Exploring Information Symmetry and the Size in the Team with the Choices Between Personal and Common Interests in the Group

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Abstract. Teamwork is extremely important from everyday life to international relations. Nonetheless, plenty of issues are created during collaboration. To be specific, there is free rider problem, unequal distribution, outcome distribution. This article argues, through a cross-section of literature and experimental methods, and cross-applying classical economics, behavioral economics, psychology, and game theory. Through research on game theory, the theory can help humans to better allocate and utilize resources and accomplish tasks more efficiently. Literature and experiment approaches are used in this work. Paper conclude expected person types including Committed collaborators, Generous contributors, free rider, cooperative gamblers, non-cooperative gamblers, Swing players, Cooperative leader, threatening leader, Deliberate saboteurs. In this paper, the reasons that willing to collaborate are fairness tendency, donation motivation, high information symmetry, Appropriate punishment facilitates teamwork, efficient team size. On the contrary, reasons of unwilling to collaborate include: Traditional rational person, hitchhiking behavior, unwillingness to free-riding behavior. To collaborate more efficiently, this article proposes that smaller team size, higher information symmetry is required.

Keywords: team cooperation · game theory · behavioral economics · information symmetry

1 Introduction

Social dilemmas are situations in which individual rationality leads to collective irrationality. All social dilemmas are marked by at least one deficient equilibrium in that there is at least one other outcome in which everyone is better off [1]. In group cooperation, giving all efforts can maximize group benefits. However, rational people often choose to maximize their own utility, which leads to a conflict between group and individual interests. For example, when several high school students in science and art team up to participate in a mathematical modeling competition, the team member studying arts chooses to reduce his or her participation time and effort in this competition because he or she believes that the mathematical modeling competition will not help his or her

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development, which is choosing individual interests over collective and individual interests. The reality is that thinking often goes beyond interests, and it is often difficult for people to remain rational (e.g., emotions, poor thinking, and moral values). I have introduced through my own experience, the experience of others, and historical events that there is a causal relationship between people's motivation in teamwork and team size and information symmetry.

When working as a team, group members usually put in different efforts. For example, some team members complete their part and revise it efficiently and with high quality, while others do not even know what they should do. Before the deadline, some team members have to finish work that is not theirs. It is highly unfair that different levels of effort equally reap the fruits of the same work. To analyze and address such a situation, this study will explore the relationship between information disclosure and the team size on group members' efforts. To go to improve efficiency as well as the motivation of group cooperation, two hypotheses can be proposed as follow.

H1: High information symmetry facilitates the total utility of the group and people's motivation.
H2: Smaller groups are more conducive to group cooperation.

2 Literature Review

2.1 Related Models in Game Theory

Firstly, a non-zero-sum game is the opposite of a zero-sum game. A non-zero-sum game is a game in which the sum of the benefits of each player under different combinations of strategies is an uncertain variable, which is also called a variable-sum game. A zero-sum game means that the sum of the benefits of all parties to the game is zero or a constant, i.e., if one party has income, the other parties must lose something. In a zero-sum game, the parties to the game are not cooperative. Secondly, the cowardly game, also known as the hawk-dove game or the snow pile game, is a model of game theory in which two players confront each other. One player's best choice depends on what his opponent will do: if his opponent concedes, his side should not concede, but if his opponent does not concede, his side should. In short, it's "don't die for the biggest". The name "Coward's Game" comes from a dangerous game where two drivers drive opposite each other.

2.2 Discussion

2.2.1 Fairness Preference

By now, we have substantial evidence suggesting that fairness motives affect the behavior of many people. The empirical results of [2], for example, indicate that customers have strong feelings about the fairness of firms' short-run pricing decisions, which may explain why some firms do not fully exploit their monopoly power. Reality provides many examples indicating that people are more cooperative than is assumed in the standard self-interest -model. [3]. Based on this theory, people expect others to contribute to teamwork equally so that it is fair, and they also pay average effort in teamwork.

2.2.2 Controversial Evidence

There is thus a bewildering variety of evidence. Some pieces of evidence suggest that many people are driven by fairness considerations. Other pieces indicate that virtually all people behave as if completely selfish. Still, other types of evidence suggest that cooperation motives are crucial [3].

3 Methodology

3.1 Methodology Description

By reviewing the literature, I have thoroughly reviewed the theoretical foundations, understood essential definitions, and understood important concepts such as the hawk-dove game, zero-sum game, non-zero-sum game, and bargaining game. The wide range of literature, richer national and regional, and more profound theoretical history provide a unified theoretical basis for this study's subsequent design of experiments and analysis.

3.1.1 Disadvantages of the Literature Approach

In the study of the relationship between information symmetry and group size on teamwork, there is no substantial literature on this group of independent and dependent variables. Most international political analysis is done through mathematical models. There is no previous analysis of the impact results. Moreover, this study targets smaller groups and does not address more extensive international relations; no specific studies on this particular group were reviewed in the literature. Finally, game theory is still a relatively new doctrine that requires interdisciplinary research and does not have a specific theorem as a basis for the discipline. The disadvantages of the literature method, side by side, confirm the difficulty and scarcity of this study.

3.1.2 Advantages of the Experiment Method

The experimental method is the most effective method to argue one's theory. Although cross-argumentation through the literature can also provide the basis for one's theory, the experimental method is the most direct and effective. The data collected through experiments can argue one's views and falsify others' views. New theories can be proposed to explain some theories that do not meet expectations. In this experiment, observable variables include information symmetry, people's payoffs for the public, and the type of people they choose to eliminate. The winner of the public good in this one and its behavior.

3.1.3 Disadvantages of the Experiment Method

The experimental method suffers from too many errors and variables that are not considered. Therefore it is impossible to collect a sufficient sample, the data available for analysis will be minimal, and the lack of data will cause too much difficulty in model building. Also, because people know they are participating in an experiment, the behaviors exhibited will differ from their authentic selves, and such fallacies cannot be avoided.

They can only be reduced by increasing the sample. Through the cross-use of literature and experimental methods, the experiments not only compensate for the weak correlation literature for the insufficiency of opinion support but also the literature provides the theoretical basis for the design and analysis of the experiments.

3.2 Experiment Design

3.2.1 Subjects' Group

In this two-week experiment, two groups of experiments are designed, the treatment group and the control group. The experiment group is divided into two groups, one group of 5 people and 40 people. Each person was given 1400 experiment coins. Each person needs to be placed into a public account at least 100 experiment coins per day to ensure daily living security, which includes adequate food and water, a comfortable living environment. A group of x people needs to pay at least x * 100 experimental coins, each person's placed experiment coins will not be disclosed. Suppose the total amount does not meet the requirements. In that case, you will not be able to get fixed living security, which indicates participants will starving and live in an impoverished living environment, and all previously placed experimental coins will be zeroed out. In small teams, one person will be plucked by referendum every 7 days; in large teams, one person will be eliminated every 2 days, and everyone's vote will be hidden. If more experimental coins are invested each day than are requested, then the remaining experiment coins will be awarded to the person who paid the most (if the highest person paid the same, they would be split equally). The winner is finally determined by the number of assets left. For the control group, repeat the experiment above, excepting that for that all information will be made open to the public (money put into public accounts, total assets, choices waiting at each time the referendum people go out).

3.3 Experiment Rules

Firstly, the rules about experimental coins can be used with any transactions in the experiment, such as the exchange of information, the provision of food, and the cost of others to become a team, but only for the experiment, if someone to the experiment outside the conditions (out of the experiment after the guarantee, etc.), will be eliminated. At the same time, a person's departure will not take away any experimental coins and confiscation. Also, there can not be any coercion of others, such as assault. In addition, any small group is accepted, and participants of the experiment can form any small group, even if the small group may be harmful to the larger group. Furthermore, any theft, robbery, or other person's belongings (experiment coins, living materials) is prohibited and will be eliminated if found, and any form of trade will be conducted by mutual consent. At the same time, to ensure that participants in the experiment can ensure active participation, the winner of the experiment will have a generous reward, while to simulate society will be looking for people from different classes of society, save the number and proportion of men and women on equal. To ensure the population can represent the whole society, people in different gender, education level, wealth, family, age will be selected according to the proportion of the whole society.

4 Experiment Analysis

4.1 Hypotheses on Being a Cooperative Team Worker, Who Pay Effort Greater or Equal to Required Effort

4.1.1 Fairness Tendency

Justice (fairness) is a foundation for all types of economic transactions, especially for strategic alliances that face a variety of internal and external uncertainty [4] and the ways in which the decision-making process influences the quality of exchange relationships [5]. When people are in a relatively fair environment, people are more inclined to do fair hope, which means less hope of free riders. In the experiment, when information is open and transparent, and the cut size is small, people are more likely to understand other people's behavior and motivation and use it to modify their behavior standards. For example, in competitive markets with incomplete contracts, the reciprocal types dominate the aggregate results. Similarly, when people face strong material incentives to free ride, the self-interest model predicts no cooperation at all. However, if there are individual opportunities to punish others, then the reciprocal types vigorously punish free-riders even when the punishment is costly for the punisher [6]. In this experiment, the periodic elimination system also allows people to punish others, which reciprocal types want, to help them punish free-riders. Thus, the tendency toward fairness is one reason people give more than or equal to the average.

4.1.2 Donation Motivations

These motives are roughly divisible into three broad categories: intrinsic, extrinsic, and image motivation. Intrinsic motivation is the value of giving per se, represented by private preferences for others' well-being. Extrinsic motivation is any material reward or benefit, either monetary or non-monetary, associated with giving, such as thank-you gestures and tax breaks. Image motivation, or signaling motivation, refers to individuals 'tendency to be motivated partly by how others perceive them [7]. The act of giving more than required is similar to donating. Again, three reasons for giving can be used for analysis: for intrinsic, some people may want everyone to get enough water and food because more is given to ensure the livelihood of all.

For extrinsic, some people may want to gain the love of others by giving more experimental coins. In contrast, the person who gives the most can get experiment coins for everyone beyond the experiment. For image, they may want to pay more experimental coins to change others' perceptions of them as trustworthy collaborators and avoid not being eliminated in regular eliminations.

4.1.3 High Information Symmetry

When information is public, people in the group know what others are giving, so people tend to give themselves to appear to fit in. People do not want to give more individually and get the same reward as others, and people do not want to be isolated or eliminated by others because they give less. Therefore, information disclosure helps people make choices by providing information about others.

4.1.4 Appropriate Punishment Facilitates Teamwork

In this experiment, periodic elimination was set as punishment. Punishment within a reasonable range is hugely efficient for teamwork, and free riders are highly likely to occur when everyone in the teamwork shares the rewards equally. In an experiment, if one can get a comfortable living environment and not be eliminated by paying very few experimental coins, one is likely to pay even less because it is more likely to win the experiment. The elimination partially limits the possibility of becoming a free rider. However, because any form of clique and deception is allowed in the experiment, it may not work for some people. In the research of Korean employees, researchers found that company's extrinsic motivation practices significantly decrease employee risks or insecurity perceptions. That is, the emphasis on individual performance as a compensation determinant increases employee perceptions of compensation risk, and company layoff experience increases employee perceptions of subsequent layoffs in the near future [8]. Economists and psychologists have documented patterns of individual decision-making behavior (e.g., loss aversion) whereby losses and gains are treated differently [4].

4.1.5 Efficient Team Size

Compared to larger teams, smaller teams communicate and collaborate more often and are more familiar with each other, which makes it more likely that people will choose to put in the effort required. Also, smaller teams are less likely to be betrayed (free rider problem). Because people tend to be fairer, as mentioned above, smaller teams are more likely to allow people to meet team requirements. To improve communication within a team, it may be optimal to curtail the team size. Doing so may help both to boost team performance and to enhance the utility of the team members [9].

4.2 Hypotheses on Being an Uncooperative Team Worker (Personal Effort Greater or Equal to Required Effort)

4.2.1 Traditional Rational Person, Hitchhiking Behavior

As a traditional rational person, paying smaller experimental coins means more likely to succeed in the experiment, and free-riding maximizes self-interest. Therefore, others who pay less are more favorable to their success, resulting in less effort than the 100 experimental coins required.

4.2.2 Unwillingness to Free-Riding Behavior

In most teamwork, the problem of hitchhiking is inevitable, and such a problem is challenging to achieve team success through individual efforts. Nonetheless, a social dilemma is established since rational people have the incentive to maximize their own profit. Social dilemmas are situations in which individual rationality leads to collective irrationality. That is, individually reasonable behavior leads to a situation in which everyone is worse off than they might have been otherwise. Many of the most challenging problems we face, from the interpersonal to the international, are at their core social dilemma [10]. Therefore, when it is predicted that giving the required effort or

less than the required effort will not affect the outcome, people may choose to protect their interests and choose to give less than the required effort.

4.2.3 Crowding Out Effects

People choose to do their jobs for external incentives, such as money and promotions. But when these external stimuli are lost, people are less willing to do their jobs than before. External stimuli tend to reduce intrinsic motivation. Monetary incentives have two kinds of effects: the standard direct price effect, which makes the incentivized behavior more attractive, and an indirect psychological effect. In some cases, the psychological effect works in an opposite direction to the price effect and can crowd out the incentivized behavior [1].

4.2.4 Types of Expected People

(1) Committed collaborators: choose to give 100 coins every time the coins are placed in the experiment. To ensure that the collaboration works properly, paying 100 experimental coins is what a reasonable collaborator would pay, they do not have to pay for others and should not drag others down, if everyone is a Committed collaborator, then the collaboration will work properly.
(2) Generous contributors: choose to give more to ensure that the group's overall requirements are met for the benefit of the group. No one can ensure the elimination of free rider, so in order to ensure the interests of the group, some people will choose to sacrifice part of their own interests.
(3) Free rider: choose to give a small amount of effort in each placement, but not too much for the overall goal to be achieved. The problem of a rational person who chooses individual interests over team interests cannot be completely avoided in a team.
(4) cooperative gamblers: choose to put most of their experimental coins in each round in order to get more coins after everyone reaches the target In order to get the reward of gaining success, some people will choose to pay over the top, the risk of this kind of behavior is that there is no way to ensure that they put in after all people pay more than the required cost. Similar to the reality of choosing to overpay in order to be first in the team.
(5) Non-cooperative gamblers: predict that the total combined effort of the others will reach the goal and choose not to put their experimental coins into the public account. The exact opposite of cooperative gamblers, also a gambler's behavior, in order to bet that others pay more than required to pay, and pay the least in the case of getting resources. Unlike the free rider, who is trying to win, the free rider is trying to get the same treatment for a smaller amount of money.
(6) Swing player: If the team's cooperation is found to be unsuccessful in the first few rounds, he chooses to invest fewer experiment coins; if the group's cooperation is successful in the first few rounds, he continues to invest the required experiment coins. Therefore, the result can be known after each placement on the public account, so people's behavior will also be influenced, they will generally put in average pay at the beginning, such as becoming Committed collaborators after finding success,

while they are likely to become free rider after failure, because they think their efforts are meaningless.

(7) Cooperative leader: asserts himself as the leader of the team and ensures the avoidance of free riders by establishing team rules. The experiment does not set the leader, but becoming the LEADER is allowed. Some leaders will set up rules to circumvent some people who do not want to give in order to ensure the success of the cooperation, and such behavior is another reason to cooperate.

(8) Threatening leader: by creating small groups to ensure access to the benefits of the small group, demanding that others pay more while they pay less, and voting out the power of others as a threat. There are some leaders who, through the support of some people, ask others to give more in order to ensure the interests of some people, which is likely to lead to internal conflicts.

(9) Deliberate saboteurs: because of certain things (psychopaths, long-term cooperation failures), do not give any effort to the success of group cooperation. Undeniably, there is no way to avoid the possibility that there may be a small group of people who are motivated to undermine cooperation.

5 Conclusion

In this proposal, through literature crossover, experiments are designed, and hypotheses are presented to argue the experiment that there is a causal relationship between information symmetry, team size, and teamwork effectiveness. When team size tends to be smaller, people work more for the benefits of the group. When teams have incredibly high information symmetry (openness and transparency of information), people are more willing to cooperate to maximize the benefits of the team. The study also proposes theories to explain why people put in more or less effort than they are required to put in. Among them, fairness tendency, donation motivations, high information symmetry, Appropriate punishment, and Efficient team size were identified as the five reasons for being excellent collaborators. On the contrary, Traditional rational people, hitchhiking behavior, and fear of free-riding behavior were cited as reasons for choosing not to collaborate. The article also suggested eight types of people who might appear in teamwork: Committed collaborators, Generous contributors, free riders, cooperative gamblers, Non-cooperative gamblers, Swing players, Cooperative leaders, Threatening leaders, and Deliberate saboteurs.

However, as we will document below, many people deviate from purely self-interested behavior in the form of reciprocity. Reciprocity means that people are often much nicer and more cooperative in response to friendly behavior than the self-interest model would predict; conversely, they are often more obnoxious. Thus, our concept of reciprocity is quite different from the good or hostile responses in repeated interactions, which are motivated solely by considerations of future material gains [7, 11]. For various objective reasons, the experiment was not completed, so the experiment and theory are based on theory and do not have too solid a foundation to support the interest rate. At the same time, this paper aims to explore the causal relationship. Although an interdisciplinary psychological analysis was conducted, there is still the possibility of

lurking variables. In addition, this will serve as a joint research project and is intended to be explored in depth in subsequent scientific studies. This includes enriching theoretical knowledge, including but not limited to sociology, psychology, economics, game theory, mathematical modeling, and experimental design studies, in the hope of providing theoretical explanations and finding practical tools to enhance the efficiency of cooperation.

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