Appendix 1 - Instructions to the Subjects

Welcome to an experiment on group decision making. During the present experimental session, you will be asked to make a large number of decisions and so will the other participants. Your decisions, as well as the decisions of the other participants, will determine your monetary payoff according to a procedure that will be explained below.

Please read the instructions carefully. If at any time during the session you have questions, please raise your hand and one of the experimenters will come to assist you. You may refer to the instructions during any time in the session.

Please note that from now on all communication between the participants is prohibited. If the participants communicate with one another in any shape or form, the session will be terminated. Please note, too, that the experiment is self-paced. Therefore, you may anticipate short delays as other participants determine and then type in their decisions.

Description of your task

Consider yourself a member of a group that includes **6** players. On each period of the game, each member of the group will be asked how much to request from a common-pool resource (a resource that several users have access to). You may think about the resource as groundwater in an aquifer. Alternatively, and more abstractly, you may view the commonly shared resource as a jar that contains many silver coins. The exact number of coins is not known to you or to any other member of your group. However, every member of the group is informed that the number of coins in the jar may assume any value between 270 and 730 (i.e., 270, 271, … , 730) with equal probability. This means that any integer in the interval [270, 730] is equally likely to be drawn. We denote the number of coins (i.e., the resource) by **x**; thus, **x** = 270, 271, … , 730.

To specify your request, you'll be asked to type it (see Screen 1). Therefore, your request must be a non-negative integer that does not exceed 730, which is the upper limit of the number of coins in the jar. After all group members type in their requests, the computer will *sum up* all the requests from the group members and compare this sum to the value of the resource **x**. Recall that the value of **x** will be drawn randomly on each period of play from the set of integers {270, 271 … , 730}.

- If the sum of the requests does not exceed the value of **x** (i.e., sum≤**x**), then each group member will be granted her own request.

- If the sum of the requests exceeds the value of **x** (i.e., sum>**x**), then each group member will receive nothing (see screen 1 below).

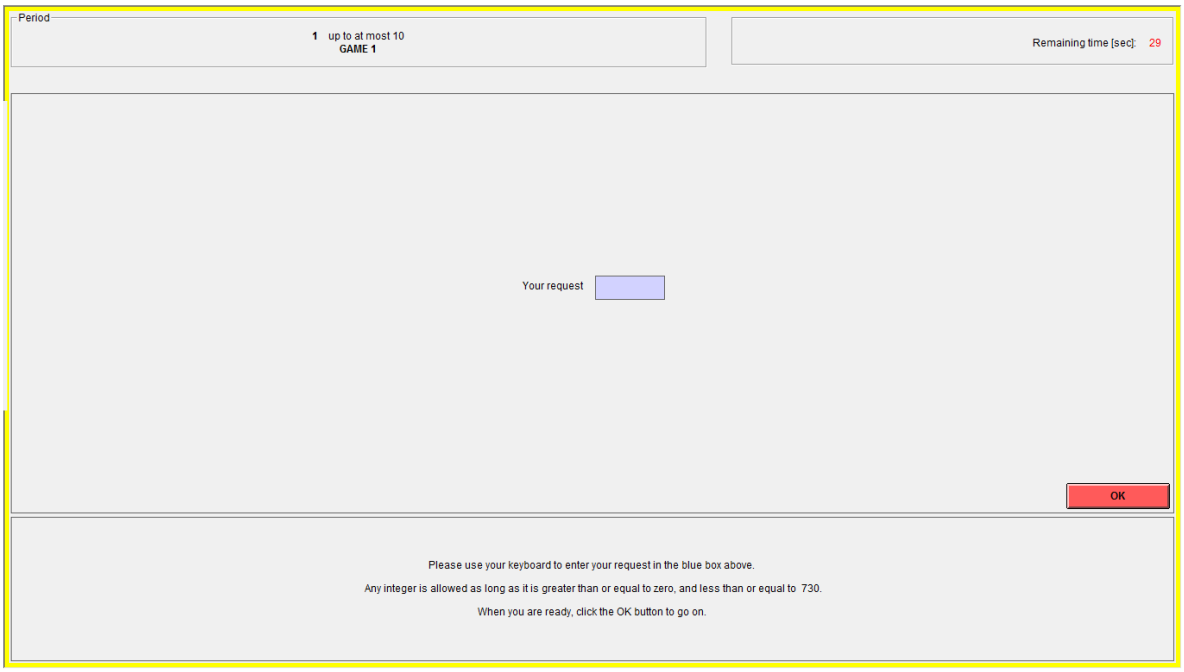
The game will continue for up to **10** periods. The number of the period appears in the top left corner of the screen. In the top right corner you can see how many more seconds remain for you to make your decision.

At the end of the period, each member of the group will be presented with Screen 2 that summarizes the results of the period. Screen 2 displays your request for the period, the requests by each member of the group, the total group request, the value of **x** for that period (called "random draw"), and your payoff (in tokens) for the period. Please see Screen 2. After reviewing

the information displayed on this screen, please press the button “continue” on the lower-right corner of the screen.

In addition to the individual payoffs, the computer will also determine whether to continue the game for another period.

Screen 1



Screen 2

- If, at any period during the game, the total group request exceeds the randomly drawn value of **x**, then the game will be terminated.

- If this is the final period, then the game will be terminated.

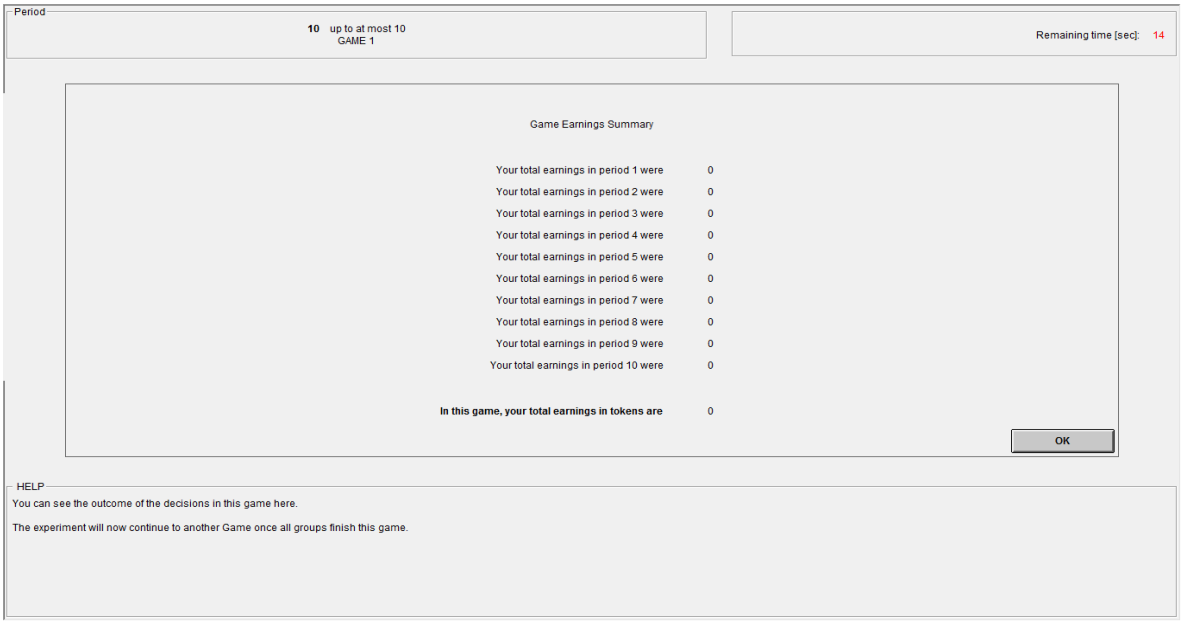
In other words, the game will be terminated either when the sum of the requests exceeds the value of the resource x or after T=10 periods, whichever comes first.

Example

Suppose that on some period, say period 3, each of the six group members requests 65, 30, 40, 110, 85, and 40, for a total group request of **370**. Suppose, too, that the size of the resource on this period, determined by the random draw, is **x = 474**. Then, because 474>370, each group member will be granted her request and the game will proceed to the next period. However, if the size of the resource happens to be **x** = 322, then individual requests will not be granted (each player earns zero tokens) and the game will be terminated.

At the end of the game, each group member will be presented with Screen 3 (see Screen 3 below) that exhibits her payoff for this game. After reviewing your payoff, please press the button "OK" to continue to the next game.

Screen 3



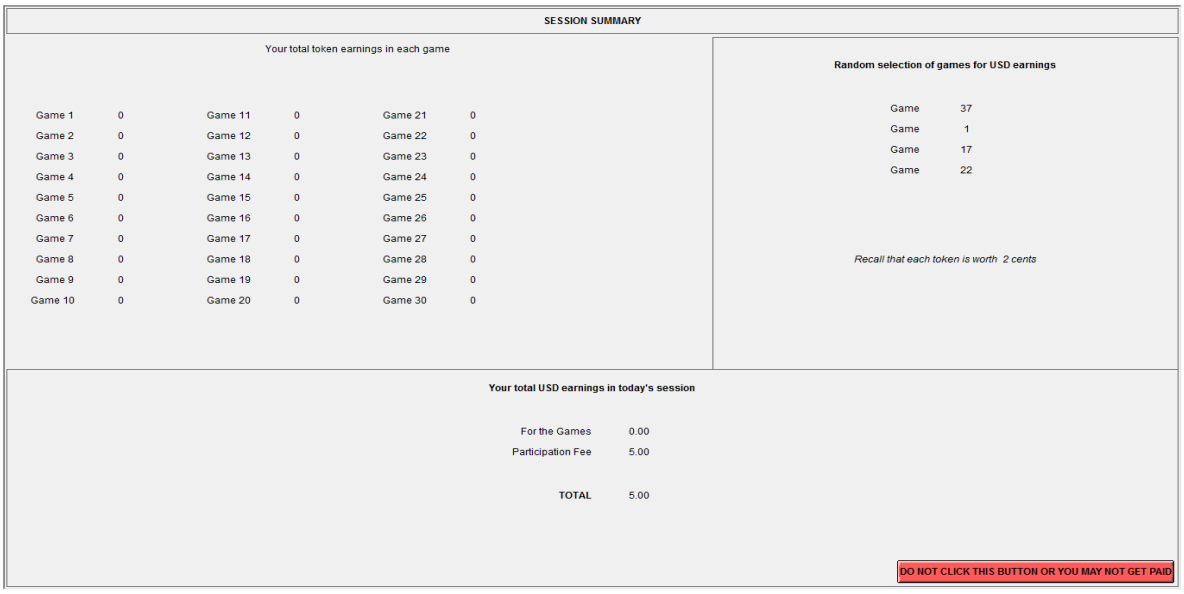
You'll participate in **30** games, each with a maximum of 10 periods. All the games are structured in the same way. At the end of the session, after completing all 30 games, you'll be presented with a Screen that shows your payoffs in all the games.

How are your earnings in USD computed?

For each one of you, the computer will randomly choose **4** games, sum up your payoffs in tokens over these 4 randomly determined games, and then convert the sum to USA dollars at the following rate 50 tokens = $1.00. In addition, you'll be paid $5.00 for participation in the

experiment. Please view Screen 4 below. However, please do not click the red button on the bottom of the screen so that the experimenter may come by, copy your earnings from the screen on your receipt, and pay you accordingly.

Screen 4



Appendix 2- Generalization to nonlinear utility functions

Assuming symmetric players as in the text, but allowing for (common) nonlinear utility functions $u(r_j)$, the expected utility to the player j in stage game $\mathbf{\Gamma}_t$ is given by

$$E(u(r_{jt})) = \begin{cases} u(r_{jt}) & if \quad \sum_{j=1}^{n} r_{jt} \le \alpha \\ u(r_{jt}) \times Prob\left(\sum_{j=1}^{n} r_{jt} \le s_t\right) & if \quad \alpha < \sum_{j=1}^{n} r_{jt} \le \beta \\ 0 & if \quad \sum_{j=1}^{n} r_{jt} > \beta \end{cases} \qquad (1')$$

In this case, the SPNE solution has the form:

$$r_{jt}^{*} = \max(r_{1jt}^{*},\ r_{2jt}^{*}), \qquad (2')$$

where $r_{1jt}^{*} = \alpha/n$ as in the text, and r_{2jt}^{*} is obtained from solving the equation:

$$\frac{\partial V_{jt}}{\partial r_{jt}} = \frac{\partial u(r_{jt})}{\partial r_{jt}} \times Prob\left(\sum_{j=1}^{n} r_{jt} \le s_t\right) + \frac{\partial Prob\left(\sum_{j=1}^{n} r_{jt} \le s_t\right)}{\partial r_{jt}} \left[u(r_{jt}) + V_{jt+1}(r_{jt+1}^{*})\right] = 0. \qquad (3')$$

Example. Suppose that all the n players have power utility functions with a common parameter c>0, such that $u(r_{jt}) = r_{jt}^{c}$. Then equation (3') yields:

$$\frac{\partial V_{jt}}{\partial r_{jt}} = c r_{jt}^{c-1} \frac{\beta - (r_{n\backslash jt} + r_{jt})}{\beta - \alpha} - \frac{1}{\beta - \alpha}\left[r_{jt}^{c} + V_{jt+1}(r_{jt+1}^{*})\right] = 0. \qquad (4')$$

Invoking symmetry to write the sum of requests by all the n players excluding player j as $r_{n\backslash jT} = (n-1) r_{jT}$, equation (4') becomes:

$$c r_{jt}^{c-1} - (nc+1) r_{jt}^{c} - V_{jt+1}(r_{jt+1}^{*}) = 0. \qquad (5')$$

The SPNE request at time t=T, r_{2jT}^{*}, is then given by:

$$r_{2jT}^{*} = \beta c/(nc+1), \qquad (6')$$

which is lower than the risk-neutral SPNE $r_{2jT}^{*} = \beta/(n+1)$ for any degree of risk-aversion 0<c<1.

For example, r_{2jT}^{*} equals 120, 117, and 114 units for c equal to 0.9, 0.8, and 0.7, respectively, for the high-uncertainty condition where β=850 (being, in each case, lower than the 121 request value when c=1). For the low-uncertainty condition, where β=730, r_{2jT}^{*} equals 103, 101, and 98 units for c equal to 0.9, 0.8, and 0.7, respectively (being, in each case, lower than the 104 request value when c=1). The *differences* in individual requests across the conditions are, however, maintained at about 17 units irrespective of these (common) c values.

Appendix 3- Observed Length of Games by Group and Uncertainty Condition