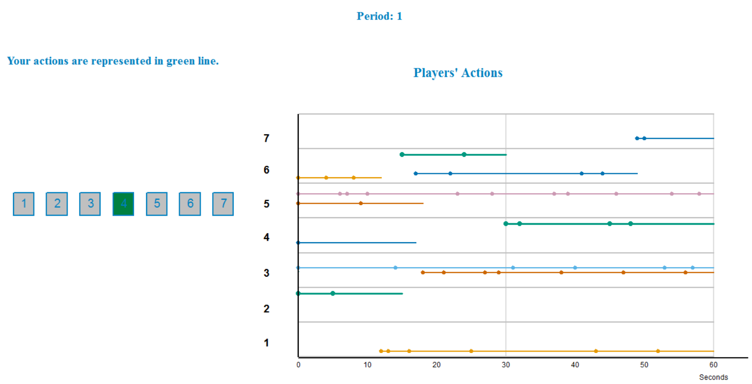


Figure 3 – Screen-shot of one possible scenario, after 60 seconds have passed

3. *Final Payoffs*

   Your **final payoff** will be the sum of payoffs from all 10 periods plus \$8 show up fee.

The following probability facts and calculations may be useful:

1. Each player is expected to receive $.8 \times \frac{1}{6} \times 60 =$ **8 revision** opportunities during the 1-minute countdown.

2. The chance of a player receiving **no revision** opportunity during the 1-minute countdown is approximately $(1 - .8 \times \frac{1}{6})^{60} \approx 0.000$, which is **approximately 0.**

3. For any **10 second interval**, the chance of receiving at least one revision opportunity is of **approximately 75%.**

4. For any **20 second interval**, the chance of receiving at least one revision opportunity is of **approximately 95%.**

K. Instructions: Infrequent Revision Mechanism

Instructions

This is an experiment in decision making. Funds have been provided to run this experiment. If you follow instructions and make good decisions you may earn a substantial amount of money, that will be paid to you in CASH at the end of the experiment. What you earn depends partly on your decisions and partly on the decisions of others.

The entire session will take place through computer terminals, and all interactions between you will be done through the computers. Please, do not talk or communicate in any way during the session. Please, turn off your phones now.

You will be randomly divided in groups of **6** persons, and will make a sequence of **10** decisions as a part of that group. After 10 periods, all groups will be disband and the phase will end. This will be the end of the experiment.

Task Description

Each period, you and every member of your group will choose an integer: **1, 2, 3, 4, 5, 6 or 7**. Your choice and the smallest number chosen in your group (**including yours**) will determine your payoff in that period. Table 1 presents your payoffs in all possible scenarios. For example, if you choose number 5 and the smallest number chosen in your group is 4 you will get 78 Cents ($.78).

		Smallest Number Chosen						
		7	6	5	4	3	2	1
Your Choice	7	1.30	1.10	0.90	0.70	0.50	0.30	0.10
	6	—	1.14	0.94	0.74	0.54	0.34	0.14
	5	—	—	0.98	0.78	0.58	0.38	0.18
	4	—	—	—	0.82	0.62	0.42	0.22
	3	—	—	—	—	0.66	0.46	0.26
	2	—	—	—	—	—	0.50	0.30
	1	—	—	—	—	—	—	0.34

Table 1 – Payoff from different actions

Once you and all the members of your group have chosen a number, a 1-minute countdown will begin. Only the number posted at the end of the countdown matters for your payoff.

1-minute Countdown

1. *Graph Description*

   Before the 1-minute countdown, you and every member of your group have chosen a number: **1, 2, 3, 4, 5, 6 or 7**. Once every member of your group has made their initial choice, the 1-minute countdown begins.

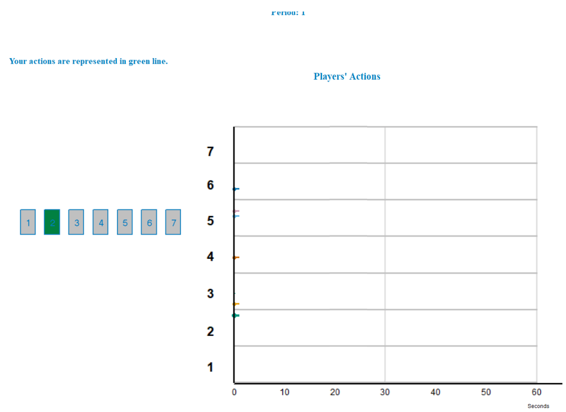


Figure 1 – Screen-shot of one possible scenario, as soon as the 1-minute countdown begins.

   When the 1-minute countdown begins your screen will appear as in Figure 1. In Figure 1, we have placed time in seconds on the horizontal axes and the number chosen by each of your group members on the vertical axes.

   The initially picked numbers chosen by you and your cohort are place along the vertical line above the zero second mark. You will see the number posted of every participant in your group. For instance, in Figure 1, we see that 2 players have chosen number 5, 1 player has chosen 2, 1 player has chosen 3, 1 player has chosen 4 and 1 player has chosen 6. Your choice is always represented in the graph with the color green, and those of others by other colors. As you can see the player has CHOSEN NUMBER 2.

   As time continues, during the 1 minute, you will be able to change your chosen number at any time by placing your cursor on your desired number to the left of the screen. When you choose a number, it will light up as the number 2 now is.

2. *Revision Opportunities*

   However, the fact that you have changed your choice DOES NOT imply that the number on the graph will change. The number on the graph will only change if a **revision opportunity** is awarded to you. A revision opportunity is awarded at random times.

   Every second a revision opportunity will be awarded to the group with 10% chance. When a revision opportunity is awarded to the group, it will be given to one of the 6 group members, with equal probability of $\frac{1}{6}$. So the chance of any other member of your group having a revision opportunity and being able to change the posted number is exactly equal to yours: $p = .1 \times \frac{1}{6} \approx 1.6\%$.

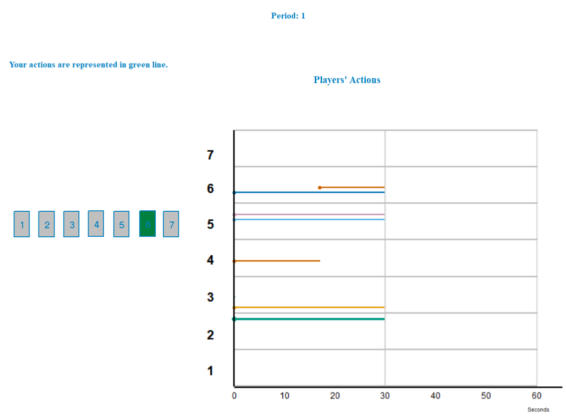


Figure 2 – Screen-shot of one possible scenario, after 30 seconds have passed.

If you had changed the number chosen, and received a revision opportunity, your number on the graph will change (the GREEN line will shift). If a revision opportunity is awarded to you, but you had not previously changed your chosen number, the number on the graph will **not** change. Let's call the number that you have chosen (the one that is lit up) which appears on the graph, your NUMBER POSTED on the graph.

When 30 seconds have passed your screen will appear as in Figure 2. You can see how many times any member of your group changed the number posted (the line changes) as well as whether a revision opportunity was awarded (*a dot on the line*). For instance, player ORANGE initially chose number 4, but after about 20 seconds the posted number became 6. Player GREEN has not changed the number posted. Note that player GREEN has chosen the number 6 (it is lit up in green), but given that no revision opportunity has arrived, the NUMBER POSTED on the graph is still 2.

3. *Final Payoffs*

   At the end of the 1 minute countdown, you will receive a payoff that depends on your number posted and on the smallest number posted by a player in your group. *Only the numbers posted at the* **end** of the countdown matter for your payoff. The numbers posted before do not matter at all for your payoff. Your **final payoff** will be the sum of payoffs from all 10 periods plus the show up fee.

   When 1-minute has passed your screen will appear as in Figure 3. You can see the number posted of every participant in your group. You will also see how many times has any member of your group changed the number posted (the line changes) as well as whether a revision opportunity was awarded (a dot in the middle of the line). For instance, players yellow and pink had no revision opportunity during the 1-minute countdown, players light and dark blue had 1 revision each, and players orange and green had three revisions each. In particular, player green the number posted 2 times. Let us take a closer look at player GREEN:

(a) She initially chose to post 2.

(b) In second 31, a revision opportunity arrived and the number posted changed to 6. Note that this was only possible because she had changed the number chosen prior to the arrival of revision opportunity.

(c) In seconds 37, another revision opportunity arrived and the number posted changed to 4.

(d) In second 55, a revision opportunity arrived, but the number posted didn't change.

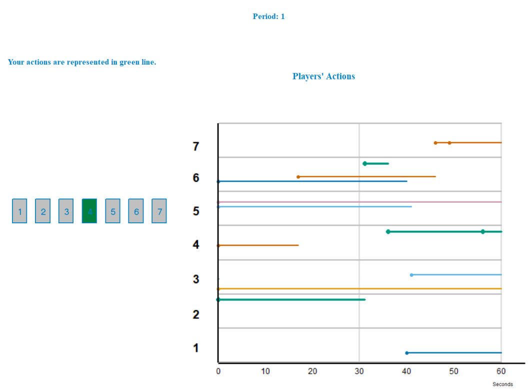


Figure 3 – Screen-shot of one possible scenario, after the 1-minute countdown has finished.

Note that only the number posted as the countdown ends matter for your payoff. For instance, GREEN's payoff depends only on his **last** number posted, and on THE MINIMUM NUMBER POSTED by his group members **at the end of the countdown**.

The following probability facts and calculations may be useful:

1. Each player is expected to receive $.1 \times \frac{1}{6} \times 60 =$ **1 revision** opportunities during the 1-minute countdown.

2. The chance of a player receiving **no revision** opportunity during the 1-minute countdown is approximately $(1 - .1 \times \frac{1}{6})^{60} \approx 0.36$, which is **approximately 36%.**

3. For any **10 second interval**, the chance of receiving at least one revision opportunity is of **approximately 15%.**

4. For any **20 second interval**, the chance of receiving at least one revision opportunity is of **approximately 30%.**

L. Instructions: Synchronous Revision Mechanism

Instructions

This is an experiment in decision making. Funds have been provided to run this experiment. If you follow instructions and make good decisions you may earn a substantial amount of money, that will be paid to you in CASH at the end of the experiment. What you earn depends partly on your decisions and partly on the decisions of others.

The entire session will take place through computer terminals, and all interactions between you will be done through the computers. Please, do not talk or communicate in any way during the session. Please, turn off your phones now.

You will be randomly divided in groups of **6** persons, and will make a sequence of **10** decisions as a part of that group. After 10 periods, all groups will be disband and the phase will end. This will be the end of the experiment.

Task Description

Each period, you and every member of your group will choose an integer: **1, 2, 3, 4, 5, 6 or 7**. Your choice and the smallest number chosen in your group (**including yours**) will determine your payoff in that period. Table 1 presents your payoffs in all possible scenarios. For example, if you choose number 5 and the smallest number chosen in your group is 4 you will get 78 Cents ($.78).

		Smallest Number Chosen						
		7	6	5	4	3	2	1
Your Choice	7	1.30	1.10	0.90	0.70	0.50	0.30	0.10
	6	—	1.14	0.94	0.74	0.54	0.34	0.14
	5	—	—	0.98	0.78	0.58	0.38	0.18
	4	—	—	—	0.82	0.62	0.42	0.22
	3	—	—	—	—	0.66	0.46	0.26
	2	—	—	—	—	—	0.50	0.30
	1	—	—	—	—	—	—	0.34

Table 1 – Payoff from different actions

Once you and all the members of your group have chosen a number, a 1-minute countdown will begin. Only the number posted at the end of the countdown matters for your payoff.

1-minute Countdown

1. *Graph Description*

   Before the 1-minute countdown, you and every member of your group have chosen a number: **1, 2, 3, 4, 5, 6 or 7**. Once every member of your group has made their initial choice, the 1-minute countdown begins.

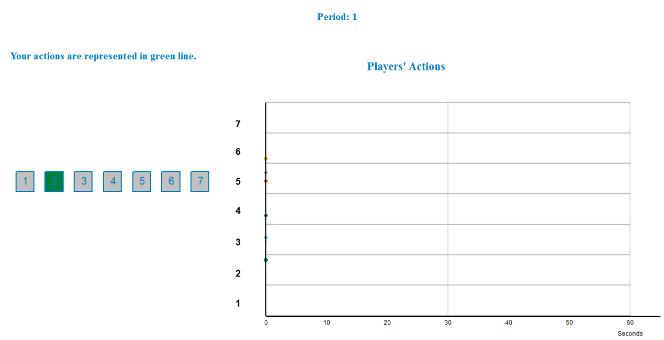
   

   Figure 1 – Screen-shot of one possible scenario, as soon as the 1-minute countdown begins.

   When the 1-minute countdown begins your screen will appear as in Figure 1. In Figure 1, we have placed time in seconds on the horizontal axes and the number chosen by each of your group members on the vertical axes.

   The initially picked numbers chosen by you and your cohort are place along the vertical line above the zero second mark. You will see the number posted of every participant in your group. For instance, in Figure 1, we see that 2 players have chosen number 5, 1 player has chosen 2, 1 player has chosen 3, 1 player has chosen 4 and 1 player has chosen 6. Your choice is always represented in the graph with the color green, and those of others by other colors. As you can see the player has CHOSEN NUMBER 2.

   As time continues, during the 1 minute, you will be able to change your chosen number at any time by placing your cursor on your desired number to the left of the screen. When you choose a number, it will light up as the number 2 now is.

2. *Revision Opportunities*

   However, the fact that you have changed your choice DOES NOT imply that the number on the graph will change. The number on the graph will only change if a **revision opportunity** is awarded to you. A revision opportunity is awarded at random times.

   Every second a revision opportunity will be awarded to the group with 13% chance. When a revision opportunity is awarded to the group, all of the group members receive a revision opportunity at the same time.

   If you had changed the number chosen, and received a revision opportunity, your number on the graph will change (the GREEN line will shift). If a revision opportunity is awarded to your group, but you had not previously changed your chosen number, the number on the graph will **not** change. Let's call the number that you have chosen (the one that is lit up) which appears on the graph, your NUMBER POSTED on the graph.

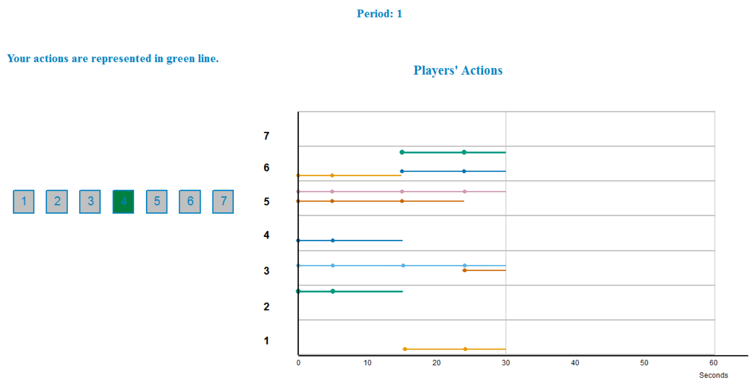


Figure 2 – Screen-shot of one possible scenario, after 30 seconds have passed.

When 30 seconds have passed your screen will appear as in Figure 2. You can see how many times any member of your group changed the number posted (*the line changes*) as well as whether a revision opportunity was awarded (*a dot on the line*). You can see that the group has had 3 revision opportunities in the first 30 seconds. The first revision opportunity was awarded after 4 seconds, the second after 15 seconds, and the third after 25 seconds.

You can also see how many times any member of your group changed the number posted. For instance, player PURPLE has not changed the number posted (which is 5). On the other hand, player BROWN initially chose number 5, but after 25 seconds the posted number became 3. Player GREEN has changed the number posted once. Let's take a closer look at player GREEN's actions:

(a) GREEN initially chose to post 2.

(b) Then, around 4th second, a revision opportunity arrived, but the number posted by player GREEN did not change.

(c) At 15th second, a revision opportunity arrived and the number posted changed to 6. Note that this was only possible because he had changed the number chosen prior to the arrival of revision opportunity.

(d) At 25th second, revision opportunity arrived, but the number posted didn't change.

Finally, note that player GREEN has chosen the number 4 (it is lit up in green), but given that no revision opportunity has arrived, the NUMBER POSTED on the graph is still 6.

When 1-minute has passed your screen will appear as in Figure 3. You can see the number posted of every participant in your group. *Only the numbers posted at the* **end** of the countdown matter for your payoff. The numbers posted before do not matter at all for your payoff. For instance, GREEN's payoff depends only on his **last** number posted, and on THE SMALLEST NUMBER POSTED by his group members **at the end of the countdown**.

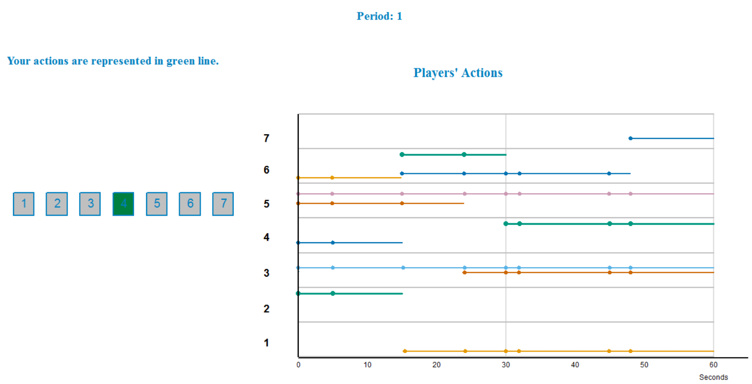


Figure 3 – Screen-shot of one possible scenario, after 60 seconds have passed

3. *Final Payoffs*

   Your **final payoff** will be the sum of payoffs from all 10 periods plus the show up fee.

The following probability facts and calculations may be useful:

1. A group is expected to receive **8 revision** opportunities during the 1-minute countdown.
2. The chance of a group receiving **no revision** opportunity during the 1-minute countdown is **approximately 0.**
3. For any **10 second interval**, the chance of receiving at least one revision opportunity is **approximately 75%.**
4. For any **20 second interval**, the chance of receiving at least one revision opportunity is **approximately 95%.**

M. Instructions: Revision Cheap Talk

Instructions

This is an experiment in decision making. Funds have been provided to run this experiment. If you follow instructions and make good decisions you may earn a substantial amount of money, that will be paid to you in CASH VOUCHERS at the end of the experiment. What you earn depends partly on your decisions and partly on the decisions of others.

The entire session will take place through computer terminals, and all interactions between you will be done through the computers. Please, do not talk or communicate in any way during the session. Please, turn off your phones now.

You will be randomly divided in groups of **6** persons, and will make a sequence of **10** decisions as a part of that group. After 10 periods, all groups will be disband and the phase will end. This will be the end of the experiment.

Task Description

Each period, you and every member of your group will choose an integer: **1, 2, 3, 4, 5, 6 or 7**. Your choice and the smallest number chosen in your group (**including yours**) will determine your payoff in that period. Table 1 presents your payoffs in all possible scenarios. For example, if you choose number 5 and the smallest number chosen in your group is 4 you will get 78 Cents ($.78).

		Smallest Number Chosen						
		7	6	5	4	3	2	1
	7	1.30	1.10	0.90	0.70	0.50	0.30	0.10
	6	—	1.14	0.94	0.74	0.54	0.34	0.14
	5	—	—	0.98	0.78	0.58	0.38	0.18
Your Choice	4	—	—	—	0.82	0.62	0.42	0.22
	3	—	—	—	—	0.66	0.46	0.26
	2	—	—	—	—	—	0.50	0.30
	1	—	—	—	—	—	—	0.34

Table 1 – Payoff from different actions

Once you and all the members of your group have chosen a number, a 1-minute countdown will begin.

1-minute Countdown

1. *Graph Description*

   Before the 1-minute countdown, you and every member of your group have chosen a number: **1, 2, 3, 4, 5, 6 or 7**. Once every member of your group has made their initial choice, the 1-minute countdown begins.

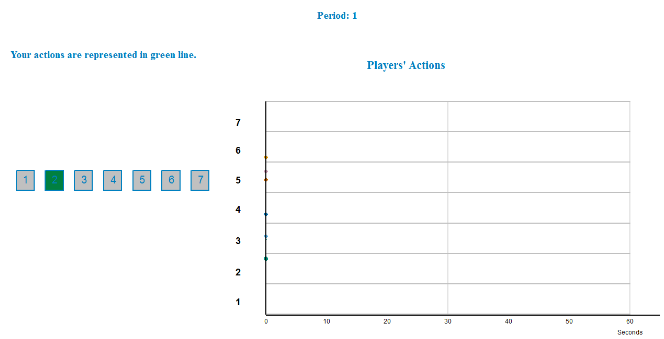
   

   Figure 1 – Screen-shot of one possible scenario, as soon as the 1-minute countdown begins.

   When the 1-minute countdown begins your screen will appear as in Figure 1. In Figure 1, we have placed time in seconds on the horizontal axes and the number chosen by each of your group members on the vertical axes.

   The initially picked numbers chosen by you and your cohort are place along the vertical line above the zero second mark. You will see the number posted of every participant in your group. For instance, in Figure 1, we see that 2 players have chosen number 5, 1 player has chosen 2, 1 player has chosen 3, 1 player has chosen 4 and 1 player has chosen 6. Your choice is always represented in the graph with the color green, and those of others by other colors. As you can see the player has CHOSEN NUMBER 2.

   As time continues, during the 1 minute, you will be able to change your chosen number at any time by placing your cursor on your desired number to the left of the screen. When you choose a number, it will light up as the number 2 now is.

2. *Revision Opportunities*

   However, the fact that you have changed your choice DOES NOT imply that the number on the graph will change. The number on the graph will only change if a **revision opportunity** is awarded to you. A revision opportunity is awarded at random times.

   Every second a revision opportunity will be awarded to the group with 80% chance. When a revision opportunity is awarded to the group, it will be given to one of the 6 group members, with equal probability of $\frac{1}{6}$. So the chance of any other member of your group having a revision opportunity and being able to change the posted number is exactly equal to yours: $p = .8 \times \frac{1}{6} \approx 13\%$.

If you had changed the number chosen, and received a revision opportunity, your number on the graph will change (the GREEN line will shift). If a revision opportunity is awarded to you, but you had not previously changed your chosen number, the number on the graph will **not** change. Let's call the number that you have chosen (the one that is lit up) which appears on the graph, your NUMBER POSTED on the graph.

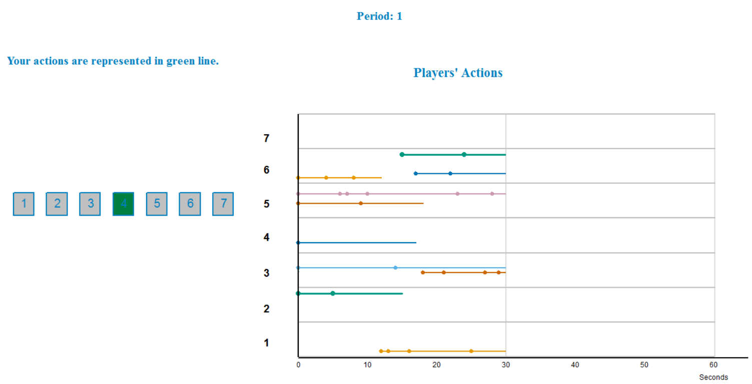


Figure 2 – Screen-shot of one possible scenario, after 1 minute has passed.

When 30 seconds have passed your screen will appear as in Figure 2. You can see how many times any member of your group changed the number posted (the line changes) as well as whether a revision opportunity was awarded (*a dot on the line*). For instance, player PURPLE has not changed the number posted (which is 5) despite having received 5 revision opportunities (5 dot's on light purple line). On the other hand, player ORANGE initially chose number 5, but after about 20 seconds the posted number became 3. Player GREEN has changed the number posted once. Let's take a closer look at player GREEN's actions:

(a) GREEN initially chose to post 2.

(b) Then, in the 4th second, a revision opportunity arrived, but the number posted by player GREEN did not change.

(c) In second 15, a revision opportunity arrived and the number posted changed to 6. Note that this was only possible because he had changed the number chosen prior to the arrival of revision opportunity.

(d) In second 25, revision opportunity arrived, but the number posted didn't change.

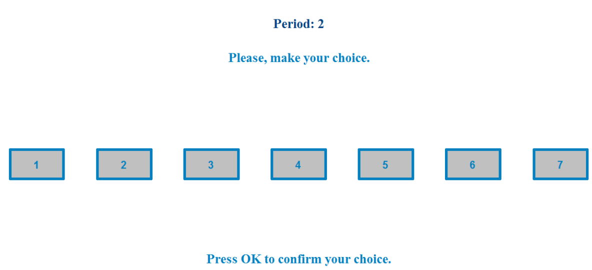
Finally, note that player GREEN has chosen the number 4 (it is lit up in green), but given that no revision opportunity has arrived, the NUMBER POSTED on the graph is still 6.

Figure 3 – Screen-shot of one possible scenario, after the 1-minute countdown has finished.

When 1-minute has passed your screen will appear as in Figure 3. You can see the number posted of every participant in your group.

3. *Final Choice*

   Once 1-minute countdown is over you will see a screen like the one bellow. You pick a number and **this number combined with the minimum number chosen in your group will determine you payoff in the period.** Note that only numbers chosen after 1-minute countdown are relevant for your payoff, numbers chosen during the 1-minute countdown *do not* affect your payoff.



4. *Final Payoffs*

   Your **final payoff** will be the sum of payoffs from all 10 periods plus the show up fee.

The following probability facts and calculations may be useful:

1. Each player is expected to receive $.8 \times \frac{1}{6} \times 60 = \mathbf{8}$ **revision** opportunities during the 1-minute countdown.

2. The chance of a player receiving **no revision** opportunity during the 1-minute countdown is approximately $(1 - .8 \times \frac{1}{6})^{60} \approx 0.000$, which is **approximately 0.**

3. For any **10 second interval**, the chance of receiving at least one revision opportunity is of **approximately 75%.**

4. For any **20 second interval**, the chance of receiving at least one revision opportunity is of **approximately 95%.**

N. Instructions: Richer Revision Cheap Talk

Instructions

This is an experiment in decision making. Funds have been provided to run this experiment. If you follow instructions and make good decisions you may earn a substantial amount of money, that will be paid to you in CASH at the end of the experiment. What you earn depends partly on your decisions and partly on the decisions of others.

The entire session will take place through computer terminals, and all interactions between you will be done through the computers. Please, do not talk or communicate in any way during the session. Please, turn off your phones now.

You will be randomly divided in groups of **6** persons, and will make a sequence of **10** decisions as a part of that group. After 10 periods, all groups will be disband and the phase will end. This will be the end of the experiment.

Task Description

Each period, you and every member of your group will choose one integer: **1, 2, 3, 4, 5, 6 or 7**. Your choice and the smallest number chosen in your group (**including yours**) will determine your payoff in that period. Table 1 presents your payoffs in all possible scenarios. For example, if you choose number 5 and the smallest number chosen in your group is 4 you will get 78 Cents ($.78).

		Smallest Number Chosen						
		7	6	5	4	3	2	1
	7	1.30	1.10	0.90	0.70	0.50	0.30	0.10
	6	—	1.14	0.94	0.74	0.54	0.34	0.14
	5	—	—	0.98	0.78	0.58	0.38	0.18
Your Choice	4	—	—	—	0.82	0.62	0.42	0.22
	3	—	—	—	—	0.66	0.46	0.26
	2	—	—	—	—	—	0.50	0.30
	1	—	—	—	—	—	—	0.34

Table 1 – Payoff from different actions

1-minute Countdown

1. *Graph Description*

   Before the 1-minute countdown, you and every member of your group have chosen two numbers, both an integer between **1, 2, 3, 4, 5, 6 or 7**. One integer represents the number you intend to choose and the other integer represents the number you thinks everyone should choose. Once every member of your group has made their initial choice, the 1-minute countdown begins.

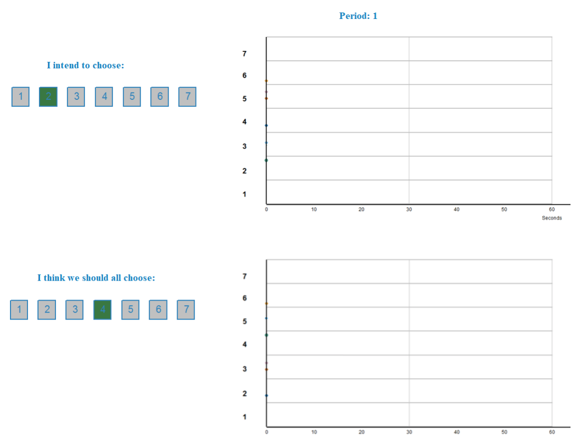


Figure 1 – Screen-shot of one possible scenario, as soon as the 1-minute countdown begins.

When the 1-minute countdown begins your screen will appear as in Figure 1. In Figure 1, you can see two graphs and in both we have placed time in seconds on the horizontal axes and the number chosen by each of your group members on the vertical axes.

On each graph, the numbers initially picked by you and your cohort are placed along the vertical line above the zero second mark. You will see the number posted of every participant in your group. For instance, in the top graph of Figure 1, we see that 2 players have chosen number 5, 1 player has chosen 2, 1 player has chosen 3, 1 player has chosen 4 and 1 player has chosen 6. Your choice is always represented in the graph with the color green, and those of others by other colors. As you can see the player has CHOSEN NUMBER 2.

As time continues, during the 1 minute, you will be able to change your chosen numbers at any time by placing your cursor on your desired number to the left of the screen. The top buttons choose the number you intend to play and the bottom choose the number you think everyone should choose. When you choose a number, it will light up as the number 2 and 4 are in the top and bottom set of buttons.

2. *Revision Opportunities*

   However, the fact that you have changed a number (on the top or the bottom set of buttons) DOES NOT imply that the number on the graph will change. The number on the graph will only change if a **revision opportunity** is awarded to you. A revision opportunity is awarded at random times.

   Every second a revision opportunity will be awarded to the group with 80% chance. When a revision opportunity is awarded to the group, it will be given to one of the 6 group members, with equal probability of $\frac{1}{6}$. So the chance of any other member of your group having a revision opportunity and being able to change the posted numbers is exactly equal to yours: $p = .8 \times \frac{1}{6} \approx 13\%$.

   If you had changed the number chosen for either of the graphs, and received a revision opportunity, your number on the graph will change (the GREEN line will shift). If a revision opportunity is awarded to you, but you had not previously changed your chosen number, the number on the graph will **not** change. Let's call the number that you have chosen (the one that is lit up) and the one which appears on the graph, your NUMBER POSTED on the graph.

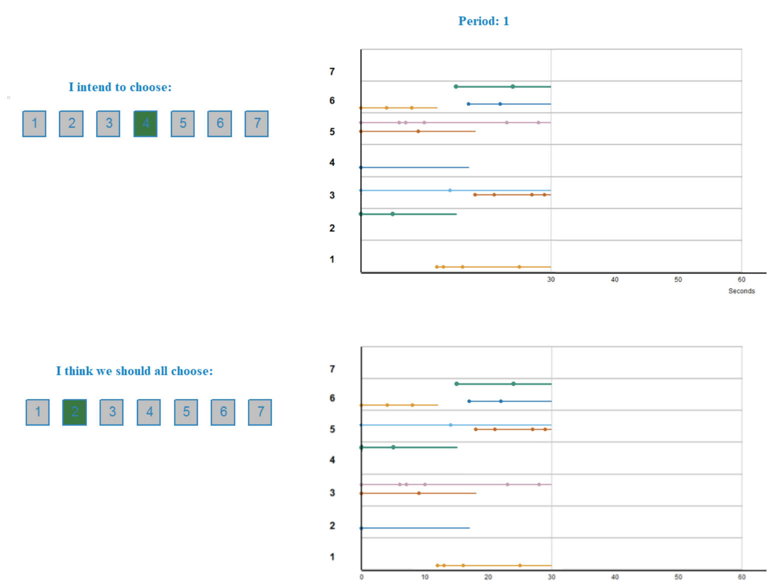


Figure 2 – Screen-shot of one possible scenario, after 1 minute has passed.

When 30 seconds have passed, your screen will appear as in Figure 2. You can see on each of the two graphs how many times any member of your group changed the number posted (*the line changes*) as well as whether a revision opportunity was awarded (*a dot on the line*). For instance, on the top graph, player PURPLE has not changed the number posted (which is 5) despite having received 5 revision opportunities (5 dots on light purple line). On the other hand, player ORANGE initially chose number 5, but after about 20 seconds the posted number became 3. Player GREEN has changed the number posted once. Let's take a closer look at player GREEN's actions in the top graph:

(a) GREEN initially chose to post 2.

(b) Then, around 4th second, a revision opportunity arrived, but the number posted by player GREEN did not change.

(c) At 15th second, a revision opportunity arrived and the number posted changed to 6. Note that this was only possible because he had changed the number chosen prior to the arrival of revision opportunity.

(d) At 25th second, revision opportunity arrived, but the number posted didn't change.

Finally, note that player GREEN has chosen the number 4 (it is lit up in green), but given that no revision opportunity has arrived, the NUMBER POSTED on the graph is still 6.

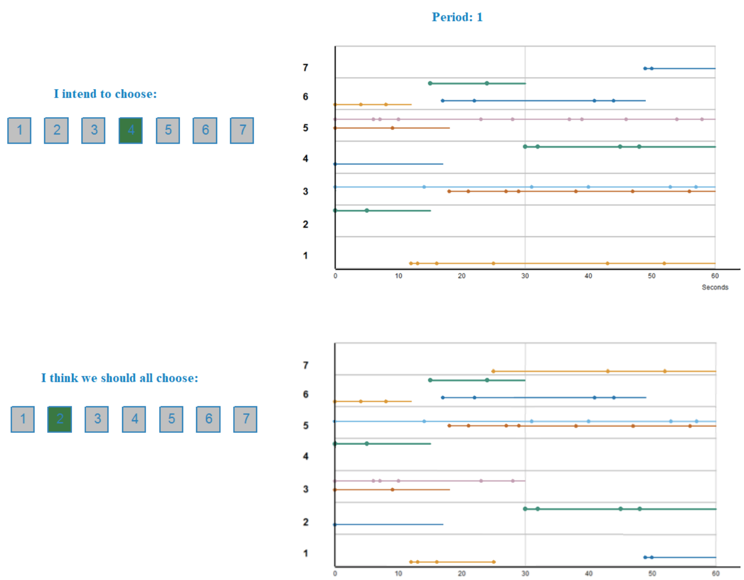
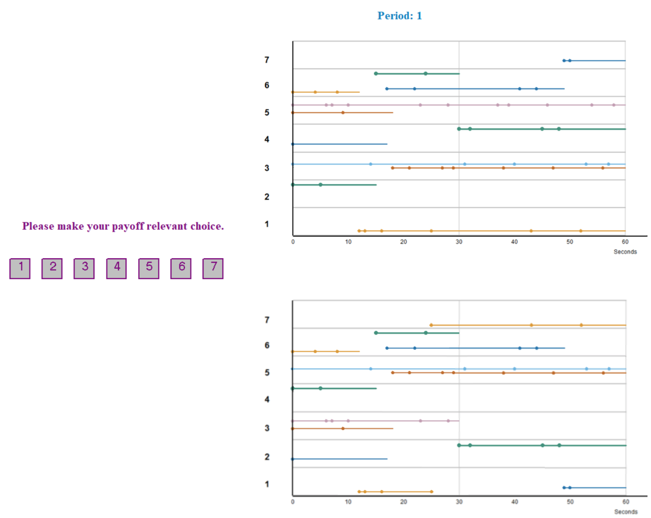


Figure 3 – Screen-shot of one possible scenario, after the 1-minute countdown has finished.

When 1-minute has passed your screen will appear as in Figure 3. You can see the numbers posted of every participant in your group on each of the graphs.

3. *Final Choice*

   Once 1-minute countdown is over you will see a screen like the one bellow. You will pick **a single number** and this number combined with THE SMALLEST NUMBER CHOSEN in your group will determine your payoff in that period. Note that only numbers chosen after 1-minute countdown are relevant for your payoff, numbers chosen during the 1-minute countdown *do not* matter at all for your payoff.



4. *Final Payoffs*

   Your **final payoff** will be the sum of payoffs from all 10 periods plus the show up fee.

The following probability facts and calculations may be useful:

1. Each player is expected to receive $.8 \times \frac{1}{6} \times 60 =$ **8 revision** opportunities during the 1-minute countdown.

2. The chance of a player receiving **no revision** opportunity during the 1-minute countdown is approximately $(1 - .8 \times \frac{1}{6})^{60} \approx 0.000$, which is **approximately 0.**

3. For any **10 second interval**, the chance of receiving at least one revision opportunity is of **approximately 75%.**

4. For any **20 second interval**, the chance of receiving at least one revision opportunity is of **approximately 95%.**

O. Instructions: Revision Cheap Talk Memory

Instructions

This is an experiment in decision making. Funds have been provided to run this experiment. If you follow instructions and make good decisions you may earn a substantial amount of money, that will be paid to you in CASH at the end of the experiment. What you earn depends partly on your decisions and partly on the decisions of others.

The entire session will take place through computer terminals, and all interactions between you will be done through the computers. Please, do not talk or communicate in any way during the session. Please, turn off your phones now.

You will be randomly divided in groups of **6** persons, and will make a sequence of **10** decisions as a part of that group. After 10 periods, all groups will be disband and the phase will end. This will be the end of the experiment.

Task Description

Each period, you and every member of your group will choose an integer: **1, 2, 3, 4, 5, 6 or 7**. Your choice and the smallest number chosen in your group (**including yours**) will determine your payoff in that period. Table 1 presents your payoffs in all possible scenarios. For example, if you choose number 5 and the smallest number chosen in your group is 4 you will get 78 Cents ($.78).

		Smallest Number Chosen						
		7	6	5	4	3	2	1
Your Choice	7	1.30	1.10	0.90	0.70	0.50	0.30	0.10
	6	—	1.14	0.94	0.74	0.54	0.34	0.14
	5	—	—	0.98	0.78	0.58	0.38	0.18
	4	—	—	—	0.82	0.62	0.42	0.22
	3	—	—	—	—	0.66	0.46	0.26
	2	—	—	—	—	—	0.50	0.30
	1	—	—	—	—	—	—	0.34

Table 1 – Payoff from different actions

Once you and all the members of your group have chosen a number, a 1-minute countdown will begin.

1-minute Countdown

1. *Graph Description*

   Before the 1-minute countdown, you and every member of your group have chosen a number: **1, 2, 3, 4, 5, 6 or 7**. Once every member of your group has made their initial choice, the 1-minute countdown begins.

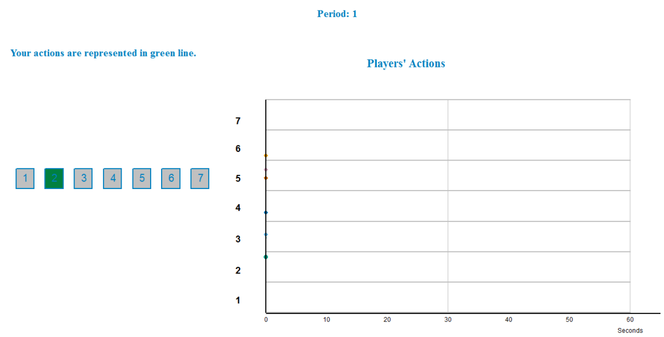
   

   Figure 1 – Screen-shot of one possible scenario, as soon as the 1-minute countdown begins.

   When the 1-minute countdown begins your screen will appear as in Figure 1. In Figure 1, we have placed time in seconds on the horizontal axes and the number chosen by each of your group members on the vertical axes.

   The initially picked numbers chosen by you and your cohort are place along the vertical line above the zero second mark. You will see the number posted of every participant in your group. For instance, in Figure 1, we see that 2 players have chosen number 5, 1 player has chosen 2, 1 player has chosen 3, 1 player has chosen 4 and 1 player has chosen 6. Your choice is always represented in the graph with the color green, and those of others by other colors. As you can see the player has CHOSEN NUMBER 2.

   As time continues, during the 1 minute, you will be able to change your chosen number at any time by placing your cursor on your desired number to the left of the screen. When you choose a number, it will light up as the number 2 now is.

2. *Revision Opportunities*

   However, the fact that you have changed your choice DOES NOT imply that the number on the graph will change. The number on the graph will only change if a **revision opportunity** is awarded to you. A revision opportunity is awarded at random times.

   Every second a revision opportunity will be awarded to the group with 80% chance. When a revision opportunity is awarded to the group, it will be given to one of the 6 group members, with equal probability of $\frac{1}{6}$. So the chance of any other member of your group having a revision opportunity and being able to change the posted number is exactly equal to yours: $p = .8 \times \frac{1}{6} \approx 13\%$.

If you had changed the number chosen, and received a revision opportunity, your number on the graph will change (the GREEN line will shift). If a revision opportunity is awarded to you, but you had not previously changed your chosen number, the number on the graph will **not** change. Let's call the number that you have chosen (the one that is lit up) which appears on the graph, your NUMBER POSTED on the graph.

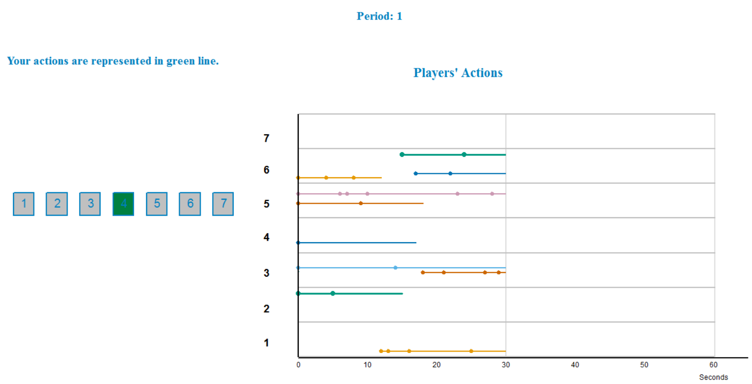


Figure 2 – Screen-shot of one possible scenario, after 1 minute has passed.

When 30 seconds have passed your screen will appear as in Figure 2. You can see how many times any member of your group changed the number posted (the line changes) as well as whether a revision opportunity was awarded (*a dot on the line*). For instance, player PURPLE has not changed the number posted (which is 5) despite having received 5 revision opportunities (5 dot's on light purple line). On the other hand, player ORANGE initially chose number 5, but after about 20 seconds the posted number became 3. Player GREEN has changed the number posted once. Let's take a closer look at player GREEN's actions:

(a) GREEN initially chose to post 2.

(b) Then, in the 4th second, a revision opportunity arrived, but the number posted by player GREEN did not change.

(c) In second 15, a revision opportunity arrived and the number posted changed to 6. Note that this was only possible because he had changed the number chosen prior to the arrival of revision opportunity.

(d) In second 25, revision opportunity arrived, but the number posted didn't change.

Finally, note that player GREEN has chosen the number 4 (it is lit up in green), but given that no revision opportunity has arrived, the NUMBER POSTED on the graph is still 6.

Figure 3 – Screen-shot of one possible scenario, after the 1-minute countdown has finished.

When 1-minute has passed your screen will appear as in Figure 3. You can see the number posted of every participant in your group.

3. *Final Choice*

   Once 1-minute countdown is over you will see a screen like the one bellow. You pick a number and **this number combined with the minimum number chosen in your group will determine you payoff in the period.** Note that only numbers chosen after 1-minute countdown are relevant for your payoff, numbers chosen during the 1-minute countdown *do not* affect your payoff.

4. *Final Payoffs*

   Your **final payoff** will be the sum of payoffs from all 10 periods plus the show up fee.

The following probability facts and calculations may be useful:

1. Each player is expected to receive $.8 \times \frac{1}{6} \times 60 = \mathbf{8}$ **revision** opportunities during the 1-minute countdown.

2. The chance of a player receiving **no revision** opportunity during the 1-minute countdown is approximately $(1 - .8 \times \frac{1}{6})^{60} \approx 0.000$, which is **approximately 0.**

3. For any **10 second interval**, the chance of receiving at least one revision opportunity is of **approximately 75%.**

4. For any **20 second interval**, the chance of receiving at least one revision opportunity is of **approximately 95%.**

P. Instructions: Revision Mechanism IU

Instructions

This is an experiment in decision making. Funds have been provided to run this experiment. If you follow instructions and make good decisions you may earn a substantial amount of money, that will be paid to you in CASH at the end of the experiment. What you earn depends partly on your decisions and partly on the decisions of others.

The entire session will take place through computer terminals, and all interactions between you will be done through the computers. Please, do not talk or communicate in any way during the session. Please, turn off your phones now.

You will be randomly divided in groups of **6** persons, and will make a sequence of **10** decisions as a part of that group. After 10 periods, all groups will be disband and the phase will end. This will be the end of the experiment.

Task Description

Each period, you and every member of your group will choose an integer: **1, 2, 3, 4, 5, 6 or 7**. Your choice and the smallest number chosen in your group (**including yours**) will determine your payoff in that period. Table 1 presents your payoffs in all possible scenarios. For example, if you choose number 5 and the smallest number chosen in your group is 4 you will get 78 Cents ($.78).

		Smallest Number Chosen						
		7	6	5	4	3	2	1
Your Choice	7	1.30	1.10	0.90	0.70	0.50	0.30	0.10
	6	—	1.14	0.94	0.74	0.54	0.34	0.14
	5	—	—	0.98	0.78	0.58	0.38	0.18
	4	—	—	—	0.82	0.62	0.42	0.22
	3	—	—	—	—	0.66	0.46	0.26
	2	—	—	—	—	—	0.50	0.30
	1	—	—	—	—	—	—	0.34

Table 1 – Payoff from different actions

Once you and all the members of your group have chosen a number, a 1-minute countdown will begin.

1-minute Countdown

1. *Graph Description*

   Before the 1-minute countdown, you and every member of your group have chosen a number: **1, 2, 3, 4, 5, 6 or 7**. Once every member of your group has made their initial choice, the 1-minute countdown begins.

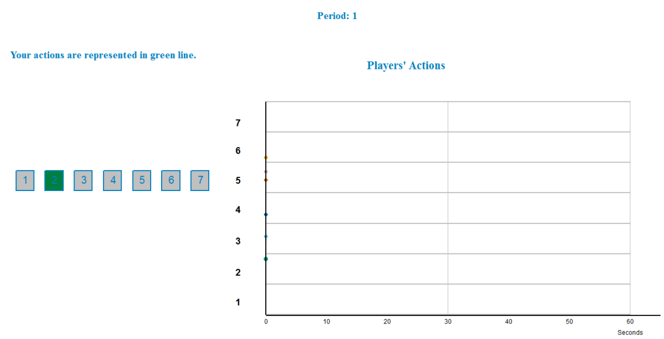


Figure 1 – Screen-shot of one possible scenario, as soon as the 1-minute countdown begins.

   When the 1-minute countdown begins your screen will appear as in Figure 1. In Figure 1, we have placed time in seconds on the horizontal axes and the number chosen by each of your group members on the vertical axes.

   The initially picked numbers chosen by you and your cohort are place along the vertical line above the zero second mark. You will see the number posted of every participant in your group. For instance, in Figure 1, we see that 2 players have chosen number 5, 1 player has chosen 2, 1 player has chosen 3, 1 player has chosen 4 and 1 player has chosen 6. Your choice is always represented in the graph with the color green, and those of others by other colors. As you can see the player has CHOSEN NUMBER 2.

   As time continues, during the 1 minute, you will be able to change your chosen number at any time by placing your cursor on your desired number to the left of the screen. When you choose a number, it will light up as the number 2 now is.

2. *Revision Opportunities*

   However, the fact that you have changed your choice DOES NOT imply that the number on the graph will change. The number on the graph will only change if a **revision opportunity** is awarded to you. A revision opportunity is awarded at random times.

   Every second a revision opportunity will be awarded to the group with 80% chance. When a revision opportunity is awarded to the group, it will be given to one of the 6 group members, with equal probability of $\frac{1}{6}$. So the chance of any other member of your group having a revision opportunity and being able to change the posted number and send the message is exactly equal to yours: $p = .8 \times \frac{1}{6} \approx 13\%$.

If you had changed the number chosen, and received a revision opportunity, your number on the graph will change (the GREEN line will shift). If a revision opportunity is awarded to you, but you had not previously changed your chosen number, the number on the graph will **not** change. Let's call the number which appears on the graph your NUMBER POSTED on the graph.

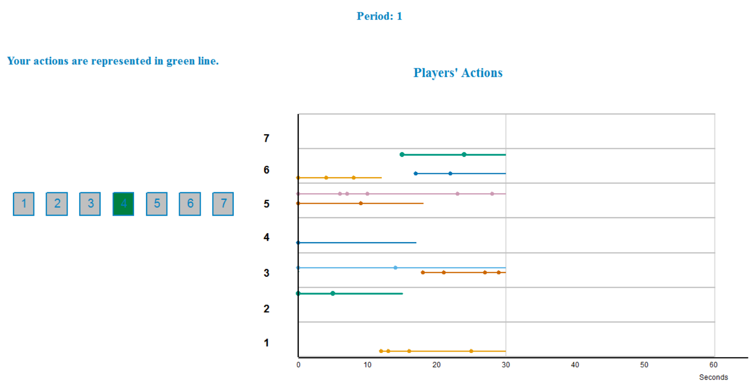


Figure 2 – Screen-shot of one possible scenario, after 30 seconds have passed

When 30 seconds have passed your screen will appear as in Figure 2. You can see how many times any member of your group changed the number posted (*the line changes*) as well as whether a revision opportunity was awarded (*a dot on the line*). For instance, player PURPLE has not changed the number posted (which is 5) despite having received 5 revision opportunities (5 dot's on light purple line). On the other hand, player BROWN initially chose number 5, but after about 20 seconds the posted number became 3. Player GREEN has changed the number posted once. Let's take a closer look at player GREEN's actions:

(a) GREEN initially chose to post 2.

(b) Then, around 4th second, a revision opportunity arrived, but the number posted by player GREEN did not change.

(c) At 15th second, a revision opportunity arrived and the number posted changed to 6. Note that this was only possible because he had changed the number chosen prior to the arrival of revision opportunity.

(d) At 25th second, revision opportunity arrived, but the number posted didn't change.

Finally, note that player GREEN has chosen the number 4 (it is lit up in green), but given that no revision opportunity has arrived, the NUMBER POSTED on the graph is still 6.

When 1-minute has passed your screen will appear as in Figure 3. You can see the number posted of every participant in your group. *Only the numbers posted at the* **end** of the countdown matter for your payoff. The numbers posted before do not matter at all for your payoff. For instance, GREEN's payoff depends only on his **last** number posted, and on THE SMALLEST NUMBER POSTED by his group members **at the end of the countdown**.

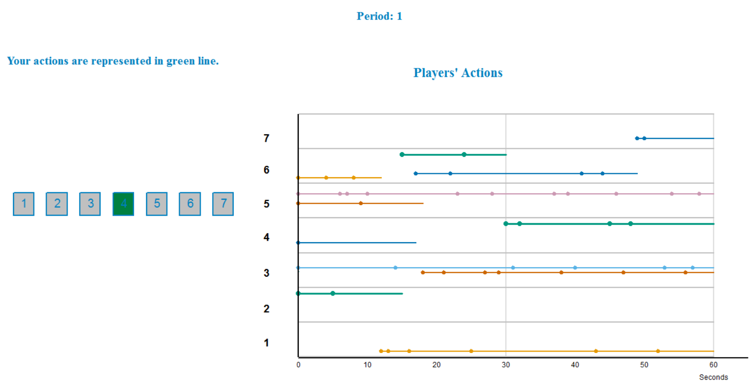


Figure 3 – Screen-shot of one possible scenario, after 60 seconds have passed

3. *Final Payoffs*

   Your **final payoff** will be the sum of payoffs from all 10 periods plus the show up fee.

The following probability facts and calculations may be useful:

1. Each player is expected to receive $.8 \times \frac{1}{6} \times 60 = \mathbf{8}$ **revision** opportunities during the 1-minute countdown.
2. The chance of a player receiving **no revision** opportunity during the 1-minute countdown is approximately $(1 - .8 \times \frac{1}{6})^{60} \approx 0.000$, which is **approximately 0.**
3. For any **10 second interval**, the chance of receiving at least one revision opportunity is of **approximately 75%.**
4. For any **20 second interval**, the chance of receiving at least one revision opportunity is of **approximately 95%.**

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