Frames and Games

JORDI BRANDTS* and CHRISTIANE SCHWIEREN**

November 16, 2004

VERY PRELIMINARY VERSION

* Institut d'Anàlisi Econòmica (CSIC)

** Universitat Pompeu Fabra

Abstract: Decision-makers are often influenced by the way in which a choice situation is presented to them or framed. This can be seen as an important challenge to the social sciences, since strong and pervasive framing effects would make it difficult to study human behavior in a synthetic or theoretic manner. We present results from experiments designed to shed light on two hypotheses about framing. The first posits that small changes in the frame only lead to small changes in behavior. The second proposes that changes in the incentive parameters will alter behavior in the same direction across different frames. Our results are consistent with these hypotheses, suggesting that there is some predictability to the way in which framing effects affect human behavior.

Keywords: Framing, Experiments, Public Goods.

JEL Classification Codes: C92, H41

Acknowledgements: The authors thank the Spanish *Ministerio de Educación y Cultura* (SEC2002-01352) and the Barcelona Economics Program of CREA for financial help.

Authors

Jordi Brandts	Christiane Schwieren
Institut d'Anàlisi Econòmica (CSIC) Campus UAB 08193 Bellaterra (Barcelona) Spain Phone: 34-935806612 Fax: 34-935801452 Jordi.Brandts@uab.es	Department of Economics and Business Universitat Pompeu Fabra Ramon Trias Fargas, 25-27 08005 Barcelona Spain Phone : 34-935422682 Fax : 34-935421746 Christiane.Schwieren@upf.edu

Introduction

Economists are proud of being able to point to situations in which the fundamental forces identified by economic analysis work inexorably. One such case is the effect that supply reductions have on prices in the international oil market. One can safely predict that prices will increase and that any attempts by politicians and journalists to prevent the increase by presenting the situation in a particular light will not work. It is known, however, that things are not always that simple. Numerous studies have shown that behaviour often depends on the way in which logically equivalent choice situations and strategically equivalent situations are described or presented to people. Such so-called framing effects have been identified in a number of different contexts. Kühberger (1998) surveys some of the relevant literature.

The existence of framing effects poses important challenges to the scientific analysis of society. After all, social science is based on the idea that human behaviour can be captured and understood by simplified representations of things. If framing effects are pervasive, if every change in the circumstances surrounding social situations affects people's decisions substantially, the analysis of humans' social behaviour will be an extremely difficult task. At the same time the question that arises is why people are affected by the framing of situations.

In this paper we study experimentally some of the possible limits of framing effects. We do that in the context of different representations of dilemma games. Andreoni (1995) compares behaviour in a public good and in a certain public bad game. He finds that subjects are more willing to cooperate in the public good case, even though the two situations are strategically equivalent. This result invites further investigation, because it is not directly consistent with some of the recent models of social preferences like those of Fehr and Schmidt (1999), Bolton and Ockenfels (2000) and Charness and Rabin (2002).

The result also differs from most other results on framing effects in this kind of games. First, the strength of the effect is surprising, because two meta-analyses (Levin et al. 1998 and Kühberger (1998)) recently showed that public good – public bad frames are not as effective in producing "framing-effects" as is the classical Asian disease situation of Tversky & Kahneman. Both meta-analyses see the reason for this in the specific structure of "game-theoretic" (Kühberger) or "goal-framing" (Levin) situations. In these situations, both choices are risky, and it is not clear, which one is riskier. The whole situation is more complex than the Asian disease-case.

Furthermore, Andreoni´s effect goes in the opposite direction from what has been found in most studies of public good – public bad frames. Usually, the negative (loss, public bad) frame has been found to have a stronger impact on responses than the positive (gain, public good) frame. For example, in a classical study by Brewer & Kramer (1986), subjects left more of the common resource in the commons frame than in the public goods frame.

Still, perhaps framing influences choices in a simple systematic way, depending also on the parameters of the game. This could then be incorporated into models of social preferences or, at least, taken into account when applying the models.

Our experiments are motivated by two specific hypotheses about the limits of framing effects. The first is that there is a kind of – in a loose sense – continuity in the relation between frames and behaviour. If this were the case, then very small changes in the way a situation is presented would have minor effects and only larger differences would lead to larger differences in behaviour. It would mean that not any small change would matter.

The second hypothesis is that variations in the parameters that govern monetary incentives lead to similar changes – in direction and magnitude – under different framing conditions. This hypothesis is motivated by the general notion that perhaps models should not be expected to accurately predict *levels* of behaviour but should have the ability of accommodating observed *comparative statics* in the sense of the shifts in behaviour in response to parameter changes.

In our experiments small and large changes in the presentation correspond to what – intuitively – are minor vs. more extensive changes in the wording used in the experimental instructions. With respect to the variations in the relevant parameters we follow the approach of Goeree, Holt and Laury (2002), who have subjects make decisions for different public good situations, which vary in several dimensions.

In our baseline treatment we largely replicate their results in a public good frame. In a public bad frame, which only differs from the public good frame by a few words, we find very similar levels of contributions as well as very similar reactions to parameter changes. With the public bad frame studied by Andreoni (1995), which differs quite substantially from the other two frames, we find – in contrast to Andreoni himself – larger contribution levels than in the other two cases. The effects of the parameter variations we find are now somewhat less parallel but still not too different

from those of the other two treatments. Overall, our data are consistent with our two hypotheses and one can say that the framing effects are limited and relatively systematic.

Basic experimental design

A public good game with ten different parameter-combinations and three different frames is the basis for this research. The parameters used were taken from Goeree et al. (2002) (see table 1). Their study changed parameters such that the "external" and "internal" return of contributions differed between the situations analyzed. The external return is defined as the return the investment has for others in the group, whereas the internal return is the value of the investment for oneself. In our experiment, parameters were varied within subjects, i.e., each subject had to take ten contribution-decisions.

Decision	1	2	3	4	5	6	7	8	9	10
Group size	4	2	4	4	2	4	2	2	4	2
Internal return	4	4	4	2	4	4	2	4	2	4
External return	2	4	6	2	6	4	6	2	6	12

Table 1: Parameter structure of the ten decisions

Frames were varied between subjects. First, we compared two frames with a subtle linguistic difference, as had been used before successfully in research by Brewer et al. (1986). One group of participants played the game with a simple public good frame, the same used by Goeree et al. (2002), describing a situation where money could be "invested" in the public account or "kept" in the private account. In the public bad frame subjects had to make a choice between "keeping" money in the public account or "investing" in the private account. Thus, in the public good situations, subjects were asked to do something good, whereas in the public bad situations subjects could avoid doing something "bad".

Our third frame differed in more aspects from the first two frames, still keeping payoffs constant. It was designed following the public bad frame Andreoni (1995) has used. In this public bad frame, the difference to a public good is not just linguistic. The frame describes the situation such that when investing in the private account, some (small amount of) money is taken from each other player in the group, while investing in the public account doesn´t affect others.

In the following, we will refer to this frame as "andreoni", in contrast to our public good and public bad frames.

144 students at Universitat Autonoma de Barcelona, from various faculties, participated voluntarily, for performance-based payment in an experiment on decision-making. In one session participated between 12 and 20 subjects. In each session, subjects took 10 different decisions, but were exposed to only one frame. Table 1 shows the parameter constellations of each decision. The order of the decisions was kept constant across participants. At the end of the experiment, one situation of the ten was randomly chosen and participants were paid according to their decision taken in this situation. In addition, they received a show-up fee of € 3.

Results

The main result of our experiment is that differences between frames are less important than the parameters of the decision task for determining contributions to a common good. This holds at least for those two frames which differed only "linguistically". The "andreoni" did have a stronger effect on contributions than the other two frames. Furthermore, the effect of the frames differed between parameter-constellations. This means, that for one set of parameters one frame resulted in the highest level of contributions, while for another parameter-constellation another frame had the highest level of contributions.

The first figure shows the average contributions for each frame and each decision. To allow for a comparison with Goeree et al.´s original results in the same situations, we added their data to our figures. In the following, we will refer to these data as "g".

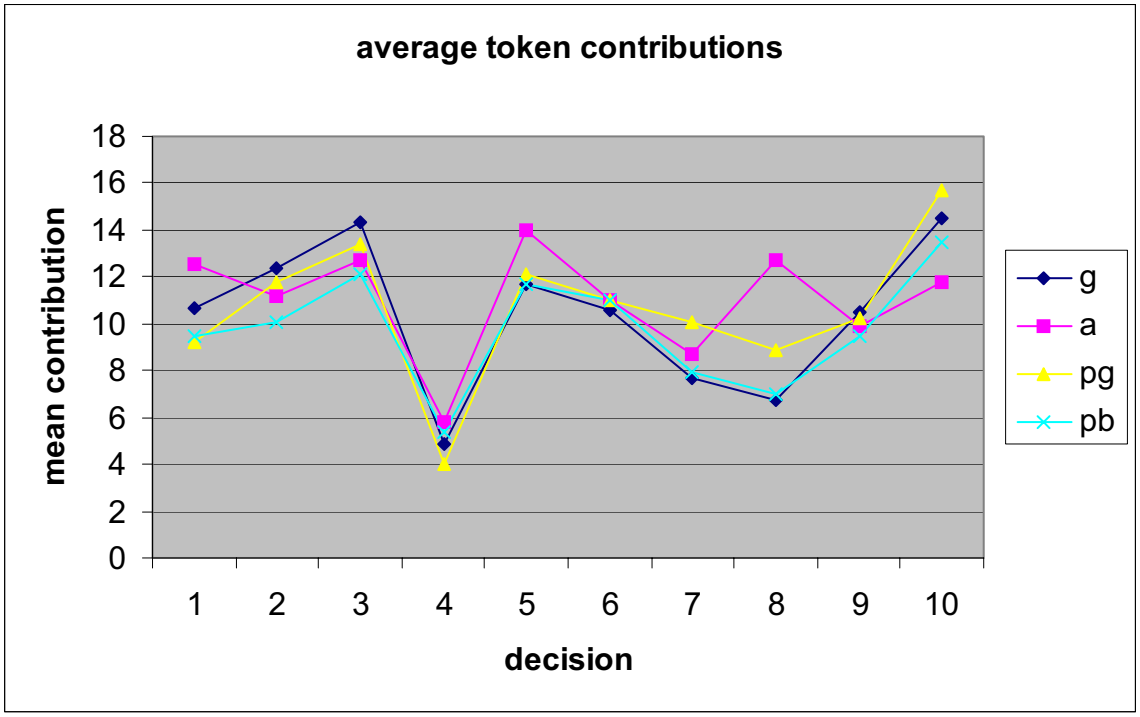

Figure 1: Average token contributions per frame and decision ("g" = Goeree´s data, "a" = our "andreoni"-frame, "pg " = public good, "pb" = public bad).

The figure clearly shows that there are no big differences between the frames in most decisions, but that there are differences for all frames between the different parameter-constellations. The graph also shows that the frames do not always influence contributions in the same direction: In some situations, one frame leads to the highest contribution, whereas in other situations, another frame evokes the highest contribution. However, the direction of change is the same for the two very similar frames, and differs only sometimes for the "andreoni" frame. A graph showing relative changes demonstrates this more clearly. To obtain relative changes, we just subtracted the contributions of each of the parameter-constellations 2 to 10 from contributions in constellation 1. This allowed us additionally to treat these data as independent and run an ANOVA with these data, which is described below.

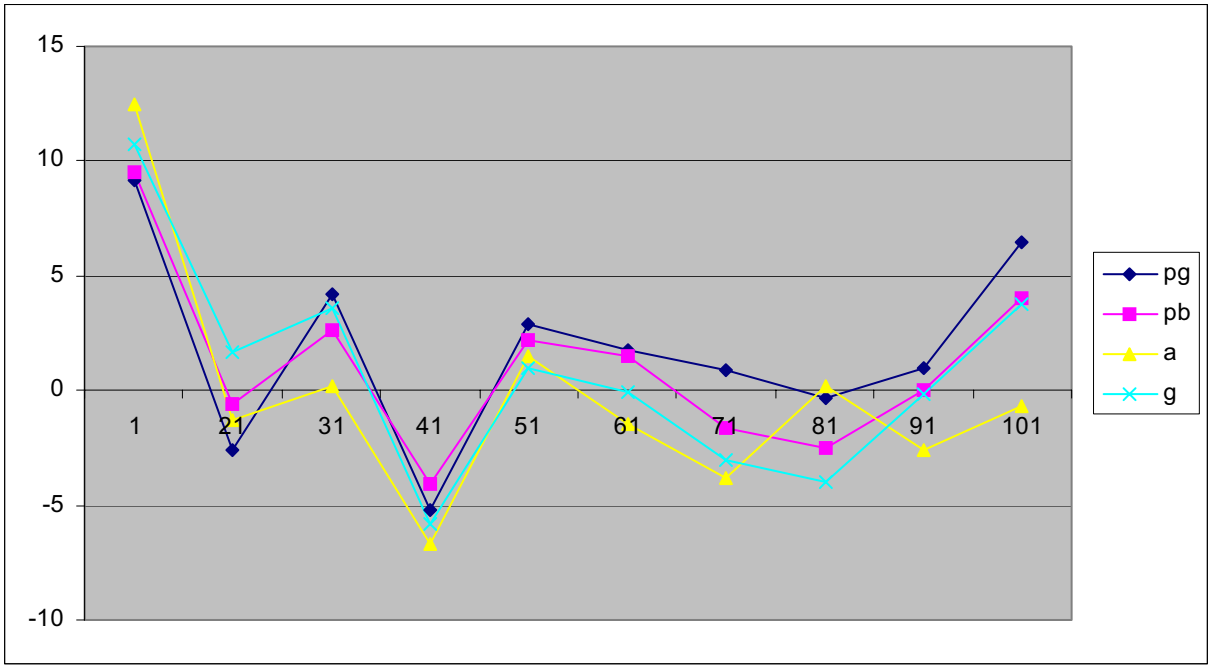

Figure 2: Changes in token contributions per frame starting with decision 1, then showing decision 2 – decision 1 etc. ("g" = Goeree´s data, "a" = our "andreoni"-frame, "pg " = public good, "pb" = public bad).

With respect to the direction of change in behavior from the first decision taken, there are differences between the frames for some situations, but they do not always go into the same direction. For example, in decision 6 the "andreoni" frame leads to reduced contributions as compared to decision 1, while all other frames lead to enhanced contributions, whereas in decision 8 it´s the other way round. For the first five decisions, frames differ mainly in the magnitude of the change and less in the direction.

Figure 2 shows that the direction of change of contributions compared to contributions in decision 1 in most instances is positive for the simple public good/public bad frames, while for the "andreoni"-frame, it is for most decisions negative.

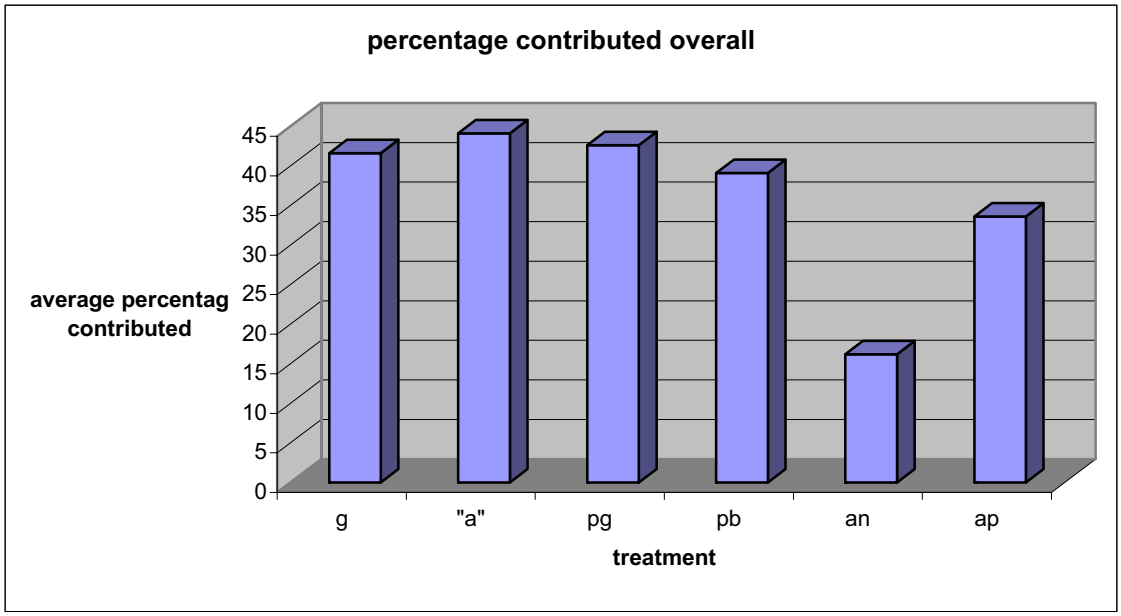

Figure 3: Percentage of endowment contributed in each frame

Figure 3 shows the percentage of the endowment contributed in each frame, over all decisions. This graph compares contributions in our experiment to those in the experiments by Goeree et al (2002) (g) and the negative and positive frame of the experiment by Andreoni (1995) (an, ap). The figure shows that there is no significant difference in overall-contributions for our three frames. Furthermore, one can see that Goeree et al.´s result is very similar to ours. However, Andreoni´s original data differ largerly from ours. In a later step we take a look at whether this might be caused by the specific parameters he is using.

But, first we take another look at contributions in all experiments, but now looking only at the percentage of participants contributing zero to the public good. The reason for doing this lies mainly in our interested of comparing our results to the results of Andreoni, whose analysis was mainly concerned with this. Furthermore, it makes sense to look at percentage zero contributions as this is on one hand the rational behavior, on the other hand it constitutes that form of behavior policy-makers most strongly want to avoid and therefore it is very important to understand how frames can influence this percentage.

Doing this analysis, differences between the frames become more pronounced. Specifically, our “Andreoni” frame differs significantly from our other two frames overall and for most of the individual parameter constellations. Our “andreoni” frame is nearly always highest with respect to the percentage of subjects contributing zero, and

never lowest. However, in Andreoni´s original study, the percentage of people contributing zero was even higher than in our version of Andreoni´s frame. A possible explanation for this is that the parameters Andreoni uses are closest to our situation number 4 - with respect to internal and external return and number of people in the social dilemma – and our situation number 4 was exactly the one with the highest percentage of people contributing zero for all our frames.

Experiment	Group size	Number of tokens available	Internal Return of Investment	External Return of Investment
ours	4	25	2	2
Andreoni	5	60	1	1/2

Table 2: Comparison of our situation 4 with Andreoni´s negative frame.

If we look additionally at the percentage of subjects contributing their full endowment in each decision and each frame, it becomes obvious that our frame "andreoni" also has a very large number of subjects contributing fully (see figure 5). As we have already seen, it also has the largest percentage of subjects contributing zero in nearly all situations. This explains, why average contribution in this frame looks very similar to the other frames. But, this average stems from different behavior than in the other two frames.

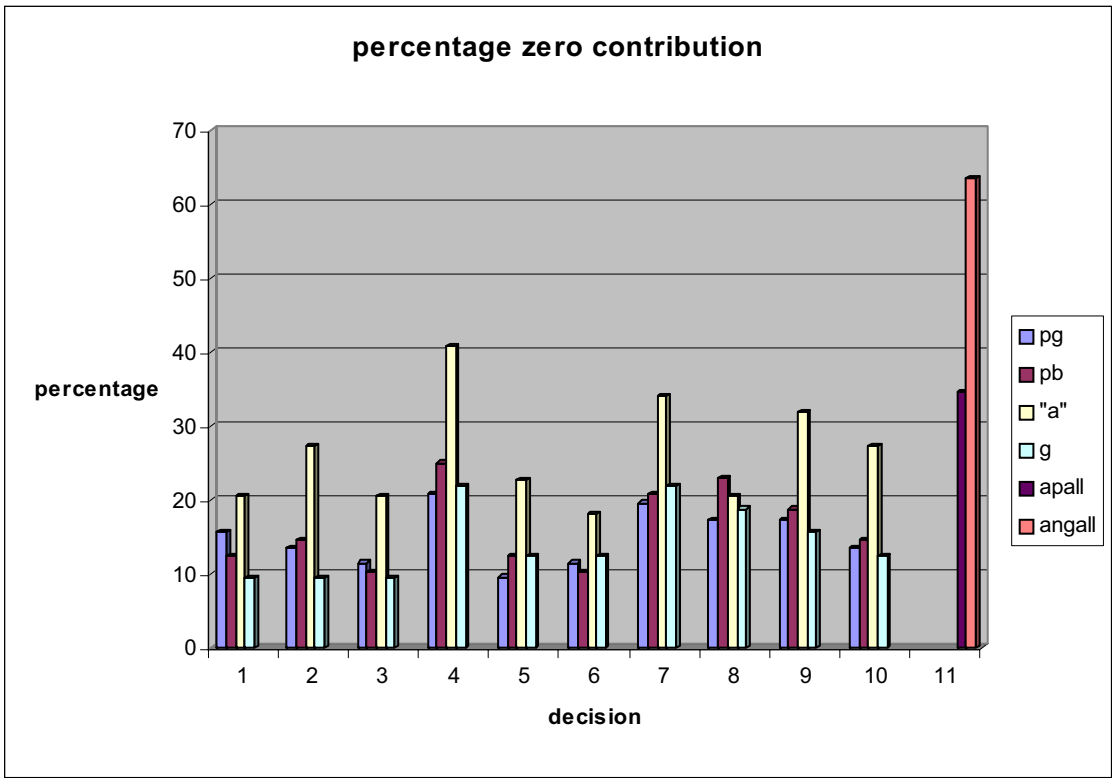

Figure 4: Percentage of subjects contributing zero for all frames

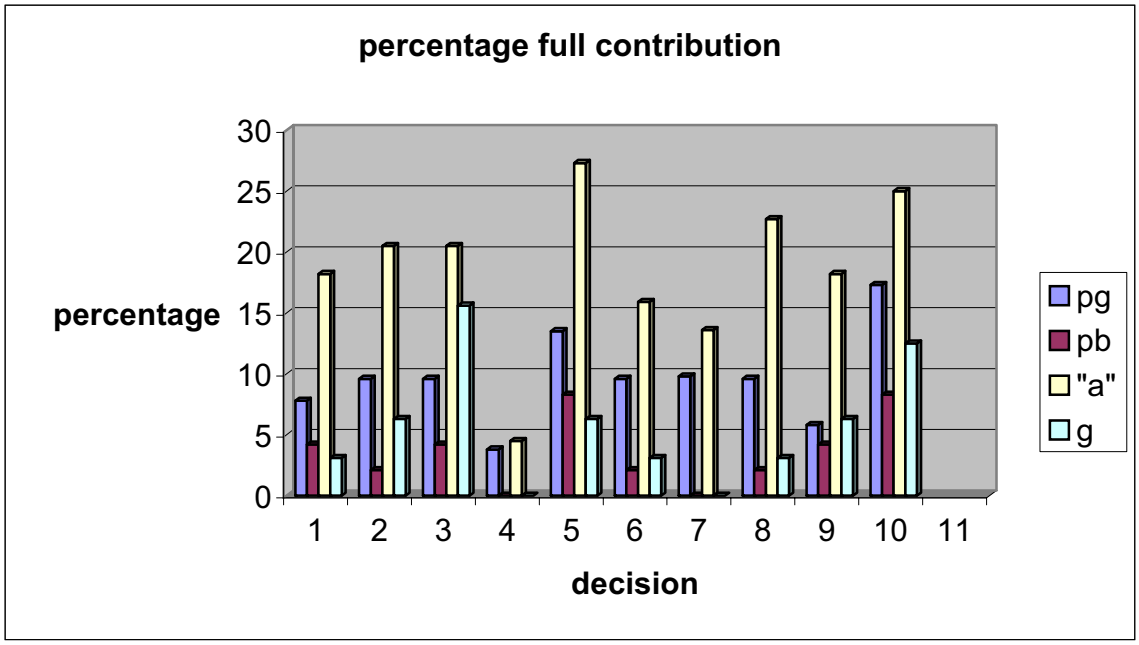

Figure 5: Percentage of subjects contributing fully for all frames. Andreoni don´t report this.

Figure 6 makes the comparison between the three frames with respect to percentage zero and full contribution easier and also describes what we analyzed statistically. We had to aggregate over decisions for comparing frames statistically, because the data for the different parameter-constellations were not independent, because each participant took all decisions within one frame, without changing order.

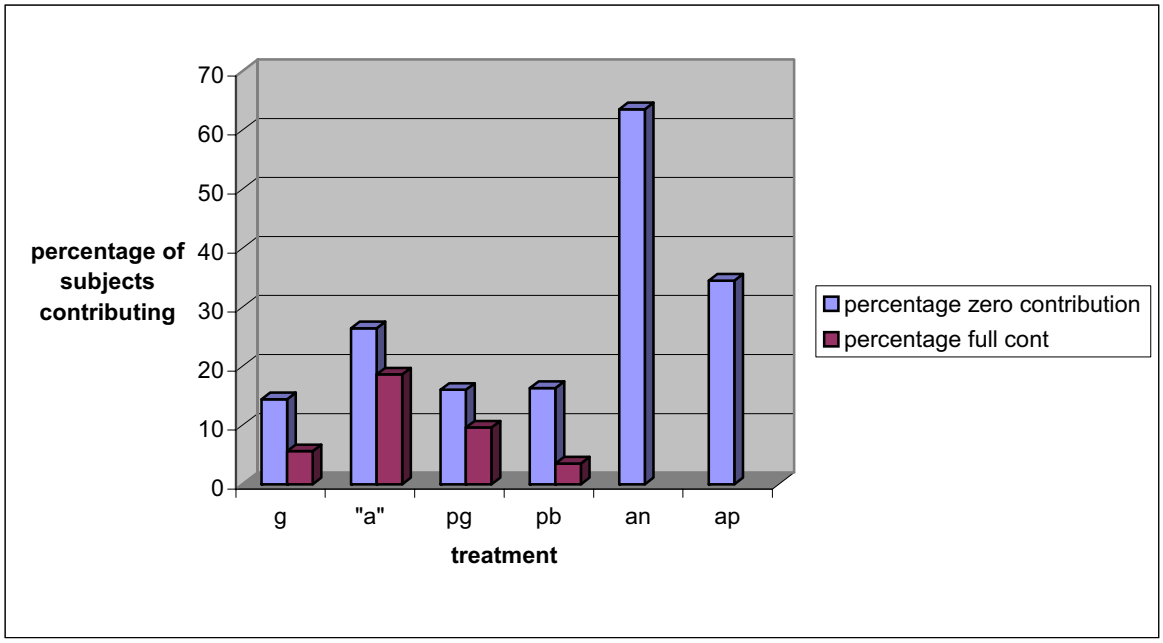

Figure 6: Percentage of subjects contributing zero and fully for all treatments, over all decisions.

Finally, one can look at whether there is a difference between treatments with respect to the percentage of subjects contributing more to the public account than to their private account. Figure 7 shows that differences do exist between decision situations. Only for a few parameter-constellations, differences also exist between frames. Again, our "pb" and "pg" frame are very similar, whereas our "andreoni" frame differs for some parameter-constellations from the other two frames.

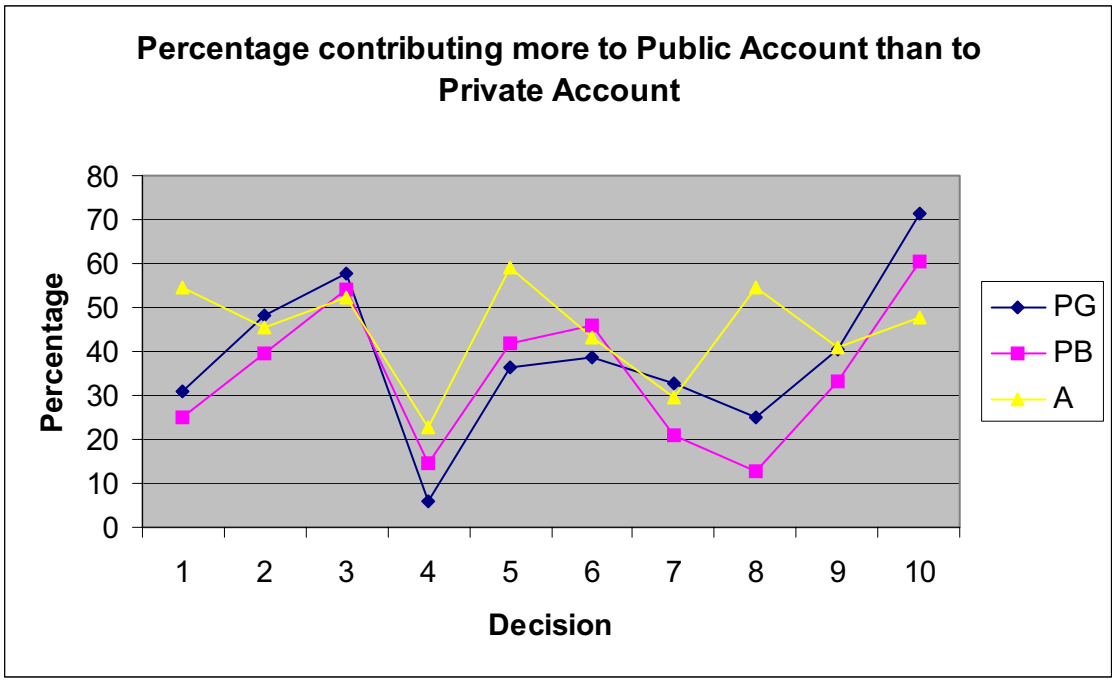

Figure 7: Percentage of subjects who contribute more to the public than to the private account for each decision and all three treatments.

The statistical analysis of differences between frames over all decisions confirms that there are no significant differences between the frames with respect to overall contributions (comparing contributions over all parameter-constellations together).

However, when looking at the percentage of full contributions and zero contributions, differences between frames become significant. The "andreoni"-frame differs significantly from the other two frames both with respect to full and zero contributions.

But, with respect to percentage of full contributions, over all decisions even the only linguistically different public good and public bad frame differ statistically significant. More people contribute fully in the public good than in the public bad frame. With respect to zero contributions, the two frames lead to equal contributions.

Percentage contributing…	Treatment	N	Mean rank	Sum of ranks	Mann-Whitney U	Z	Exact significance
Zero	pg	11	10.86	119.50	53.5	-.46	.652
	pb	11	12.14	133.50			
Full	pg	11	15.91	175.00	12.0	-3.21	.001
	pb	11	7.09	78.00			

Table 2: t-test for differences between "pg" and "pb" frames with respect to full and zero contributions

Percentage contributing…	treatment	N	Mean rank	Sum of ranks	Mann-Whitney U	Z	Exact significance
Zero	Pg	11	6.45	71.00	5.00	-3.66	.000
	A	11	16.55	182.00			
Full	Pg	11	7.27	80.00	14.00	-3.07	.001
	A	11	15.73	173.00			

Table 3: t-test for differences between "pg" and "a" frames with respect to full and zero contributions

Percent contribution	treatment	N	Mean rank	Sum of ranks	Mann-Whitney U	Z	Exact significance
zero	Pb	11	7.36	81.00	15.00	-3.00	.002
	A	11	15.64	172.00			
full	pb	11	6.27	69.00	3.00	-3.79	.000
	A	11	16.73	184.00			

Table 4: T-test for differences between "pb" and "a" frames with respect to full and zero contributions

An ANOVA using parameter-constellation ("decision") as independent factor and contribution as the dependent variable reveals, that for each frame the type of decision is an important predictor of the amount contributed. Decisions in the different parameter-constellations are made independent for this analysis by subtracting contributions in each decision from contributions in decision 1, as had already been described in the beginning of this section. This means, that we don't compare absolute contributions now, but deviations in contributions from the contribution in the first situation.

Treatment		Sum of squares	df	Mean squared	F	Sig.
pg	Inter-grupos	538.008	42	12.810	1.630	.009
	Intra-grupos	3669.492	467	7.858		
	Total	4207.500	509			
pb	Inter-grupos	450.303	31	14.526	1.854	.004
	Intra-grupos	3509.697	448	7.834		
	Total	3960.000	479			
a	Inter-grupos	582.660	36	16.185	2.140	.000
	Intra-grupos	3047.340	403	7.562		
	Total	3630.000	439			
Overall	Inter-grupos	1052.511	45	23.389	3.013	.000
	Intra-grupos	10744.989	1384	7.764		
	Total	11797.500	1429			

Table 5: ANOVA testing for the influence of "parameter structure" on contributions for each frame separately.

In the following, we also look at individual decisions. There are no significant differences for any of the parameter-combinations separately between the basic public good and public bad frames.

When comparing the public good frame with our "andreoni" frame resp. the public bad frame with our "andreoni" frame, for many individual parameter constellations the difference in contributions between frames becomes significant. However, effects vary in the direction they have, as figures 1 and 2 showed: for some decisions, the "andreoni"- frame leads to higher contributions than any of the other two frames, while for other constellation this frame leads to lower contributions than the pb or the pg frames do.

		t	df	Sig. (2-sided)	Mean differences	Standard error of mean
D1B	No equal variances	-1.92	81.50	.059	-3.35	1.75
D2B	No equal variances	.29	82.05	.774	.54	1.88
D3B	No equal variances	.37	83.96	.716	.69	1.88
D4B	No equal variances	-1.36	77.84	.177	-1.82	1.33
D5B	No equal variances	-1.03	79.08	.306	-1.92	1.87
D6B	No equal variances	.05	81.77	.962	.08	1.74
D7B	Equal variances	.8	94	.427	1.44	1.80
D8B	Equal variances	-2.15	94	.034	-3.86	1.80
D9B	No equal variances	.16	81.73	.870	.30	1.83
D10B	No equal variances	1.90	80.86	.061	3.86	2.03

Table 6: Comparison PG – A

		t	df	Sig. (2-sided)	Mean differences	Standard error of mean
D1B	No equal variances	-1.76	77.81	.082	-3.02	1.71
D2B	No equal variances	-.65	72.54	.515	-1.16	1.78
D3B	No equal variances	-.32	81.02	.749	-.60	1.86
D4B	No equal variances	-.34	79.63	.734	-.46	1.36
D5B	No equal variances	-1.23	79.30	.224	-2.31	1.89
D6B	No equal variances	.04	80.56	.970	.07	1.74
D7B	No equal variances	-.46	79.04	.646	-.80	1.75
D8B	No equal variances	-3.42	72.67	.001	-5.77	1.69
D9B	No equal variances	-.22	82.68	.826	-.41	1.86
D10B	No equal variances	.82	82.04	.413	1.70	2.07

Table 7: Comparison PB - A

Comparing the individual changes in later decisions with respect to decision one, the result is similar. No significant differences between the simple public good and the simple public bad frame exist, but there are significant differences for many decisions between our "andreoni" frame and the simple public good and public bad frames.

		t	df	Sig. (2-sided)	Mean differences	Standard error of mean
D1BD2B	Equal variance	-2.65	93	.009	-3.82	1.44
D1BD3B	Equal variance	-2.77	93	.007	-3.94	1.43
D1BD4B	No equal variance	-.88	81.89	.382	-1.51	1.72
D1BD5B	Equal variance	-1.26	93	.212	-1.60	1.27
D1BD6B	Equal variance	-3.04	93	.003	-3.45	1.14
D1BD7B	Equal variance	-2.94	93	.004	-4.94	1.68
D1BD8B	Equal variance	.31	93	.754	.42	1.34
D1BD9B	Equal variance	-2.23	93	.028	-3.45	1.55
D1BD10B	No equal variante	-4.52	92.46	.000	-7.06	1.56
D1B	No equal variance	-1.92	81.50	.059	-3.35	1.75

Table 8: Comparison PG – A

		t	df	Sig. (2-sided)	Mean differences	Standard error of mean
D1BD2B	Equal variance	-1.17	90	.245	-1.86	1.59
D1BD3B	Equal variance	-1.72	90	.089	-2.43	1.41
D1BD4B	No equal variance	-1.61	68.54	.111	-2.56	1.59
D1BD5B	Equal variance	-.60	90	.553	-.71	1.19
D1BD6B	Equal variance	-2.79	90	.006	-3.09	1.11
D1BD7B	Equal variance	-1.42	90	.160	-2.22	1.57
D1BD8B	Equal variance	2.22	90	.029	2.75	1.23
D1BD9B	Equal variance	-1.74	90	.086	-2.61	1.50
D1BD10B	Equal variance	-3.37	90	.001	-4.73	1.40
D1B	No equal variance	-1.76	77.81	.082	-3.02	1.71

Table 9: Comparison PB – A

Discussion

Overall, we find only a weak effect of frames, which is in line with our hypotheses and with results from meta-analyses on framing studies using this type of frames (see Kühberger (1998) and Levin et al. (1998)).

We hardly find significant differences between the two only linguistically different frames, but we do find significant differences between the "more different" frame ("andreoni") and both the two basic public good and public bad frames. This confirms our hypothesis that stronger framing manipulations have stronger effects.

Our results further indicate that the direction of the framing effects seems to be influenced by the parameters chosen. This explains partially why Andreoni (1995), contrary to most other studies on framing in public good/public bad games, finds lower contributions in the public bad frame than in the public good frame. Comparing his results to our data, the fourth parameter-constellation of our experiment, which is most similar to Andreoni´s parameters results in the highest percentage of zero-contributions of all our constellations. This is close to the percentage of zero-contributions Andreoni reports.

Another important aspect about the "andreoni" frame used in our experiment is that it leads to the largest variance in results. This frame has both the highest percentage of zero-contributions and the highest percentage of full contributions for most parameter-constellations. Unfortunately, Andreoni does not report on percentage of full contributions in his experiment, so that we don't know whether this is also the case for his experiment.

Boettcher (2004) concludes from his review of the existing literature on framing that "Relatively minor differences in experimental design appear to exaggerate or minimize the impact of prospect framing" (p. 355). The comparison of Andreoni´s and our experiments are a nice example for this. If the "right" parameters are chosen, larger framing effects can be found, whereas the "wrong" parameters lead to no or very small framing effects. Furthermore, the effect of frames can go in both directions as the results with our "andreoni"-frame show: It leads both to more zero and more full contributions.

Our results are far from being conclusive. They confirm what Levin et al. (1998) state, that "goal frames" are more complicated than simple Asian-disease problems, because more than one aspect of the message can be manipulated, and because it is not obvious which option is the riskier one. Furthermore, there is room for differences in emotional intensity induced by different terminologies used. Andreoni´s frame might

enhance emotional intensity as opposed to the two other frames we use, as taking money from someone probably is emotionally more involving than just making different contributions.

One important problem of our design that could provide an alternative explanation for the results found is that each subject went through all 10 decisions. This might have some demand-characteristics, inducing subjects to think carefully about the decision. Research by McElroy and Seta (2003) has shown that subjects are far less susceptible to framing manipulations when they are prone to or asked to think analytically about their decision. However, the same can obviously be said about our "andreoni"-frame and Andreoni´s experiment, and in both these cases there were framing effects as opposed to the basic situation.

Our review of the literature showed that there exist some first attempts to characterize situations in which framing effects occur in public good/public bad frames. However, there is no conclusive evidence yet and systematic research is lacking on what aspects of the frame and the parameters determine whether framing has an effect on subjects or not in this kind of situations. Our research wants to be a first step in this direction. Apart from providing some tentative results showing what factors might influence the effectiveness of framing manipulations, it underlines the necessity of further, more systematic research in this direction.

References

Andreoni, J. (1995), Warm-Glow Versus Cold-Prickle: The Effects of Positive and Negative Framing on Cooperation in Experiments. The Quarterly Journal of Economics, Vol. 110, 1-21.

Boettcher III, W. A. (2004), The Prospects for Prospect Theory: An Empirical Evaluation of International Relations Applications of Framing and Loss Aversion. Political Psychology, Vol. 25, 331-362.

Bolton, G. E. & Ockenfels, A. (2000). ERC: A Theory of Equity, Reciprocity, and Competition. American Economic Review, Vol. 90, 166-193

Brewer, M. B. & Kramer, R. M. (1986), Choice behavior in social dilemmes: Effects of social identity, group size, and decision framing. Journal of Personality and Social Psychology, Vol. 50, 543-549.

Charness, G. & Rabin, M. (2003), Understanding Social Preferences with Simple Tests. General Economics and Teaching 0303002, Economics Working Paper Archive at WUSTL.

Fehr, E. & Schmidt, K. (1999), A Theory of Fairness, Competition and Cooperation. Quarterly Journal of Economics, Vol. 114, 817-868.

Goeree, J. K., Holt, C. & Laury, S. (2002), Private Costs and Public Benefits: Unraveling the Effects of Altruism and Noisy Behavior. Journal of Public Economics, Vol. 83, 257-278.

Kuehberger, A. (1998), The Influence of Framing on Risky Decisions: A Meta-analysis. Organizational Behavior and Human Decision Processes, Vol. 75, 23-55.

Levin, I. P., Schneider, S., & Gaeth, G. J. (1998), All Frames Are Not Created Equal: A Typology and Critical Analysis of Framing Effects. Organizational Behavior and Human Decision Processes, Vol. 76, 149-188.

McElroy, T. & Seta, J. J. (2003), Framing effects: An analytic-holistic perspective. Journal of Experimental Social Psychology, Vol. 39, 610-617.

Appendix: Instructions

(The words that differed between the treatments are underlined; the normal font corresponds to the public good frame, the italics to the public bad and the bold to the Andreoni frame. Note that the Andreoni frame sometimes involves completely different and additional sentences than the other two treatments.).

INSTRUCTIONS

This is an experiment on decision-making. You will be paid for your participation and the amount of money you earn will depend on the decisions that you and the other decision-makers will take.

At no point in the experiment will you be asked to reveal your identity to anybody. Your name will never be associated with your decisions. In order that your decisions remain confidential, please do not reveal your decisions to any of the other participants.

At this moment we will give you 3 euros for being on time. All the money you earn from now on will be for you and your earnings will be paid to you in cash at the end of today's experiment.

This experiment

In this experiment you will be asked to make a series of decisions about how to allocate a set of "tokens". You and the other participants will be randomly assigned to groups and you will not be informed about the identities of the others in your group.

For each decision you will be told how many people are in your group. For each decision you will have 25 tokens to assign. You have to decide how many of these tokens you wish to leave (*invest,* **invest***)* in account A and how many you wish to invest (*leave,***invest***)* in account B. The quantity of money you make depends on how many tokens you leave (*invest,* **invest**) in account A, on how many you invest (*leave,* **invest***)* in account B and on how many the others in your group invest (*leave,***invest***)* in account B (**A). (**Note: In the Andreoni frame treatment, A is the account people are pointed to and not B. At several places below A appears in parentheses behind B; this always refers to the Andreoni frame treatment).

Examples of decisions that you will make in this experiment

Each decision you will make will be similar to the following one:

Example 1: You are in a group of 2 (you and another person). Each of you has 25 tokens to allocate. You will earn 5 cents for each token that you invest in account A. For each token that you invest (*leave*) in account B, you will earn 4 cent and the other person will earn 3 cents (a total of 7 cents for you two together). (**For each token that you invest in account A the earnings of the other person are reduced by 3 cents. For each token that you invest in account B, you will earn 4 cents and the other person will not be affected.** Note: The previous sentence replaces for the Andreoni frame treatment the preceding sentence).

I addition to the earnings that you accumulate from account A and from account B, you will also receive automatic earnings of 75 cents.

For each token that the other person leaves (*invests,* **invests***)* in account A, that person will earn 5 cents. For each token that the other person invests (*leaves,* **invests***)* in account B, that person will earn 4 cents and you will earn 3 cents (a total of 7 cents for you two together).

Summarizing, you will earn:

5 cents multiplied by the number of tokens you leave (*invest,* **invests***)* in A
+ 4 cents multiplied by the number of tokens that you invest (*leave,* **invests***)* in B

+ 3 cents multiplied by the number of tokens that the other person in your group invests (*leaves)* in B.
- 3 cents multiplied by the number of tokens that the other person in your groups invests in A
+ automatic earnings of 75 cents. Note: The previous expression replaces for the Andreoni frame treatment the preceding one.

I leave (*invest,* **invest***)* in A_____tokens I invest (*leave,* **invest***)* in B____tokens (The sum has to be equal to 25)

You can choose any number of tokens to leave (*invest,* **invest***)* in A and any number to invest (*leave,* **invest***)* in B, but *the total number of tokens you* leave *(invest,* **invest***) in A plus the number of tokens that you* invest (*leave,* **invest***) in B have to sum to the total number of tokens that you have received for allocation.*

If you want you can use your calculator, or one that we can lend you, to verify the earnings and to ensure that all tokens have been allocated.

****

To ensure that you understand how your earnings would be calculated in this example, please fill out the following. Choose numbers for the tokens that you leave (*invest,* **invest***)* in A, the tokens that you invest (*leave,* **invest**) in B and the tokens that the other person invests (*leaves,* **invests***)* in B (**A)**. This is only to illustrate how your earnings are calculated. In the true experiment, all will make their own decisions and we will calculate your earnings for you.

If I leave (*invest,* **invest***)*_____tokens in A and invest (*leave,* **invest***)*_____tokens in B, and the other person in my group invests (*leaves,* **invests***)*_____tokens in B (**A**), I will earn:
_____cents for the tokens that I leave (*invest,* **invest***)* in A (5 cents each)
_____cents for the tokens that I invest (*leave,* **invest***)* in B (4 cents each)
_____cents for the tokens that the other person invests (*leaves,* **invests***)* in B (3 cents each).
A total of:_____cents.

Please fill this out and we will come to see each of you to answer any questions you have and to verify your responses.

Once you are finished you can proceed to the second example.

Example 2: Was presented in an analogous fashion

****

Earning money in this experiment

You will be asked to make 10 allocation decisions like the ones of the examples that we just presented. We will calculate your earnings in the following way:

After collecting your decision sheets, we will verify that everybody has completed all decisions and that the 25 tokens have been assigned for each decision. Then we will throw a ten-sided die. The number that will appear on the die will determine which of the decisions will be implemented. For example, if a 1 comes out you will be paid for the first decision. If a 0 comes out you will be paid for your tenth decision. You will only be paid for the decisions that you and the others in your group made for that case. For example, if a 1 comes out you will be paid on the basis of the decisions that you and the others in your group made for case 1. You will not be paid for any of the other decisions.

After determining which decision will be paid, we will assign you randomly to groups of the size specified in the decision. This will be done by drawing from this envelope numbers corresponding to your identification numbers. For example, if a decision resulted for which you are in groups of 4 we will draw 4 numbers. The participants corresponding to these identification numbers will be in one group. Then we will draw another 4 numbers to determine which 4 participants are in the second group. This will be repeated until all will have been assigned to a group.

This means that you will earn money based on the number of tokens that you left (*invested,* **invested***)* in A in this decision, the number of tokens that you invested (*left,* **invested***)* in B in this decision, and the number of tokens invested (*left,* **invested**) in B (**A**) by the other or others in your group (the total invested (*left,* **invested**) by all the other persons) in this decision.

At the end of the experiment we will return to you a sheet on which you will see how much you have earned in the experiment. You will only be told the total number of tokens invested (*left,* **invested***)* in B (A) by the other or others in your group. You will not be told with whom you were grouped.

During the experiment you will not be allowed to talk or communicate with the other participants. If you have a question during the experiment, please raise your hand and one of us will come to your table. At this moment, do you have any questions about the instructions and procedures? If you have a question please raise your hand and one of us will come to your table to answer it.

On the following sheets there are ten decisions that we wish you to make. Please, fill out the sheets taking the time that you need to be careful. When all are finished we will collect the sheets.

DECISION SHEET

Please fill out the empty spaces for each of the decisions that follow. Make sure that the number of tokens under *I* leave (*invest,* **invest***) in A* plus the number under *I* invest *(leave,* **invest***) in B* is equal to 25 tokens.

Decision 1: You are in a group of 4 (you and other 3 persons). Each of you has 25 tokens to allocate. You will earn 5 cents for each token that you leave (*invest,* **invest***)* in account A. For each token that you invest (*leave,* **invest***)* in account B, you will earn 4 cent and each of the other persons will earn 2 cents (a total of 10 cents for you four together).

For each token that another person leaves (*invests,* **invests***)* in account A, that person will earn 5 cents. For each token that the other person invests (*leaves,* **invests***)* in account B, that person will earn 4 cents and each of the other persons will earn 2 cents (a total of 10 cents for the group). (**For each token that you invest in account A the earnings of the other person are reduced by 3 cents. For each token that you invest in account b, you will earn 4 cents and the other person will not be affected.** Note: The previous sentence replaces for the Andreoni frame treatment the preceding sentence).

I addition to the earnings that you accumulate from account A and from account B, you will also receive automatic earnings of 75 cents.

Summarizing, you will earn:

5 cents multiplied by the number of tokens you leave (*invest,* **invest***)* in A
+ 4 cents multiplied by the number of tokens that you invest (*leave,* invest*)* in B
+ 2 cents multiplied by the number of tokens that the other persons in your group invest (*leave)* in B.
- 2 cents multiplied by the number of tokens that the other persons in your groups invest in A
+ automatic earnings of 150 cents. Note: The previous expression replaces for the Andreoni frame treatment the preceding one.

I leave (*invest,* **invest***)* in A_____tokens I invest (*leave,* **invest***)* in B____tokens (The sum has to be equal to 25)

Situations 2-10 were presented in an analogous fashion.