Does relational quality in a group affect CPR management?

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Abstract

1. INTRODUCTION AND RATIONALE

The capacity for developing good relational quality among members of a group is believed to have a very important role in facing social dilemmas, becoming an important subject of study in experimental and behavioural economics. Experimental studies have been conducted in Public Good contexts, while Common Pool Resources (CPR) settings are much less studied. For example, the development of relationships among players in PG games have been associated with a reduction of free riding and an increase of cooperation among group members. Gachter and Fehr (1999) found that social familiarity (like shaking hands) when combined with social approval, significantly reduces free riding. Charness (2012) observed that team building tasks (like creating words from available letters) raised awareness of being part of a team, subsequently increasing contributions to the PG. Group identity, stimulated through participant painting preferences (e.g., Klee or Kandinski), allowed Chen and Li (2009) to show the effect of that group identity on participants' social preferences.

We contribute to the above literature by testing how the quality of relationships built through communication among group members affects CPR management. Specifically, we observe experimentally whether relational quality perceived by members of a group affects CPR management. To this aim, we induce first different levels of relational quality in groups through competitive, cooperative and neutral effort tasks, and then let the groups play a repeated CPR. We also aim at understanding the role of communication on perceived relational quality, comparing the effect of communication with the effect of the effort task.

1.1 Research question and hypotheses

Our general research question is: Does relational quality in a group affect CPR management?

Specific research questions are: 1) Can effort tasks have an effect on relational quality in a group? 2) Do different levels of relational quality influence CPR management in a group? ? We test the following hypotheses:

H1: The rule of payment (individual, cooperation or competition) in the effort task creates different relational qualities between the group members. This can be in the positive sense (Chen and Li, 2009; Bicchieri, 2002; Charness, 2012; Charness et al. 2018) or in the

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negative one (Balafoutas et al., 2012).

H2: Better relational quality improves (respectively, worst relational quality worsens) co-operation in CPR dilemmas (Brugnach et al, 2021; Lopez and Villamayor-Tomas, 2017, specifically to group identity).

2. METHODS

Our work builds on an exploratory research previously carried out by the authors (Brugnach et al. 2021). A pilot study that aimed at testing the hypothesis that relational quality among users of a CPR (irrigation water) could improve its management under uncertainty conditions. In this work the authors introduced the novelty of "explicitly considered relationships as a constitutive element in collective CPR decision-making processes. (...) Where relationships, beyond serving the purpose of exchanging information, connect people, their experiences and feelings, eventually influencing player's behaviours". The hypothesis was tested through a protocol that allowed different levels of chat, non-face-to-face(1), communication, considering asymmetry of access to the CPR and issues of uncertainty. The results suggested that the relationships established among players through different levels of communication are important to cope with uncertainty in the management of water resources.

Following up on the promising results from this pilot study, and aiming at more conclusive conclusions, we designed a simpler experimental set-up without uncertainty and on a repeated, symmetric CPR, with groups of 4 players. We induce first different levels of relational quality in groups through competitive, cooperative and neutral effort tasks(2), and then let the groups perform a CPR game. A questionnaire (cf. section 2.2) aimed at eliciting the perception of relational quality by subjects is submitted to subjects after the task and after the CPR game.

2.1 Experimental design

The experimental protocol involves two steps. 1) An effort task, where players count numbers in columns. The rule of payment in the effort task can be individual, cooperative or competitive. 2) A CPR game is played.

A questionnaire (cf. following section) containing qualitative questions to elicit the players' perceptions of relational quality is submitted to players after the effort task and after the CPR. The same questionnaire is submitted to players after the two steps.

A between procedure is used to test the treatment effect. Within the same treatment, the questionnaire checks the changes in perceived relational quality due to the effort task.

Initial task: A remunerated effort task where players count the sums of numbers in columns of tables. This task can be a) Individual (each player is remunerated based on its performance, independently on the performances of others); b) collective (players in a group communicate and they are remunerated based on the performances of the others). The collective tasks can be b1) cooperative (gains in function of the group performance), or b2) competitive (an individual of the group wins based on his/her performance compared to the others' performances). During the task (individual or collective), subjects in a group can communicate (cheap talk).

CPR game: the Walker Gardner Ostrom (2000) model is used, recalibrated on groups with N=4. Cooperation is given by the optimal solution that maximises the total group payoffs, while no cooperation corresponds to the Nash equilibrium, i.e.: when all players maximise their own payoff.

A demographic questionnaire ends the session.

To summarise, the following steps are included in a session: initial task, questionnaire 1,

CPR game, questionnaire 2, demographic questionnaire.

The treatments will consist of different payment rules for the initial real effort tasks (individual, cooperative, competitive), as indicated below:

T0 (Baseline) individual initial task

T1 = cooperative initial task

T2 = competitive initial task

2.2 Questionnaire

We designed a questionnaire to characterise and quantify the quality of the relationships that players are able to develop in interaction with the other players through the experiment, considering three aspects of relational quality: 1. players' perceptions of each other, 2. player's emotional experience: feelings that arise during the game and 3. how close players felt to the others while playing. It is assumed that players do not know each other before the experiments.

1. Players' perceptions of each other. This part of the questionnaire is devoted to characterise how players perceive their relationship with others during the experiment, considering how they perceive the others behaving towards them, and how they perceive themselves behaving towards others. Attributes that characterise perceived relationships are based on Brugnach et al. 2021, who present a compilation from the literature ten attributes that are identified as commonly associated in CPR, namely trustworthy, fair, selfish, cooperative, competitive, understanding, caring, envious, altruistic, empathic.

2. Emotional experience. This part of the questionnaire is dedicated to characterise players' emotional experience, eliciting how they have felt during the experiment. To this end, we adopt the theoretical framework of De Leersnyder et al (2013) developed to study the regulation of emotions in different cultural groups. This work is based on the premise that it is the interaction with others, within particular relationships and contexts, that shapes emotional experiences; emotions that in turn, influence back the interactions with others and the quality of relationships. They identify 16 main emotions emergent in relational context, and classify them as emotions that are positively engaging and disengaging, and those that are negatively engaging or disengaging.

3. Closeness to the group. This part of the questionnaire, aims at capturing a yet different characteristic of relationships: how close players felt with others. To this end we adapted the framework of Gaechter et al (2015) to measure the closeness of relationships between a player and the group.

3. PRELIMINARY RESULTS

The results presented here are preliminary, corresponding to the initial stage of analysis in which we are when writing this abstract.

To test hypothesis 1 we analysed the answers to the questionnaire after the initial task.

Our results indicate that:

1) Perceptions of subjects' behaviour towards others and of others' behaviour towards subjects are significantly influenced by the initial task in the direction hypothesised.

2) Players' emotional experience is significantly influenced by the initial task in the direction hypothesised.

3) Players' perception of closeness to each other is significantly influenced by the initial task in the direction hypothesised.

To test hypothesis 2 we observed whether there is a treatment effect on the players' extraction levels and whether extraction levels are correlated with treatments relational quality indexes.

Our results indicate that:

1) Players' extraction means over 10 periods are significantly lower in T1 than in T2 (MW test p-value = 0.06). Extractions in T1 are closer to optimal equilibrium (individual extraction = 9) while extractions in T2 are closer to Nash equilibrium (individual extraction = 14). No significant differences exist between T0 and T1 and between T0 and T2.

2) Perceptions of subjects' behaviour towards others and of others' behaviour towards subjects are significantly correlated with extraction levels, and follow the hypotheses made.

3) There is limited correlation between the emotional experience and the extraction levels, except in the case of negative disengaging emotions, which have a significant positive correlation with extraction levels.

4) Feeling part of a group reduces significantly the extraction (all observations over the 10 periods, not the mean/participant).

4. ACKNOWLEDGMENTS

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(1) Face-to-face communication was also possible in the protocol, but in a second phase and it was not used to test its effects on relational quality.

(2) In fact, for the test of our main hypothesis, the differences created in relational quality in our treatments are a necessary condition. However, as the methods used in the protocol (real effort tasks) to influence relational quality are new for this aim, we test them as well. So if our hypotheses about the capacity of real effort tasks to influence relational quality in a group are not confirmed, the main hypothesis about the influence of relational quality on CPR management cannot be tested. We move from the works of Chen and Li (2009), Bicchieri (2002), Charness (2012), Charness et al. (2018), to test whether better relational quality in a group is related to the creation of group identity, and from the work of Balafoutas et al. (2012) to test whether lower relational quality is induced by competition.