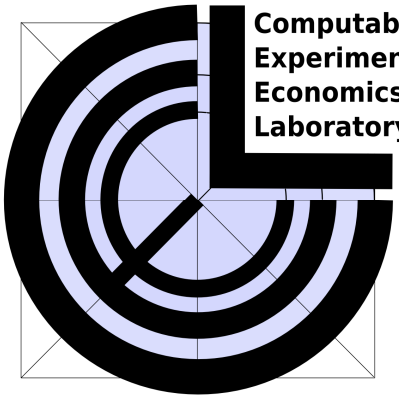

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How to explain the participation effect: is it a question of different expectations and communication? A preliminary investigation

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How to explain the participation effect: is it a question of different expectations and communication? A preliminary investigation

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Abstract

This experiment is a preliminary test to explain the participation effect observed in Bortolami and Mittone (2009). The aim of this new version is to test whether the contributory gap is more properly justifiable in terms of pure environmental choices, or, on the contrary, whether the gap is more strictly related to behavioural dynamics. To verify the former hypothesis, an environmental change regarding communication is introduced. To test the latter, empirical and normative expectations are explicitly considered.

KEY WORD: public goods, participation effect, computer mediated communication, empirical and normative expectations.

JEL: C92, H41

1. Introduction

The experiments in Bortolami and Mittone (2009) show that the way by which a sanctioning/rewarding rule is implemented in a public good game significantly affects the level of individual contributions. They compare the effect of two different enactment procedures: a self-determination modality and an imposition modality of the same rule to control free riding. From a purely theoretical perspective, the same rules should deter opportunistic behaviour with the same efficacy, and only different rules are expected to generate different efficiency, for example according to their severity (as in Decker, Stiehler & Strobel 2003).

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Bortolami and Mittone observe that whenever a group participates actively in the determination of a sanctioning/rewarding rule, the levels of individual contributions are significantly greater than those obtained in a group that simply receives the same norm, taking all other conditions as fixed.

Moreover, the participation effect is displayed with a domain of rules that never alter the dominance of free riding behaviour. In other words, Bortolami and Mittone choose a set of parameters that cannot generate rules strong enough to make the contribution the dominant strategy (as for instance in Tyran and Feld, 2006).

Bortolami and Mittone's experimental design consists of two games in succession, the first is called the Basic Game (a linear public good game) and the second is called the Basic Game with Rule (the same Basic Game, but now played with the sanctioning/rewarding rule). After having played the Basic Game, the experimental group (constituent group) proceeds by creating the sanctioning/rewarding rule. This enactment procedure is called the Rule Phase, which consists of a combination of discussion and voting stages. The final rule is an arrangement of five elements that the constituent group determines step-by-step. The rule is then implemented in the Basic Game of both the constituent group and of a control group (recipient group). Since the rule is determined in the constituent group, Bortolami and Mittone define this procedure as endogenous enactment (or self-determination). To the contrary, the control group merely receives the rule, so that this is termed exogenous enactment (or imposition).

Bortolami and Mittone initially study whether a participation effect exists. After having observed such behavioural regularity, they quote three different classes of possible explanatory elements. The first concerns the enactment procedure in itself, deeming the vote, discussion and decomposition modality to play a potential influence. The second class regards several hypotheses about different conformity expectations generated within groups. Finally, they quote a set of social-psychological dynamics associated with participation, such as the group goal effect, the closeness effect and the inner coherence effect.

None of the aforementioned possible classes is directly tested in Bortolami and Mittone. This paper instead directly investigates whether the gap may be explained in terms of two specific elements: communication modality and/or in terms of different contributory expectations generated in the groups. In order to isolate the role of these potential variables, the initial experimental design in Bortolami and Mittone (2009) is properly modified. This new formulation in the experimental design is named "Software Version".

The remaining part of the paper is organized as follows: Section 2 provides the modifications of the experimental environment; Section 3 describes the new experimental design; Section 4

presents the experimental results; Section 5 discusses the main findings and finally Section 6 concludes.

2. The software version

2.1 The role of the communication modality

The only main (and possibly) relevant difference between the environment of the standard version in Bortolami and Mittone (2009) and that of the software version lies in the way by which players can communicate. In the present new version, we have introduced Computer Mediated Communication (CMC) by the use of a chat.

CMC by chat aims at verifying whether the participation effect is affected (or explained) by the way used to communicate within groups. As largely accepted by scholars (see for instance Isaac & Walker, 1988), it is not only the mere presence of communication that is an important element in achieving a cooperative level of contribution: but also the medium by which communication is realized may have interesting consequences. The main result observed in the literature is that face-to-face communication is potentially stronger than impersonal communication, since the former implies more *meta-factors* that may reinforce the communication device. Importantly, scholars deem the face-to-face medium to be relevant even in contexts where psychical interaction is reduced. Brosing et al. (2003) suggest that visual and active interactions are equally important elements that affect both contribution levels and cooperation stability.

Following the definition of Brosing et al., our chat is both non-verbal interaction (i.e. people communicate by writing), and active communication, since our players can exchange opinions and reply to each other's communication. Furthermore, our chat maintains the anonymity condition, since players enter the chat by their Identity Codes (ID). From this perspective, our chat is similar, but not identical, to their individualization treatment (in which players can see the other players for just ten seconds)[2]. Neither their lecture nor their audio conference treatments correspond to our chat: in fact, our players do not listen to the content of the chat. Their video-conferencing treatment is different from our chat: our players cannot physically establish "who said what" (i.e. they cannot associate the ID in the chat and the "real" identity of the player).

[2] In any case, this parallelism seems to be quite contrived. Brosing et al. (2003) explicitly isolate the individualization treatment. In our case, we may conjecture that players have seen the other participants only for a short time, that is, when they enter the laboratory. Nevertheless, this consideration does not weaken our environment, since it is a *ceteris paribus* condition between groups (i.e. our constituent group and our receiver group do the same).

The aforementioned characteristics allow us to consider our chat as an original one, when compared to Brosing's et al. (2003) communication media. Consequently, we cannot expect to obtain exactly the same results as in their experiments. Nevertheless, several other studies may suggest the direction of our chat effect. For instance, Bochet et al. (2006) observe that both types of communication -i.e. face-to-face and CMC by chat- improve the level of contribution. More importantly, the level of public good provided does not significantly differ between the two media. From this perspective, we may expect the same contributory effect as well in our experimental test. However, a direct experimental test on our chat is needed, given the specificity of our environment.

Moreover, outside the public good game literature, there is an open debate among socio-psychological scholars about the effect of CMC. Broadly speaking, the debate concerns scholars who assert that there are important differences between CMC and face-to-face communication, and scholars who argue the equivalence of such communication media.

The first class of studies deems face-to-face communication to be the best vehicle to spread social norms within a group. To this end, they stress the role of real and concrete social interaction to build up social identity and group responsibility. In this sense, CMC is an artificial device, which both alienates individuals from their real social context, and weakens social cues. This approach is defined as Reduced Social Cues (RSC). Consequently, CMC may degenerate into so-called de-individualization, which may have the same effects as anonymity (see, for example, Sproull & Kiesler, 1991). In the context of social problems, like the public good, this de-individualisation could amplify the anti-social phenomena, such as free riding.

The so-called SIDE approach (Social Identity-De-individualization) belongs to the second debated class. These studies acknowledge two different identity types: the personal identity (unique for each individual), and the social identity (any individual has several social identities, according to different social contexts). Following this perspective, the effect of CMC is strictly related to the context where the communication takes place. In other words, specific contexts highlight different social norms, which may elicit different social identities (see, for example, Spears, Postmes, Lea, & Wolbert, 2002). Therefore, it is possible that, in certain contexts, CMC implies hyper-social behaviour, even more cooperative than the face-to-face medium. The latter consideration is chiefly analyzed in the so-called SIP (Social Information Processing), where authors deem CMC to also elicit social stereotypes. In this regard, Walther (1996) asserts that asynchronous communications[3] may lead to such stereotyped characterization. From this

[3] Asynchronous communication does not require the contemporaneous presence of both sender and receiver whenever the message is sent. The presence of this interval of time characterizes this communication, as in exchanging letters. E-mails are the classical example of CMC asynchronous

perspective, both face-to-face communication and CMC by chat are synchronic communications, but the latter may maintain the anonymous condition.

Considering the aforementioned results, we may expect that the introduction of CMC communication should not completely nullify the positive gap between constituent and recipient groups. In other words, we assume that the mere possibility to communicate dominates the communication modality. Nevertheless, since we suspect that the positive gap is also due to inner group dynamics, we cannot exclude at the beginning the specificity of face-to-face communication, as claimed by the pure CMC theory, or by Isaac and Walker (1988). Put differently, previous experimental studies suggest the equivalence between face-to-face communication and CMC, since no significant difference in the level of public good provided has been found. Our specific experimental design, however, is not perfectly comparable to such studies. Consequently, we cannot be sure that the equivalence of the media in our case. Hence, a first experiment is run to verify whether the change of communication modality is relevant to the level of public good provided. To this end, we have formulated the following experimental question:

Does computer-mediated communication (by chat) nullify the contributory gap between constituent group and recipient group?

If the answer is "yes", we will explain the participating effect in terms of the communication medium. In this case, we should consider in more depth the reason why face-to-face communication significantly affects our gap.

If the answer is "no", we will seek other possible factors to explain why direct participation in a normative procedure yields a higher level of contribution in the constituents groups.

Although we include CMC to verify whether the participation effect is influenced, it is interesting to note that the insertion of the chat makes our environment comparable to Dickson's et al. experiment (2007). These authors highlight the importance of the content of communication in the presence of heterogeneous agents. The chat allows us to monitor the communication networks, that is, we can observe both the person who speaks and the one who listens, and the content of the communication. This may be interesting to reveal whether communication is effectively cheap talk or whether, on the contrary, it has a strategic meaning or a persuasive effect. Nevertheless, this analysis has to be postponed to future research, since

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communication. On the contrary, Synchronous communication involves the contemporaneous presence of both sender and receiver, for example, the classical face-to-face communication, or a telephone communication. In the CMC context, chat is an example of synchronous communication. Nevertheless, the way in which people gather information by communication is different. In face-to-face communication there is generally one sender and one (or multiple) receiver. On the contrary, in chat communication, the information flow does not follow a particular order (i.e. people may receive multiple messages at the same time).

our environment does not allow us to relate personal communication and effective contribution, for at least two reasons. The first concerns a general problem of our chat: individual messages appear in sequence and sometimes it is not possible to link individual answers and their related questions.[4] The second reason regards the step-by-step procedure in the Rule-Phase, where there are five chats. The correspondence between individual communication and final contribution is fragmented and, consequently, a clear and immediate relationship cannot be established.

2.2 The Role of Expectations

In this software version, we have introduced another element of novelty, that is a questionnaire provided at the end of the first round in the Basic Game with Rule (BG+R), but before the announcement of the total aggregate level of public good. This questionnaire represents a hybrid method to test whether contributions are related to expectations and, possibly, whether different contributions between constituent and recipient groups are due to *different* expectations.

The questionnaire is distributed at the moment of the BG+R for two main reasons. Firstly, we do not aim to change completely the experimental design, in order to maintain (where possible) the comparability of this new version to the standard one. From this perspective, we have still not introduced any specification about the "types" of players and, hence, we are focusing again on the aggregate effect of normative participation.

Secondly, we suppose that the first round may be the moment when expectations about conformity (i.e. about the contributions of the others) are mainly exempt from the subsequent game dynamics.

Our method is a not the mere application of an already-existing example in the literature. To be more precise, our method is a hybrid of at least three different approaches. The first coincides with the specification in Bicchieri (2006), that is, we include her definition of expectation by means of normative and empirical expectations. The second defines our core of analysis as in Croson et al. (2006), that is, we consider the individual average contributions as an anchor of personal updating. Finally, our distinction between empirical and normative expectations may be a parallel to Dufwenberg's et al. (2006) distinction between first- and second-order beliefs.

In particular, our experimental modification should directly test whether Bicchieri and Xiao's (2007) specific statement about free riding and compliance is concretely observed in our results. The authors deem empirical expectations to be insufficient to make people comply. To

[4] All players enter the chat with their personal ID. In the chat instructions we explicitly ask people to always refer to the other's ID when they reply. However, sometimes people simply answered "Yes" or "I do not agree", without indicating to which question they referred (for instance, "Yes, I agree with ID5's opinion", and so on).

this end, they report free riding to be the typical example. When compliance in public goods means to abide by a contributory norm, the expectation of the positive contributions of the others (i.e. empirical expectations) increases the incentive to free ride. Consequently, the authors assert this type of expectation-alone- does not support conformity behaviour in public good games. They suggest the introduction of normative expectations, that is, individual expectations about the expectations of the others about proper conformity (more precisely, what the individual believes others think ought to be done).

When applied to our framework, Bicchieri and Xiao's position is quite general, since it does not take into account whether the way by which norms are enacted may affect individual expectations of conformity and, henceforth, individual contributions. Nevertheless, it is important to stress that their study concerns dictator games and not public good games. In fact, the authors do not explicitly clarify which kind of expectations is predicted to occur in case of free riding.

The classical theoretical hypothesis deems free riders to have exogenous expectations. Furthermore, free riders have a unique dominant strategy in null contributions, independently of the contributions of the others. In cases where free riders expect positive contributions, theory asserts that they will free ride more (as in the case of positive Nash conjectures). If we assume that expectations affect behaviour (as in Offerman, 1997; Offerman, Sonnemans & Schram, 2001) and not vice-versa, we may formulate the theoretical free riding prediction following Bicchieri's approach, i.e. distinguishing between empirical expectations (E.E) and normative expectations (N.E). However, a pure theoretical perspective does not introduce any separation between expectations, since any representative agent (perfectly rational) will never contribute, independently of his expectations. A possible translation of the theoretical expectations may be realized as follows:

$$\forall\ E.E_i(\overline{q}_{-i}) \text{ and } \forall\, N.E_i(E_{-i}(\overline{q}_{-j})), \qquad q_i = 0 \qquad [1]$$

Where $E.E_i(\overline{q}_{-i})$ is individual *i*'s empirical expectation about the average of the others' contributions. The normative expectation, $N.E_i(E_{-i}(\overline{q}_{-j}))$, concerns individual *i*'s expectation about what he thinks the others will expect on average. In this perspective, the theoretical expectation in [1] finds a more direct analogy between Bicchieri's definition and first and second order beliefs.

The specification of what "one ought to do" is related to expectations of conformity, i.e, with the expectation of the others' contributions. Suppose that complying with the norm means simply to contribute, then the conformity expectations in [1] may be specified as follows:

$$E.E_i(\bar{q}_{-i}) > 0 \qquad \text{and}$$
$$N.E_i(E_{-i}(\bar{q}_{-j})) > 0 \qquad [2]$$

Case [2] expresses the consistency of the direction between empirical expectations and normative expectations. Individual conformity follows such consistency when the agent positively contributes too, that is:

$$E.E_i(\bar{q}_{-i}) > 0 \text{ and } N.E_i(E_{-i}(\bar{q}_{-j})) > 0 \text{ yields } \quad q_i > 0 \qquad [3]$$

To the contrary, the incentive to free ride may be formalized as follows:

$$E.E_i(\bar{q}_{-i}) > 0,\ N.E_i(E_{-i}(\bar{q}_{-j})) > 0 \text{ yields } \quad q_i = 0 \qquad [4]$$

In our environment, the conformity threshold is exogenously determined, that is, people do not comply with the contributory norm whenever their contribution belongs to the range $0 \le q_i \le 4$ ($q_i \le 4$)[5]. To the contrary, we consider as conforming behaviours all the contributions belonging to the range $5 \le q_i \le 10$ ($q_i \ge 5$).

If one assumes that the same norm has the same effect independently of its enactment, the level of contributions should be the same between constituent and recipient groups. To the contrary, in the standard version Bortolami and Mittone observe a gap, which they relate to the participation effect. To test whether this gap is supported by expectation considerations, we may follow two different hypotheses. The first concerns different conformity expectations between groups, whereas the second concerns different uses of such expectations. Since we are considering a group effect rather than an individual perspective, we consider average expectations between groups.

Assuming that empirical and normative expectations have the same direction (i.e. they are consistent, following Bicchieri's perspective), we may formalize the first hypothesis as follows:

$$\text{H1.} \qquad \overline{E.E}_{Gr1}(\bar{q}),\ \overline{N.E}_{Gr1}(\bar{q}) \neq \overline{E.E}_{Gr2}(\bar{q}),\ \overline{NE}_{Gr2}(\bar{q}) \qquad [5]$$

Following hypothesis [5], the gap may be explained in terms of greater expectations of conformity in the constituent groups than in the recipient groups, for example:

$$\overline{E.E}_{Gr1}(\bar{q}),\ \overline{N.E}_{Gr1}(\bar{q}) \ge 5 \text{ and } \overline{E.E}_{Gr2}(\bar{q}),\ \overline{NE}_{Gr2}(\bar{q}) \le 4 \qquad [5.a]$$

The second hypothesis assumes equal expectations between groups, which means:

$$\text{H2.} \qquad \overline{E.E}_{Gr1}(\bar{q}),\ \overline{N.E}_{Gr1}(\bar{q}) = \overline{E.E}_{Gr2}(\bar{q}),\ \overline{NE}_{Gr2}(\bar{q}) \qquad [6]$$

In our framework, for example, H2 may be:

[5] In Bortolami and Mittone (2009) free riding is intended in the "weak" meaning, that is with contribution $0 \le q_i \le 4$ (see next sections for details).

$$\overline{E.E}_{Gr1}(\overline{q})\ ,\ \overline{N.E}_{Gr1}(\overline{q}) = \overline{E.E}_{Gr2}(\overline{q}),\ \overline{NE}_{Gr2}(\overline{q}) \geq 5 \qquad [6a]$$

Nevertheless, different (or equal) expectations alone do not explain our gap, since it is necessary to express the relation between expectations and contributions.

Assuming the relationship suggested by Offerman (1997), expectations determine contributions. Conformity may be intended as the positive correlation between conformity expectations (i.e. $\overline{E.E}(\overline{q}),\ \overline{E.N}(\overline{q}) \geq 5$) and conformity contributions ($\overline{q} \geq 5$). To the contrary, a strategic use of conformity expectations means to observe (weak) free riding contributions. This may be expressed by the following specifications:

$$\overline{E.E}(\overline{q}),\ \overline{N.E}(\overline{q}) \geq 5 \text{ and } \overline{q} \geq 5 \text{ for conformity behaviour} \qquad [7]$$

$$\overline{E.E}(\overline{q}),\ \overline{N.E}(\overline{q}) \geq 5 \text{ and } 0 \leq q_i \leq 4 \text{ for strategic use} \qquad [8]$$

In exemplification [5a], the recipient groups should contribute less as the result of rational-theoretical behaviour and not in a strategic meaning. In other words, the strategic use arises as exploitation of other positive contributions, but, when one expects others will also not contribute, the incentive to free ride is related to the pure condition of Marginal Per Capita Return (MPCR) $MPCR < 1$ (see for example Sefton & Steinberg, 1996).

3. The Experiment

3.1 Participants

The global game is proposed to two groups, the experimental group and the control. Each consists of 14 members, chosen randomly (by voluntary subscription to the game) among students at the University of Trento (Italy).

Before the game starts, each member is given a personal identity number (ID), in order to maintain anonymity condition during the entire game. Before making the first choice, all the instructions are read aloud by the experimenter and any doubts are clarified (see the Instructions in Appendix for details).

3.2 Procedure

The sequence of the game is the same as the standard version in Bortolami and Mittone (2009) except for the chat phase and the presence of the questionnaire to elicit participants' expectations.

Both groups play five rounds of the "Basic Game". The BG belongs to the family of linear public good games with voluntary contribution mechanism, without infra-group

communication. The linear payoff function in the Basic Game is $\pi_i = 10 - q_i + 0.08 \sum_{j=1}^{14} q_j$, where the initial endowment is 10 Euros.

At the beginning of each round, people have to decide their personal choice of investment. At the end of each round, the participants see in their computer screen the total amount of the public good provided.

The experimental group proceeds to the "Rule-Phase", in which the sanctioning/rewarding rule is determined. The final rule is the output of five different phases in succession. Each phase is presented separately, and people do not know the specific content of each phase in detail, but they commonly know the total number of the phases and what each phase will regulate. At the beginning of the "Rule-Phase" they are informed that they have to decide about:

1. When the control will take place;
2. How many people will be controlled;
3. The type of punishment;
4. The possibility to reward;
5. The type of reward.

Each phase consists of a discussion stage about a set of alternatives, followed by a voting referendum (with majority criterion). The chief difference of the software version is the introduction of the chat. We propose five "chat rooms", one for each discussion phase. Any chat is open after the relative component options on the screen have been read. The specific chat room is opened for the same period as in the standard version discussion phase. People may decide to close the chat before the maximum time available has elapsed, by keying in "I'm ready to vote". If all members are ready to vote, the chat is closed. When the chat is closed, it is not possible to enter again, and agents anonymously type their preferred option. The computer adds up all votes, displaying on each screen the option that obtained the majority of preferences. Any winning option is displayed on the lower part of the screen, in order to allow agents to monitor step-by-step the normative enactment.

Finally, the experimental group and the control group play the five rounds of the BG again, but now knowing that the rule (BG+R) is in force.

At the end of the first round, but before the communication of the aggregate level of contributions, both groups answer to the (remunerated) questionnaire. We structured our questions in two parts: the first concerns what individuals expect other players will contribute on average; the second concerns what individuals expect other players will expect. This distinction is an intermediate definition of expectations when compared to a pure Bicchieri's

approach. In fact, our questionnaire regards both first and second order expectations about contributions, and conformity expectations due to the normative enactment. In other words, whenever players indicate how much they expect other players will contribute, they are also indicating the expected level of compliance. For instance, whenever they express expectations greater than the weak free riding threshold, they are implicitly assuming that other players will abide by the contributory norm. The two sets of questions concern the indication of both the expected average individual contribution, and the expected collective public good provided (by indicating the expected column in the payoff table). Following Gachter and Renner (2006) and Bicchieri and Xiao (2007), our questionnaire is paid, that is, players know they can win an extra monetary recompense for any correct prediction (at the end of the BG+R).

The payoff function in the BG+R is the same of the standard version, that is:

a) In case the player is audited (with probability $p = \frac{r}{5}\frac{n}{14}$) his payoff becomes:

$$\pi_i = 10 - q_i + 0.08\sum_{j=1}^{14} q_j - \frac{1}{14}C(Q) + R(Q) \qquad \text{if } 5 \le q_i \le 10 \qquad [9]$$

$$\pi_i = 10 - q_i + 0.08\sum_{j=1}^{14} q_j - \frac{1}{14}C(Q) - P(Q, q_i) \qquad \text{if } 0 \le q_i \le 4 \qquad [10]$$

b) In case the single player is not audited (with probability $p = 1 - \frac{r}{5}\frac{p}{14}$) his payoff becomes:

$$\pi_i = 10 - q_i + 0.08\sum_{j=1}^{14} q_j - \frac{1}{14}C(Q) \qquad [11]$$

Where:

r is the number of round controlled; *n* is the number of subjects controlled; *C* is the sum of all collective costs associated with the specific rule; *R* is the Reward; *P* is the Punishment.

This general payoff function changes according to the options chosen by the subjects in the Rule Phase. Table 1 specifies what are the values associated with every option and the associated costs (see the Instructions in Appendix for details).

For the sake of exposition suppose the subjects determine a rule combination with {1C; 2A; 3A; 4A and 5E}. The associated values will be (r=2; n=1; R=0.02Q; P= π_i). The specific payoff function would become:

a) In case the player is audited (with probability $p = \frac{2}{5}\frac{1}{14}$) his payoff becomes:

$$\pi_i = 10 - q_i + 0.08\sum_{j=1}^{14} q_j - \frac{1}{14}0.0601Q + 0.02Q \qquad \text{if } 5 \le q_i \le 10 \qquad [9a]$$

$$\pi_i = 10 - q_i + 0.08 \sum_{j=1}^{14} q_j - \frac{1}{14} 0.0601Q - \pi_i \qquad \text{if } 0 \le q_i \le 4 \qquad [10a]$$

b) In case the single player is not audited (with probability $p = 1 - \frac{2}{5}\frac{1}{14}$) his payoff becomes:

$$\pi_i = 10 - q_i + 0.08 \sum_{j=1}^{14} q_j - \frac{1}{14} 0.0601Q \qquad [11a]$$

Phase	*Options and Associated Costs (c)*				
	A	*B*	*C*	*D*	*E*
1	*r = 1 (fixed at the beginning), c = 0.05Q*	*r=1 (random), c = 0.03Q*	*r = 2, c= 0.06 Q*	*r = 3, c= 0.09Q*	*r = 5, c=0. Q*
2	*n= 1, c= 0.001Q*	*n= 2, c= 0.002Q*	*n= 3, c= 0.003Q*	*n= 4, c= 0.004Q*	*n= 5, c= 0.005Q*
3	*Yes*	*No*			
4	*R= 0.02Q (windfall)*	*R= 0.02Q (endogenous)*			
5	*P=0.02 Q*	*P=0.1π_i*	*P= α Q* *α =0.05Q, If q_i=0* *α =0.04Q, If q_i=1* *α =0.03Q, If q_i=2* *α =0.02Q, If q_i=3* *α =0.01Q, If q_i=4*	*P= β π_i* *β=0.10, If q_i=0* *β=0.08, If q_i=1* *β=0.06, If q_i=2* *β=0.04, If q_i=3* *β=0.02, If q_i=4*	*P= π_i*

Table 1. *The parameters associated with the Rule's options.*

The actual final payoff is determined according to individual personal performance. It is common knowledge (i.e. it is clearly stated in the instructions) that the payment will be provided at the end of the whole game (i.e. after the BG+R), by random extraction of one round for each game. This method is adopted in order to exclude any uncontrolled interference among games, and to allow the games to be considered as multiple one-shot games when they are analysed separately.

4. Results

4.1 The Comparison of the Basic Games

As in the standard versions, the first comparison between groups concerns the BG. The aim is to provide the same game experience before proceeding to the BG+R. The BG prediction is that, on average, one observes weak levels of free riding in both groups. The first five rounds in Figure 1 show the aggregate level of public good provided in BG.

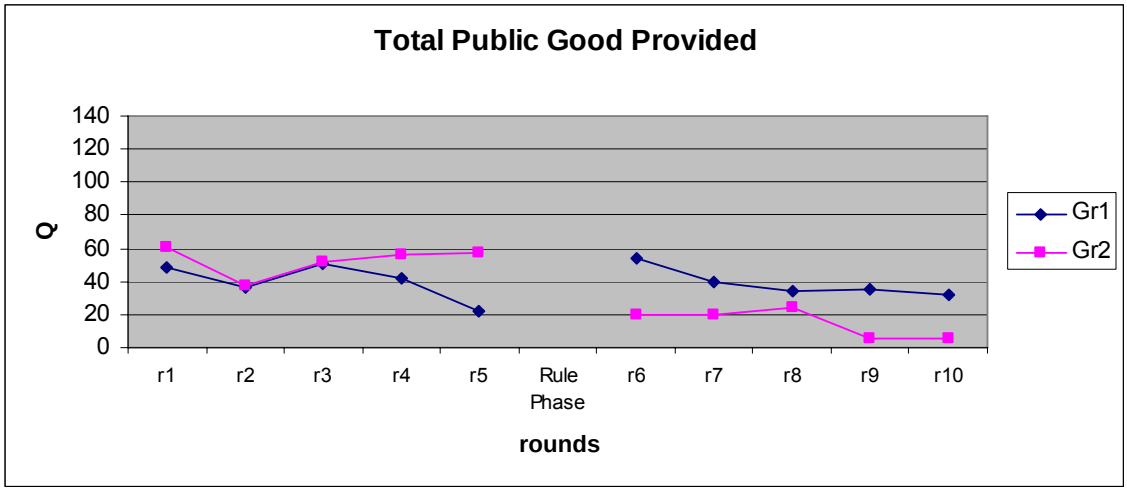

Fig. 1. *The level of total public good provided (Q)*

In a general game history perspective, the experimental-constituent group (henceforth G1) contributes on average about 28% of the maximum public good achievable, whereas the control-recipient group (henceforth Gr2) contributes with 37%. Decay is present in the first group after the third round, where the amount of the final round is about the half of the first round. This decrement implies smaller individual average contributions in the first group than in the second group (where $\overline{q}_{Gr1} = 2.8$ Euros and $\overline{q}_{Gr2} = 3.7$ Euros). Despite this contributory difference, both groups confirm our prediction of a weak free riding contribution in BG.

From an between-groups perspective, Gr1 and Gr2 are significantly different only in the last round, in which Gr2 provides a significantly greater level of aggregate public good (see Table 2). Nevertheless, comparing the individual average contributions, Gr1 and Gr2 are not significantly different (Mann-Whitney one-tailed test, $p = 0.210$).

Between-groups (Mann-Whitney Test)	***R1-R1***	***R2-R2***	***R3-R3***	***R4-R4***	***R5-R5***
Gr1-Gr2	*p= 0.559*	*p= 0.510*	*p= 0.869*	*p= 0.274*	*p= 0.026*

Table 2. *Between-groups analysis. Round-wise comparisons (level of Q) in BG*

It is possible to distinguish the contributions of participants according to four classes of contribution: the strong free riding class ($q_i = 0$); the very weak free riding class ($1 \le q_i \le 4$); the half-endowment class ($q_i = 5$) and the contributory class ($5 \le q_i \le 10$). The Mann Whitney test confirms that no class is significantly different between-groups (respectively,

$p = 0.065$ for the strong free riding class; $p = 0.655$ for the weak free riding class; $p = 0.105$ for the half-endowment class; $p = 0.906$ for the contributory class).

4.2 The Rule-Phase and the CMC by chat

The constituent group proceeds with the normative enactment, choosing among the same alternatives as in the standard version.

The final rule states that at the end of the game, one round is randomly selected by the computer. In this round, the computer selects one player. If she/he is a weak free rider, she/he will pay 10% of the payoff sanction. If the audited player is a contributor, she/he will receive 2% of the public good, exogenously provided. The total cost of the norm enactment is 3.1% and it makes the Q columns in the payoff shift at most by one column to the left.

This norm is very weak, the weakest when compared to standard version norms.

Given the final options, the final payoff is differentiated among eventual contributor and eventual free rider:

a) In case the player is audited (with probability $p = \frac{1}{5}\frac{1}{14}$) the payoff becomes:

$$\pi_i = 10 - q_i + 0.08\sum_{j=1}^{14} q_j - \frac{1}{14}0.031Q + 0.02Q \qquad \text{if } 5 \le q_i \le 10 \qquad [12]$$

$$\pi_i = 10 - q_i + 0.08\sum_{j=1}^{14} q_j - \frac{1}{14}0.031Q - 0.10\pi_i(Q) \qquad \text{if } 0 \le q_i \le 4 \qquad [13]$$

b) In case the single player is not audited (with probability $p = 1 - \frac{1}{5}\frac{1}{14}$) the payoff becomes:

$$\pi_i = 10 - q_i + 0.08\sum_{j=1}^{14} q_j - \frac{1}{14}0.031Q \qquad [14]$$

4.3 The results of the Basic Game with Rule

The results of the BG+R are very important, since they provide a direct test of the existence of the gap at the presence of a CMC by chat. We adopt the same efficiency indexes used in the standard version, that is, we proceed by comparing the total level of public good provided and the number of free riders after the normative enactment.

4.3.1 The total level of public good provided and individual contributory averages

The second five rounds in Figure 1 show the aggregate level of public good provided in both groups. It clearly emerges that the constituent group always contributes more than the recipient group. More interestingly, when compared to the BG in Figure 1, the groups reverse their

relationship. In BG the recipient group contributes more (but not significantly more) than the constituent group.

A first important observation concerns the effect of the weak norm enactment. This norm does not improve the level of contribution in both groups. Gr1 provides, on average, 28% of maximum public good, whereas Gr2 achieves 10%. This means that the constituent group does not change the individual average contribution ($\overline{q}_{Gr1R} = 2.78$ Euros) and Gr2 decreases the individual average contribution ($\overline{q}_{Gr2R} = 1.07$ Euros) when compared to the case of the absence of the rule. For this purpose, from within-group perspective, with and without the norm, Gr1 does not significantly reduce its average contribution (Wilcoxon test, $p = 0.997$), whereas Gr2's contribution significantly decreases (Wilcoxon test, $p = 0.003$)

Through between-groups round-wise comparison, we can test whether the software version displays the same participation effect observed in the standard version. In particular, we focus on the first round comparison, since we suppose that in such rounds the participation can display an unconditional effect (i.e. it is not associated with the game history). Table 3 confirms that the first, the fourth and the last rounds are statistically different, although not in a strong direction. These differences imply that the aggregate level of public good provided is statistically greater in Gr1 than in Gr2 ($p = 0.009$).

Between-groups (Mann-Whitney Test)	***R1-R1***	***R2-R2***	***R3-R3***	***R4-R4***	***R5-R5***
Gr1-Gr2	*p= 0.044*	*P= 0.148*	*p= 0.401*	*p= 0.008*	*p= 0.036*

Table 3. *Between-groups analysis. Round-wise comparisons (level of Q) in BG+R*

We summarize these first observations in our first result:

Result 1. *The insertion of a weak norm does not increase the levels of public good provided in both groups. Nevertheless, the constituent group provides, on average, a significantly greater level of public good than the recipient group. In a round-wise between-groups comparison, the maximum participation gap is observed in the fourth round, but also the first round is statistically (weakly) different.*

4.3.2 Contributory allocations and number of free riders

To understand the source of the contributory gap between groups, we consider how individual allocations are distributed in the entire game history. Figure 2 shows two modal values: the first coincides with the strong free riding class and the second is the half-endowment contributions.

The strong free riding allocations correspond to about 44% of cases in Gr1 and 77% in Gr2. The half endowment class is about 34% of cases in Gr1 and 15% in Gr2. In particular, in the first round, the number of strong free riders in Gr1 corresponds to about a 50% of free riders in Gr2 (35% and 64% respectively), whereas the number of half contributions in Gr1 is double that of the number in Gr2 (50% and 21% respectively). From this perspective, we can conjecture that the first round gap is due to the greater number of strong free riders in Gr2.

Figure 3 aggregates the same information obtained in Figure 2, in order to highlight the difference between classes of allocations.

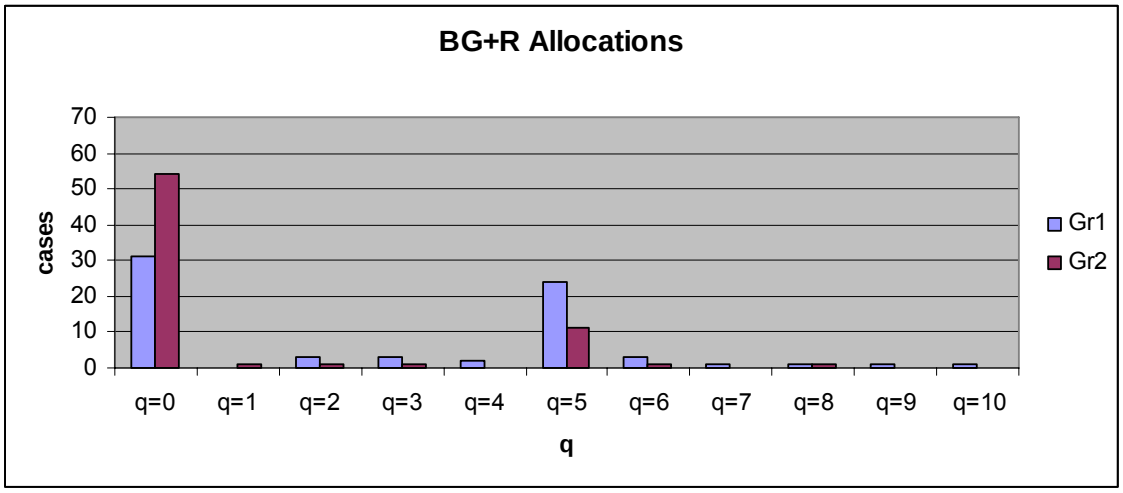

Figure 2. *Frequencies for type of allocation (q) in the BG+R.*

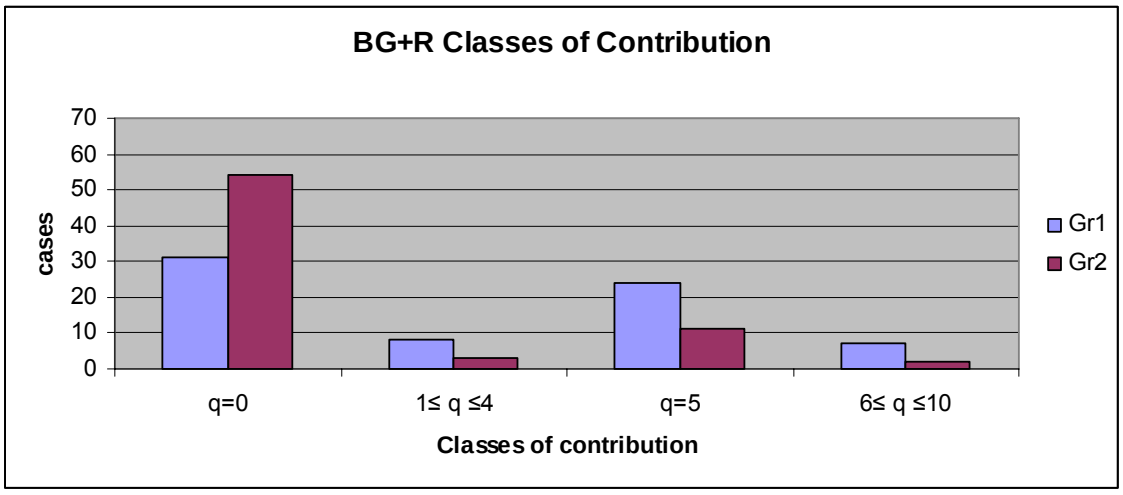

Figure 3. *Frequencies for classes of contribution in the BG+R*

The Mann-Whitney test confirms that, from the game perspective, the number of free riders is significantly greater in Gr2 than in Gr1 ($p = 0.008$). Moreover, the number of half-

contributions is significantly greater in Gr1 than in Gr2 ($p = 0.017$). To the contrary, the weak free riding class and the contributory class are not significantly different (respectively, $p = 0.154$ and $p = 0.106$). These observations are summarized in our second result:

Result 2. *This weak sanctioning norm is not able to repress the number of free riders. Nevertheless, the number of strong free riders is significantly smaller in the constituent group than in the recipient one. Furthermore, Gr1 displays a significantly greater number of half endowment contributions than Gr2.*

4.4 Expectations analysis

Table 4 provides a first within-group comparison in terms of collective average contributions, empirical and normative expectations. Empirical and normative individual expectations do not differ significantly in both groups (Wilcoxon test $p = 0.096$ in Gr1 and $p = 0.157$ in Gr2). The Spearman correlation test supports the consistency of the expectations' direction in both group, that is, empirical and normative expectations are strongly positively correlated. Moreover, in Gr1 individual expectations are positively and significantly related to individual contributions. To the contrary, in Gr2 this relationship is weaker and not significant (Table 5).

Group Average (r1 BG+R)	***q***	***E.E***	***N.E.***
Gr1	*3.85*	*4.57*	*5.14*
Gr2	*1.4*	*2.5*	*2.7*

Table 4. *Group average contributions and expectations*

Spearman Correlation test	***q-E.E***	***q-N.E***	***N.N-N.E.***
Gr1	*0.652 (p=0.011)*	*0.713 (p=0.004)*	*0.832 (p=0.000)*
Gr2	*0.142 (p=0.627)*	*0.057 (p=0.844)*	*0.854 (p=0.000)*

Table 5. *Spearman Correlation test within-groups*

We notice that the constituent group presents, on average, greater empirical and normative expectations. The Mann Whitney test confirms that both expectations are significantly different between-groups ($p = 0.012$ for E.E and $p = 0.003$ for N.E). This is a very important result, since we obtain a first empirical support for the hypotheses in Section 2.2.

Given the strong correlation between expectations and their common direction, we proceed to consider only the empirical expectations. Figures 4 and 5 show that the weak norm causes different empirical expectations between groups. The recipient group expects prevalently weak free riding contributions, whereas the constituent group mainly expects the conformity class. Figure 5 highlights that the contributory composition within-group is reversed in the between-groups comparison. In fact, the contributory class is 64% in Gr1 and 29% in Gr2, whereas the punishable class yields 34% in Gr1 and 71% in Gr2.

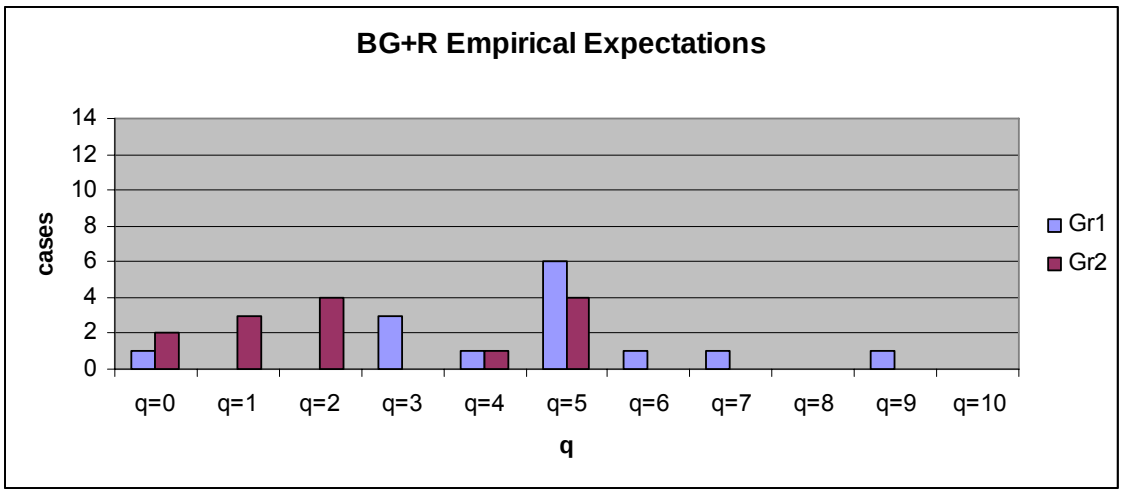

Figure 4. *Empirical Expectations between groups*

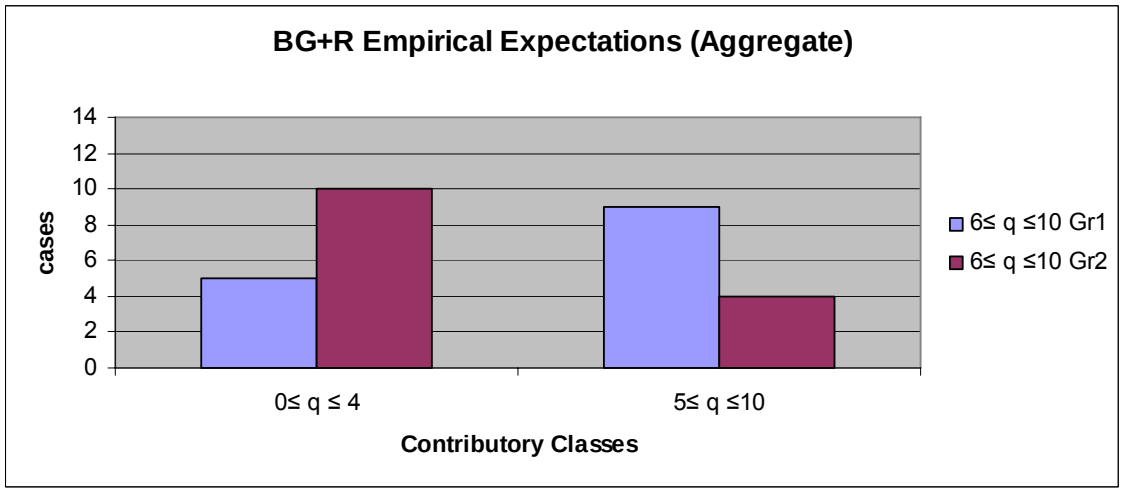

Figure 5. *Empirical Expectations for Contributory Classes*

These results support hypothesis H1 (5), that is, empirical and normative expectations have the same direction within-groups, but they significantly differ between-groups. In particular, we may specify Hypothesis 1 in the same way as expressed in (5.a):

$E.E_{Gr1} = N.E_{Gr1} \geq 5$ and

$E.E_{Gr2} = N.E_{Gr2} \leq 4$

In order to understand the "use" of such expectations, we consider how contributions are related to expectations. As exposed in Section 2.2, the strategic use of expectation arises when individual expectation belongs to the contributory class *but* the effective contribution is in weak (strong) free riding class. Figures 6 and 7 provide within-group analysis of the strategic use of expectations. The perfect application of strategic use is really marginal in both groups, since it is applicable only to one player in Gr1 (subject 10) and 2 subjects in Gr2 (subjects 1 and 10). Nevertheless, the constituent group has greater expectations of conformity and positive answers to such expectations (confirmed by the positive and significant Spearman index in Table 5). To the contrary, the recipient group has less conformity expectations and it contributes with prevalently strong free riding allocations.

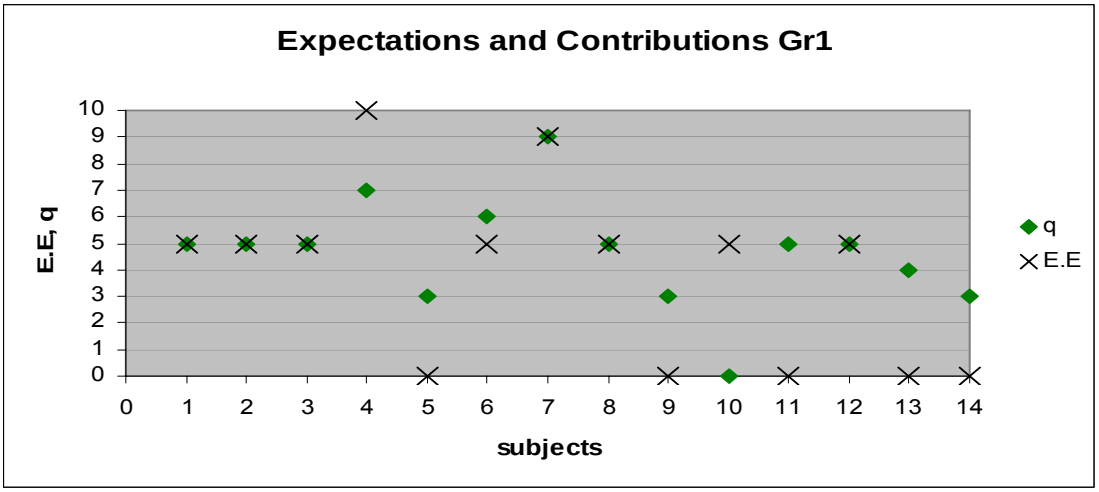

Figure 6. *Strategic use of Expectations in the constituent group (Gr1)*

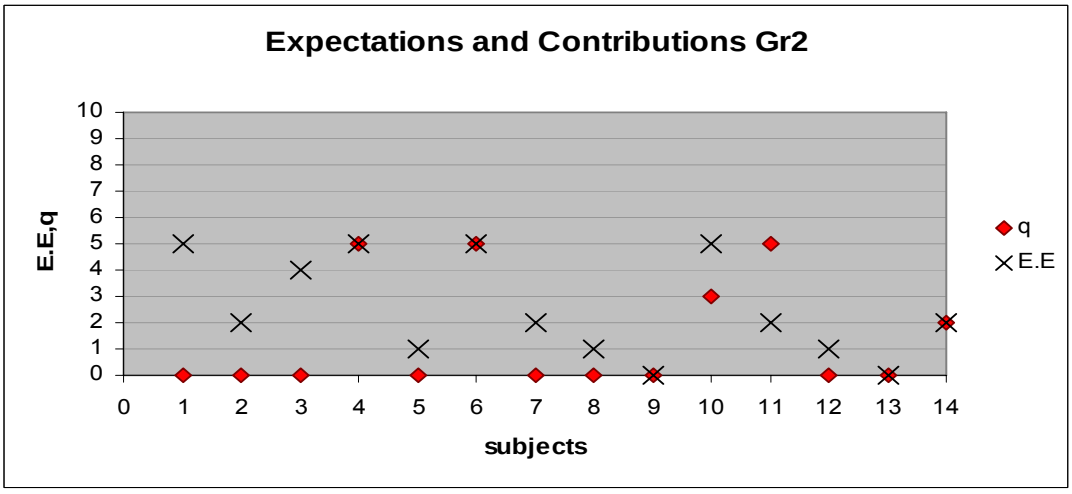

Figure 7. *Strategic use of Expectations in the recipient group (Gr2C)*

In Gr1 strong free riding expectations do not coincide with null contributions, although the latter mostly belong to the weak free riding class (except for player 11). In Gr2 the opposite behaviour occurs, that is, the greatest part of strong free riding allocations matches positive expectations of others.

Our results confirm that participating to a normative enactment positively affects conformity expectations. More importantly, the constituent group does not exploit such greater expectations in a strategic sense. This may suggest that people positively answer to these expectations by contributing more, i.e., they seem to be conditionally conformist. To the contrary, the recipient group not only does not expect group conformity, but it also free rides independently of any expectation (since group expectations are weakly and insignificantly related to effective contributions).

5. Discussion

Our results confirm the presence of a behavioural gap due to the participation effect. Even adopting a CMC by chat, the constituent group contributes more than the recipient group. In order to perfectly isolate the effect of the CMC, we should compare the results of the software version to those of another standard version experiment with the same norm. Although there is no equal software-rule in the standard versions, we deem the present norm to be similar to the A-rule in Bortolami and Mittone (2009). In fact, both norms may be defined as weak sanctioning rules. Both experiments achieve a similar result, that is, the constituent groups contribute more, but the enacted norm is inefficient. Moreover, both recipient groups decrease their initial contributions (i.e. in BG) in the presence of an exogenous enactment. Therefore, we observe that a participation gap is generally present, independently of the type of norm (i.e. different weak norms). In contrast, the specific normative formulation may be responsible for the contributory differences between experiments A and that of the software. Although we are chiefly interested in participation effect realization (and, hence, independent of the final rule), we compare the efficiency associated with different formulations, between the standard version (A-rule) and this first software version (henceforth C-rule). Nevertheless, in order to single out which component may cause contributory differences, we should compare the components' incidence one-by-one, *ceteris paribus*. On the contrary, C-rule and A-rule differ in two components, specifically, the number of players audited, and the type of sanction (but both norms determine the sanction as percentages on free-rider payoff). Provided that Gr2A and Gr2C have experienced the same free riding extent[6], the problem of different component

[6] The Mann-Whitney test confirms that Gr2A and Gr2C are not significantly different in their BGs. Nevertheless, the only significant difference is in the first round-wise comparison (p= 0.015). Other

incidence is completely excluded, since also the BG+R comparisons show the absence of any significant difference (see Table 6).

Between-groups (Mann-Whitney Test)	***R1-R1***	***R2-R2***	***R3-R3***	***R4-R4***	***R5-R5***
Gr2A-Gr2C	*p= 0.679*	*p= 0.818*	*p= 0.747*	*p= 0.628*	*p= 0.730*

Table 6 *Between-groups analysis. Round-wise comparisons (level of Q) in BG+R(A-C)*

These results suggest that, despite the presence of different weak components, the participation effect is found equally in the software version and in the standard experiment A. Moreover, we reassert that weak norms do not improve contributions, but the constituent groups contribute less inefficiently. This is realized independently of the communication medium adopted, suggesting the dominance of communication *per se*.

It remains to be explained why the participation gap is still realized in the software version. The analysis of the expectations provides a first (partial) explanation of our contributory differences between groups. We observe that empirical and normative expectations have the same direction in both groups, providing a first answer to Bicchieri and Xiao's (2007) open question. The study of these authors regards a dictator game, but they ask whether in public good games these expectations are consistent or whether, on the contrary, the incentive to free ride is predominant. Although both groups present expectation consistency, we find that participating in the enactment process achieves significantly greater expectations than in the recipient group. More importantly, the constituent group does not exploit such greater expectations. As we stated previously (see Section 2.2), greater expected positive contributions should theoretically stimulate free riders to defect. On the contrary, Gr1 replies positively to such expectations by contributing in the same direction. This observation is supported by our data, since expectations and contributions are strongly and significantly related in the constituent group. The use of lower expectations in the recipient group suggests a "rational reply". In other words, players do not expect the conformity of the others; therefore, any positive contribution that they should exploit is lacking. Moreover, they contribute independently of any expectation of the others, leading to the theoretical prediction of strong free riding contributions. We cannot assert the general absence of strategic use in the recipient group, since our results are related to this weak norm formulation. In fact, we cannot exclude that severe norms would lead to different results. In other words, in the presence of strong rules,

rounds (R_n) do not show any significant difference between groups (specifically, p=0.147 in R_2; p= 0.214 in R_3; p= 0.080 in R_4; p= 0.854 in R_5). Moreover, there is no difference in the total level of public good provided in the game history (p=0.117).

people may expect greater contributions than those expected with C-rule; therefore, the incentive to free ride is effectively realized. The new results should be compared to hypotheses H1 and H2, but now the concrete existence of free riding incentive should be compared, in particular, to specification [7] or [8].

In spite of the above considerations, our results neither explain why participation generates greater expectations, nor why the constituent group does not use these expectations strategically. It looks as if the constituent group displays conditional conformity, that is, people may comply because they expect other players to abide by the contributory norm. This provides indirect support to Tyran and Feld's (2006) definition of conditional contributions in the presence of a mild law. As in that study, our data also reinforce some undetected behavioural dynamics in the presence of inefficient sanctioning rules. Probably, the participation gap is also related to direct involvement in the enactment process, which may generate inner (positive) group dynamics. For instance, the presence of the voting mechanism may represent a sort of behavioural anchoring for BG+R contributions. Nevertheless, people acknowledge the weakness of the norm, so they expect, at most, contributions that avoid the application of the norm (i.e. the half endowment allocation).

6. Conclusions

This experiment is the first session of our software version, which confirms the presence of the participation gap using a CMC by chat. From this perspective, the role of communication *per se* seems to dominate the choice of the medium adopted, confirming previous experimental results (Bochet et al. 2006).

Although this experiment provides interesting results, we are aware of several important limitations, regarding both the confirmation of the behavioural gap between groups, and the role of expectations. First of all, this is only the first experiment with the software version. We confirm the correctness of the BG structure by comparing the contributory range obtained in the standard and the software versions. In both versions, we obtain significant levels of weak free riding. In order to more firmly confirm the result of the BG+R, we should compare the same norm. Nevertheless, we obtain that similar weak norms have the same effect in terms of efficiency. This validates the hypothesis that the participation gap is not merely casual in the software version.

Secondly, we test the role of expectations in a very small number of observations, and only for the first round. Future investigations should be addressed to replicate this avenue with more experimental groups, and also throughout the general game- history perspective.

Finally, we are mainly interested in normative enactment with a collective dimension, rather than from an individual perspective. In this regard, we have not carried out a deep within-group analysis. Nevertheless, our first results suggest the presence of a conditional conformity (group) effect as a good candidate to explain the participation gap. This provides indirect support to Tyran's and Feld definition of conditional contributions in the presence of a mild law (see Tyran & Feld, 2006).

In any case, further research is required, not only to replicate this software version, but also to verify whether participation implies a greater level of expectations, independently of the effective (weak or severe) norm enacted. Therefore, part of the questions presented in Bortolami and Mittone (2009) still remains to be tested, upholding the potential of this experiment for future investigations.

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APPENDIX

Instructions

Software Version
(This is a translation of the original Italian version)
Introduction
[In brackets the variations for the second group]

Welcome and thank you for your participation
With this game you can earn an amount of money, which depends both on your decisions and on what other players will decide.
Please read carefully the following instructions. If you have any questions, please raise your hand and an experimenter will clarify your doubts.
Throughout the whole game, you are not allowed to communicate. The violation of this rule leads to the exclusion from the experiment and from all payments.
To ensure your anonymity, you will play using your ID. Nobody will be able to trace your personal identity from your decisions. Please, key in your ID whenever required.
This game consists of three separate parts, which will be presented in sequence.

1. **Basic Game**. This is the baseline game of the entire experiment. It consists of 5 independent stages (rounds).
2. **Rule-Game.** In this part you and other players will decide a rule, by means of a specific procedure of discussion and voting [2. Chat].
3. **Basic Game with rule.** You will play the Basic Game with the norm. [3. Again the Basic Game with a change].

The payoff table is the same for all participants, 14 players including yourself. This table will help you to make your choices. The instructions about the payoff table will be given in the next steps. The instructions for the Rule-Game [Chat] will be provided after the Basic Game.
At the end of the experiment you will be paid in cash.

Basic Game

The decision situation
You have an endowment of 10 Euros, that you can invest. You can decide to invest between two different funds, called Private Fund and Collective Fund, respectively.
You decide how many Euros to allocate to the different funds. Any combination is acceptable, provided that your digits are integer numbers in the range 0 to 10 (included), and that the sum of the amounts invested is 10 Euros.
In general:

- Any Euros spent in the Private Fund guarantees you will receive at least the same amount. Examples: if you decide to invest 10 Euros, you will receive at least 10 Euros; if you invest 8 Euros you will receive at least 8 Euros.
- The Collective Fund pays a variable return, which depends on the amount present in the Collective Fund itself. The amount in the Collective Fund is the sum of all contributions that you and other

players will decide to invest in this fund. The greater the amount present in the Collective Fund, the more money the fund will return.
The Computer calculates how many Euros are invested in the Collective Fund; it applies a rate of 0.8%, and such increased amount will be equally divided into 14 parts, one for each player. You will receive 1/14 of the Collective Fund, independently of your initial investment in this fund.
Only in the case when the Collective fund reaches 140 Euros, does it return 15 Euros to each player.
Example: you decide to invest 4 Euros in the Collective Fund. As soon as other players enter their investment, the computer will calculate the total amount present in the Collective Fund and its relative interest. For instance, if the Collective Fund has 100 Euros, the computer will announce 108 Euros, which divided into 14 equal parts, will provide 7.7 Euros to each player.
The real values obtained from the investment will be approximated (example 1,12 becomes 1; 2,49 becomes 2.5; 3,39 becomes 3.5 and so on)

Your payoff
Your final payoff is the sum of your initial investment in the private Fund, plus 1/14 of the Collective Fund.
Example: you invest 4 Euros in the Collective Fund and, consequently, the remaining 6 Euros are invested in the Private Fund. If the computer announces 100 Euros, your payoff will be 14 Euros:

$$6 \quad + \quad \frac{100\,(1+0.08)}{14} = 13.7 \rightarrow 14 \text{ Euros}$$

From the Private Fund (6 Euros) + From the Collective Fund (7.7 Euros)

The Payoff Table
The payoff table helps you to understand your possible payoff.
In the first column you find any possible allocation to the Collective Fund (from 0 to 10 Euros included).
In the first line you find all possible levels of Collective Fund that the computer may announce (from 0 to 140s Euros included).
Your possible payoff corresponds to the intersection of your investment choice in the Collective Fund, with the column of the possible amount announced by the computer. Any cell already includes the sum of your investment returns, from both the private and the collective investment. You can check that the payoff in the example above is really the intersection of line 4 Euros, with column 100 Euros (see Fig.1).
The announcement is made after you and other players key in your investment choice. The announcement of the Collective Fund, and your relative payoff, indicates the end of a round. Your initial investment, the Collective Fund and your payoff are recorded at the top of the computer screen (see Fig. 2).

	Possible Total Amounts Present in the Collective Fund										
What you invest in the Collective Fund	**0-13**	**14-27**	**28-41**	**42-55**	**56-69**	**70-83**	**84-97**	**98-111**	**112-125**	**126-139**	**140**
0	10.5	11.5	12.5	13.5	14.5	15.5	16.5	18	19	20	
1	9	10.5	11.5	12.5	13.5	14.5	15.5	17	18	19	
2	8	9	10	11.5	12.5	13.5	14.5	16	17	18	
3	7	8	9	10	11.5	12.5	13.5	15	16	17	
4	6	7	8	9	10	11.5	12.5	14	15	16	
5	5.5	6	7	8	9	10	11.5	13	14	15	
6	4.5	5.5	6	7	8	9	10	11.5	13	14	
7	3.5	4.5	5.5	6	7	8	9	10.5	12	13	
8	2.5	3.5	4.5	5.5	6	7	8	9.5	10.5	12	
9	2	2.5	3.5	4.5	5.5	6	7	8.5	9.5	11	
10	1	2	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	15

Fig.1 Payoff Table

The procedure of the Basic Game
At the beginning, the computer will ask you to key in your ID. After that, click OK.
From here on, all procedures will be computerized. Please, key in your ID whenever required.

After the first Collective Fund announcement, you will have to make four more choices. All rounds are independent of the others, that is, at the beginning of a new round you always have 10 Euros available.
The Basic Game will end after the fifth announcement is made. The payment for this game is made at the end of the experiment, by randomly extracting one round among the five you have played. During the entire game you are not allowed to communicate.

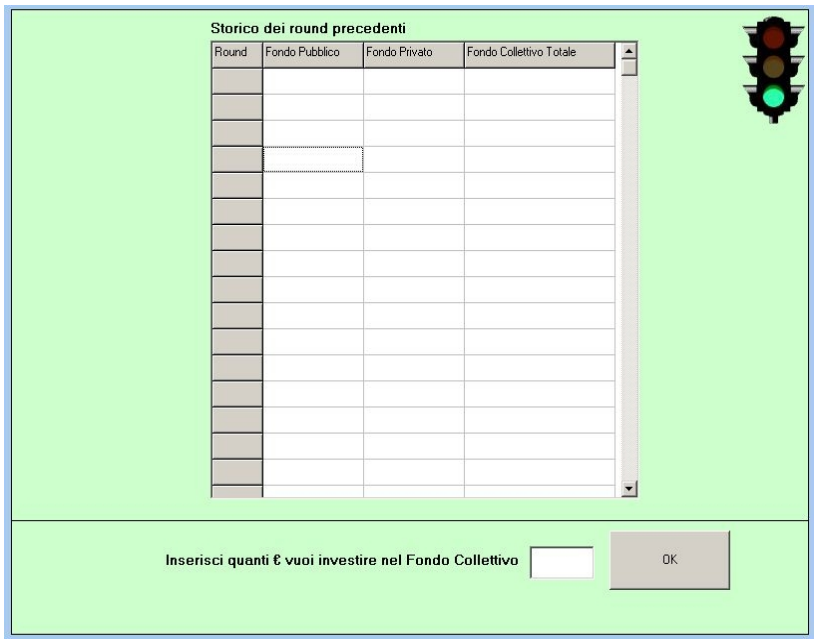

Fig.1 Basic Game's Computer screen (Italian version)

Control Questions
Please answer the following questions:

1) If you decide to invest 0 Euro in the Private Fund, and the computer announces 70 Euros, what is your final payoff? _____
2) If you decide to invest 0 Euro in the Collective Fund, and the computer announces 70 Euros, what is your final payoff? _____
3) If you decide to invest 3 Euros in the Private Fund, and the computer announces 12 Euros, what is your final payoff? _____
4) If you decide to invest 3 Euros in the Collective Fund, and the computer announces 12 Euros, what is your final payoff? _____

Are there any questions?

Rule-Phase

The aim of this game is to create a rule that significantly reduces the individual investments in the Collective Fund from 0 to 4 Euros included, that is, to promote the investment from 5 to 10 Euros included.
This rule will be inserted in your next Basic Game.
The rule consists of 5 components, which decide:

- When the control takes place;
- The number of players that are audited;
- The possibility to reward people who contribute with more than 4 Euros included;
- The type of reward;
- The type of sanction to be applied to players who contribute from 0 to 4 Euros included.

The game consists of a sequence of five phases, one for each rule component.
All components have a set of alternatives (options). As you will see, these options may be related to some costs.
You can briefly discuss the set of options with other players. To communicate, you will use a **chat**, where your name will be kept anonymous by means of your ID.
At the end of the chat, you will proceed to the voting stage. Your vote is free and anonymous.

The winning option for each phase is the one which has the majority of preferences. If two options have the same number of preferences, you will vote again. If there is parity another time, the computer will randomly select the winning option.
After the rule is completed, you will play the Basic Game, being aware now that the norm is actually in force.
Please note that:

- The computer will present all phases, one at a time;
- After you read all the available options, the chat will be open for a maximum period of time indicated by the computer.
- When the available time elapses, the chat will be closed and it will not be possible to enter it again.
- You can vote only when the chat is closed
- Any winning option will be announced by the computer.
- Any winning option will be displayed on the lower part of the computer screen.

The Chat-rooms
The communication within the chat is NOT free. You can exchange opinions about any single option, its advantages/disadvantages, and so on, but it is strictly forbidden to communicate the amount you will contribute in subsequent rounds.
The chat is open for a period, which the computer will announce at the beginning of each phase. It is possible to close the chat before the expiry of the available period. This may occur when you and all other players deem the information exchanged in the chat to be sufficient. The chat will be closed when all of you will key in "I'm ready to vote". In any case, the chat will be closed as soon as the available time is over.
Whenever you express personal opinions about what other players have already said, please do not forget to refer to those particular players. In this regard, please key in "I agree/I do not agree with ID (and the number) …"
When the chat is closed, you will proceed to the voting stage.
Are there any questions?

Phases

First Phase. "When to control" Component. (Discussion phase: maximum 8 minutes)
In order to significantly reduce the number of allocations from zero to four Euros (included), how often is it necessary to audit?
Options:

A ☐ Establish now the selected audited round. If A is the winning option, you will propose the round you prefer to be controlled. This option costs 5% of the collective final fund.

B ☐ One round randomly extracted at the end of the game. This control will cost 3% of the collective final fund

C ☐ At the end of each round. This control will cost 40% of the collective final fund.

D ☐ Two rounds randomly extracted at the end of the game. This control will cost 6% of collective fund.

E ☐ Three rounds randomly extracted at the end of the game. This control will cost 9% of the collective final fund.

It is very important to know that:
Your effective payoff will always be determined by randomly extracting ONE round at the end of the Basic Game with Rule, BUT:
If the winner option is A or C, your payoff will coincide with the one of a randomly extracted round.
If the winner option is B, the payoff coincides with the controlled round.
If the winner option is D or E, your payoff will coincide with one round randomly extracted among that set of rounds.

Second Phase. "Number of players to be audited" Component. (Discussion phase: maximum 5 minutes).
In order to significantly reduce the number of allocations between zero and four Euro (included), how many players should be audited?
Options:

A ☐ One player (this option costs 0.1% of the final Collective Fund)

B ☐ Two players (this option costs 0.2% of the final Collective Fund)

C ☐ Three players (this option costs 0.3% of the final Collective Fund)

D ☐ Five players (this option cost 0.5% of the final Collective Fund)

Third Phase. "Reward possibility" Component. (Discussion phase: maximum 4 minutes).
Do you want to provide rewards to audited player(s), who will have contributed with more than four Euros?
Options:

A ☐ Yes

B ☐ No

Fourth Phase. "Type of Reward" Component. (Discussion phase: maximum 5 minutes)
The reward to the audited player(s) who has (have) contributed with more than four Euros, consists of
Options:

A ☐ A bonus coinciding with 2% of the Collective Fund. This amount will be paid without any implication to the Collective Fund provided. In other words, this bonus will be a windfall.

B ☐ A bonus coinciding with 2% of the Collective Fund. This amount will be paid by the audited player(s) if she/he is (they are) not contributor(s). In the case that the control does not reveal the presence of any non-contributor, this amount will be paid by all other uncontrolled players.

Fifth Phase. "Type of Sanction" Component. (Discussion Phase: maximum 8 minutes).
What is the sanction to the audited member(s), in the case she/he has (they have) contributed from zero to four Euros (included)?
Options:
A monetary sanction equivalent to:

A1 ☐ 2% of the net Collective Fund

A2 ☐ 10% of her/his (their) payoff

A proportional monetary sanction, related to the degree of her/his (their) level of non-contribution. Options:

B1 ☐ a percentage of the net Collective Fund. In particular, if q=0 she/he pays 5% of the fund; if q=1 she/he pays 4% of the fund; if q=2 she/he pays 3% of the fund; if q=3 she/he pays 2% of the fund; if q=4 she/he pays 1% of the fund.

B2 ☐ a percentage of her/his payoff. In particular, if q=0 she/he pays 10% of her/his payoff; if q=1 she/he pays 8% of her/his payoff; if q=2 she/he pays 6% of her/his payoff; if q=3 she/he pays 4% of her/his payoff; if q=4 she/he pays 2% of her/his payoff.

C ☐ She/he will completely lose her/his payoff.

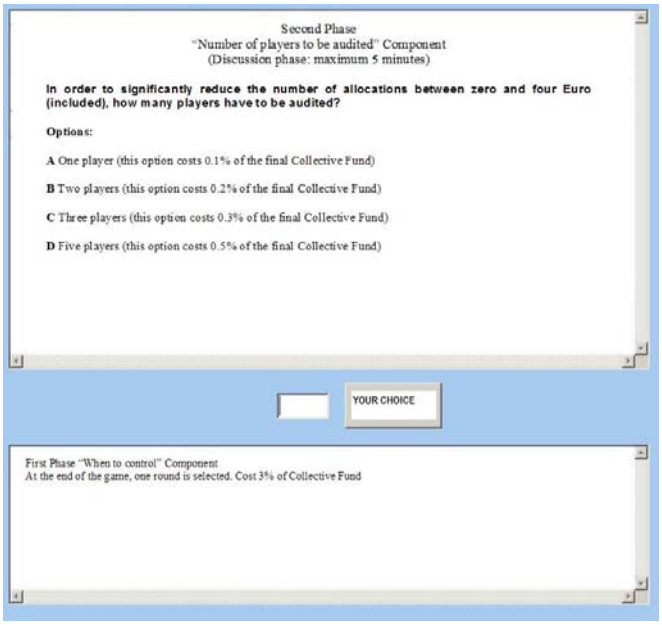

Fig.2 Example in the Software version. Second Phase. Translation of the Italian Version

Chat

(Recipient Group)

In the chat you can communicate with other group members about the significance of the game you have just played. In the chat you will be identified by your personal ID, keeping your personal anonymity.
The communication in the chat is NOT free. You can only exchange opinions about the game you have already played, in terms of significance, possible advantages or disadvantages related to the payoff table, and only in order to understand how the game has worked.
It is strictly forbidden to communicate what you will contribute in subsequent rounds.

The chat is open for a period that the experimenter will soon communicate. It is possible to close the chat before the expiry of the period available. This may occur when you and all other players deem the information exchanged in the chat to be sufficient. The chat will be closed when all of you key in "I'm ready to play". In any case, the chat will be closed as soon as the available time is over.
Whenever you express personal opinions about what other players have already said, please do not forget to refer to those particular players. In this regard, please key in "I agree/I do not agree with ID (and the number) …"

When the chat is closed, you will proceed to the second stage. Remember that your investment choices are always free and anonymous.

Second Game

(Recipient Group)

This game is exactly the same as the first one, with only one difference. Now the following rule is enforced in the game:
"……."

Questionnaire

Before the computer announcement, please complete the following questions. Any correct estimate will be paid 1.5 Euros in addition to your final payoff.

ID……

These estimates regard ONLY the next round of the game. You have to predict what other players will contribute in the first round, not in other rounds.
The real values obtained at the end of the round will be approximated to the closest integer (example 1,12 becomes 1; 2,49 becomes 2; 3,51 becomes 4 and so on).

YOUR ESTIMATES

1) In your opinion, what will other players contribute (on average) to the Collective Fund?

0 Euro □
1 Euro □
2 Euros □
3 Euros □
4 Euros □
5 Euros □
6 Euros □
7 Euros □
8 Euros □
9 Euros □
10 Euros □

2) In your opinion, how many players (excluding yourself) will contribute to the Collective Fund with...? (write the number of players beside the corresponding allocations. Remember: the sum must yield 13)

0 Euro ____
1 Euro ____
2 Euros _____
3 Euros ____
4 Euros ____
5 Euros ____
6 Euros _____
7 Euros _____
8 Euros _____
9 Euros _____
10 Euros ____

3) In your opinion, in which column will the Collective Fund be announced?

a) 0-13 Euros □
b) 14-27 Euros □
c) 28-41 Euros □
d) 42-55 Euros □
e) 56-69 Euros □
f) 70-83 Euros □
g) 84-97 Euros □
h) 98-111 Euros □
i) 112-125 Euros □
j) 126-139 Euros □
k) 140 Euros □

OTHERS' ESTIMATES (In your opinion)

Each member in your group has estimated the contributions in the next round as you have done. Please assess now the total of the amounts the other 13 group members stated as their estimate.

4) In your opinion, what did other players state they expect about the average contribution to the Collective Fund?

0 Euro □
1 Euro □
2 Euros □
3 Euros □
4 Euros □
5 Euros □
6 Euros □
7 Euros □
8 Euros □
9 Euros □
10 Euros □

5) In your opinion, in which column do you believe other players expect the Collective Fund to be placed?

a) 0-13 Euros □
b) 14-27 Euros □
c) 28-41 Euros □
d) 42-55 Euros □
e) 56-69 Euros □
f) 70-83 Euros □
g) 84-97 Euros □
h) 98-111 Euros □
i) 112-125 Euros □
j) 126-139 Euros □
k) 140 Euros □