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GROUP COMPETITION AND PERSONALITY IN AN EXPERIMENTAL PUBLIC GOODS GAME*

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Abstract

This paper introduces a variation of the public goods game where four groups compete to win prizes. It uses experiments to consider behavioral and personality aspects, enabling us to treat a new field. As for the behavioral aspect, it emerges that intra- and inter-group awareness is effective in promoting cooperation. In addition, cooperative actions are observed in a cooperative rather than uncooperative atmosphere. As for the personality aspect, the game is examined from four standpoints, namely, preference for competition, preference for risk, passion for profit, and trust in others.

Keywords: Public Goods Game, Experiment, Group Competition, Personality, Culture
JEL Classification: C92

I. *Introduction*

The voluntary cooperation of agents is vital in the real economy because many contracts are incomplete and efficient behavior cannot be formally enforced. Furthermore, many real-world problems require cooperation in situations that involve free rider incentives. Based on standard assumptions, the Nash equilibrium of games involving cooperation decisions is inefficient. This paper examines a variation of a one-shot public goods game to see how cooperation is generated.

Marwell and Ames (1981) introduced a public goods game where individuals have resources they can allocate; either for their own private consumption or the group's public

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consumption. In their experiments, they used tokens that are worth more to the individual when privately consumed, but generate more value to the group as a whole when used to provide public goods. Numerous public goods game experiments show that people cooperate far more than predicted by standard economic theory, which assumes rational and selfish individuals. However, another fact derived is that contribution to the group account is substantially below the Pareto optimal level of 100%, while there is also considerable heterogeneity across individuals in terms of their choice of contributions. This paper examines this latter phenomenon by analyzing the personality aspects of the players.

A characteristic of this paper lies in applying the public goods game to inter-firm competition. The contest among four groups is investigated, whereby the four compete with one another for the prizes obtainable in accordance with the amount of public goods collected in each group. Six different games are generated by three different sizes of prizes and two different treatments. The treatments are concerned with the revelation of each player's contribution to the other group members and the players' awareness of the other groups. The effect caused by the difference between the two treatments is called the "group effect" in this paper since it is attributable to intra- and inter-group awareness. The condition with some prizes is called the "prize condition" and that without prizes the "no-prize condition" throughout this paper. Each group plays a one-shot public goods game and the group that collects the highest level of public goods wins the larger prize. The prizes are distributed equally to members, and are hence also public goods within the groups. Individuals know the system of the prizes and decide on their contribution level to the group account simultaneously and independently. This paper considers not only the group effect but also the effect of personality, which generates one piece of evidence of the need to examine personality in employment tests undertaken by real world firms.

Some theoretical public goods games introduce prizes. Baik (2008) introduces a group-specific public good prize, which is a public good within a group. The paper shows a situation in which a local government has a budget for building a bridge and several communities compete to win the budget. The local government selects the winning community according to a rule based on voluntary contributions made by those living there. Baik et al. (2001) consider contests with two groups, and models them as first-price all-play auctions. A group expending more effort on the group than its rival is certain to win the prize, and the winning group pays the higher bid. Our rule for selecting the winning group is similar to Baik et al. (2001). The prize in our model is a group-specific public goods prize. These two papers employ models that consider inter-group competition, so their models are similar to our setting to some extent. The difference between our model and these models is that the public goods game is played inside the group in the former but not in the latter. There are papers that investigate the use of prize-based mechanisms to incentivize contribution to public goods, showing that they are an effective way of overcoming free riding. Faravelli (2007) studies multi-prize contests as a means of financing public goods and proved that it is optimal to set the last prize equal to zero. Faravelli and Stanca. (2007) investigate single and multiple prize contests as incentive mechanisms for the private provision of public goods. They found that contrary to theoretical predictions, total contributions are significantly higher in the one-prize contest. The model in this paper uses the order of magnitude of public goods among the groups to incentivize contributions to the group account. Prizes are public goods among group members in our setting, but not in the models of the other papers. Namely, this paper investigates prize-based

mechanisms among groups.

The main findings of our analysis can be summarized as follows. The first finding is that our new game enables us to open a new field as an application of a public goods game to firm competition. The second is that the cooperative actions of members can be promoted by enhancing the comradeship of the group (by the group effect). The third is that, in a cooperative atmosphere, individuals increase their contribution levels when facing prizes but not when in an uncooperative atmosphere. Finally, personality significantly influences individual actions in a game. The above-mentioned findings are analyzed based on four personality aspects, namely, preference for competition, preference for risk, passion for profit, and trust in others. These four aspects influence individual actions under some conditions.

The paper proceeds as follows. Section II offers interpretations of the game. Section III presents the experiment. Section IV discusses our observations and results. Finally, Section V summarizes the paper and provides concluding remarks.

II. *Real World Interpretations*

This section introduces some interpretations of our new game. The game used for our experiments can be interpreted in the real world as follows. Suppose that four firms exist in the market, where they compete for shares. An individual's contribution to public goods corresponds to the level of his effort toward the firm in the real world. Conversely, his investment in private goods corresponds to the level of his effort toward himself. The firm enhances competitiveness by collecting public goods and the more public goods, the higher the degree of competitiveness and the larger the profits of the firm in the market.

One example of the individual effort level for public goods is working overtime, while investing in private goods corresponds to the private use of time. Although reducing overtime work is worth more to the individual, working extra hours generates more value to the firm in our setting. By making members work extra hours, the firm raises competitiveness and they can receive higher wages. By reducing overtime work, members can gain some benefit by being free.

This paper introduces two conditions: the prize condition and the no-prize condition. The former is a condition with some prizes and the latter is that with none. Before giving some interpretations of the two conditions, we define two new games among groups: the single-prize contest and the multi-prize contest. The former is a game in which a prize is given only to the group winning the first place. The latter is a game in which a prize is given to several groups. The prize condition in our model is a multi-prize contest among groups. There are some examples of single-prize contests among groups. One is a game in which the winner takes all. An example of multi-prize contests is the case where market shares are determined in accordance with the degree of competitiveness of each firm. The firm collecting the most public goods takes the largest market share.

The prize distributed to each group member can be interpreted as a bonus. When firms make larger profits, they often make bonus payment to their members especially in Japan. Sometimes, bonuses are distributed with sufficient equality regardless of the contribution levels of the workers to the firm. In other words, bonuses are one of the public goods within groups. Another example of a prize is the amount that will be used for the facilities of the firm. A firm

that gains a profit from market shares sometimes invests in facilities using this profit. Examples of facilities include fringe benefits, recreation facilities, and the working environment. All the members in the group can benefit from such facilities, regardless of their contribution to the firm. Facilities in a firm are public goods among its members.

This paper also investigates the game from a personality aspect and suggests some evidence for use in employment tests. With such employment tests, examiners often try to gauge a job applicant's personality through interview. This paper provides some evidence in support of a policy considering not only the applicant's ability but also his/her personality by showing that personality significantly affects contribution to the firm. The new application of the public goods game opens the way to investigating firm competition and substantiates the importance of worker personality in the firm.

III. *The Experiment*

The experiment was conducted in early 2008 in Japan and included observations made on 128 subjects. The subjects were students of several different majors. The payoff promised in return for participation was extra credit points for the course they were taking. Some extra points for higher payoff were promised so that participants would have an incentive to play their best. The 128 subjects were divided into 32 groups randomly. Each group consisted of four individuals, each of whom was given a budget of 100 tokens. Each subject then had to decide how many of the 100 tokens to contribute to private goods and how many of them to public goods. The experiment is based on a linear public goods game with four players. Each token invested in private exchange earned 1 point. Each token contributed to group exchange earned 0.4 points for each subject in the group, regardless of which subject contributed. The game was carefully explained so that they understood the mechanism and the implications of the payoff function. We did not impose any time limit, so the subjects had plenty of time to decide. The payoff rule, group size, rival groups, and total amount of tokens in the group were all common knowledge. The subjects were not allowed to talk to each other. A one-shot public goods game is basically used in the experiment. Before the game started, the subjects responded to Questions Q 1.1 through Q 1.4 (with responses recorded on an 11-point scale, 0 through 10, ranging from strongly disagree to strongly agree).

The payoff function mentioned above is as follows:

$$\pi_i = 100 - g_i + 0.4\sum_{j=1}^{4} g_j$$

The amount of the public good of a group is supplied by the sum of all contributions g_j made to it by its members. The theoretical game prediction is complete free riding by all subjects.

In this experiment four groups compete for the prizes. Three different conditions and two different treatments are examined for each condition of the game, so it considers a total of six different experiments, namely Experiments 1-1, 1-2, 1-3, 2-1, 2-2, and 2-3. Note that the left side of the numbers denotes treatment and the right side condition. Explanations of the treatments and conditions are given below.

Condition 1 is a no-prize condition for a game while Conditions 2 and 3 are prize

TABLE 1. STRUCTURE OF PRIZES UNDER THREE CONDITIONS

	Prizes			
	1st	2nd	3rd	4th
Condition 1	0	0	0	0
Condition 2	60	40	20	0
Condition 3	120	80	40	0

Notes: Points are distributed to each individual according to the public goods level of his/her own group and others.

conditions. Under Condition 1, individuals simply play the public goods game referred to above. However, four groups compete for prizes under Conditions 2 and 3. The group making the largest contribution to the public goods wins the first prize, the lower-contribution groups take lesser prizes and the fourth leaves empty-handed. The prizes are equally distributed to each member of the group. Condition 2 entails smaller amounts of prizes and Condition 3 larger amounts. Table 1 shows the structure of prizes under three different conditions. Under all conditions, in the case of ties among groups, the prize was summed up and divided equally among those tying.

The payoff function of each player in the game is as follows:

$$\pi_i = 100 - g_i + 0.4\sum_{j=1}^{4} g_j + P$$

where the amount of the public good of the group is the collective sum of all contributions g_j made to it by its members and P denotes the prize points distributed to each group member.

In Treatment 1, the subjects need not reveal their contribution levels to their group members. In Treatment 2, they have to reveal their contribution levels to the other group members after the game starts. Moreover, individuals are made aware of other groups before Treatment 2 starts. Treatment 2 differs from Treatment 1 in the following aspects: One is revealing of actions post-game and the other is awareness of the other groups. We refer to this difference as the 'group effect' in our paper because it is the effect caused by intra- and inter-group awareness. It was not until all the games were over in the experiment that individuals revealed their contribution levels. Therefore, the subjects could not observe whether the group members had been cooperative or not.

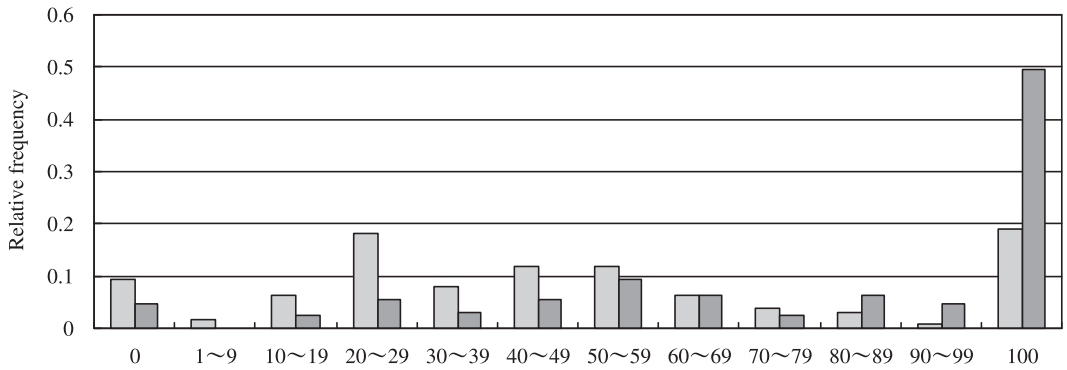
Accompanying this experiment, the subjects responded to some questions that are shown in Question Group 2 in the Appendix. These questions required them to imagine certain situations of the game. The responses enable us to examine some interesting situations that are difficult to examine in an actually played game.

IV. *Results*

Figure 1 reports the distribution of contributions to public goods under Condition 1. For ease of reference, Figure 2 presents the average contributions in all experiments.

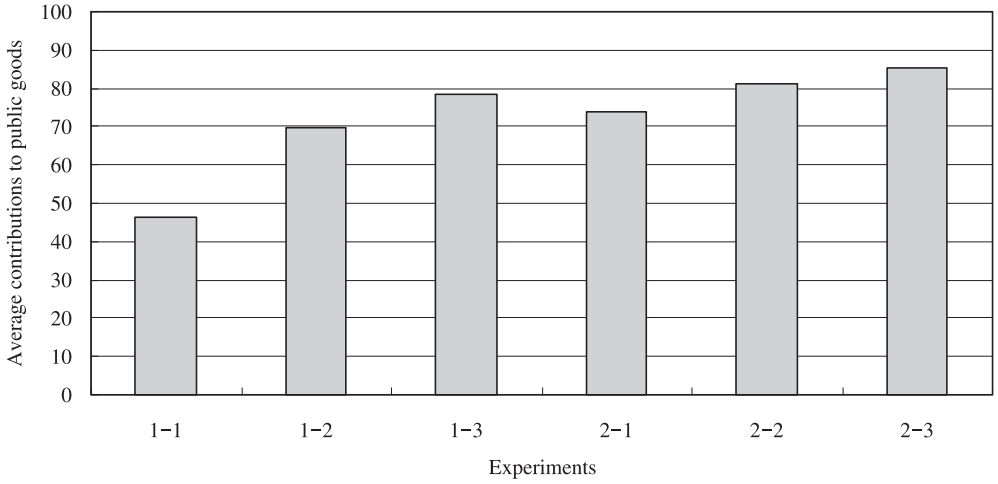
We now list and investigate the implications of the data of our experiment. The investigation in this section is undertaken from behavioral and personality standpoints.

FIG 1. DISTRIBUTION OF CONTRIBUTIONS TO PUBLIC GOODS IN CONDITION 1



Note: left: Experiment 1−1, right: Experiment 2−1

FIG 2. AVERAGE CONTRIBUTIONS TO PUBLIC GOODS IN ALL EXPERIMENTS



Result 1: *The average voluntary contribution to public goods differs due to the group effect. Revealing contribution levels to others and the awareness of other groups together reduce free riding in the game.*

To test the difference between the two treatments, Wilcoxon signed-rank tests are undertaken. The differences are highly significant in all conditions according to the tests ($P<$ 0.05; two-sided) . Individuals significantly increased their contribution levels to the group account in Treatment 2.

This result shows that revealing contribution levels to other members and the awareness of other groups together are an effective means of raising contribution levels to the group account.

TABLE 2. AVERAGE CONTRIBUTION UNDER COOPERATIVE AND UNCOOPERATIVE CONDITIONS

	Average contribution		
	No Information	Cooperative	Uncooperative
Condition 1	46.2 (33.1)	67.1 (31.4)	15.6 (22.6)
Condition 2	69.6 (32.7)	73.7 (30.8)	20.6 (29.8)

Notes: Numbers in parentheses are standard deviations. N=127

TABLE 3. THE PROPORTION OF INDIVIDUALS WITH EACH PRIZE EFFECT (%)

Prize Effect	Cooperative	Uncooperative
Positive	39.4	25.2
Zero	43.3	54.3
Negative	17.3	20.5

Notes: "Cooperative" is concerned with the difference between Q2.1 and Q2.3.
"Uncooperative" is concerned with the difference between Q2.2 and Q2.4.

This result can be seen under all conditions, so the effect exists regardless of the size of prizes. The cooperative actions of members can be promoted by revealing contribution levels to other members and by enhancing the comradeship of the group which, in turn, is enhanced by making the members more aware of the other groups.

Result 2: *In Treatment 1, individuals tend to increase their contribution levels at the possibility of prizes when others are cooperative but do not when others are uncooperative.*

We define a cooperative atmosphere as a case where other members are going to contribute 90 tokens to the group account and an uncooperative atmosphere as one where others are going to contribute 10 tokens to the group account. Q2.1 and Q2.3 assume that individuals are playing in a cooperative atmosphere, while Q2.2 and Q2.4 assume the opposite respectively. The effect caused by the introduction of prizes is called the "prize effect". A positive prize effect means that prizes promote cooperative actions.

Support for Result 2 comes from Tables 2 and 3. Table 2 reports the average contribution in cooperative and uncooperative atmospheres respectively, while Table 3 shows the proportion of individuals with each of positive, zero, and negative prize effects. The difference in the proportion between positive and negative prize effects is remarkably large in the cooperative atmosphere in comparison with the uncooperative atmosphere.

When a group has a cooperative atmosphere, individuals tend to increase their contribution levels by the effect of prizes but do not in an uncooperative atmosphere, hence the prize effect works more strongly in a cooperative atmosphere. Most individuals are willing to cooperate if they expect the same of others.

Next, we examine contribution levels by taking individuals' personalities into account. An inspection of the data at an individual level shows that the subjects are heterogeneous. Basically, subjects' contribution decisions fall into three distinct categories: complete cooperation, free riding, and the rest. Accordingly, this paper divides the subjects into the following three types: cooperators, who are subjects contributing 100 tokens to public goods; free riders, who are subjects contributing not more than 50 tokens to public goods; and the rest. The numbers of cooperators and free riders in each game are shown in Table 4, with the sum of

TABLE 4. THE NUMBER OF COOPERATORS AND FREE RIDERS

	Experiments					
	1-1	1-2	1-3	2-1	2-2	2-3
Cooperators	24	54	67	63	74	85
Free riders	83	44	30	39	27	21
SUM	107	98	97	102	101	106

TABLE 5. CHI-SQUARE TEST

		Experiments					
		1-1	1-2	1-3	2-1	2-2	2-3
Question	1.1	**			**		
	1.2					*	**
	1.3	**	*	*			
	1.4				**		

Notes: * denotes significance at a 10% level. ** denotes significance at a 5% level.

TABLE 6. MANN-WHITNEY TEST

		Experiments					
		1-1	1-2	1-3	2-1	2-2	2-3
Question	1.1						
	1.2						*
	1.3	**	**	**		*	
	1.4				*		

Notes: * denotes significance at a 10% level. ** denotes significance at a 5% level.

cooperators and free riders in each game being about 100 individuals.

The subsequent results show what kind of individual cooperates or free rides in six different experiments. In Tables 7 through 10, individuals are divided into two categories based on their responses to Question Group 1 in the Appendix. Responses 0 through 5 are classified as "negative" and those 6 through 10 are classified as "positive." In the Mann-Whitney test, however, we used the raw data. Tables 5 and 6 show the test results concerning the differences in responses to Question Group 1 between cooperators and free riders in each experiment. For example, Table 5 shows that in Experiment 1-1 significantly more free riders agree with Q1.1 than cooperators.

Result 3: *Free riders tend to consider competition desirable under Condition 1.*

Support for this result comes from Tables 5 and 7. Q1.1 measures the extent to which one feels competition is desirable and Table 7 shows the proportion of individuals who agree with Q1.1. There is a significant difference in the proportion of individuals who agreed with Q1.1 between cooperators and free riders in Experiment 2-1 ($X^2(1)=4.47$, $P<0.05$). This result shows that individuals with relatively low contributions to public goods tend to consider competition desirable. By similar argument, there is a significant difference in Experiment 1-1 beyond a 0.05 level. Under the prize condition, there are no significant differences between the two in

TABLE 7. THE PROPORTION OF INDIVIDUALS WHO AGREE WITH Q1.1 (%)

	Experiments					
	1-1	1-2	1-3	2-1	2-2	2-3
Cooperators	8.3	18.5	17.9	17.5	18.9	18.8
Free riders	28.9	29.5	26.7	33.3	33.3	28.6

terms of the desirability of competition.

Individuals who consider competition desirable free ride under no-prize conditions and take cooperative actions under prize conditions. As mentioned in Result 2, a cooperative action is generated by the effect of prizes. As shown in Table 7, the proportion of individuals agreeing with Q1.1 among cooperators is lower than that among free riders in all experiments. There is a propensity for free riders to consider competition desirable, although it is insignificant in some experiments.

Result 3 suggests that prize conditions can promote cooperation regardless of the desirability of competition. It is useful to know the desirability of competition under no-prize conditions in order to achieve cooperation, but less so under prize conditions. A number of individuals may become conditional cooperators in situations with some prizes in the game. This result is applicable to the firm competition described in Section 2.

Result 4: *In Experiment 2-3, the proportion of people who would rather take an unstable job with high income than a stable one with relatively low income differs depending on whether one is a cooperator or a free rider. Free riders show a relative preference for a stable job over an unstable one.*

To investigate the difference in risk attitude, the responses to Q1.2 are examined. It classifies individuals into two categories: more risk-averse and less risk-averse individuals. This paper defines those individuals who agree with Q1.2 as less risk-averse and those who disagree as more. Table 8 shows the relation between the preference for risk and contribution levels in all experiments. There is a significant difference in the proportion of individuals who agreed with Q1.2 between cooperators and free riders in Experiment 2-3 ($X^2(1)=4.01$, $P<0.05$). The difference is also highly significant beyond a 0.1 level according to the Mann-Whitney test. As shown in Table 5, there is also a significant difference in the proportion in Experiment 2-2 beyond a 0.1 level. These observations lead to Result 4. However, there are no significant differences in other experiments between cooperators and free riders with regard to Q1.2.

There are two points to be remarked. The first is that this result is observed in the game with larger amounts of prizes. Prizes are public goods among group members in the model, so the fear of being exploited by free riders through prizes is similar to that through public goods. Contributing to public goods and expecting prizes equally require them to trust others. More risk-averse individuals contribute relatively less to public goods under a large risk than less risk-averse individuals. The second point is that this result is observed in Treatment 2. Tables 5 and 6 show no significant differences between cooperators and free riders with respect to preference for risk in Treatment 1. Based on this result, we can conclude that risk differs in Treatments 1 and 2. Perhaps, subjects feel risks more real when they are aware of their and other groups.

TABLE 8. THE PROPORTION OF INDIVIDUALS WHO AGREE WITH Q1.2 (%)

	Experiments					
	1-1	1-2	1-3	2-1	2-2	2-3
Cooperators	45.8	50	52.2	52.4	52.7	52.9
Free riders	45.8	50	36.7	35.9	33.3	28.6

TABLE 9. THE PROPORTION OF INDIVIDUALS WHO AGREE WITH Q1.3 (%)

	Experiments					
	1-1	1-2	1-3	2-1	2-2	2-3
Cooperators	25	33.3	34.3	34.9	40.5	40
Free riders	50.6	52.3	53.3	46.2	51.9	47.6

Result 5: *There is a difference in the degree of passion for profit between cooperators and free riders. Free riders tend to pursue profit by any means.*

Support for Result 5 is shown in Tables 5, 6, and 9. To investigate the difference between cooperators and free riders in terms of the degree of passion for profit, we examine the responses to Q1.3. Table 9 shows the proportion of individuals who agree with it among cooperators and free riders. There is a significant difference in the proportion of individuals who agreed with Q1.3 between cooperators and free riders in Experiment 1-1 ($X^2(1)=4.93$, $P< 0.05$). There are also significant differences in Experiments 1-2 and 1-3 beyond a 0.1 level. However, there are no significant differences in Treatment 2. In Experiment 1-1, the difference is again highly significant according to the Mann-Whitney test ($P< 0.05$; two-sided). This is also true in Experiment 1-2 and Experiment 1-3 ($P< 0.1$; two-sided). As shown in Table 9, the proportions among free riders exceed those among cooperators in all experiments. However, the table shows that some free riders who are passionate about pursuing profit may become conditional cooperators due to the group effect. These analyses of observations lead to Result 5.

As shown above, knowing individuals' personalities, their passion for profit in particular, is essential to achieving cooperation with a high probability. Knowing members' passion to pursue profit is especially important in situations where they are less aware of their group and other groups.

Result 6: *There is a difference between cooperators and free riders in terms of the degree of trust in others in Experiment 2-1. Among cooperators there is a relatively large proportion of individuals who expect others to be trustworthy.*

This paper examines the responses to Q1.4 in order to investigate the difference between cooperators and free riders in terms of the degree of trust in others. As shown in Tables 5 and 6, there is a significant difference in the proportion of individuals who agreed with Q1.4 between cooperators and free riders in Experiment 2-1 ($X^2(1)=5.96$, $P<0.05$). The difference is also highly significant beyond a 0.1 level according to the Mann-Whitney test. These analyses of observations lead to Result 6.

As shown in Table 10, the proportion of individuals who agree with Q1.4 in Treatment 2 increased among cooperators and decreased among free riders by the effect of prizes. The prize conditions tend to make distrustful people more cooperative even though they face more risk of

TABLE 10. THE PROPORTION OF INDIVIDUALS WHO AGREE WITH Q1.4 (%)

	Experiments					
	1-1	1-2	1-3	2-1	2-2	2-3
Cooperators	50	50	52.2	44.4	50	52.9
Free riders	56.6	56.8	56.7	69.2	63	57.1

being exploited by free riders.

Questions similar to Q1.4 are shown in Gachter et al. (2004). However, we used a very simple question to measure one aspect of trust shown in Q1.4. Because differences in trust levels generate different actions, it is important to take them into consideration when aiming at efficiency in a game. This result shows that we can raise our own interests by promoting bonding within the firm under a no-prize condition. Arai (2007) shows the importance of trust and trustworthiness in achieving economic efficiency and points out that neoclassical economics ignores it. Result 6 also implies that because culture determines trust levels to some extent, it affects efficiency or the amount of cooperation achieved within an organization.

As shown above, this paper considers a personality perspective. There are several different types of individuals in the real world, but most papers assume their own simplified personalities. In contrast, this paper classifies individual personality using the four aspects likely to be influenced by culture, gender, and several other factors. Cross-cultural differences in behavior are discussed in Roth et al. (1991), while some other papers discuss gender differences. Brown-Kruse and Hummels (1993) found that men contribute more toward the public good than women. This effect also emerges in Sell (1997). In contrast, Nowell and Tinkler (1994) find the opposite to be true. Finally, Solow and Kirkwood (2002) find no significant differences between the sexes. As shown above, results seem to differ substantially according to the context under consideration. This paper demonstrates that culture often influences economic efficiency through personalities.

V. *Conclusions*

An individual sometimes makes his or her decisions under the restriction of being a member of a group or organization. This paper examines experimental evidence concerning voluntary cooperation in inter-group competition involving a public goods game, where four groups compete to win prizes. This game was used to measure the degree of voluntary cooperation, since it is not driven by repeated game incentives or reputational concerns. The groups compete for the prizes and gaining a higher level of public goods means winning the larger prize. Prizes are distributed equally to members, and are hence also public goods within the group. The game helps us understand, for example, share competition among firms. This paper investigates the game from both behavioral and personality perspectives and presents the following findings.

One finding is that the cooperative actions of members can be promoted by revealing the contribution levels to other members and by enhancing the comradeship of the group which, in turn, is enhanced by making the members more aware of the other groups. Another finding is that the effect of prizes, which increases contribution levels, is especially salient in a

cooperative atmosphere, but it is not in an uncooperative atmosphere.

This paper examines four aspects of personality: preference for competition, preference for risk, passion for profit, and trust in others. Free riders tend to consider competition desirable. This holds true under no-prize conditions but not under prize conditions because many individuals become conditional cooperators in the latter case. Risk-averse individuals reduce their contribution levels under a larger prize condition, for fear of being exploited by free riders. Individuals who fiercely pursue profit tend to free ride in situations where they are less aware of the other groups and their own members. Finally, individuals who expect others to be altruistic tend to cooperate. These are important ways in which culture affects economic efficiency.

Appendix: Questions

Question Group 1

Q1.1. I think that it would be better for Japan if people competed rather than cooperated.

Q1.2. I would rather take an unstable job with a high income than a stable job with a relatively low income.

Q1.3. One has to pursue one's profit making the best use of one's brain and, if legally allowed, exploiting other people.

Q1.4. Most of the people in our society are concerned only with their own profit.

For each of these questions, the respondents rated themselves on a 11-point scale (0=strongly disagree, 5= neutral, 10=strongly agree)

Question Group 2

Q2.1. You are playing a public goods game (Condition 1). You have heard the informal information that each of the group members except you will contribute 90 tokens to public goods. How many tokens do you contribute to public goods in this situation?

Q2.2. You are playing a public goods game (Condition 1). You have heard the informal information that each of the group members except you will contribute 10 tokens to public goods. How many tokens do you contribute to public goods in this situation?

Q2.3. You are playing a public goods game (Condition 2). You have heard the informal information that each of the group members except you will contribute 90 tokens to public goods. How many tokens do you contribute to public goods in this situation?

Q2.4. You are playing a public goods game (Condition 2). You have heard the informal information that each of the group members except you will contribute 10 tokens to public goods. How many tokens do you contribute to public goods?

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