Appendix A Experimental Instructions (Treatment Disclosed 2/3)

Welcome to our experiment! You will receive RMB15 for having shown up on time. Please read all of the instructions carefully. Properly understanding the instructions will help you to make better decisions and therefore earn you more money. The experiment will last approximately one hour. Your earnings in this experiment will be measured in the experimental currency (i.e., EC) unit. At the end of the experiment, we will convert your earnings in EC to RMB, and pay you your earnings in private. The exchange rate is 3.2 EC= RMB1.

Your total payment in this experiment will be the sum of

(1) Your show-up fee: RMB15;

(2) Your earnings in this experiment;

To make sure you understand the experiment, the experimenter will first read the instructions out loud before the start of the experiment, and support will also be available at any time during the experiment. Please remember that you are not allowed to communicate with other participants during the experiment. If you do not obey this rule, you will be asked to leave the laboratory and will not be paid. Whenever you have a question, please raise your hand and an experimenter will come to help you.

The game

In this experiment, there are two decision-making stages in each period. At the beginning of each period, you will be randomly assigned to a group of 3 players. Each of you will be randomly labeled A, B, or C and will receive 80 EC as your initial endowment.

Stage 1: Entry decision

In this stage, you will have to choose whether to enter the competition stage (Stage 2).

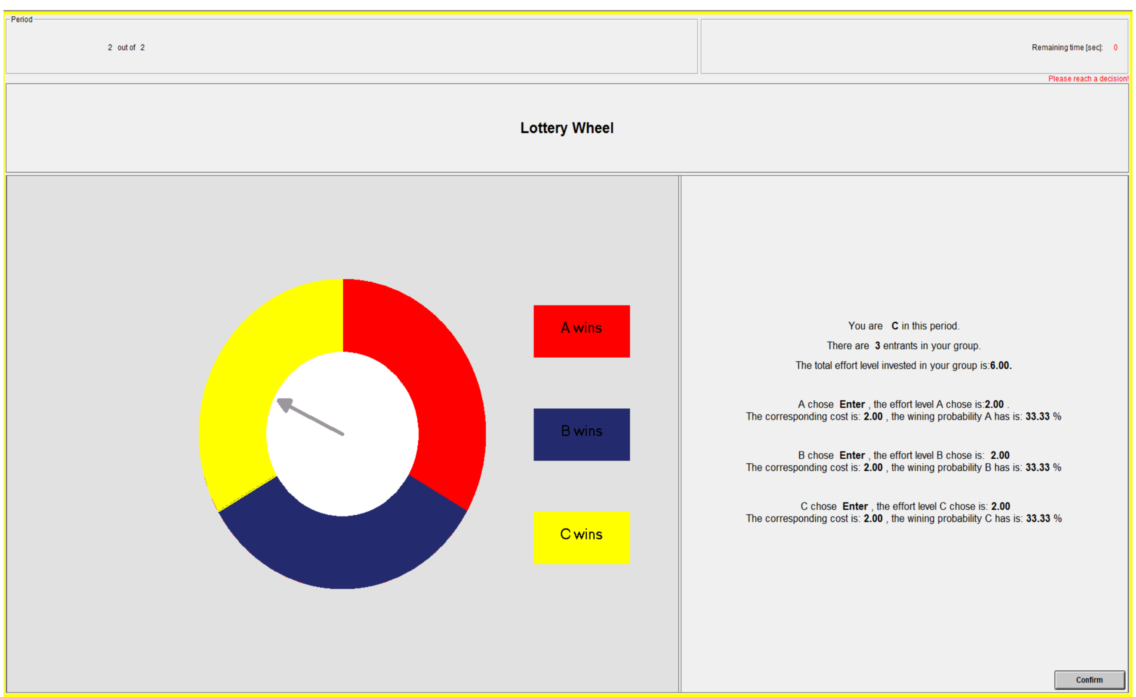
- If you choose to enter the competition, an entry fee of 40 EC will automatically be deducted from your initial endowment. In exchange, you will have the opportunity to compete against your group members and receive a prize of 100 EC with a certain probability in Stage 2. Your winning probability will depend on both your decision and those of your group members in Stage 2, and on how many of you have chosen to enter Stage 2.

- If you choose not to enter Stage 2, no entry fee will be charged. However, you will not have a chance to win the prize.
- Once all players have made their entry decisions, the total number of participants in the competition in Stage 2 will be revealed to all members (participants and non-participants) in your group. Those who have chosen not to enter Stage 2 will no longer need to make decisions in this period, but will have to wait quietly for their group members to complete Stage 2. If no-one in your group enters Stage 2, the prize will be kept by the experimenter.

Stage 2: Competition

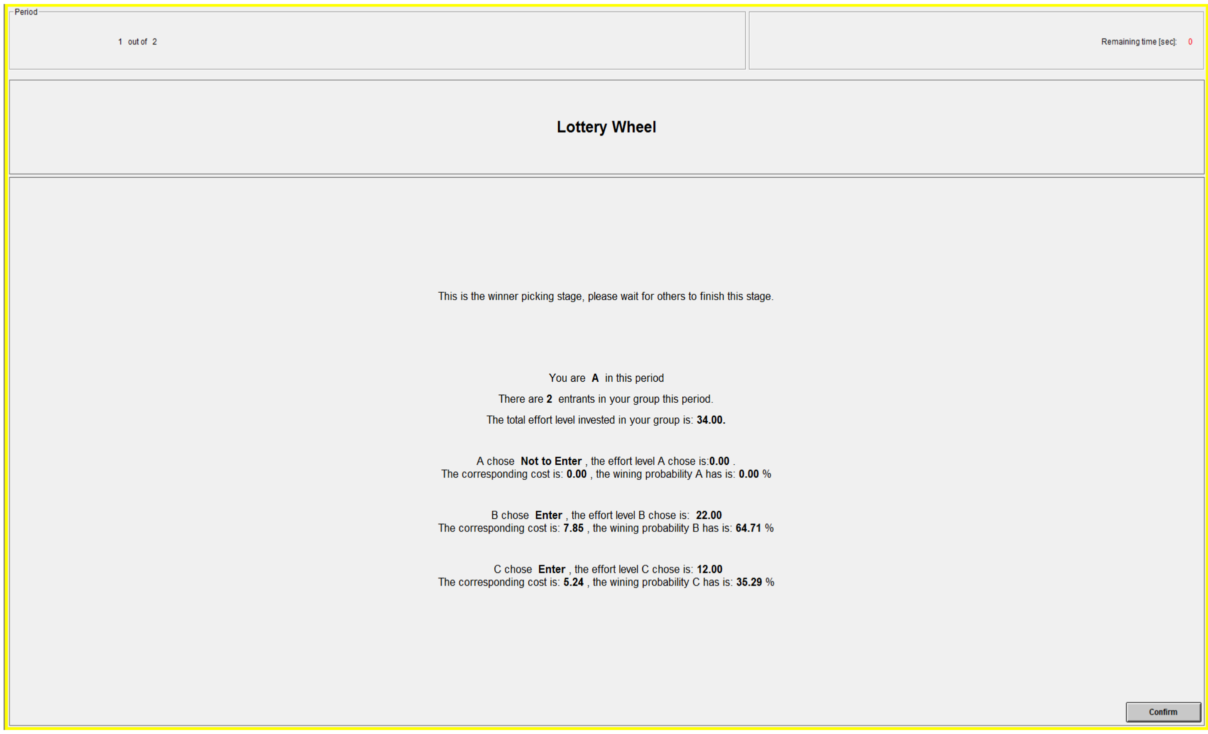
In this stage, all entrants compete for a prize of 100 EC. After learning the actual number of entrants in his/her group, each entrant must choose the level of effort he/she is willing to invest. The cost of effort x is calculated by a cost function, $C(x) = x^{\alpha}(\alpha = 2/3)$, and will be deducted from your initial endowment for this period (therefore, you can choose an effort level that costs less than the balance of your endowment, i.e., 40 EC.). After all entrants in your group have made their decisions, the computer will select one winner in your group:

Figure 4: Lottery Wheel Screenshot–Entrants



- If only one player has chosen to enter Stage 2, this player will receive the prize with a probability of 100%, no matter how much he/she has invested in the competition.

Figure 5: Lottery Wheel Screenshot–Non-entrants



- If more than one player has chosen to enter Stage 2, your probability of winning the prize will depend on your choice of effort relative to that of all entrants in your group. Specifically, your probability of winning will be equal to your effort divided by the total effort of all entrants in your group, namely $P_i = (x_i)/(x_i + x_j)$, where x_j is the total effort of all other entrants in your group). Note that in this case you may have one or two other competitors in your group. After choosing your effort level, a lottery wheel will appear on your computer screen. The probability of all entrants winning and the random draw process will be displayed in a dynamic lottery wheel. The wheel will be divided into three colored areas: red, blue, and yellow. The red area represents the winning area of participant A, the blue area, the winning area of participant B, and the yellow area, the winning area of participant C. The relative size of the colored areas will correspond to the probability of each participant winning (note that if there are only two entrants in your group, the wheel will only have two colors). In the center of the lottery wheel an arrow will initially point vertically upwards. When the random draw begins, the arrow will start spinning and after a while will stop randomly. If the arrow stops in the red area, participant A will win the prize. If the arrow stops in the blue area, participant B will win the prize. If the arrow stops in the yellow area, participant

C will win the prize. Obviously, the higher the level of effort you choose relative to that of your competitor(s), the larger your winning area on the lottery wheel, and the more likely you will be the winner of this competition. At the same time, the higher the level of effort, the higher the cost.

(To help you to better understand the relationship between your choice of effort and the cost of your effort, we provide a table on the last page of this document that describes the levels of effort you can choose and their corresponding costs. You can also use the calculator button on your screen to help you with your decision.)

Your earnings

Your earnings for each period will be calculated at the end of each period, as follows (and displayed to you):

- If you choose not to enter Stage 2

$$your\ earnings = Endowment = 80EC$$

  (Please note that although you can keep your initial endowment for this period, it cannot be carried over to the next period(s) to help your decisions in other periods.)

- If you choose to enter Stage 2

  a If you lose,
  $$your\ earnings = Endowment(80EC) - Entry\ Fee(40EC) - effort\ cost(x^{\alpha}EC)$$

  b If you win,
  $$\begin{aligned} your\ earnings = {} & Endowment(80EC) - Entry\ Fee(40EC) \\ & + Prize(100EC) - effort\ cost(x^{\alpha}EC) \end{aligned}$$

Procedure

You will play 25 periods of this two-stage game. However, you will always be randomly matched with two participants and labeled A, B, or C at the beginning of each period. On the lottery screen, your group members' entry decision, effort level and corresponding cost, probability of winning, and the number of entrants in your group will be displayed on your screen, irrespective of whether you choose to enter Stage 2. (see the sample screenshots above) At the end of each period, your earnings will be calculated by the computer and displayed on your screen.

After completing all 25 periods, the computer will randomly draw one period out of these 25 periods. Your total earnings from this period will be converted to RMB (at the rate of 3.2 EC= RMB1) and paid to you, together with your show-up fee (RMB15).

To further ensure that all participants in this experiment understand the game correctly, you will need to answer several control questions designed based on the information provided in these instructions. The experiment will start after all participants have answered these questions correctly. Please do not hesitate to ask for help if you have any questions regarding the information provided in our instructions or the control questions.

At the end of today's experiment, you will also need to complete a short post-experiment questionnaire, including your demographic information (e.g., sex, age, study major, etc.) and your decisions in the experiment. All information provided will remain anonymous and will be kept strictly confidential. This information is collected only for academic research purposes.

Thank you again for your participation and your patience! The experiment will start soon.

Cost schedule

Cost Function of Your Effort Level $C(X) = X^{\alpha}$ ($\alpha = \frac{2}{3}$)

Effort	Cost	Effort	Cost	Effort	Cost	Effort	Cost	Effort	Cost	Effort	Cost
0	0.00										
1	1.00	51	13.75	101	21.69	151	28.36	201	34.31	251	39.79
2	1.59	52	13.93	102	21.83	152	28.48	202	34.43	252	39.90
3	2.08	53	14.11	103	21.97	153	28.61	203	34.54	253	40.00
4	2.52	54	14.29	104	22.12	154	28.73	204	34.65		
5	2.92	55	14.46	105	22.26	155	28.86	205	34.77		
6	3.30	56	14.64	106	22.40	156	28.98	206	34.88		
7	3.66	57	14.81	107	22.54	157	29.10	207	34.99		
8	4.00	58	14.98	108	22.68	158	29.23	208	35.11		
9	4.33	59	15.16	109	22.82	159	29.35	209	35.22		
10	4.64	60	15.33	110	22.96	160	29.47	210	35.33		
11	4.95	61	15.50	111	23.10	161	29.59	211	35.44		
12	5.24	62	15.66	112	23.24	162	29.72	212	35.55		
13	5.53	63	15.83	113	23.37	163	29.84	213	35.67		
14	5.81	64	16.00	114	23.51	164	29.96	214	35.78		
15	6.08	65	16.17	115	23.65	165	30.08	215	35.89		
16	6.35	66	16.33	116	23.79	166	30.20	216	36.00		
17	6.61	67	16.50	117	23.92	167	30.33	217	36.11		
18	6.87	68	16.66	118	24.06	168	30.45	218	36.22		
19	7.12	69	16.82	119	24.19	169	30.57	219	36.33		
20	7.37	70	16.98	120	24.33	170	30.69	220	36.44		
21	7.61	71	17.15	121	24.46	171	30.81	221	36.55		
22	7.85	72	17.31	122	24.60	172	30.93	222	36.66		
23	8.09	73	17.47	123	24.73	173	31.05	223	36.77		
24	8.32	74	17.63	124	24.87	174	31.17	224	36.88		
25	8.55	75	17.78	125	25.00	175	31.29	225	36.99		
26	8.78	76	17.94	126	25.13	176	31.41	226	37.10		
27	9.00	77	18.10	127	25.27	177	31.52	227	37.21		
28	9.22	78	18.26	128	25.40	178	31.64	228	37.32		
29	9.44	79	18.41	129	25.53	179	31.76	229	37.43		
30	9.65	80	18.57	130	25.66	180	31.88	230	37.54		
31	9.87	81	18.72	131	25.79	181	32.00	231	37.65		
32	10.08	82	18.87	132	25.92	182	32.12	232	37.76		
33	10.29	83	19.03	133	26.06	183	32.23	233	37.86		
34	10.50	84	19.18	134	26.19	184	32.35	234	37.97		
35	10.70	85	19.33	135	26.32	185	32.47	235	38.08		
36	10.90	86	19.48	136	26.45	186	32.58	236	38.19		
37	11.10	87	19.63	137	26.58	187	32.70	237	38.30		
38	11.30	88	19.78	138	26.70	188	32.82	238	38.40		
39	11.50	89	19.93	139	26.83	189	32.93	239	38.51		
40	11.70	90	20.08	140	26.96	190	33.05	240	38.62		
41	11.89	91	20.23	141	27.09	191	33.17	241	38.73		
42	12.08	92	20.38	142	27.22	192	33.28	242	38.83		
43	12.27	93	20.53	143	27.35	193	33.40	243	38.94		
44	12.46	94	20.67	144	27.47	194	33.51	244	39.05		
45	12.65	95	20.82	145	27.60	195	33.63	245	39.15		
46	12.84	96	20.97	146	27.73	196	33.74	246	39.26		
47	13.02	97	21.11	147	27.85	197	33.86	247	39.37		
48	13.21	98	21.26	148	27.98	198	33.97	248	39.47		
49	13.39	99	21.40	149	28.11	199	34.09	249	39.58		
50	13.57	100	21.54	150	28.23	200	34.20	250	39.69		

Appendix B Supplementary materials to predictions

Equilibrium Characterization when N is Disclosed

Whenever $N \geq 2$, each participant i chooses his level of effort x_i to maximize his expected payoff

$$\pi_i = \frac{x_i^r}{\sum_{j=1}^{N} x_j^r} V - x_i^{\alpha},$$

The unique equilibrium effort x_N^* is determined by the first order condition

$$r\frac{N-1}{N^2 x_N} v = \alpha x_N^{\alpha-1}.$$

Since the payoff π_i of a representative contestant i is globally concave in x_i assuming that all others taking the effort of x_N^*, therefore $x_N^* = \left(\frac{N-1}{N^2}\frac{rV}{\alpha}\right)^{\frac{1}{\alpha}}$ is a unique symmetric equilibrium effort. And the equilibrium payoff is $\pi_N^* = \frac{1}{N}V - (x_N^*)^{\alpha} = \frac{V}{N}\left(1 - \frac{N-1}{N}\frac{r}{\alpha}\right)$. In a standard Tullock contest wih N contestants, to guarantee the existence of the pure-strategy equilibrium effort we must have $r \leq \alpha\frac{N}{N-1}$. Hence we impose an upper limit on r such that $r \leq \alpha\frac{M}{M-1} \leq \alpha\frac{N}{N-1}$.

Equilibrium Characterization when N is Concealed

Consider an arbitrary potential participant i who chooses to enter the contest with probability q_C. Suppose that all other potential participants play a strategy (q_C, x_C) with $x_C > 0$. He chooses his effort $x_{i,C}$ to maximize his expected payoff

$$\pi_i(x_{i,C}|\, q_C, x_C) = \sum_{N=1}^{M} C_{M-1}^{N-1} q_C^{N-1}(1-q_C)^{M-N}[\frac{x_{i,C}^r}{x_{i,C}^r + (N-1)x_C^r}V - x_{i,C}^{\alpha}].$$

Differentiating $\pi_i(x_{i,C}|\, q_C, x_C)$ with respect to $x_{i,C}$ yields

$$\frac{d\pi_i(x_{i,C}|\, q_C, x_C)}{dx_{i,C}} = \sum_{N=1}^{M} C_{M-1}^{N-1} q_C^{N-1}(1-q_C)^{M-N}\frac{(N-1)r x_{i,C}^{r-1} x_C^r V}{[x_{i,C}^r + (N-1)x_C^r]^2} - \alpha x_{i,C}^{\alpha-1}.$$

Suppose that a symmetric pure-strategy equilibrium effort exists. This equilibrium can be solved by the first order condition $\frac{d\pi_i}{dx_{i,C}}|_{x_{i,C}=x_C} = 0$ given an entry probability q_C. Hence, $x_C^*(q_C)$ must solve

$$\sum_{N=1}^{M} C_{M-1}^{N-1} q_C^{N-1}(1-q_C)^{M-N}\frac{(N-1)rV}{N^2 x_C^*} - \alpha x_C^{*\alpha-1} = 0,$$

which yields

$$x_C^*(q_C) = [\sum_{N=1}^{M} C_{M-1}^{N-1} q_C^{N-1}(1-q_C)^{M-N} \frac{N-1}{N^2}\frac{rV}{\alpha}]^{\frac{1}{\alpha}}.$$

The equilibrium expected payoff from entering the contest is

$$\begin{aligned}
\pi^*(x_C^*(q_C), q_C) &= \sum_{N=1}^{M} C_{M-1}^{N-1} q_C^{N-1}(1-q_C)^{M-N}\frac{V}{N} - [\sum_{N=1}^{M} C_{M-1}^{N-1} q_C^{N-1}(1-q_C)^{M-N}\frac{N-1}{N^2}\frac{rV}{\alpha}] \\
&= \sum_{N=1}^{M} C_{M-1}^{N-1} q_C^{N-1}(1-q_C)^{M-N}\frac{V}{N}(1-\frac{N-1}{N}\frac{r}{\alpha}).
\end{aligned}$$

By entering the contest and submit an effort of $x_C^*(q_C)$, every potential contestant i ends up with an overall expected payoff $\pi^*(x^*(q_C), q_C) - \Delta$, which must be zero in equilibrium. Therefore, the equilibrium entry probability q_C^* is determined by solving $\pi^*(x^*(q_C^*), q_C^*) = \Delta$.

The expected overall effort of the contest $(TE_C^*(q_C^*))$ obtains as

$$TE_C^*(q_C^*) = Mq_C^* x^*(q_C^*) = Mq_C^*[\sum_{N=1}^{M} C_{M-1}^{N-1} q_C^{*N-1}(1-q_C^*)^{M-N}\frac{N-1}{N^2}\frac{rV}{\alpha}]^{\frac{1}{\alpha}}.$$

In the following, we will show the equilibrium entry probability q_C^* is unique. Note that q_C^* satisfies $F(q_C^*) = \sum_{N=1}^{M} C_{M-1}^{N-1} q_C^{*N-1}(1-q_C^*)^{M-N}\frac{V}{N}(1-\frac{N-1}{N}\frac{r}{\alpha}) - \Delta = 0$. Since $F(q_C^*)$ is continuous in and differentiable with q_C^*, we first claim that $F(q_C^*)$ strictly decreases with q_C^* to prove that q_C^* is unique. Taking its first order derivative of $F(q_C^*)$ with respect to q_C^* yields:

$$\begin{aligned}
\frac{F(q_C^*)}{dq_C^*} &= \sum_{N=1}^{M} C_{M-1}^{N-1}[(N-1)q_C^{*N-2}(1-q_C^*)^{M-N} - (M-N)q_C^{*N-1}(1-q_C^*)^{M-N-1}]\pi_N^* \\
&= \sum_{N=1}^{M} C_{M-1}^{N-1}(N-1)q_C^{*N-2}(1-q_C^*)^{M-N}\pi_N^* - \sum_{N=1}^{M} C_{M-1}^{N-1}(M-N)q_C^{*N-1}(1-q_C^*)^{M-N-1}\pi_N^* \\
&= (M-1)\{\sum_{N=2}^{M} C_{M-2}^{N-2}q_C^{*N-2}(1-q_C^*)^{M-N}\pi_N^* - \sum_{N=1}^{M-1} C_{M-2}^{N-1}q_C^{*N-1}(1-q_C^*)^{M-N-1}\pi_N^*\} \\
&= (M-1)\sum_{N=1}^{M-1} C_{M-2}^{N-1}q_C^{*N-1}(1-q_C^*)^{M-N-1}\left(\pi_{N+1}^* - \pi_N^*\right).
\end{aligned}$$

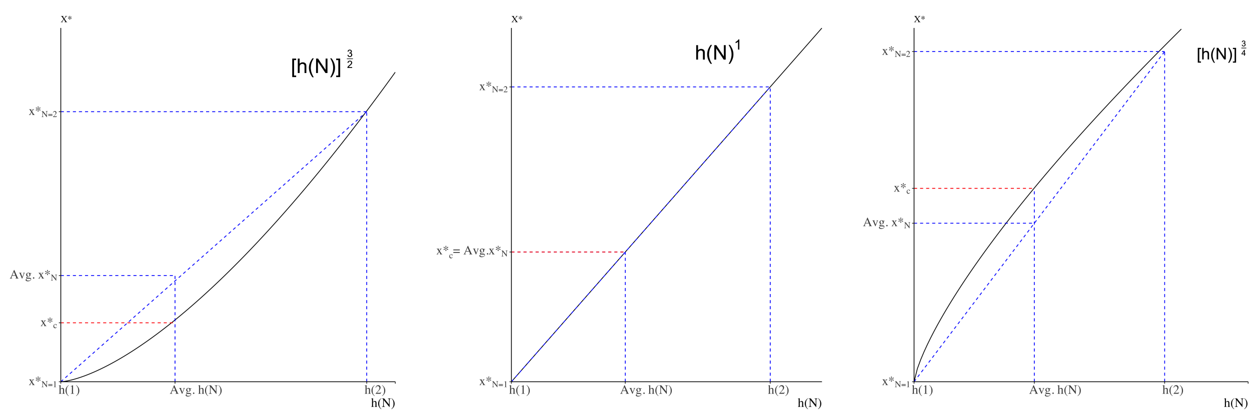
This first-order derivative is clearly negative since $\pi_N^* = \frac{1}{N}\left[1-\left(1-\frac{1}{N}\right)\frac{r}{\alpha}\right]V \geq 0$ and is monotonically decreasing with N.

In addition, when all other potential participants enter with probability $q_C = 0$, a participating contestant receives a payoff $V - \Delta > 0$, hence he should enter with probability one. Similarly, when all other potential participants enter with probability 1, a participating contestant would receive a negative expected payoff given the regular assumption ($\frac{V}{M} < \Delta$) and hence should not enter. Neither $q_C = 0$ nor $q_C = 1$ constitute an equilibrium. Therefore, a unique $q_C^* \in (0,1)$ that solves $\pi^*(x_C^*(q_C), q_C) = \Delta$ exists in the equilibrium, in which each potential participant is indifferent between entering and staying inactive when all others play the equilibrium strategy.

A two-player example

To compare the equilibrium efforts under different disclosure policies and cost structures, let us consider a two-player example $(M = 2)$ with $V = 1, \Delta = \frac{2}{3}, r = 1$, hence the actual number of contestants N can only be 1 or 2.

Given V, r, α and $h(N) = \frac{N-1}{N^2}\frac{rV}{\alpha}$, we have $h(1) = 0$, $h(2) = \frac{1}{4}$. Under disclosure policy, when $N = 1$, $x_{N=1}^* = [h(1)]^{\frac{1}{\alpha}}$; when $N = 2$, $x_{N=2}^* = [h(2)]^{\frac{1}{\alpha}}$, the average equilibrium effort is $Avg.x_N^* = (1 - q_D^*)\, x_{N=1}^* + q_D^* x_{N=2}^* = (1 - q_D^*)\,(h(1))^{\frac{1}{\alpha}} + q_D^*\,(h(2))^{\frac{1}{\alpha}}$. While under concealment, the equilibrium effort is $x_C^* = [(1 - q_C^*)\, h(1) + q_C^* h(2)]^{\frac{1}{\alpha}}$.



(a) concave cost $\alpha = \frac{2}{3}$ (b) linear cost $\alpha = 1$ (c) convex cost $\alpha = \frac{4}{3}$

Figure 6: A two-player example

We plot $x_N^* = [h(N)]^{\frac{1}{\alpha}}$ with different α separately in Figure 6. The X-axis is $h(N)$, and the Y-axis is x_N^*. In figure 6(a), with concave cost $\alpha = \frac{2}{3}$, $q_C^* = q_D^* = 0.38$, the average of $h(N)$, $Avg.h(N) = (1 - q_C^*)\, h(1) + q_C^* h(2) = 0.14$ induces $x_C^* = [h(N)]^{\frac{3}{2}} = 0.05$, which is smaller than $Avg.x_N^* = (1 - q_D^*)\, x_{N=1}^* + q_D^* x_{N=2}^* = 0.09$; In figure 6(b), with linear cost $\alpha = 1$, $q_C^* = q_D^* = 0.44, Avg.h(N) = (1 - q_C^*)\, h(1) + q_C^* h(2) = 0.11$ induces $x_C^* = [h(N)]^{\frac{1}{\alpha}} = 0.11$, which is the same as $Avg.x_N^* = (1 - q_D^*)\, x_{N=1}^* + q_D^* x_{N=2}^* = 0.11$; In figure 6(c), with convex cost $\alpha = \frac{4}{3}$, $q_C^* = q_D^* = 0.48, Avg.h\left(N\right) = \left(1 - q_C^*\right) h\left(1\right) + q_C^* h\left(2\right) = 0.09$ induces $x_C^* = \left[h\left(N\right)\right]^{\frac{3}{4}} = 0.16$, which is bigger than $Avg.x_N^* = \left(1 - q_D^*\right) x_{N=1}^* + q_D^* x_{N=2}^* = 0.13$. This simple example basically illustrates how Jensen's inequality is used to prove our main theoretical prediction.

Multiple equilibria

In a symmetric equilibrium, each potential participant enters with the same probability and chooses the same level of effort upon entry. While the symmetric equilibrium is the most natural one to consider for *ex-ante* symmetric players, there always exist asymmetric equilibria in which a subset $M'(< M)$ of potential participants enter either stochastically or deterministically, while the remaining $(M - M')$ potential participants always stay inactive. In such an asymmetric equilibrium, both the active and inactive participants should end up with an expected payoff of zero. For the M' active potential participants who enter with probability $q_{M'}^* \left(> q_M^*\right)$, their equilibrium strategy is equivalent to the strategy played in the symmetric equilibrium of a game that starts with M' potential participants.

To guarantee that all participants enter the contest stochastically such that disclosure policy is not irrelevant, we make the regular assumption $\frac{V}{M} < \Delta < V$ as a sufficient condition. We further impose an upper limit $r \in (0, \overline{r}] \subset (0, \alpha\frac{M}{M-1}]$ to guarantee the existence of a pure-strategy equilibrium effort. Under these restrictions, the expected payoff from entering the contest should at least cover the entry cost (i.e, $\pi_M^* \geq \Delta$). In this unique equilibrium (q_M^*, x^*), each participant expects an overall payoff of zero since the expected payoff from the effort-making stage fully offsets the entry cost. However, when $r > \alpha\frac{M}{M-1}$, it is possible that for some $M'\left(\leq M\right)$, $\pi_{M'}^* < \Delta$ while $\pi_{M'-1}^* \geq \Delta$, such that not all M potential participants would like to make positive effort. In this case, there is no symmetric equilibrium, only asymmetric equilibrium exists, and the number of asymmetric equilibrium can be more than one.

Given the parameters we adopt in the experimental design ($V = 100, \Delta = 40, r = 1, M = 3$), the assumptions $\frac{V}{M} < \Delta < V$ and $r \leq \alpha\frac{M}{M-1}$ are satisfied automatically, the unique symmetric equilibrium has been fully characterized in the main text. Now consider an asymmetric equilibrium with $M' = 2$ active potential participants whereas the third participant always stays inactive. Note that the number of active potential participants should be at least 2. When there is only one active participant, he will earn the prize with probability one regardless of his effort and hence should always enter. In this case, at least one of the two inactive participants also has an incentive to become active. To solve the equilibrium strategy of the active potential participants, it is equivalent to find the symmetric equilibrium of a game with M' potential participants. In this game, the regular assumption no longer holds given that $\frac{V}{M'} > \Delta$. When this is the case, Fu et al. (2015) (in Corollary 3) characterizes the condition for pure-strategy equilibrium effort with *deterministic* vs. *stochastic* entry. They show that when $r \leq \alpha\frac{M'}{M'-1}\left(1 - \frac{M'\Delta}{V}\right)$, there exists a unique asymmetric equilibrium, in which all M' potential participants enter the contest with probability one and exert the same level of effort in pure-strategy upon *deterministic* entry whereas the third participant stays inactive. However, when $r > \alpha\frac{M'}{M'-1}\left(1 - \frac{M'\Delta}{V}\right)$, there exists a unique asymmetric equilibrium, in which all potential participants enter the contest with probability $q^* < 1$ and exert the same level of effort in pure strategy upon *stochastic* entry whereas the third participant stays inactive. Given the specific parameter values used in our experiment, we always have $r > \alpha\frac{M'}{M'-1}\left(1 - \frac{M'\Delta}{V}\right)$, regardless $\alpha = \frac{2}{3}, 1$ or $\frac{4}{3}$. Therefore, these $M' = 2$ potential participants should enter the contest with probability $q^* < 1$ and exert the same level of effort upon entry. The equilibrium outcomes (including individual effort, entry rate and total effort) under the *Disclosure* policy can be further characterized with the following table:

	x_N^*		π_N^*		q_D^*	$TE_D^*(q_D^*)$
	$N = 1$	$N = 2$	$N = 1$	$N = 2$		
$\alpha = \frac{2}{3}$	0	229.64	100	12.50	0.69	215.96
$\alpha = 1$	0	25.00	100	25.00	0.80	32.00
$\alpha = \frac{4}{3}$	0	9.01	100	31.25	0.87	13.73

Such an asymmetric equilibrium under the Concealment policy should look like the following:

	q_C^*	x_C^*	$TE_C^*\left(q_C^*\right)$
$\alpha = \frac{2}{3}$	0.69	130.40	178.83
$\alpha = 1$	0.80	20.00	32.00
$\alpha = \frac{4}{3}$	0.87	8.14	14.20

Comparing the equilibrium total effort in the above tables, one could see that the optimal disclosure policy should not change under the asymmetric equilibrium. Therefore, when the same equilibrium concept is used (either symmetric or asymmetric), our theoretical predictions regarding the optimal disclosure policy should always hold. Furthermore, the comparison shows that given a disclosure policy, the total effort elicited from a contest with $M = 3$ potential participants is lower compared to a contest with $M' = 2$ potential participants, which confirms the result provided by Fu et al. (2015): A contest is less able to elicit effort if it involves too large a pool of potential participants.

Given the existence of the asymmetric equilibrium, there is a possibility that participants in our experiment may have played the asymmetric equilibrium in stead of the symmetric equilibrium. Hence, in Appendix C.4 and C.5, we further summarize how frequently we observe contests with different sizes (i.e., N=0, N=1, N=2 and N=3) and distributions of individual entry rate for each treatment. Note that the maximum number of entrants should be 2 in the asymmetric equilibrium. However, we observe a significant number of contests with N=3 in each treatment and the individual entry rate is distributed widely across 0 to 1. Both evidences suggest that it is very unlikely that our participants played the asymmetric equilibrium in the experiment.

Appendix C Additional Results

Appendix C. 1: Individual Effort in Concealed Treatments: Mixed-effects Regressions (Rounds 14-25)

VARIABLES	Concave	Linear	Convex
Effort	155.60***	22.85***	9.76***
	(12.30)	(2.46)	(0.54)
$\sigma^2_{(sub)session}$	258.59	14.44	0.00
	(435.39)	(17.63)	(0.00)
$\sigma^2_{individual}$	3,007.12	82.35	11.02
	(793.56)	(21.46)	(2.69)
Equ.	117.97	18.12	7.42
p-value	*0.00*	*0.05*	*0.00*
Adjusted Equ.	160.44	19.56	7.63
p-value	*0.69*	*0.18*	*0.00*
No. of Groups	4	4	4

We estimate the average individual effort for different cost functions separately with mixed-effects models to control for the random effects at the individual and (sub)session levels, using data from rounds 14-25. The p-values under "Equ." and "Adjusted Equ. " are from Wald tests that compares the estimated average individual effort with the corresponding predictions. Stars indicate the significance level of each coefficient (** $p < 0.05$, *** $p < 0.01$).

Appendix C. 2: Individual Effort in Disclosed treatment
Mixed-effects Regressions with control variables (Rounds 14-25)

	Mixed Linear Regressions			Mixed Tobit Regressions		
	Concave	Linear	Convex	concave	linear	convex
N=1	10.20	1.928	-1.415			
	(33.69)	(3.911)	(1.771)			
N=2	195.9***	26.40***	9.958***	204.2***	31.22***	9.836***
	(32.29)	(3.810)	(1.747)	(60.67)	(6.948)	(2.872)
N=3	154.4***	23.09***	7.472***	145.3**	27.32***	6.961**
	(32.32)	(3.836)	(1.741)	(60.71)	(6.959)	(2.865)
Risk	0.901	-0.326	0.105	4.477	-0.628	0.0752
	(3.161)	(0.480)	(0.230)	(5.741)	(0.856)	(0.381)
Male	10.68	2.889	-0.247	18.59	6.881	0.516
	(14.92)	(2.534)	(1.004)	(27.36)	(4.587)	(1.672)
Win_t-1	-0.0970	-0.166	-0.507	-3.078	-0.743	-0.527
	(6.744)	(0.983)	(0.345)	(10.57)	(1.267)	(0.433)
Major	-7.610	0.450	2.300	9.311	-1.615	3.721
	(20.26)	(2.912)	(1.262)	(36.78)	(5.232)	(2.087)
$\sigma^2_{sub(session)}$	444.96	2.86	0	2675.63	15.01	0
	(447.08)	(5.47)	(0.00)	(2380.52)	(21.45)	(0.00)
$\sigma^2_{individual}$	1461.39	34.28	7.2	4986.22	118.66	20.56
	(441.25)	(11.20)	(1.85)	(1612.54)	(36.94)	(5.57)
Observations	379	340	337	344	278	274
Number of groups	4	4	4	4	4	4

We estimate the average individual effort for different cost functions separately with mixed-effects models to control for the random effects at the individual and (sub)session levels, using data from rounds 14-25. “Risk” is a self-reported measure of willingness to take risks in everyday life, which takes integers between 0 and 10, with 0 being “Not willing to take risks at all” and 10 being “Very willing to take risks.” “Win$_{t-1}$” is a binary variable that is equal to 1 if the participant won in the previous round, and 0 otherwise. “Major” is a dummy variable that equals to 0 for participants who study science, engineering, mathematics or economics, and 1 for the remaining areas (e.g., arts, history, literature, or law). Stars indicate the significance level of the estimated coefficients (** $p < 0.05$, *** $p < 0.01$). Standard errors are reported in brackets.

Appendix C. 3: Individual Effort in Concealed Treatments: Mixed-effects Regressions with control variables (Rounds 14-25)

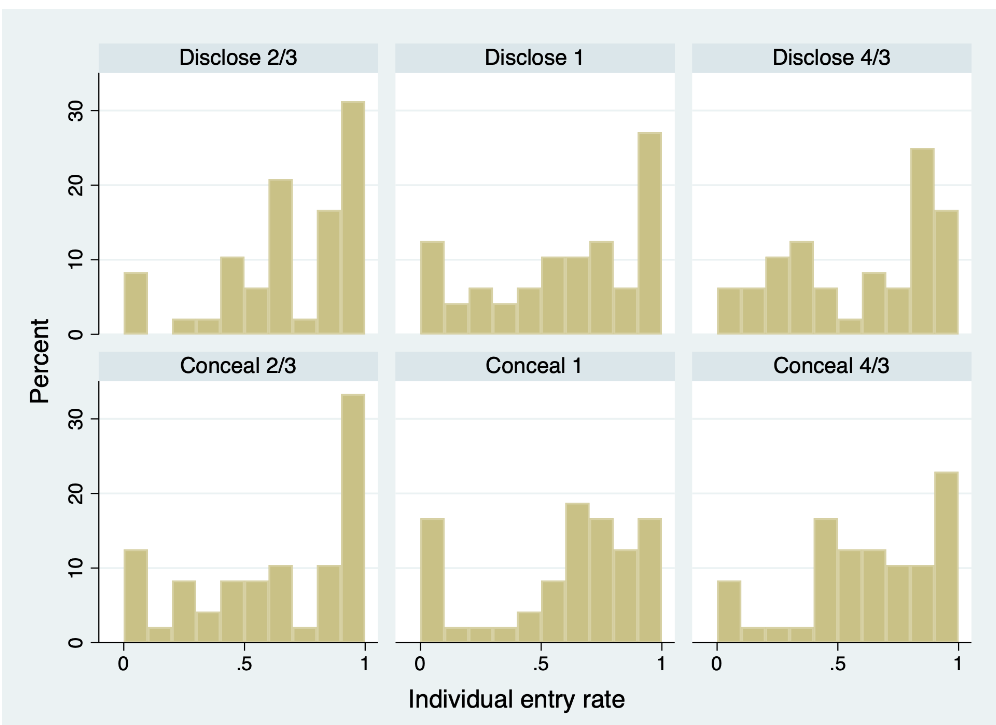
VARIABLES	Concave	Linear	Convex
Concealment	187.6***	26.85***	7.265***
	(35.68)	(6.047)	(1.934)
Risk	-5.713	0.124	0.424
	(4.987)	(0.817)	(0.244)
Male	21.38	-1.217	-0.107
	(23.67)	(3.253)	(1.068)
Win_t-1	-5.610	-1.410	-0.00542
	(6.067)	(0.889)	(0.373)
Major	-6.593	-4.521	0.685
	(22.47)	(4.193)	(1.594)
$\sigma^2_{sub(session)}$	497	8.81	0
	(610.43)	(14.50)	(0.00)
$\sigma^2_{individual}$	2686.95	83.4	10.15
	(727.64)	(21.90)	(2.50)
Observations	335	331	347
Number of groups	4	4	4

We estimate the average individual effort for different cost functions separately with mixed-effects models to control for the random effects at the individual and (sub)session levels, using data from rounds 14-25. "Risk" is a self-reported measure of willingness to take risks in everyday life, which takes integers between 0 and 10, with 0 being "Not willing to take risks at all" and 10 being "Very willing to take risks." "Win_{t-1}" is a binary variable that is equal to 1 if the participant won in the previous round, and 0 otherwise. "Major" is a dummy variable that equals to 0 for participants who study science, engineering, mathematics or economics, and 1 for the remaining areas (e.g., arts, history, literature, or law). Stars indicate the significance level of the estimated coefficients (** $p < 0.05$, *** $p < 0.01$). Standard errors are reported in brackets.

Appendix C. 4: Frequency of the number of entrants by treatment

	Concave		Linear		Convex	
	Disclose	Conceal	Disclose	Conceal	Disclose	Conceal
N=0	22	18	21	16	24	22
N=1	67	114	112	131	126	103
N=2	173	180	189	187	167	177
N=3	138	88	78	66	82	98

Appendix C 5: Histogram of Individual entry rate



Appendix C 6: Histograms of individual effort