Public Good Contribution Game

INTRODUCTION

This game can be used to simulate the dilemmas that often arise with contributions to a public good.

Participants play in groups of 5 players. If there are more than 5 participants, the game can be played with multiple groups of 5. Give each player a group number and a player number (e.g. Group 1 Player A, B, C, D, E; Group 2 Player A, B, C, D, E, etc.), a set of instructions, and a scorecard.

The following variations can be used to simulate various types of rules and governance arrangements that can increase the likelihood of cooperation. However, it is also useful to see how different groups innovate.

1. Distribute the player numbers throughout the room, but tell people not to reveal their group number or player number. No communication is allowed between players, and all contributions are made in private. This situation, in which people are anonymous and do not know their fellow players, is often the most difficult to get cooperation.
2. Gather members of each group together face to face, but still no communication and contributions are made in private, known only to the participant and the game-keeper.
3. "Cheap talk": the group can talk for 60 seconds (or some other designated time) between rounds, but contributions are then made in private. (Noting what is discussed during this time is often quite interesting.)
4. Monitoring: Theory suggests that monitoring is important to get compliance with rules, e.g. those that the group sets about what each member should contribute to the group. However, monitoring is not free; it costs someone time or other resources to make patrols or check up on others to see if they are abiding by the rules. To simulate this, after decisions are made, any player may ask to inspect what another player contributed, but it costs the inspecting player 1 token.
5. Sanctioning: Sanctioning those who do not contribute is also shown to increase rule compliance. Ask the group if they would like to impose a penalty on those who do not follow the rules set by the group. If they want a penalty, would they impose and enforce it themselves, or would they prefer that an external agent (e.g. the gamekeeper) were to impose the penalty? For example, the penalty might be a fine of a certain number of tokens, to be added to the general pool to be distributed among the remaining 4 group members, or might be seen as a fine collected by the "government", i.e. the game keeper.

With each variation, play a couple of rounds and, except in the case of the no communication rounds, invite the participants to reflect on their experience, and how it might relate to real instances of the commons.

GAME: INSTRUCTIONS

Please read through these instructions carefully before class. Be sure to bring these instructions along with you to class. PLEASE DO NOT DISCUSS THE GAME WITH OTHERS IN THE COURSE. However, I encourage you to begin thinking about the types of decisions you might make in the experiment. If you have questions, feel free to talk to me before the session. Before the game begins, everyone will be given an opportunity to ask questions. Once the game begins, you may raise your hand if you have questions. Talking with the others during the game is NOT permitted.

In each round of the game, you will have the opportunity to earn [imaginary] cash, or "tokens" .

Introduction

This game attempts to recreate a situation in which a group of families must make decisions about how to contribute to a shared resource, for example, a forest, a water source, or a fishery.

In this game, the resource will be referred to as the irrigation system. You will play for several rounds that are equivalent, for instance, to years or harvest seasons. Make no assumptions about the number of rounds.

In each round of the game, you will be given 5 tokens. You can either keep those tokens, or contribute them to your group's common pool (e.g. for irrigation maintenance). All money that is pooled will be doubled in value. This doubled pool will be distributed among all the members of your group; you can think of this as contributing to the irrigation system, which needs to be done collectively, but gives a higher return than just keeping the money yourself.

The Payoff Table
We will work with a so-called payoff table that contains all the information that helps you to make your decision in each round of the experiment (see annex).

Most games use payoff structures that are similar to real life situations as they simulate overexploitation of a resource, which means that too much investment will decrease the payoff. Because of time constraints we have opted for a simplified version.

The PAYOFF STRUCTURE in this game will be as follows:

Each player in a group must decide on her own how many of her/ his 5 Tokens she/ he will contribute. The single contributions will be added up after each round, doubled and divided equally among the group's players.

Let's say your group has contributed 13 Tokens. The payoff is the double, i.e. 26, divided by 5 (number of players in a group) plus the remaining Tokens you have kept for yourself.

To play in each round you must write your player number (which the instructor will give you), the current round number, and your decision (a number between 0 and 5) on a GAME CARD that the instructor will give you.

It is very important that you keep in mind that your decisions are completely private and you may not show them to the rest of members of the group. The instructor will be the only one to know what you decided and will not divulge your decisions to anyone.

After everyone has made her/ his decision, the instructor will collect the GAME CARDS from all 5 group members, and will calculate the total of Tokens that the group decided to spend extracting from the forest. When the instructor announces the group total, each of you will be able to calculate the amount that you earned in the round. An example follows.

In this experiment, we assume that each player has available a maximum of 5 tokens to contribute each year investing in an irrigation system. In the PAYOFF TABLE this corresponds to the columns from 0 to 5. Each of you must decide from 0 to 5 in each round. But to be able to know how much money you earned, you need to know the decisions that the rest in the group made.

An example of how the payoff table works:

		MY CONTRIBUTION						
		0	**1**	**2**	**3**	**4**	**5**	
TOTAL CONTRIBUTION	…							…
	4	1.6	1.6	1.6	1.6	1.6	-	**4**
	5	2	2	2	2	2	2	**5**
	6	2.4	2.4	2.4	2.4	2.4	2.4	**6**
	7	2.8	2.8	2.8	2.8	2.8	2.8	**7**
	8	3.2	3.2	3.2	3.2	3.2	3.2	**8**
	…							…

- You decide that "MY CONTRIBUTION" will be 2.
- The instructor collects all the Decision Cards and announces that a TOTAL of 6 Tokens were contributed.
- Therefore, you know that your payoff for the round is 2.4.

The Record Sheet
Let us look how the experiment works in each round. Each participant will receive a RECORD SHEET like the one attached to the end of these instructions.

Using the Example above, let us see how to use this RECORD SHEET. Suppose that you decided to contribute 2 Tokens this round. On the GAME CARD, you should write 2 next to "What I contribute" You must also write this number in the first column (A) of the RECORD SHEET. (You are writing your decision down in 2 places: the GAME CARD you give to the instructor and the RECORD SHEET you keep). Then write the amount you keep in Column B.

The instructor will collect the GAME CARDS from everyone in your group and will calculate the total contribution by the group. The instructor will announce this total to the group. Suppose that the total was 13 Tokens. Write 13 in column C of the RECORD SHEET.

Next you take the PAYOFF table (at the end of these instructions) and determine your payoff for the round. This number you enter in column D. By adding up "What I contribute" (A) and your payoff (D) you can now calculate your total earnings (to be entered in column E).

RECORD SHEET:

Round	A What I contribute	B What I keep	C Total Group contribution	D Payoff to each group member (see Payoff table)	E My total earnings this round (=B+D)
1	2	3	13	5.2	8.2
2					
…					

Note: Column A +B must equal 5
Column D= (2 * Column C)/5
Column E= Column B + D

You will realize that your total earnings are bigger if you have contributed less than the average in your group. Say, one team member has given 4 Tokens in our example; he or she will have total earnings of 6.2 compared to your 8.2 Tokens.

It is very important to clarify that nobody will know your decisions in each round or your earnings for the game. Only the group total is announced in public. No one, excluding the instructor, will know what each participant in your group decided.

If you have any questions about how to earn money in the experiment, please ask before the game begins.

Summary of Steps for Playing One Round of the Experiment

How is it played: In each round, you must decide how many Tokens between 0 and 5, you want to devote to the collective investment. Your earnings in each round depend on both your decision and the decisions by the rest of the group, according to the PAYOFF STRUCTURE.

What you need: To play you need a RECORD SHEET, and several GAME CARDS. You also need a player number. The instructor will provide all of this.

Steps for each round:
1. Thinking about the PAYOFF STRUCTURE, decide how many TOKENS you will contribute.
2. On the RECORD SHEET, write your decision in Column A (What I keep) AND Column B (What I contribute) for the current round.
3. On a GAME CARD, write your player number, the round number, and your decision (What I contribute). Make sure it corresponds exactly to what you wrote on the RECORD SHEET. Hand the game card to the instructor.
4. The instructor will collect all the game cards and announce the TOTAL GROUP CONTRIBUTION.
5. On the RECORD SHEET, write this total in Column B (Total group contribution).
6. On the RECORD SHEET, calculate Column C (Their investment). This equals Column B minus Column A.
7. On the RECORD SHEET, write in Column D the payoff you received for this round. To know how much you earned, use the PAYOFF TABLE.
8. Then calculate your Total earnings buy adding Columns A & D and write this number ion Column E
9. Play another round (Go back to step 1).

ANNEX:

RECORD SHEET:

NAME: _____   PLAYER NUMBER: _____

Round No.	Column A What I contribute	Column B What I keep	Column C Total Group contribution	Column D Payoff to each group member (see Payoff table)	Column E My total earnings this round (=B+D)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

PAYOFF TABLE: Payout to group members

	MY CONTRIBUTION						
	0	**1**	**2**	**3**	**4**	**5**	
0	0						**0**
1	0.4	0.4					**1**
2	0.8	0.8	0.8				**2**
3	1.2	1.2	1.2	1.2			**3**
4	1.6	1.6	1.6	1.6	1.6		**4**
5	2	2	2	2	2	2	**5**
6	2.4	2.4	2.4	2.4	2.4	2.4	**6**
7	2.8	2.8	2.8	2.8	2.8	2.8	**7**
8	3.2	3.2	3.2	3.2	3.2	3.2	**8**
9	3.6	3.6	3.6	3.6	3.6	3.6	**9**
10	4	4	4	4	4	4	**10**
11	4.4	4.4	4.4	4.4	4.4	4.4	**11**
12	4.8	4.8	4.8	4.8	4.8	4.8	**12**
13	5.2	5.2	5.2	5.2	5.2	5.2	**13**
14	5.6	5.6	5.6	5.6	5.6	5.6	**14**
15	6	6	6	6	6	6	**15**
16	6.4	6.4	6.4	6.4	6.4	6.4	**16**
17	6.8	6.8	6.8	6.8	6.8	6.8	**17**
18	7.2	7.2	7.2	7.2	7.2	7.2	**18**
19	7.6	7.6	7.6	7.6	7.6	7.6	**19**
20	8	8	8	8	8	8	**20**
21		8.4	8.4	8.4	8.4	8.4	**21**
22			8.8	8.8	8.8	8.8	**22**
23				9.2	9.2	9.2	**23**
24					9.6	9.6	**24**
25						10	**25**
	0	**1**	**2**	**3**	**4**	**5**	
	MY CONTRIBUTION						

(Left and right vertical labels: **TOTAL CONTRIBUTION**)