

Let's assume that there will be 40 people attending class when you play this game. (The numbers can be adjusted if the size of your class is different).

This is a game¹ where you risk losing some of your own money. I can't promise that you won't lose, but every instance I have heard of or been involved with, the moderator wins quite a bit of money. (I always give it to charity and tell my class that this is what I will do – after I have collected their money.) Anyway, if you're game, here's how it goes.

Prior to class, go to the bank and get a \$5 bill for every student in the class -- \$200 for a class of 40. You can use \$10 or \$20 per person if you wish, particularly if you are teaching an executive class. Bring the money to class with you so that you can show your students that you're serious and that this game is about real, not fictitious, money.

- Give everyone in the class an empty, blank envelope.
- Tell people they can put any amount of money they wish in their envelope.
- Announce that you will give each student \$5 if the class as a whole puts a total of \$150 in the envelopes. (Again, this is for a group of 40.)
- They should not talk about this among themselves.
- They should simply put whatever amount they wish into the envelope and seal it.
- Prior to collecting the envelopes, have everyone write down, on the back of the envelope, on the lower right corner, how much they think the class will contribute. They can also add any comments they wish. Names are not needed.
- Collect the envelopes and have an assistant tabulate the contributions and record them on an overhead transparency. The recording should list

contributions and estimates in two columns, with the smallest contributions first and increasingly larger contributions later in the column. This tabulation should be happening while you are discussing either this exercise or other material.

- If your class contributed at least \$150, you pay each of them \$5 in cash. Regardless of their contributions, *you keep the cash that they put in the envelopes.*

Try to prevent collusion among the students. Also prevent, if you can, anyone announcing how they will solve the problem as they put their money in their envelope.

You can allow people to use IOU's -- but it increases your risk. Also, setting the critical amount at \$150 is in your favor: There's only a small window (from \$150 to \$200) where you can lose. If you set the amount lower, you risk losing more and more often -- but you may stimulate more contributions.

Typical Reactions

I can relate two reactions to The Game of Envelopes and Money. In the first I was an unfortunate participant; in the second I was a much more fortunate instructor.

My first exposure to this game came at the end of an international conference on social dilemmas. Scholars from around the world gathered for their third semi-annual meeting in Groningen, The Netherlands in late July, 1988. Prior to playing the game, the group of approximately forty people heard each other present a variety of papers on social dilemma research. Clearly, we were well informed about this phenomenon.

At the last session of the conference, David Messick, who was then at the University of Santa Barbara and is now at the Kellogg School at Northwestern and Christel Rutte of Erasmus University in Rotterdam, distributed envelopes just as your instructor did.

¹ I first experienced this game when it was introduced by David Messick and Christel Rutte. It is described in their paper (Messick and Rutte, 1990).

Dave's instructions were also almost exactly the same as yours, with the exception that the contributions and the payoffs were in Dutch guilders rather than American dollars. He challenged us to collectively contribute 250 guilders. At the time, a guilder was worth about 50 cents. He offered to pay everyone 10 guilders if our total contribution equaled or exceeded 250.

No one had been forewarned of this game. Many of us were leaving The Netherlands soon and had used up as much of our Dutch money as we could. But, then again, Dave wasn't asking for much in terms of contributions.

People quickly looked around the room to count the number of people who were in the group for this last session. Different counters came up with different numbers, but the total was at or above 40 people. (The actual total was 43 plus the two experimenters.) Many of us dutifully calculated what the equal share contribution for everyone would be and we conservatively added a little, a "cushion." Thus, most contributions were 6 guilders or a little more, since 6 might not quite cover it. Clearly, almost everyone expected everyone to be a contributor.

The counting of the money seemed to take a long time -- possibly you felt the same way in your class. Finally, the total was announced. It was 245.59 guilders. Most of us were stunned. Needless to say, the group was buzzing and conversation on the bus back to the hotel was dedicated to figuring out how this could have happened. We came so close, falling short by less than 5 guilders.

Strategies

Several factors that most of us didn't consider helped determine the outcome. The great majority of people claimed that they had contributed six or seven guilders, mostly seven. (The actual count was 18 -- 42%, with most of them at 6 rather than 7.) Some people (a total of 8 -- 19%) contributed 10, as they had no small change. Others (4 more -- 9%) only had small change and contributed all of it -- but many of these contributions were 5 guilders or less. Seven people (16%) did not contribute -- all of them predicted that the 250 guilders would not be reached. Five others (12%) predicted that the total would not be achieved, but they nevertheless contributed something -- but not very much. Their average was less than 5 guilders each.

Several people on the bus ride to the hotel claimed that they fully expected the public good to be

achieved, but that (1) they had no cash with them at all or (2) they had no change remotely close to 5 or 10 guilders. The actual contributions, however, don't support their stories. Possibly it was an easy way to say that they had contributed when in fact they hadn't. Thus, for want of just one person who didn't contribute because they didn't think we would achieve the total necessary, the entire group did not achieve its goal. Dave and Christel, though, weren't too unhappy.

There was one other noteworthy contribution -- of 12 guilders. Why did someone set themselves up for a certain loss? They explained it in a note on their envelope: "Just in case some mushroom doesn't contribute."

Prior to the game, Dave Messick had suggested that anyone who wanted to could have a real impact on the outcome of the game. He didn't specify how, as he didn't want to reveal the nature of the game. Many of us now wish that we had contributed much more, even if it did mean a personal monetary loss. The money was not that significant. To think that you could have turned the tide for such a large group -- that would certainly have been worth a small financial loss.

But almost no one considered this. We were quite convinced that everyone would contribute their fair, equal share. Everyone was going to act the same way we did and things would clearly work out very well. In essence, we overconcluded on the basis of our own point of view--we paid for being affected by our *egocentric bias*. We simply didn't see that some people wouldn't react exactly the way we did.

The obvious solution to this problem is the short-term solution to a prisoner's dilemma game: Don't cooperate. Although there is a chance of doing well by cooperating, the risks are quite high. The dominant strategy, again, is to not cooperate: If everyone contributes enough anyway, you win the prize and don't lose anything by contributing yourself. If everyone doesn't contribute enough, you don't gain (no one but your instructor does) but you don't lose either. Since the game is played only once, there is no chance that your choices will affect anyone else's future choices. And since you're choosing to contribute or not contribute anonymously, no one can accuse you of being the person whose non-contribution led to the group failing to reach their desired goals.

If all this is true, why did I and many of my

colleagues contribute 6 or 7 guilders? As I suggested, we were affected by an egocentric bias. There was some basis for this feeling, as we had all experienced the same conference together and all realized that everyone understood how social dilemmas could be solved cooperatively if everyone pitched in. We were all familiar with an "equal share" solution, where everyone shouldered the same risk and would gain about the same profit if we succeeded. Thus, the equality norm, which is quite pervasive in western society, was another element that contributed to our choice of how much to contribute. Messick and Rutte (1990) assessed whether this "equal share" model worked; they also added the notion that no one was certain enough in this situation to think that everyone would contribute exactly enough. Thus, they suggested that most contributors used an "equal share plus error" model, calculating the equal share for each person and adding a little more. Thus, many people contributed 7 guilders rather than 6, which would have been enough if *everyone* had contributed 6. Unfortunately, in this case, we didn't calculate quite enough error into our calculations. Thus we fell short of our goal -- just short.

The second experience I can report on the Game of Envelopes and Money comes from administering the game to an Executive MBA class -- a group of students who worked full time but had returned to school to get an MBA. They were, on average, almost 40 years old; their median salary in the late 1980s was \$56,000. They were not typical University students.

The game was set up the same way except for an increase in the stakes. There were 36 people in the class. Each could win \$10 if the class as a whole contributed \$250.

They had just completed play of either the Gas Station Game or the Diamond Bidding Game (other DRRC cases based on the prisoner's dilemma). The two pairs of groups who played the Gas Station Game established a strong, constant pattern of mutual cooperation; the two groups who played the Diamond Game had double-crossed each other and were not feeling very trusting. We had discussed their play in these games for some time prior to playing the Envelopes and Money Game.

The results for this group were very different: This time the total contribution was only \$143.15. Eleven people (31%) were pessimistic and didn't think that the group would contribute enough. Their total contribution was \$13 -- or an average of only \$1.18

each. Two people who thought that the group would exceed the \$250 total did not contribute anything; two others also didn't contribute, one writing "don't have any cash," the other writing that his/her study group "will put in \$30." The remaining 21 people (58%) contributed a total of \$130.15, which means an average of \$6.20 each. Four of them (11%) contributed \$10. For the group to have achieved the total of \$250 most efficiently, everyone needed to contribute seven dollars. Thus, even the people who were optimistic about the group's contributions did not contribute enough, on average, to be successful. Indeed, seven of this group of 21 (19% overall) contributed \$5 or less. Their only rationale for these seemingly inappropriate contributions was that they didn't have change to make the more appropriate contribution of \$7 (or \$7 and a little more).

Clearly, this group was much different than the people who played the game at the end of the social dilemmas conference in Holland. They fell far short of the amount necessary to supply the public good. They were required to contribute more than the academics in Groningen (\$7 rather than 6 guilders), but they didn't have some of the academics' problems. They weren't in a foreign country that they were soon leaving, so they had no immediately previous impetus to use all their cash. They were probably wealthier as well. In addition, they were a more cohesive group than the academics: They attended four classes together each week and had been doing so for almost two months. They would continue to be meeting with each other for the next year and a half of their executive MBA program.

Compared to the academics, almost as many of the executives expected the total to be achieved. In general, they contributed much less per person than the academics. They were asked to contribute more -- twice as much -- but their potential gain was almost twice as much, too.

Their previous experiences in the Gas Station and the Diamond Bidding Games may have reduced their contributions, but most of them claimed that the *opposite* was true -- that their experience may have led them to contribute more. The result, then, is somewhat discouraging: Can people left to their own devices contribute enough to attain a public good? When I asked my executive class if they would like another chance, they unanimously said "No." One strong conclusion we might draw from these results: The structure of this game is not conducive to cooperation. Indeed, the difficulty of generating cooperation in large group dilemmas is also

documented by a wide range of research results.

References

- Messick, D.M., and Rutte, C. 1990. The provision of public goods by experts: The Groningen study. In W. Liebrand, H. Wilke, and D. Messick (Eds.), *Social Psychological Approaches to Social Dilemmas*: In press.
- Olson, M. 1965. *The Logic of Collective Action*. Cambridge, MA: Harvard University Press.

NOTE: This case comes from a collection of cases designed and created by J. Keith Murnighan. Each case can be used in conjunction with text materials that he also wrote. (The entire collection comprises his book, *The Dynamics of Bargaining Games*, which was originally published by Prentice Hall in 1991). The entire book is available for classroom use on DRRC's website DRRCExercises.com. Individual chapters of the text can be paired with any of the exercises to form a complete modular package. (Murnighan recommends that the text material be assigned and read after rather than before experiencing the exercises; they were written to augment hands-on understanding rather than prepare students for their negotiations.) User fees for each chapter are \$1 per student. The user fee for the entire text of 17 chapters is \$10 per student. For more information visit the DRRC website.