Cultural Education and the Voluntary Provision of Cultural Goods: An Experimental Study

Massimo Finocchiaro Castro[♦]

Department of Economics, Royal Holloway College, University of London, UK
&
DEMQ, University of Catania, Italy

Abstract

We study the effect of the possibility of investing in cultural education on the voluntary contributions to the cultural good. Moreover, we provide treatments with different context in order to control for a possible framing effect. Our results show the absence of effect of cultural education on the contributions to the cultural good and a slight increase in the allocations of subjects' endowments to the cultural good when the cultural context is implemented in the laboratory.

JEL Classification: A13, H41,C92, Z10.

Keywords: cultural education, cultural good, framing, experiments, voluntary provision.

♦ Address: Department of Economics, Royal Holloway College, Egham, Surrey, TW20 OES, UK; Tel.: +44 1784 443378; E-mail: m.finocchiaro-castro@rhul.ac.uk

1. Introduction

Our experimental design deals with a twofold problem. The first task is to combine the case of voluntary provision of cultural goods with the possibility of investing in cultural education. As it will be explained in the next sections, the structure of the experiment involves the possibility for subjects to invest in cultural education before having to choose whether and how much of their initial endowment to allocate to the provision of cultural goods. In fact, we consider that investments in cultural education can lead to an increase in the individual sensibility to cultural goods consumption and, therefore, to higher levels of subjects' contributions to the cultural goods[1]. This view is supported by Throsby (2001, pag.114), who affirms that "it is apparent that a person enjoyment of music, literature, drama, the visual arts and so on and hence her willingness to spend money on consuming them, are importantly related to her knowledge and understandings of these art forms. Such cultural competence is acquired through education and experience, and hence stronger and more discriminating tastes for the arts are likely to be shown by better educated and by those who have already become consumers". Therefore, there are two forces able to influence the allocation of individual endowments to the provision of cultural goods: education and previous consumption. In the present paper we will focus on the effects of cultural education which has been, according to my opinion, not fully explored yet.

The second task is, then, to prepare an experimental setting able to cope with the well-known framing effects. What we want to look for is the presence, first, and the magnitude, then, of the switch in the experimental instructions from a neutral to a loaded wording. We will try to stress that fact that the use of loaded instructions can be relevant to certain experimental investigations. In such a case as the cultural economics, it seems to be useful to explore the effects of an increase of the direct knowledge of the kind of good subjects are asked to contribute to. An example of the positive effects of direct knowledge of the object of the experiment is the work of Paradiso and

[1] For a theoretical explanation of this accumulation process see Finocchiaro Castro and Mazza (2001).

Trisorio (2001). Therefore, we expect to assist to an increase in the subjects' contribution levels to the cultural good in those in-context treatments compared with the context-free ones. Strikingly, our prevision about contributions to cultural goods, most of the times, has been disattended by experimental data. They showed only a slight difference in contributions due to the framing effects as it will be explained in the next sections. The present paper is structured as follows. Section 2 reviews the relevant results coming from the literature on framing effects. Section 3 describes the experimental design and the theoretical predictions. Section 4 presents and discusses the results of the experiment and Section 5 concludes.

2. Background

2.1 Framing in Public Goods Experiments

Before describing the state of arts regarding the results on the effects of framing in public goods experiments, let us explain what is commonly meant by framing. A clear and, at the same time, broad definition of framing can be borrowed by Elliot and Hayward (1998, pag.232). They describe a frame as "a framework within information is considered, selected, interpreted, evaluated or simply understood". The authors go further on with their analysis stating, on the same paragraph, that "framing is then any manipulation of factors causing a change in an individual's frame such that a predictable behaviour is affected, that predictable behaviour is a framing effect". After an investigation of relevant literature, it comes out the presence of two types of framing: the pure-framing and the valence framing. The former occurs when subjects are presented with alternative, although perfectly equivalent, problem wordings (see Albers and Harstad, 1991;Kashima and Maher, 1995). Differently, the latter refers to situation where the information is presented to the subjects either in a negative or in a positive light[2].

[2] For a detailed review of pure-framing studies see Levin, Schneider and Gaeth (1998).

A significant number of studies on economics and psychology have focused on the analysis of valence framing effects. The first and, probably, most important contribution has been the one of Tversky and Kahneman (1981), where they describe the well-known *Asian disease* problem and their main result, the choice reversal effect. The work of Tversky and Kahneman (1981) has been replicated several times to look for regularities in the results. Bohm and Lind (1992) observe that, in their experiment, the framing effects are noticeably smaller than in Tversky and Kahneman's study, but they were still substantial and statistically significant. Other replications with real financial incentives are Knetsch and Sinden (1984), Kahneman and Knetsch (1992) and Bateman et al. (1997a, 1997b).

If compared with the amount of works on experimental economics, rather few studies have investigated the effects due to valence framing in public goods experiments. An interesting attempt to analyze the impact of positive versus negative framing in a standard linear public goods experiment has been run by Andreoni (1995), finding that when the externality generated from the public good is positively framed subjects contribute more than when negatively framed, even if they face the same incentives. These results have been replicated without fully supporting Andreoni's findings (Park, 2000).

At the same time, other economic related works, confirm the presence of strong framing effects on cooperation. In particular, subjects show up to be more willing to cooperate when they face a positive framing than facing a negative framing (Sonnemans et al., 1998;Willinger and Ziegelmayer, 1999;Cookson, 2000). From the point of view of psychologists, the studies of valence framing effects on cooperation generated a huge academic production implementing hypothetical instead of real incentives[3]. The majority of these works focusing on positive versus negative framing effects does not show any significant framing effects (Fleishman, 1988), while others (i.e.

[3] As Cookson (2000) points out it may be either that hypothetical incentives increase framing effects relative to real incentives because of subjects cannot focus carefully on decision problems or that framing effects results in "optical illusions" only, preventing subjects' to miss the point (Tversky and Kahneman, 1981).

Brewer and Kramer, 1986) find results contrasting with Andreoni (1995) and Sonnemans et al. (1998), even if implementing a common-pool resource game instead of a public good game.

2.2 Context-free versus in-Context Experimental Settings

One of the first rule to abide to when writing the instructions for an experiment is avoiding any kind of suggesting words. Every sentence has to be neutrally formulated in order to exclude the case for any expressions that may affect the behaviours of subjects. This aspect becomes particularly relevant when experimentalists try to model real-life situations to be checked in the laboratory. In fact, the attempt at replicating real-world decision problems starkly contrasts the need for an abstract terminology to be adopted, ending up with some difficulties in properly interpreting the experimental findings. Therefore, the majority of experimental studies implement a neutral and abstract set of instructions, although applied to real-world situations. Interesting examples of the effects of loaded instructions on experimental results may be taken from many different areas of experimental economics. Fehr, Gaechter and Kirchsteiger (1997) study the loaded instructions effects on labour market; Potters and van Winden (2000) analyze the impact of an in-context environment of lobbyists and policymakers; Weber, Keppe and Meyer-Delius (2000) find that negative and positive framing of endowments affects outcome in an experimental market environment; Hoffman, McCabe and Smith (2000), in exchange ultimatum game experiments, use instructions to change an impersonal exchange situation to a personal exchange situation; Shiv, Edell and Payne (1997) examine the effects of negative and positive framing of advertising claims on consumers choices and attitudes; Bolton and Katok (1995) identify different procedure-induced framing effects concerning task description frames; Druckman (2001) addresses the question on whether providing people with certain type of additional information enables them to adapt and overcome framing effects; Abbink and Hennig-Schmidt (2002) present a work including one condition where a framing of the economic problem of corruption as a bribery experiment; finally, Eckel and Grossman (1996) check for the role of altruism on subjects' decisions running a double-

blind dictator game replacing the subject acting as recipient during one treatment with a local branch of American Red Cross.

In particular, a question emerges from this analysis, should we use the experimental methodology to investigate the importance and effects of context looking at it in a "positive" way? The same doubt is pointed out by Loomes (1999, pag.39) "it may be more useful to try to study the impact of context than to pursue the impossible goal of eliminating it". According to us, this problem seems to be even more in the need of an answer when social and cultural factors as well as other-regarding behaviour matter.

2.3 The Public Good Nature of Culture

In the last decades economists seem to concern more and more about the link between the preservation and restoration of historical buildings, the level of cultural good and the economic theory (Champarnaud et al., 2002; Fryer, 2002; van der Ploeg, 2002). One of the first puzzles to be solved by the economists trying to apply the main tools of economic theory to cultural matters has been the definition of cultural good. Given that the aim of the present work is not the solution to this puzzling question, we will consider only the "public good" nature of cultural goods, which is, by the way, one of the most widely mentioned characteristic among the cultural economics literature.

The main effect coming from the public good nature of cultural goods is the presence of positive externality for the whole society when these goods are provided (Scandizzo, 1992; Mazza, 1993; Throsby, 1994; Pethig and Cheng, 2000;Finocchiaro Castro and Mazza, 2001). As it has been noted by Trimarchi (1993), even if cultural goods possess clearly the characteristic of non-rivalry in consumption, they may cause problems of congestion[4]. At the same time, cultural goods hardly show to possess the characteristic of non-excludability, given that it seems technically doable and economically convenient to implement mechanisms of consumption exclusion. Differently, Mazza

[4] For example congestion may occur in the case of cultural events taking place in museums or concert halls.

(1993, pag.37) points out that "Although cultural goods may be rival in consumption, it is often suggested that they produce 'national feeling' benefits which are non-excludable". A similar opinion is the one pursued by Mossetto (1993, pag.96) who describes the ambiguous role of artistic goods saying that "artistic goods are endowed with non-excludability even if the consumption is sometimes rival". However, we will consider the provision of cultural goods at a social level in order to be able to include both of the characteristics of non-rivalry and non-excludability into the definition of cultural goods, given the relevance of those goods for the society as a whole[5].

3. Experimental Design and Predictions

3.1 The Design

The experiment described in this paper involves two conditions, each of them played twice. The two conditions are called, respectively, context-free and cultural-context and each of them is composed by two treatments. The first treatment is a standard public good game with participants divided into five groups of four players and is the same for both conditions. All subjects are endowed with six tokens. They have to decide about the allocation of their endowment between two projects A and B. Each token placed in project A (x_i) earns one Experimental Currency (EC) for the subject. Differently, each token allocated to project B (g_i) gives the exactly the same payoff to every member of the group as showed by the second term of the left member of equation (1). In particular, the marginal per-capita return from the tokens allocated to Project B is 0.4. Then, each subject has to maximize the following payoff function,

$$\pi_i = x_i + 0.4\sum_{i=1}^{4} g_i, \quad s.t. \; x_i + g_i = 6 \tag{1}$$

[5] This point of view is suggested by Trimarchi (1993).

The second treatment, the same for both conditions, is divided into two phases. During phase I, subjects are asked to decide whether to allocate an initial endowment of six tokens between two projects C and D. They are told that the earnings from project D (z_i) will be available at the beginning of each period of phase II, directly added up to their initial endowment for that phase[6]. As stated for project B in the first treatment, the payoff from project C (y_i) is the same for each member of the same group and it depends on the contribution of all the members to this project.

At the end of each period of phase II, subjects have to maximize the following payoff function,

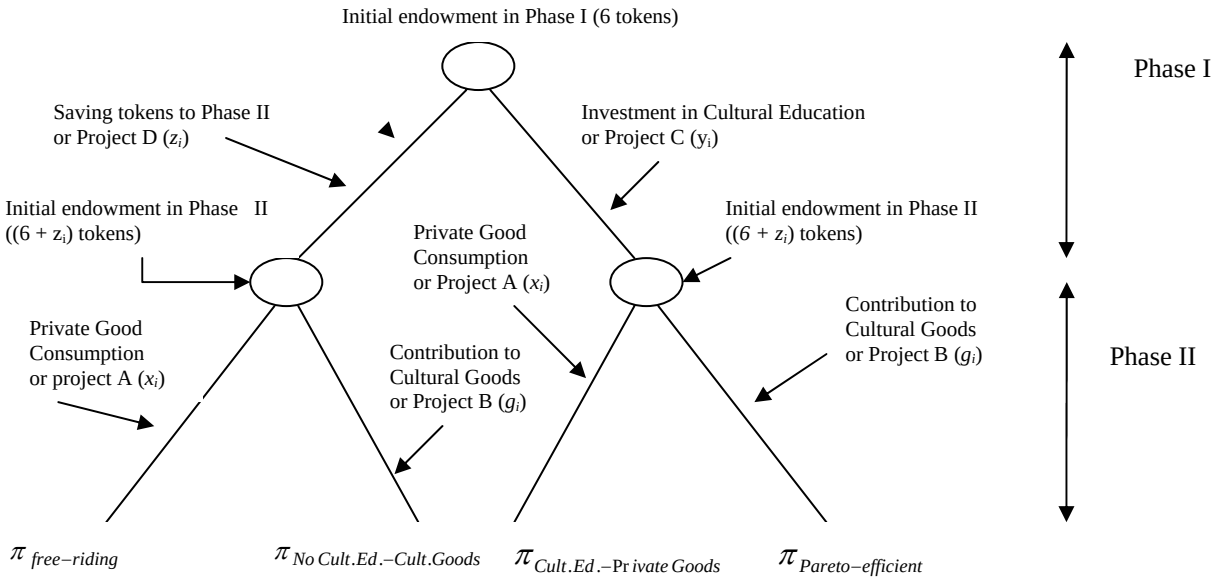
$$\pi_i = (x_i + z_i) + \left(0.3\sum_{i=1}^{4} y_i + 0.4\sum_{i=1}^{4} g_i \right) \qquad (2)$$
$$s.t.\ x_i + z_i + y_i + g_i = 12$$

Considering the equation in (2), it is important to remind that the term in square brackets represents the earnings accruing equally to each member of the group from both of investment in cultural education[7] and provision level of cultural goods. In this case, the marginal return accruing to every subject from investment in cultural education is 0.3. In order to make the structure of this second treatment clear, we introduce Fig.1 which depicts the game tree of the stage game.

Before moving to analyze the theoretical predictions, we describe the second condition called "cultural-context". The structures of the two treatments, constituting this condition, are exactly same as those of the previous treatments. They only differ in the adoption of a loaded wording. Table 1 presents a clear description of the changes adopted within this condition, all the other features of the treatments remaining the same as in the context-free condition.

[6] The highest individual endowment for phase II could be 12 tokens. In particular, 6 tokens as earnings from investment into project D in phase I plus 6 tokens as initial endowment of phase II given independently from any decisions made during phase I.

[7] The investment in cultural education has both a private and a public component. The former is given by the individual satisfaction from the art consumption due to the increased skills in arts; the latter is represented by the positive externality generated by the higher level of cultural education reached at social level. In this paper, I will only consider the public component of cultural education as relevant to my analysis following other contributions in the same field (Champarnaud et al., 2002; Fryer, 2002; van der Ploeg, 2002).



- Fig.1 -

Cultural-Context	**Context-Free**
"private good"	project A
"cultural good"	project B
"investment in cultural education"	project C
"Saving tokens to phase II"	project D

- Table 1 -

The experiment has been conducted at the Computer Laboratory at the Faculty of Law of the University of Catania. A total of 80 subjects have been recruited among a population of students from a wide range of studies such as Economics, Law and Political Science. Students could participate in only one of the two conditions of the experiment.

The design of the experimental software has been developed by the ECD staff of the University of Catania. At the end of each period, individuals have been informed about their payoffs from their own decisions regarding the allocation of their endowment among private good (project A), cultural education (project C) and cultural good (project B). Moreover, they have been reminded that their payoffs would also be affected by the decisions on investment in cultural education and contribution to cultural good made by the other members of the group. Before beginning the experiment, the

instructions have been read aloud and explained in detail. Any kind of communication has been forbidden. Subjects typed written responses directly into the computer in their own time. The order in which treatments were run varied across the two conditions to control for order effects and any effects of repetition. A random rematching protocol has been implemented so that each subject had no the chance to play with the same group members more then once. This was done to avoid the effects of strategic behaviours. At the end of each condition, subjects were paid anonymously in cash at an exchange rate of 0.50 euro per token earned.

3.2 Predictions

The first thing to note is that when there is a positive level of investment in cultural education (project C), the MR from the public good component of (2) increases because of the rise in the interest in the provision of cultural goods. In fact, the higher the level of individual cultural education is, the higher the intensity of individual sensibility to arts will be. A virtuous circle may be closed with a higher rate of contribution to the provision of cultural goods which causes a rise in the level of the stock of cultural goods in the society[8] and an increase in the attention to arts. Then, new investments in cultural education are expected to take place in order to start the circle again[9]. This mechanism seems to be able to give a fundamental suggestion on how to capture all the positive externalities generated by the investments in cultural education and by the contribution to the cultural goods. In fact, every subject investing in cultural education, in the experimental setting, contributes to the creation of benefits fully captured by all the members of the group. Although this solution seems to be working properly from a theoretical point of view, it poses some questions on the ability of individuals in internalizing such benefits and on the effective attitude to invest in

[8] The stock of cultural capital presents in a society in every moment is defined as society's cultural capital by Throsby (1999).
[9] A formal description of how this virtuous circle works can be found in Finocchiaro Castro and Mazza (2001).

cultural education[10]. The willingness to address these questions has led me to the implementation of the experimental design described in section *3.1*.

According to the standard game-theoretic approach, the Nash dominant strategy, obtained applying the backward induction procedure, foretells zero investment in cultural education and zero contribution to the provision of cultural goods. In other words, each subject should be playing the free-riding strategy. However, as showed by several experimental studies on public goods provision, the Nash dominant strategy does not coincide with the symmetric Pareto efficient solution. The latter suggests that each member of a group has to invest all of her endowment of phase I in cultural education and all the resources available in phase II in the provision of cultural goods.

According to the game tree of the stage game described by Fig.1, there are many possible final payoffs given the several choices that subjects may make. We will focus only on those four of them showed by Fig.1 at the end of the game tree. The first we want to discuss on is the free-riding payoff. Each subject is attracted by the chance to gain this profit level not investing anything in cultural education and not contributing any tokens to the cultural goods, while the others in the group are cooperating. This is the well-known path of choices to be followed by all the self-interested fully rational subjects. On the other side, it stays the symmetric Pareto efficient payoff. This level of profits is achievable only if all the subjects in a group invest their entire endowments in both cultural education and cultural goods. In other words, subjects are choosing to fully cooperate. In this way, the group as a whole can get the highest possible payoff. The sharp contrast between these two payoff levels represents one of the common results from public goods experiments (Ladyard, 1995).

Differently, this work allows for at least other two cases that need some further explanations. The first is the case when the members of a group are not so much willing to invest in cultural education

[10] In real-life situations, only already "highly educated" people seem to ask for more cultural education because of either real interest in the arts or prestige seeking behaviours.

during phase I but they are ready to contribute all of their endowments to the provision of cultural goods. There are several possible explanations to justify this pattern of choices.

First, subjects may feel already enough educated and, then, they prefer to save tokens during phase I to contribute more to the provision of cultural goods than subjects investing in cultural education. Second, they could be simply not interested in gaining more sensibility to culture and arts but, at the same time they want to do "the right thing" contributing to the cultural goods. This motive for contributing may be seen as a kind of warm glow emanating from the contribution to the cultural goods (Bagnoli and Lipman, 1992; Andreoni, 1990). In this case, subjects are supposed to gain utility from the contribution per se with any interest in how it can affect their endowments and in the level of the provision of the cultural goods achieved by the group. Third, although being cooperators, subjects may not have understood properly the role of investment in cultural education as font of positive externality (Andreoni, 1995).

The last payoff, showed by Fig.1, we want to analyze reflects the case where all the members of a group decide to invest all their endowments, available in phase I, into cultural education but they contribute very little to the provision of cultural goods. At a first glance, it could seem to be an illogic choice. In fact, if a subject is willing to increase her knowledge and sensibility to arts, she should be ready to participate to the diffusion of cultural goods in the society. Therefore, we do not expect either any self-interested or cooperator subjects, joining the experiments, to undertake this pattern of choices unless because of errors or confusion. Nonetheless, moving from game-theoretical reasoning, there may be people considering being themselves part of an elité when spending money and time on cultural education even if they do not care of the provision of cultural goods. We control for this prestige-seeking motive not communicating the individual contributions to the cultural goods to the other members of the group. In fact, subjects moved by prestige would only contribute to the cultural goods if their donations are publicly announced to their peers.

4. The Results

4.1 The effects of Cultural Education

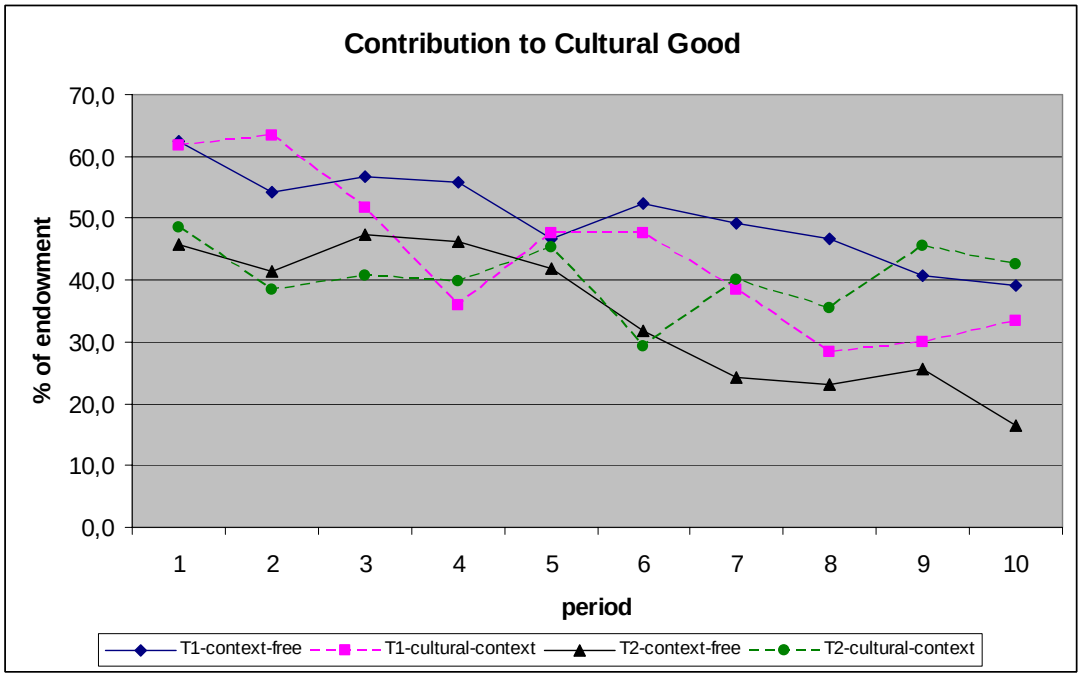
The first aspect we are going to deal with it will be the effects of investments in cultural education on the individual contributions to cultural goods. Clearly, in this case, we avoid the influence of framing by comparing the levels of contributions to cultural goods coming from the two treatments within one context at time. In this way, we can elicit the differences due only to the presence of investments in cultural education. In order to be able to disentangle all the possible influences between treatments, we present a table showing the average level of contribution as a percentage of the endowment reached along the 10 periods in each treatment.

Period		*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Treatment 1 - Context Free	Cultural Good	62,5	54,2	56,7	55,8	46,7	52,5	49,2	46,7	40,8	39,2
Treatment 1 - Cultural Context	Cultural Good	61,7	63,3	51,7	35,8	47,5	47,5	38,3	28,3	30,0	33,3
Treatment 2 - Context Free	Cultural Education	46,7	43,3	51,7	47,5	30,0	29,2	17,5	22,5	23,3	14,2
	Cultural Good	45,7	41,3	47,4	46,1	41,9	31,7	24,3	23,0	25,5	16,5
Treatment 2 - Cultural Context	Cultural Education	40,8	37,5	40,8	45,8	46,7	30,0	31,7	26,7	40,8	31,7
	Cultural Good	48,4	38,4	40,8	39,8	45,2	29,4	40,1	35,4	45,5	42,5

- Table 2 -

Let us start from the analysis of the data coming from the context-free condition. As shown by Fig.2 and table 2, the contributions to the cultural good from treatment 1 are always higher than the ones from treatment 2, which enables individuals to invest in cultural education. In order to test for the significance of this difference we implement the non-paramentric Mann-Whitney test. The value we obtain by this test shows that the variations are significant ($z = -2.874$). The decreasing trends

present in Fig.2 seem to be the same across the treatments, while there is a stronger end-effect in treatment 2 than in treatment 1. However, our previsions have been disattended and, moreover, have been subverted by the experimental data. Infact, we were expecting to see a higher level of contributions, on average, to the cultural good when the subjects have the oppportunity to invest in cultural education than when this possibility is not avalaible. It seems like subjects have not noticed the eventual positive effect for the whole group coming from investments in cultural education before. In particular, in the context-free condition, there cannot have been any influences from the framing on the individual contributions to cultural good. I think that cultural education has been interpreted as an eventual alternative choice to the contribution to cultural good by subjects. They did not get the opportunity to internalize the positive externality for the whole group allocating their initial endowment to the cutural education before contributing to the cultural good.



-Fig.2-

In order to verify more deeply this result, we have run the same test considering the data coming from the first period of observation and then considering only the last period's data. In the first case, every single contribution choice represents an indipendent observation because it has been taken

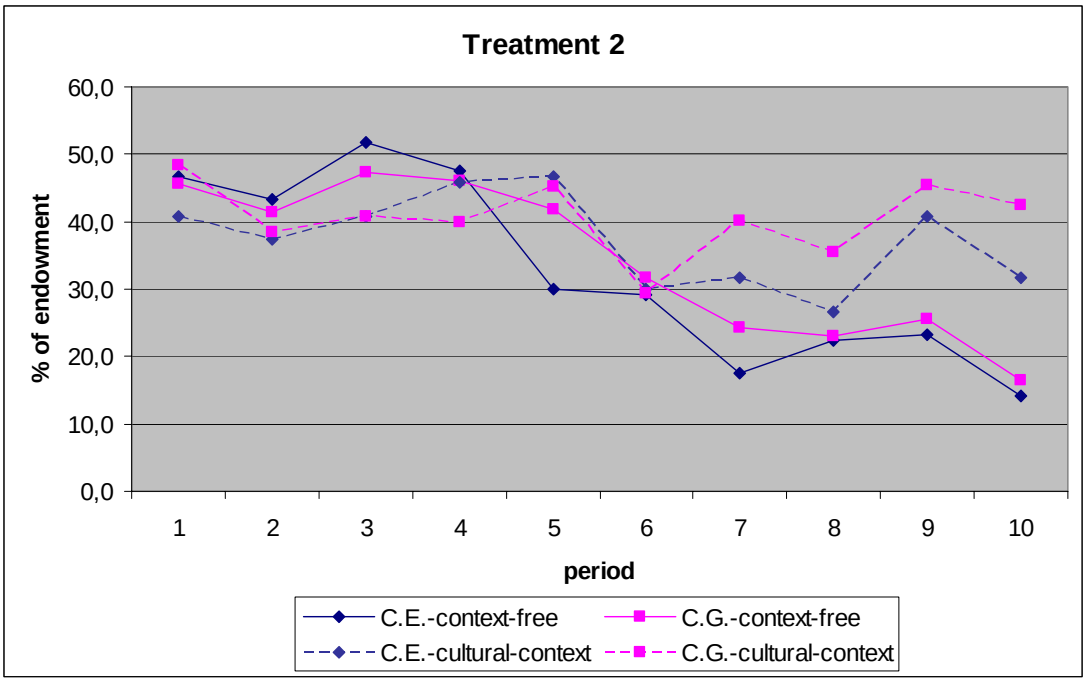
along the first period of the experiment when no influence can affect the choices. The test confirms the significance of the difference in contribution levels to the cultural good between the two treatments ($z = -2.487$). Considering the second case, differently, we cannot use the same amount of data but we have to adopt the average groups' contributions during the last period. Also in this circumstance, the test is showing the presence of significant differences ($z = -2.417$). Therefore, comparing the levels of contributions to the cultural good, when the context-free is implemented there are significant variations between the two treatments.

If we examine the case of the cultural context, we notice that the Mann-Whitney test does not show the presence of any significant difference between the levels of contribution to the cultural good ($z = -0.302$). This means that the possibility of investing in cultural education, during treatment 2, has not influenced subjects' decisions. Also in this case, we have checked for differences in the contributions in the first and last period of the condition. The results from the test regarding both of the first period ($z = -1.794$) and the last period ($z = -0.943$) confirm the whole trend not eliciting any significant variations.

As shown by Fig.2, althought not statistically significant, there are some differences in the patterns followed by the contributions made in the two treatments. First of all, it is worth noticing that the levels referring to treatment 2 are higher than the ones from treatment 1 in each of the last four periods. It may be interpreted as the effect of the investment in cultural education being able to boost the contributions to the cultural good. Moreover, the presence of this effect, in the last four periods, is showing the interval of time necessary to understand and learn the role of investment in cultural education. Second, althought always below the contribution levels of treatment 2 from period 8 onward, Fig.2 shows an unusual increase in the contributions during treatment 1. This increase in contribution has been noticed in four groups out of five contrasting the well-known end-effect observed in the other cases.

4.2 The effects of Framing

In this section, we will investigate the effects due to what we call the cultural context. Those effects may be found in both of investments in cultural education and contributions to cultural good across the two conditions characterizing our experiment. We can start having a look at the patterns of the investments in cultural education across the two contexts. The first thing to be noticed is that the values coming from the cultural context are always greater than those of the context-free after period 4, althought they both show the usual decreasing trend reflecting the end-effect. This result seems to be entirely due to the framing effect that has put in evidence the role of the investment in cultural education. Moreover, it is interesting to notice the striking difference in the values of the last period: 31.7% in the case of cultural contest and 14.2% in the case of context-free, as showed by Fig.3. As done in the previous paragraph, we have checked whether those variations were significant through the Mann-Whitney test ($z = -0.758$) finding that we cannot reject the null hypothesis stating that the two groups of observations have the same distribution. As done before, we have also checked for significant differences in the first and last period. Regarding the former, we have a clear evidence of not significant differences between the two framings ($z = -0.989$). Infact, also graphically, it is possible to see that the values relative to the first period are very close each other. In order to assist to a strong increase in the distance between those two lines, we have to look at the last two periods. This observation suggests that even a “technical” feature as the change in the framing needs some time for its implications to be fully understood by the subjects. This consideration is confirmed by the result of the Mann-Whitney test when applied to the last period data ($z = -2.402$).



- Fig.3 -

In this case, there is a significant difference in the values and we can reject the null hypothesis, stating that the two contexts differ during the last period. Again graphically, we can notice how greater is the value of the cultural context compared to that of the context-free. This aspect validates both of the effects of framing in the case of the increase in the investments in cultural education when the cultural context is implemented and the fact that this effect requires some periods to be fully internalized by subjects.

Therefore, subjects, on the average, do not seem to immediately understand the game even if we introduce a different framing which makes clearer and easier the way to choose the best strategy. According to our previsions, having the possibility to make such investments should have helped subjects in internalizing the positive externality for their own group originating from both of the investments in cultural education and the cultural good provision. In our experiment, it is possible to notice that this intuition has been caught by subjects just after period 4 for both of the contributions to cultural education and cultural good.

We can, now, move on to the analysis of the framing effects on the contributions to the cultural good, focusing on the differences between the two conditions in order not to mix the effects of

framing with those coming from the presence of investments in cultural education. Then, we consider, first, the results coming from treatment 1. As showed by Fig.2, the two lines are both decreasing regardless of the context implemented. In the case of cultural context, the level of contribution starts from pretty high values (62.5%) and, then, it decreases until period 8 (28.3%). Surprisingly, during the last two periods, the level of contributions increases slightly above the 30% contrasting the famous end-effect. At a first glance it may seem due to the implementation of the cultural context. Anyway, it has to be noticed that the contributions to the cultural good, when using loaded instructions, is almost always below the level of the context-free contributions. Therefore, it does not seem to be such a framing effect able to explain the rise in the last two periods.

All the considerations we have formulated can be tested through the Mann-Whitney test which confirms that all the differences between the two contexts are not significant ($z = -1.362$). This result is also proved both when considering the first period ($z = -0.334$) and the last period of the experiment ($z = -0.862$). Although, in the case of cultural context, the instructions have been written such in a way to make clear references to the concepts of cultural good and cultural education, we have not found any significant variations in the contribution levels during treatment 1. These results seem to contrast the common finding of the experimental literature regarding the framing effects showed in the previous sections.

Concluding, we have to analyze the patterns of contributions to cultural goods showed by treatment 2. Again referring to Fig.3, it is possible to check that the two lines take almost the same values until period 6 showing the usual declining trend. The most interesting part comes from period 7 onward with the steep increase in the contribution to the cultural good in the case of the cultural context. In fact, while the context-free case shows a decreasing trend and a clear end-effect in the contributions, the level of contributions in the cultural context increases remaining well above the one of the context-free and presenting a light end-effect in the last period only.

Therefore, we can check, using the Mann-Whitney test, for the presence of significant differences between groups of observations not finding any significant difference ($z = -0.756$). We get the same

result when we consider the observations coming from the first period only (z = -0.666). However, if we check for the last two periods of observations, the differences are all significant (z_9 = -2.193; z_{10} = -2.402)[11].

Therefore, the effect of framing seems to be focused on the last periods of the experiment where the differences in contributions become significant. This behaviour may imply the fact that subjects required a quite long period of time in order to understand the benefits coming from cooperation. Nevertheless, it seems peculiar that, given such a clear and straight reference to cultural goods in the instructions, the effect of framing has started so late. Further research is required to analyze more in depth the role of framing when a cultural context is implemented.

5. Concluding Remarks

Our main aim has been to answer to two questions. First, if the possibility of investing a portion of the initial endowment in cultural education may affect the individual levels of contribution to the cultural good. Second, if the adoption of different framing along the experiment may have influenced subjects' contributions.

Considering the first question and focusing on the context-free framing, the cultural education does not seem to have caused any increase in the contributions to the cultural good. Moreover, the values regarding the treatment 1, which does not include the investments in cultural education, are always much greater that the ones of treatment 2. This result has subverted our previsions regarding the positive effects of cultural education on the contributions to the cultural good. Most likely, the possibility to gain higher earnings for the own group has not been either understood or exploited by

[11] The subscripts refer to the period of observation.

subjects. Differently, in the case of cultural context, we did not find any significant differences in the contribution levels to cultural good. Anyway, it is interesting to notice that treatment 1 does not show the common end-effect, most probably because of the peculiar context implemented.

Regarding the second question, our first result shows that a change in the framing did not have any effect either on the investments in cultural education, except in the last period, or on the contributions to the cultural good in the case of treatment 1. A more interesting result concerns the case of treatment 2. Infact, the framing seems to have a strong effect only on the last two periods, while it does not show any significant effect on the rest of the periods. Such an effect appears to be completely due to the adoption of the cultural context although we have to underline the amount of time that subjects have surprisingly required to increase the cooperation. Therefore, it seems that, even if implementing a clear and direct context such a cultural one, individuals are not affected enough by the context so to increase the level of cooperation from the beginning of the experiment.

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