Pre-Play Contracting in the Prisoners' Dilemma

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Abstract

We consider a modified Prisoners' Dilemma game in which each agent can offer to pay the other agent to cooperate. The subgame-perfect equilibrium of this two-stage game is Pareto efficient. We examine experimentally whether subjects actually manage to achieve this efficient outcome.

Introduction

It is easy to write down simple games which have inefficient equilibria. If an equilibrium is inefficient, this means that there is some way to make all agents at least as well off, so we might suspect that the players would be interested in finding ways to modify the game so as to encourage an efficient outcome.

The classic Prisoners' Dilemma is perhaps the simplest game with a dominant strategy equilibrium that is Pareto inefficient, and there has been much theoretical and empirical work concerned with ways to improve upon the inefficient outcome.

Literally thousands of experiments on social dilemmas have been conducted across the social sciences.[1] While researchers often find some fraction of cooperation, the general result in these experiments is that the incentives to defect can be very powerful. When subjects are faced with a single shots of a Prisoner's Dilemma they seldom reach mutually cooperative outcomes. For example, in several recent experiments only 10 to 20 percent all moves were cooperative.[2] Nonetheless, subjects do respond to incentives to increase cooperation. Roth and Murningham (1978), for instance, found that in a game with an uncertain end point the subjects were more cooperative the longer the anticipated horizon. Selton and Stoecker (1986) and Andreoni and Miller (1993) look at finitely repeated games and find that subjects will be more cooperative when they can build reputations.

Surprisingly, very little experimental work has been done to examine mechanisms designed to directly overcome these dilemmas. To our knowledge, no systematic experiments have been conducted on popular and well-understood mechanisms such as the Groves-Clarke tax. One mechanism which has been examined is the "Smith Auction" (Smith 1979, 1980), which is designed for public goods provision. In this mechanism subjects first offer a private contribution to the public good. These offers are revealed to all other players, and only if all players unanimously agree on accepting all the offers is the public good provided. While the theoretical properties of this mechanism are not well established, Smith nonetheless finds that it generates significant amounts of cooperation. When the public good is provided it is generally at about the efficient level, although patterns of giving are typically not consistent with Lindahl equilibrium allocations. Banks, Plott and Porter (1988) generalized Smith's mechanism and find similar results.

In this paper we take another approach and look at the role of pre-play contracting. More precisely, we add another stage to the Prisoners' Dilemma game in which the players can make binding commitments to pay the other player some amount if he choose to cooperate. Of course it has long been known that the ability to make binding commitments eliminates the "dilemma"Π in the Prisoners' Dilemma. However, there has been surprisingly little written about the exact form that such binding commitments might take.

[1] See Rapaport and Chamma (1965) and Dawes (1980) for reviews of these experiments in Sociology and Psychology. Roth (1988) surveys some of the studies by economists.

[2] Roth and Murningham (1978) find 10.1 percent, Cooper, DeJong, Forsythe and Ross find 20 percent, and Andreoni and Miller (1993) find 18 percent.

Here we model the "committment stage" explicitly and exhibit a two-stage game whose subgame-perfect equilibria are Pareto efficient. These equilibria imply a certain pattern of transfers between the agents that is reminiscent of a competitive equilibrium. In particular, in order to induce cooperation, each agent must be paid an amount at least as large as the amount that he would receive if he were to defect. Roughly speaking, each agent is receiving his "opportunity cost" for cooperation.

Pay for play

Before proceeding any further, we describe the exact form of our two-stage game, which we call Pay for Play. Suppose that we have a Prisoners' Dilemma in which each agent has strategies (Cooperate, Defect). We introduce a prior stage to this game where each agent can announce a nonnegative number, indicating the amount that he will pay the other agent if he chooses the Cooperate strategy in the second stage. This announcement is binding; once the agent offers a contract, he is obligated to carry it out.

Let us calculate the subgame perfect equilibrium of such a game. Consider the following example of an asymmetric Prisoners' Dilemma

		Column: Cooperate	Column: Defect
Row	Cooperate	$6,7$	$0,11$
	Defect	$9,0$	$3,4$

Now we add an "announcement stage" to this game where each agent simultaneously and independently announces how much he will pay the other agent if he cooperates. If Row announces a sidepayment of s_1 and Column announces a sidepayment of s_2, the game becomes:

		Column: Cooperate	Column: Defect
Row	Cooperate	$6+s_2-s_1, 7+s_1-s_2$	$0+s_2, 11-s_2$
	Defect	$9-s_1, 0+s_1$	$3,4$

Column receives 11 by defecting and 7 from cooperating. Therefore the minimal payment that would induce him to cooperate is 4. Similarly, the minimum payment to induce Row to cooperate is 3. If these payments are announced the second-stage game is transformed to

		Column: Cooperate	Column: Defect
Row	Cooperate	$5,8$	$3,8$
	Defect	$5,4$	$3,4$

Note that in this game it is a weakly dominant strategy for each player to choose Cooperate.

It is not hard to see that if $s_1 \geq 4$ it is a dominant strategy for Column to play Cooperate; otherwise it is a dominant strategy for Column to play Defect. Similarly, Row will Cooperate if and only if $s_2 \geq 3$.

It can be shown that this is the unique subgame perfect equilibrium when the sidepayments can be any real number. In the experimental game that we consider, the sidepayments are restricted to be integers. This restriction adds a new subgame perfect equilibrium to the game, namely one where each agent pays 1 unit more than the breakeven announcement. In the example we are considering here we would have $s_1 = 5$ and $s_2 = 4$ so the game becomes

		Column: Cooperate	Column: Defect
Row	Cooperate	$5,8$	$4,7$
	Defect	$4,5$	$3,4$

In this game it is strictly dominant strategy to Cooperate. This equilibrium is supported by the pessimistic expectations that if the other player is indifferent between cooperating and defecting, he will choose to defect. The other equilibrium is supported by the optimistic expectations that if the other person is indifferent between his two strategies he will choose to cooperate.

The idea of adding a ''contracting stage'' to the Prisoners' Dilemma is a variation on Varian's (1991) *compensation mechanism*. The idea is that each player offers to compensate the other for the ''costs'' that he incurs by making the efficient choice. Varian (1991a, 1991b) shows that this sort of "compensation mechanism" is very powerful. It can be used to internalize nearly any sort of externality, resolve public goods problems, regulate bilateral monopolies, etc. In addition to being robust the mechanism yields outcomes, that are competitive equilibria, with externalities priced at the appropriate efficiency price.

Overview of the experiment

Since the compensation mechanism is so powerful, it is of interest to see how well it performs on actual human subjects. Our basic experimental design is as follows. Player A has two playing cards, a "Push card" with a 6 on it, and a "Pull card" with a 4 on it. There is a pot of chips between the two players. If player A plays his Push card, then 6 chips are pushed from the pot to the other player. If player A plays his Pull card, then he pulls 3 chips from the pot. Player B has a push card of 7 and a pull card of 4 and has the same options. Note that this game has the same payoff structure as the Prisoners' Dilemma game illustrated above. The dominant strategy is for each player to play his Pull card card; the Pareto efficient strategy is for each player to play his Push card.

We first ran 15 rounds of this "Push-Pull" game with each subject playing against a different subject each time. As is commonly observed, the players started out cooperating but soon switched to defecting. By the last round, almost everyone was playing the Defect strategy.

We then offered a new option. Each player could offer to "Pay for Push". That is each player independently named an amount that he would pay the other player if the other player played his Push card. In the experiment, each player manipulated a slider that indicated how many chips he would transfer to the other player if the other player chose to Push. Once both players had committed to their payments, the amounts were revealed to the other player and we moved on to Push-Pull game described above.

We found that the addition of the Pay for Push stage induced quite a bit of cooperation. In the last few moves, about 2/3 of the choices were Cooperate. (This will be described in detail in below.) Furthermore, the payment was very close to the payment predicted by the theory. The theory predicted an average payment of 3.5, and the subjects made an average payment of about 3.6. We conclude that the subjects ended up playing reasonably close to the subgame perfect equilibrium.

Experimental procedure

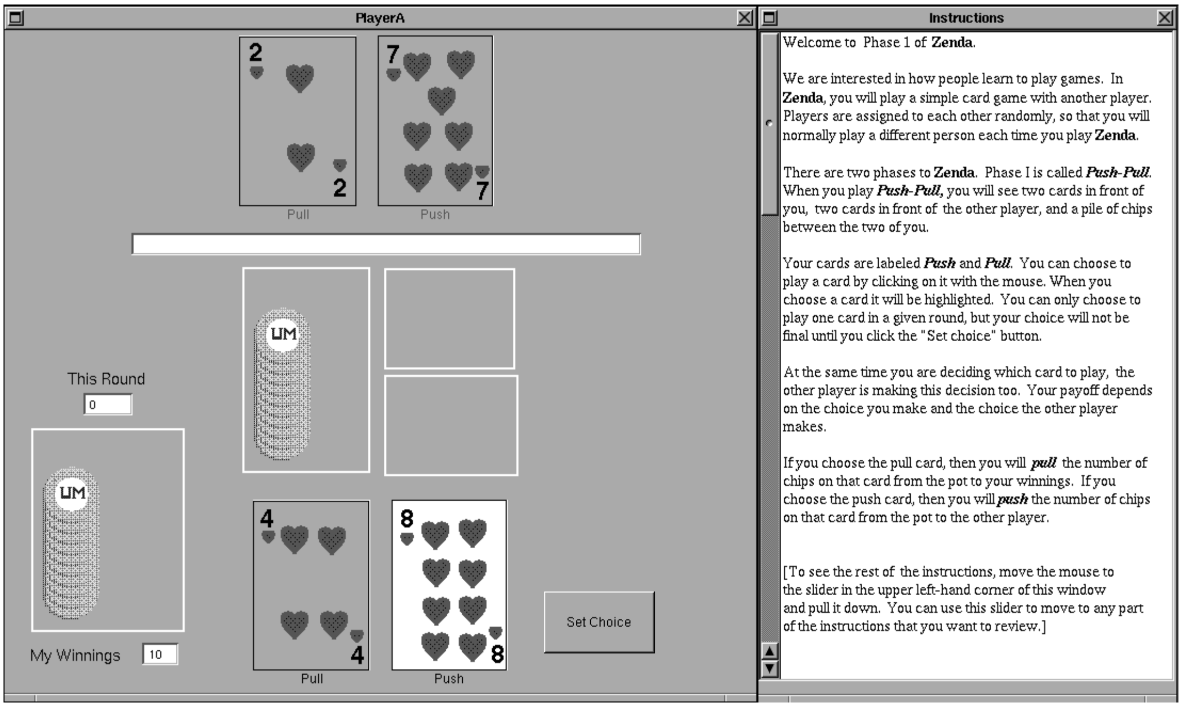
We recruited some subjects from a subject pool that had been used in a very different bargaining experiment run several months earlier. Other subjects were recruited from economics principles courses; we were careful to recruit subjects before any mention had been made of Prisoners' Dilemma in the classroom.

We used a lab of NeXT computers. There were no partitions between the computers, but the subjects were seated quite far apart and subjects pairs were on opposite sides of the room. The subjects had 5 minutes to read the instructions and were asked if they needed anything to be clarified. (They didn't.)

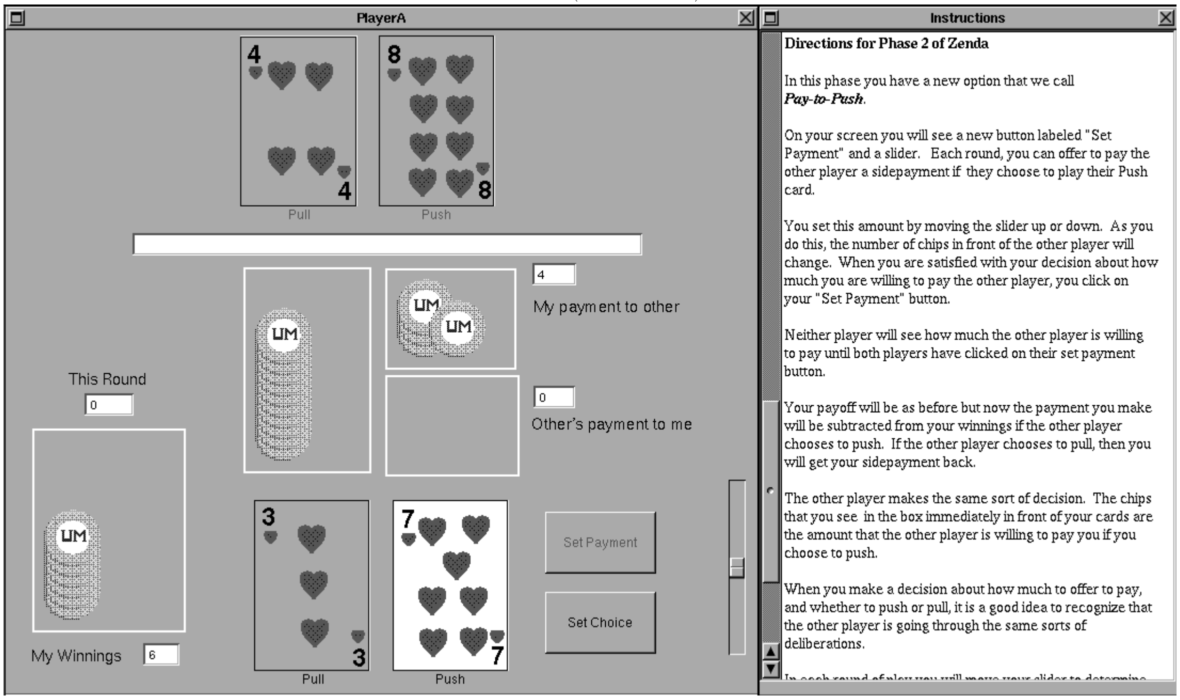
We used 8 subjects per run, and conducted 3 runs. Subjects 1–4 played against subjects 5–8. After each round, players 1–4 were reassigned to a different player in the 5-8 group. Each player had cards (4,6) or (3,7) and these cards were switched every round. Each point was worth 5 cents. The subjects received $3 for showing up, and averaged about $9–$15 in winnings. The game took about 45 minutes to play, and there was about 15 minutes of setup time for reading the instructions, etc.

We had no practice trials since we were interested in how long it took subjects to learn to play the game starting from scratch. The experiments reported in this paper took place on Tuesday afternoon, November 17, 1992.

The screen that each player saw during Phase 1 (standard Prisoners' Dilemma) looked like this:



The screen that each player saw during Phase 2 (Push-Pull) looked like this



Detailed analysis of the data

The following sections present our analysis of the data. The analysis is conducted using *Mathematica*. We show all the statements necessary to create the plots and do the calculations. This means that users can examine the raw data and/or analyze other runs using exactly the same commands. We think that this kind of ''living paper'' is a nice way to present experimental data.

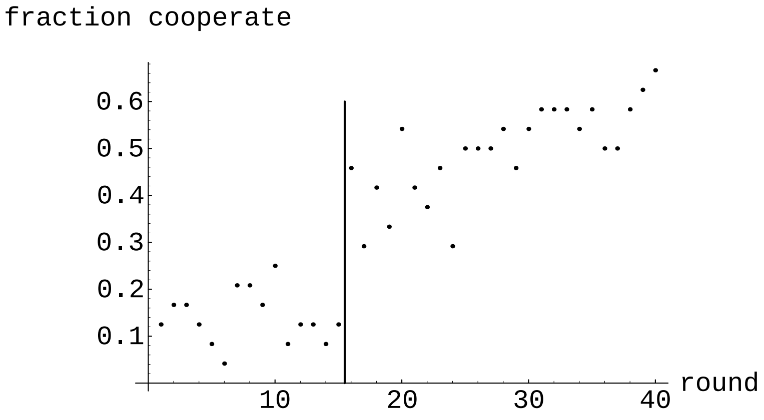
History of play

First we examine some summary statistics about how the subjects played the game.

Fraction of cooperate choices

The following diagram shows the fraction of choices that were Cooperate. Note how the amount of cooperation increased dramatically when the compensation mechanism was introduced in round 16.

```
In[1]:= ListPlot[Map[Mean,myChoice],AxesLabel->{"round","fraction cooperate"},
        Epilog->Line[{{15.5,0},{15.5,.6}}]]
```




```
Out[1]= -Graphics-
```

Here is the fraction of cooperate choices during Phase 1 and the last 5 rounds of Phase 1.

```
In[2]:= meanChoicePhase1 = N[Mean[Take[Map[Mean,myChoice  ,1],round1]]]
        meanChoicePhase1End = N[Mean[Take[Map[Mean,myChoice  ,1],{11,15}]]]

Out[2]= 0.138889

Out[2]= 0.108333
```

Here is the fraction of cooperate choices during Phase 2 and the last 5 rounds of Phase 2.

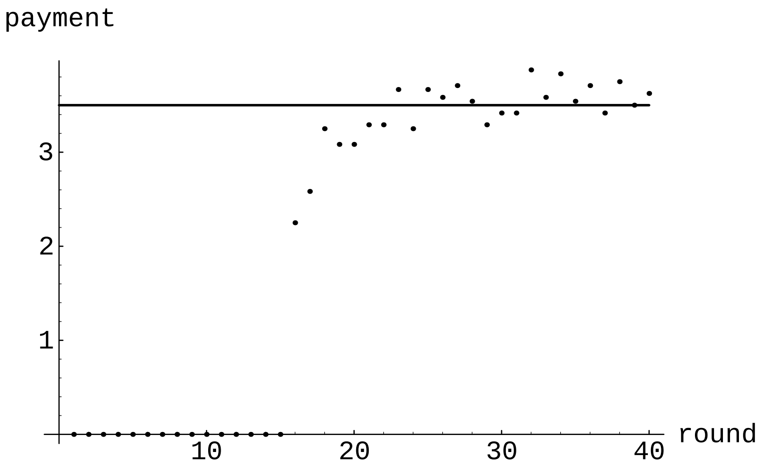
```
In[3]:= meanChoicePhase2 = N[Mean[Take[Map[Mean,myChoice  ,1],-round2]]]
        meanChoicePhase2End = N[Mean[Take[Map[Mean,myChoice  ,1],-5]]]

Out[3]= 0.495

Out[3]= 0.575
```

These levels of cooperation are consistent with other recent studies, and are perhaps are even somewhat lower than what is typically found.

Sidepayments

The mean sidepayment is depicted in the next plot. The equilibrium payments should be 3 for half of the players and 4 for the other half so the average sidepayment should be 3.5.

```
In[1]:= ListPlot[Map[Mean,mySide],AxesLabel->{"round","payment"},
        Epilog->Line[{{0,3.5},{40,3.5}}]]
```



Out[1]= -Graphics-

The mean sidepayments for the 25 rounds and last 5 rounds were:

```
In[2]:=  meanSidePayment = N[Mean[Take[Map[Mean,mySide  ,1],-round2]]]
         meanSidePaymentEnd = N[Mean[Take[Map[Mean,mySide  ,1],-5]]]

Out[2]=  3.40833

Out[2]=  3.6
```

The players with the 3's should offer a payment of 4, and the players with 4s should offer a payment of 3. Here are the payments by the 3-types and the 4-types overall.

```
In[3]:=  flatPullCard=Flatten[Take[myPullCard,-25]];
         flatMySide=Flatten[Take[mySide,-25]];
         side3=side4=0;
         For[i=1,i<=Length[flatPullCard],i++,
           If[flatPullCard[[i]]==3,
           side3=side3+flatMySide[[i]],
           side4=side4+flatMySide[[i]]]];
         N[2*side3/Length[flatPullCard]]
         N[2*side4/Length[flatPullCard]]

Out[3]=  3.37667

Out[3]=  3.44
```

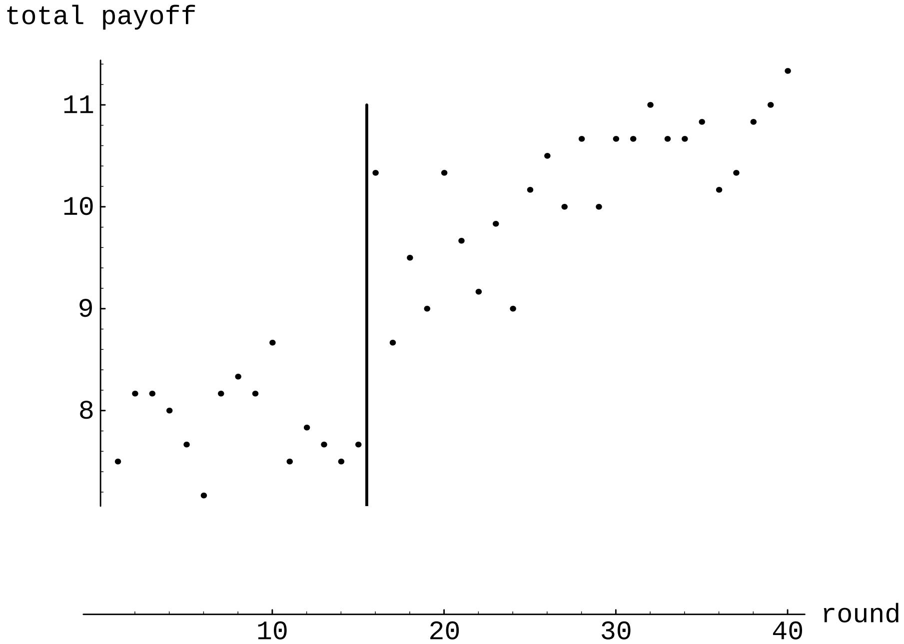
Here are the payments by the 3-types and the 4-types in the last 5 rounds.

```
In[4]:=  flatPullCard=Flatten[Take[myPullCard,-5]];
         flatMySide=Flatten[Take[mySide,-5]];
         side3=side4=0;
         For[i=1,i<=Length[flatPullCard],i++,
           If[flatPullCard[[i]]==3,
           side3=side3+flatMySide[[i]],
           side4=side4+flatMySide[[i]]]];
         N[2*side3/Length[flatPullCard]]
         N[2*side4/Length[flatPullCard]]

Out[4]=  3.68333

Out[4]=  3.51667
```

Total payoff

The predicted total payoff in Phase 1 (the class Prisoners' Dilemma) is 7. The predicted total payoff in Phase 2 (the compensation mechanism) is 13. Here are the actual payoffs.

```
In[1]:= ListPlot[Map[Mean,totalPayoff],
          AxesLabel->{"round","total payoff"},
          AxesOrigin->{0,6},Epilog->Line[{{15.5,0},{15.5,11}}]]
```




```
Out[1]= -Graphics-
```

```
In[2]:=
```

Do they make attractive offers?

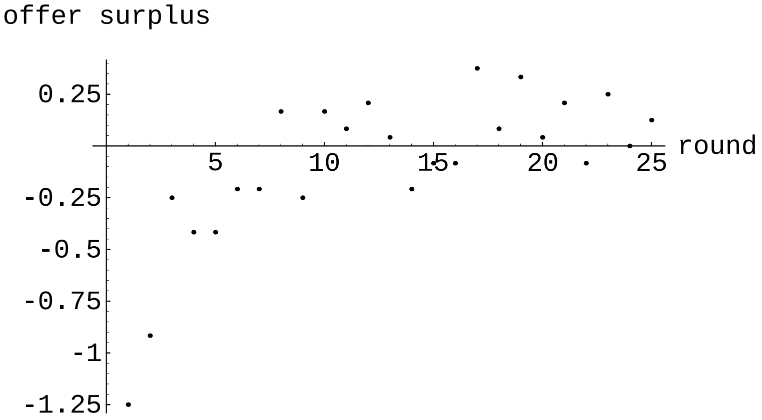
We have seen earlier that Phase 2 of the game each player will have a dominant strategy which depends on the side payment set in the first stage. It is natural to ask whether players set a payment that induces the other player to cooperate.

How often did players make a good offer to the other party?

In the subgame perfect equilibrium,one player should offer the other player (at least) the value of his pull card (or the value of his pull card plus 1). Call the difference between on player's offer and the other player's pull card, the offer surplus. This should be 0 or 1 in the subgame perfect equilibria. Here is a plot of the actual offer surplus.

```
In[1]:= offerSurplus=Take[hisSide-myPullCard,-25];
        ListPlot[N[Map[Mean,offerSurplus]], AxesLabel->{"round","offer surplus"}]
```

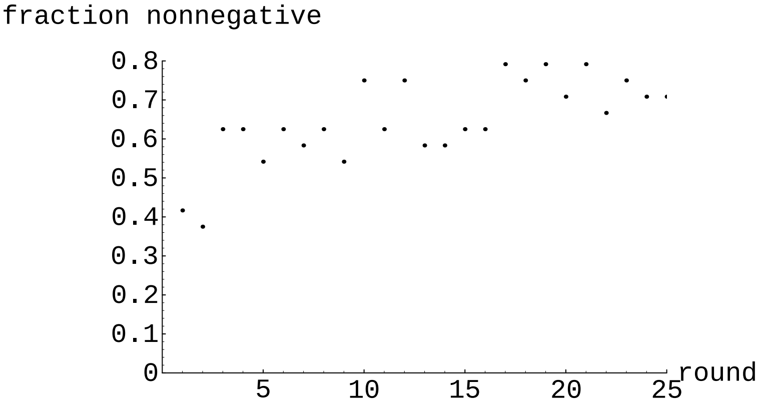
file: Pre-Play: on 1/11



Out[1]= -Graphics-

The players appear to learn fairly quickly that they should offer a nonnegative surplus to the other players. Here is a plot of the fraction of offers that are nonnegative.

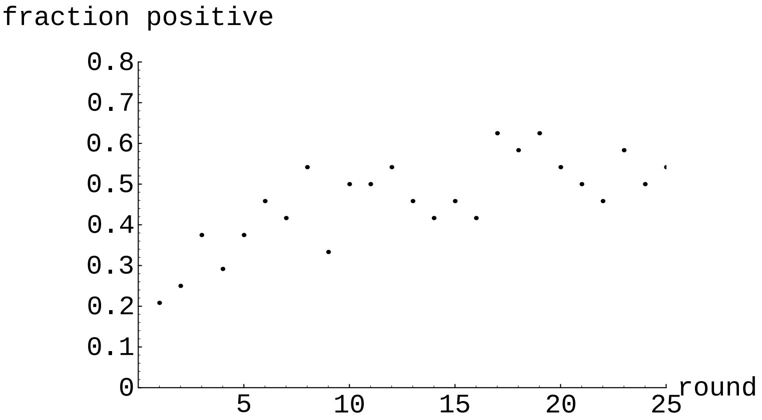
```
In[2]:= ListPlot[Map[FractionNonNeg,offerSurplus], AxesLabel->{"round",
        "fraction nonnegative"},
        PlotRange->{{0,25},{0,.8}}]
```



Out[2]= -Graphics-

How often did players make a great offer to the other party?
Here is the fraction of the time a strictly positive offer was made:

```
In[1]:= ListPlot[Map[FractionPositive,offerSurplus],
        AxesLabel->{"round","fraction positive"},
        PlotRange->{{0,25},{0,.8}}]
```



Out[1]= -Graphics-

Do they play dominant strategies?

For any given offer, a player will have a dominant strategy to cooperate or defect. We say that a "good offer" is one that makes it a weakly dominant strategy to cooperate, and a "great offer " is one that makes it a strongly dominant strategy to cooperate. A "bad offer" is one for which it is a dominant strategy to defect.

If they received a good offer did they cooperate?

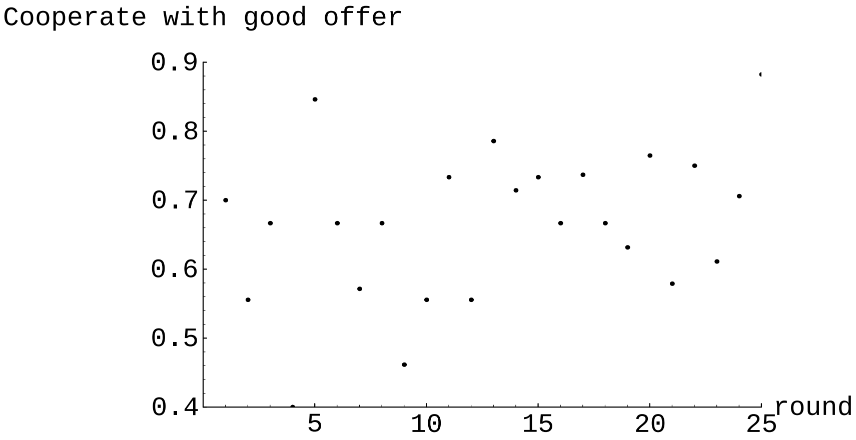
```
In[1]:= nonNegPayment=Map[NonNegative,offerSurplus];
        cooperate=Map[Positive,Take[myChoice,-25]];
```

```
In[2]:= goodOfferAndCooperate=Map[NumberTrue,MapThread[And,{nonNegPayment, cooperate},2]]
Out[2]= {7., 5., 10., 6., 11., 10., 8., 10., 6., 10., 11., 10., 11., 10., 11., 10., 14.,
          12., 12., 13., 11., 12., 11., 12., 15.}
```

```
In[3]:= goodOffer=Map[NumberTrue,nonNegPayment]
Out[3]= {10., 9., 15., 15., 13., 15., 14., 15., 13., 18., 15., 18., 14., 14., 15., 15., 19.,
          18., 19., 17., 19., 16., 18., 17., 17.}
```

```
In[4]:= goodOfferAndCooperate/goodOffer
Out[4]= {0.7, 0.555556, 0.666667, 0.4, 0.846154, 0.666667, 0.571429, 0.666667, 0.461538,
          0.555556, 0.733333, 0.555556, 0.785714, 0.714286, 0.733333, 0.666667, 0.736842,
          0.666667, 0.631579, 0.764706, 0.578947, 0.75, 0.611111, 0.705882, 0.882353}
```

```
In[5]:= ListPlot[goodOfferAndCooperate/goodOffer,
        AxesLabel->{"round","Cooperate with good offer"},
        PlotRange->{{0,25},{.4,.9}}]
```



Out[5]= -Graphics-

This is the fraction of the time that they cooperated when they received a good offer.

In[6]:= **Mean[goodOfferAndCooperate/goodOffer]**

Out[6]= 0.664288

If they received a great offer did they cooperate?

In[1]:=
```
positivePayment=Map[Positive,offerSurplus];
cooperate=Map[Positive,Take[myChoice,-25]];
```

In[2]:=
```
greatOfferAndCooperate=Map[NumberTrue,MapThread[And,{positivePayment, cooperate},2]]
```

Out[2]= {3., 4., 7., 5., 8., 9., 6., 10., 5., 8., 10., 8., 8., 10., 9., 9., 13., 11., 11., 11., 9., 10., 10., 11., 12.}

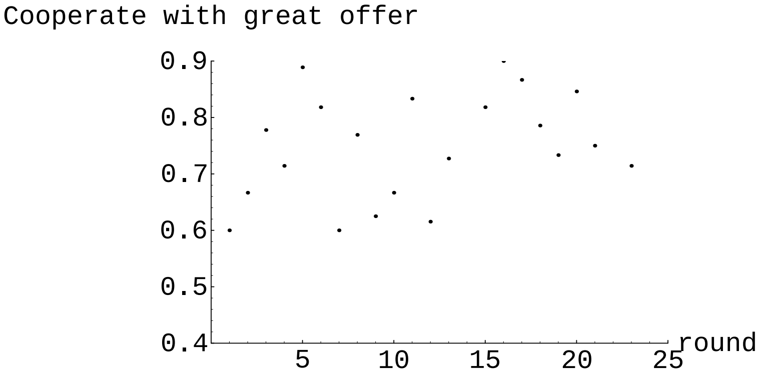
In[3]:=
```
greatOffer=Map[NumberTrue,positivePayment]
```

Out[3]= {5., 6., 9., 7., 9., 11., 10., 13., 8., 12., 12., 13., 11., 10., 11., 10., 15., 14., 15., 13., 12., 11., 14., 12., 13.}

In[4]:=
```
greatOfferAndCooperate/greatOffer
```

Out[4]= {0.6, 0.666667, 0.777778, 0.714286, 0.888889, 0.818182, 0.6, 0.769231, 0.625, 0.666667, 0.833333, 0.615385, 0.727273, 1., 0.818182, 0.9, 0.866667, 0.785714, 0.733333, 0.846154, 0.75, 0.909091, 0.714286, 0.916667, 0.923077}

In[5]:=
```
ListPlot[greatOfferAndCooperate/greatOffer,
AxesLabel->{"round","Cooperate with great offer"},
PlotRange->{{0,25},{.4,.9}}]
```




```
Out[5]= -Graphics-
```

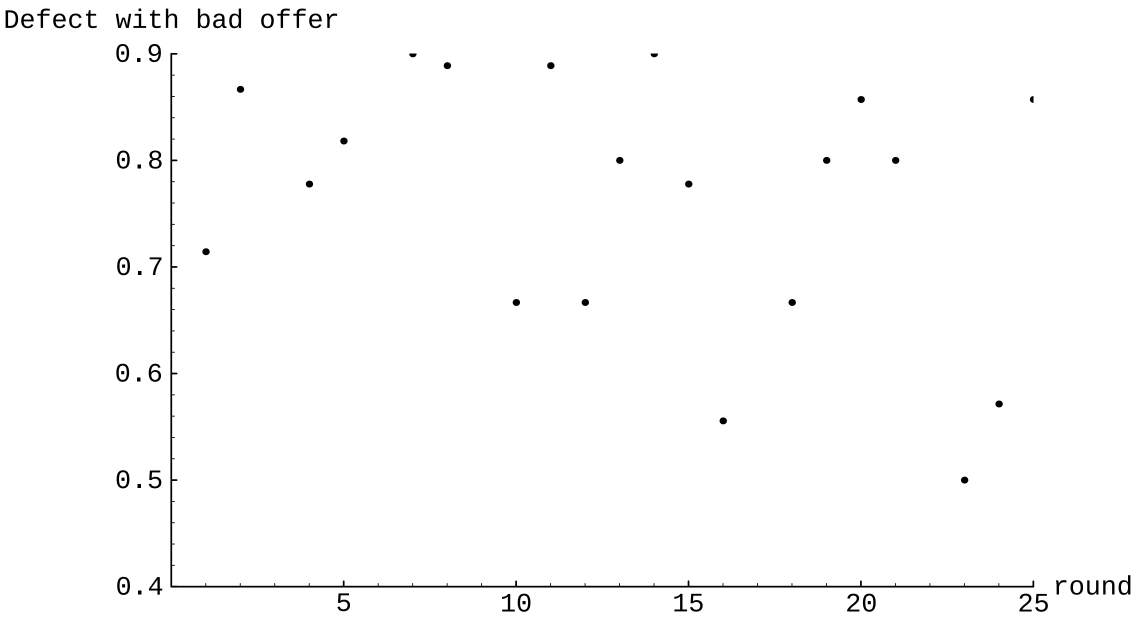
The faction of the time that a player cooperated when they got a great offer was:

```
In[6]:= Mean[greatOfferAndCooperate/greatOffer]

Out[6]= 0.778634
```

In general, cooperation appears to be chosen much more frequently when it is strictly in the subject's interest.

If they received a bad offer did they defect?

```
In[1]:= negPayment=Map[Negative,offerSurplus];
        defect=Map[Not,cooperate];

In[2]:= badOfferAndDefect=Map[NumberTrue,MapThread[And,{negPayment, defect},2]]

Out[2]= {10., 13., 9., 7., 9., 9., 9., 8., 10., 4., 8., 4., 8., 9., 7., 5., 5., 4., 4., 6.,
          4., 8., 3., 4., 6.}

In[3]:= badOffer=Map[NumberTrue,negPayment]

Out[3]= {14., 15., 9., 9., 11., 9., 10., 9., 11., 6., 9., 6., 10., 10., 9., 9., 5., 6., 5.,
          7., 5., 8., 6., 7., 7.}

In[4]:= badOfferAndDefect/badOffer

Out[4]= {0.714286, 0.866667, 1., 0.777778, 0.818182, 1., 0.9, 0.888889, 0.909091, 0.666667,
          0.888889, 0.666667, 0.8, 0.9, 0.777778, 0.555556, 1., 0.666667, 0.8, 0.857143,
          0.8, 1., 0.5, 0.571429, 0.857143}

In[5]:= ListPlot[badOfferAndDefect/badOffer,
        AxesLabel->{"round","Defect with bad offer"},
        PlotRange->{{0,25},{.4,.9}}]
```




```
Out[5]= -Graphics-
```

This is the faction of the time that they defected when they received a bad offer.

```
In[6]:= Mean[badOfferAndDefect/badOffer]

Out[6]= 0.807313
```

Other runs

We had other runs on June 8, 1992, June 8, 1993, and July 20, 1993. (The July run involved only 6 subjects due to inclement weather.) The interested reader can examine each of these data sets simply by setting the appropriate directory in the Initialization section and executing the above statements. We feel that all the runs tell essentially the same story.

Summary

We found that the subjects learned to make attractrive offers to the other player. We also found that subject were likely to play their dominant strategy and were quite likely to play their strongly dominant strategy. The fully efficient equilibrium was achieved in about 60% of the time. This is due to the fact that players must make the right choices at both stages: set an attractive sidepayment in the first stage and then choose the dominant strategies in the second stage.

References

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Instructions to Subjects

Instructions for Zenda

Zenda is a simple card game that you play with one other person. Each game of Zenda will consist of 15-25 rounds of play. Players are matched up randomly each round, so that you will play a different person each round. All of your choices and earnings in the experiment will be confidential.

In Zenda, you will be playing for chips. The value of the chips corresponds to cash earnings for you. In particular, each chip you earn is worth 5 cents. So if you earn 5 chips in a round, you earn 25 cents in the round. If you earn 10 chips, you earn 50 cents in that round. The earnings that you make each round will be totaled by the experimenter and paid to you privately and in cash at the end of the experiment. No other subject will know your earnings.

After each round is finished, a dialog box will be displayed informing you of this fact and asking you to wait until the other players are finished. Please click on the ”OK” button as soon as you have read and understood the material since the system will wait until everyone has clicked ”OK” before it proceeds. Dialog boxes will be displayed at other times during the game; after you have read and understood a dialog box, click ”OK”.

Please do not talk to any other player or look at any other player’s screen. If you have a problem, please raise your hand and someone will come to help you. We expect the experiment to last about 50 minutes.

Information about you

The first thing that you see will be a panel that asks for information about you. The University requires that we collect this information since we are going to give you money. This information is not recorded as part of the experimental data; it is only there to satisfy University rules about dispersing money. In the experiment you are only identified by a ”player number” and we maintain strict anonymity. No one in the experiment will ever know your name, your choices, or your earnings.

Phase 1 of Zenda

There are two phases to Zenda. Phase 1 is called Push-Pull. When you play Push-Pull, you will see two cards in front of you, two cards in front of the other player, and a pile of chips between the two of you. The pile of chips between you is the ”pot”; it is the source of the payments.

Your cards are labeled Push and Pull. You can choose to play a card by clicking on it with the mouse. When you choose a card it will be highlighted but your choice will not be final until you click the ”Confirm choice” button. If you choose the pull card, then you will pull the number of chips on that card from the pot to your pile of chips. If you choose the push card, then you will push the number of chips on that card from the pot to the other player.

Note that the chips that you push or pull come from of the pot in the middle of the table, not from either player’s pile of chips.

When both players have made their decision to push or to pull, you will see a message appear telling you what has happened and your earnings will be displayed. When all players have have made their choices, you will see a panel and a beep will announce the start of a new round. Click on the "OK" button on the panel to start playing the new round.

An example

Suppose that your push card is a 6 and your pull card is a 4. Then if you choose to push, the other player will get 6 chips from the pot in the middle of the table. If you choose to pull, then you will get 4 chips from the pot.

Suppose that the other person has a push card of 7 and a pull card of 3. Then if he pushes, you will get 7 chips from the pot. If he pulls, you will get no chips from the pot.

The total number of chips that you end up with depends on the choices made by you and the choices made by the other player.

Summary Phase 1 of Zenda

Choose to push or pull and click "Confirm choice." If you push, the other player gets the number of chips on your push card; if you pull, you get the number of chips on your pull card. When you see a dialog box that tells you the round has ended, click on "OK" so that the play can proceed. You will play 15 rounds of Phase 1.

Phase 2 of Zenda

In this phase you have a new option that we call Pay-for-Push. Everything else about Zenda will be the same as in Phase 1. In particular, during each round of Phase 2 you will be randomly paired with another subject each time you play Zenda.

On your screen you will see a new button labeled "Confirm payment" and a slider. You can use the slider to offer a payment to the other player to encourage them to choose to play the push card..

You set this payment by moving the slider up or down. As you do this you will move chips from your pile of chips to a pile in front of the other player. When you are satisfied with your decision about how much you are willing to pay the other player, you click on your "Confirm payment" button. Neither player will see how much the other player is willing to pay until both players have clicked on their "Confirm payment" button. Once you've seen how much the other player has offered to pay you to push, you can decide whether to push or to pull. Your payoff will be as before but now the payment you make will be subtracted from your pile of chips if the other player chooses to push. If the other player chooses to pull, then you will get your payment back. Likewise, if

you choose to push, the payment offered to you by the other player will be added to your earnings, and subtracted from the other players earnings.

Summary of Phase 2 of Zenda

In each round of play you will move your slider to determine how many chips you want to pay the other player to Push. Once you have decided this, you click on your "Set Payment" button. When both players have clicked their "Confirm payment" button, each will be able to see how much the other player has offered. At that point, each player can choose whether to push or pull as before. When both players have clicked their "Confirm payment" button, each player sees the payoffs and a new round begins.

You will play 25 rounds of Pay-for-Push.

Things to remember

1. You play against a new person every time.

2. You should click "OK" as soon as you have read and understood a message.

3. You are playing for real money; each chip is worth 5 cents.