Individual versus Group Play in the Repeated Coordinated Resistance Game*

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Abstract

This paper reports an experiment to evaluate the effectiveness of repeated interactions in deterring leaders' from using divide-and-conquer strategies to extract surplus from their subordinates, when every decision-maker involved is a group instead of an individual. We find that both the resistance rate by subordinates and the divide-and-conquer transgression rate by leaders are the same in the group and individual repeated coordinated resistance games. Similar to the individual game, adding communication to the group game can help deter opportunistic behavior by the leaders even in the presence of repetition.

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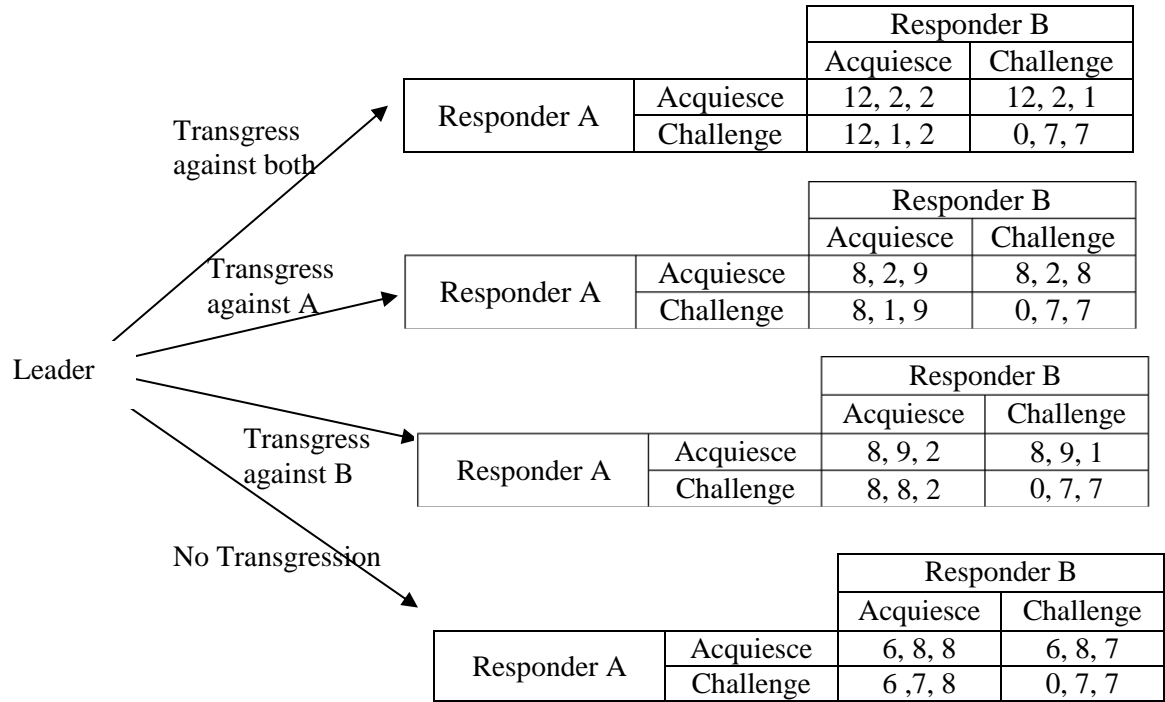
1. Motivation and the Hypothesis

This paper reports an experiment to evaluate the effectiveness of repeated interactions in deterring leaders' from using divide-and-conquer (hereafter DAC) strategies to extract surplus from their subordinates, when every decision-maker involved is a group instead of an individual. Our hypothesis is that compared to an environment in which every decision maker is an individual, group play will lead to more aggressive DAC "transgression" by the leaders.

A sizable literature has emphasized that successful economic development requires mechanisms that deter the predatory behavior of the state. If political leaders can confiscate the wealth of citizens without any repercussions, no one will have the incentive to engage in costly production and investment (North and Weingast, 1989; North, 1990; Weingast, 1995, 1997; Greif, 2006; Acemoglu and Robinson, 2012). Coordinated resistance by citizens is key to deter leader expropriation (Weingast, 1995, 1997; Acemoglu and Robinson, 2006, chapter 11). A leader may expropriate wealth from a "victim" and share it with a "beneficiary" (Weingast, 1995, 1997; Acemoglu et al., 2004). The beneficiary benefits from such DAC transgression and thus has the incentive to support it, making DAC strategies difficult to defeat.

Weingast's pioneering work (1995, 1997) emphasizes the importance of repeated interaction in deterring DAC. He considers the Coordinated Resistance (hereafter CR) game illustrated in Figure 1 that captures the following ideas. First, successful transgression reduces the subordinate's payoff by 6 but only increases the leader's *private* payoff by 3, as some surplus is destroyed in the process. Second, challenging a transgression is costly regardless of whether it succeeds, and the transgression will fail if and only if *both* responders incur the cost to challenge. Third, the leader can either transgress against both responders, or attempt to divide-and-conquer. When the leader adopts DAC he shares some of the surplus expropriated from the victim with the beneficiary to gain her support.

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Responder B (Transgress against both)

		Acquiesce	Challenge
Responder A	Acquiesce	12, 2, 2	12, 2, 1
	Challenge	12, 1, 2	0, 7, 7

Responder B (Transgress against A)

		Acquiesce	Challenge
Responder A	Acquiesce	8, 2, 9	8, 2, 8
	Challenge	8, 1, 9	0, 7, 7

Responder B (Transgress against B)

		Acquiesce	Challenge
Responder A	Acquiesce	8, 9, 2	8, 9, 1
	Challenge	8, 8, 2	0, 7, 7

Responder B (No Transgression)

		Acquiesce	Challenge
Responder A	Acquiesce	6, 8, 8	6, 8, 7
	Challenge	6 ,7, 8	0, 7, 7

Fig. 1. *The Divide-and-Conquer Coordinated Resistance Game (payoffs are for (Leader, Responder A, Responder B))*

Weingast (1995, 1997) emphasizes how repetition allows the responders to use "trigger strategies" to facilitate coordinated resistance. These strategies specify that regardless of whether she is a victim or a beneficiary, a responder will challenge any transgression, and any failure to challenge will lead both responders to acquiesce any transgression thereafter. Cason and Mui (2014) points out that repetition can also enable the leader to punish a beneficiary who refuses to acquiesce to the transgression and this can deter coordinated resistance. Recent studies of the CR game find that social preferences can affect behavior even in the one-shot CR game (Cason and Mui, 2007; Rigdon and Smith, 2010). Cason and Mui (2014) shows that in both the finitely and indefinitely repeated CR game, even with social preferences,[1] there exists an equilibrium in

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[1] Specifically, they consider a model in which responders consider the leader's transgression illegitimate, with utility that is decreasing in the leader's payoff. If this social preference is strong enough, beneficiaries may act against their own material interest to challenge the DAC transgression when they expect that the victim will also challenge.

which the leader's threat of punishing the challenging beneficiary can deter coordinated resistance. Facing such a threat, a beneficiary knows that if she challenges the leader in the current period, she will be targeted as the victim in the next period and if the other citizen (who will then be the beneficiary) does not challenge the leader, this beneficiary who challenges in the current period can be trapped as a victim forever. This possibility can deter a beneficiary from challenging the leader in the repeated CR game, even if she has social preferences and prefers that the DAC transgression be defeated.

Cason and Mui (2014) also reports an experiment employing treatments that involve both indefinite and finite repetition of the CR game. They find that in all of these repeated game treatments, leaders target beneficiaries who previously challenge DAC. Overall, both indefinite and finite repetition reduce DAC compared to the one-shot game, and by similar rates. Leaders, however, still choose DAC at least half the time. Despite the theoretical literature's emphasis on repetition in deterring DAC (Weingast, 1995, 1997), these empirical results show that repetition alone is far from sufficient to significantly reduce DAC, and adding communication reduces expropriation significantly even in the presence of repetition. Cason and Mui (2014) conclude that research aiming to identify mechanisms that can deter divide-and-conquer transgression should avoid focusing on repetition alone. Instead, researchers should consider repetition in conjunction with communication or other mechanisms that may enable potential challengers of DAC to coordinate their actions.

In Cason and Mui (2014) and all previous empirical studies of the CR game every player is an individual. In many situations, however, transgression decisions are made by a group of elites, and each responder can be a group of citizens. This study considers the repeated group CR game in which each decision maker is a group. If the earlier finding in the individual CR game that repetition has limited effectiveness in deterring DAC transgression also holds in the group

CR game, then it will strengthen the case that researchers should consider repetition in conjunction with other coordinating mechanisms that can deter DAC transgressions.

In the past two decades, a literature has examined the implications of group decision making in games, mainly by comparing behavior in the same game when all decision-makers are individuals to the case when all decision-makers are groups.[2] Insko et al. (1988)) and Schopler and Insko (1992) find that groups are less cooperative in the prisoner's dilemma than individuals. This finding regarding the prisoner's dilemma has been referred to as the "discontinuity effect" and has also been found in subsequent studies (Bornstein and Ben-Yossef, 1994; Morgan and Tindale, 2002; Wildschut and Insko, 2007).

Cason and Mui (1997) finds that in the team dictator game in which team members communicate face-to-face, there is no difference in the allocation chosen by the teams and individuals, but when team members differed in their individual dictator game choices the more other-regarding member exerts a stronger influence on the team decision. Luhan et al. (2009) considers a team dictator game in which team members communicate through anonymous electronic chat, and finds that teams are more self-regarding than individuals in this setting. Bornstein and Yaniv (1998) reports that in the ultimatum game, group proposers offer less than individual proposers, while group responders are more willing to accept a low offer than individual responders. Results are mixed in the trust game, as Cox (2002) finds that group and individual trustors behave similarly while group trustees returned less than individual trustees, whereas Kugler et al. (2007) find that group trustors transferred less than individual trustors but groups and individuals trustees returned the same percentage of the amount sent.

Davis and Harless (1996) finds that groups perform better than individuals in a

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[2] Appendix D discusses some notable exceptions that consider mixed decision-makers when players of a game consist of both individuals and groups.

monopolist price-searching experiment. Cooper and Kagel (2005) show that groups behave more strategically than individuals in the limit-pricing game, and Kocher and Sutter (2005) finds that groups learn faster than individuals in the beauty contest game. Feri et al. (2010) finds that groups coordinate more efficiently than individuals. Using a large number of normal form games designed to measure strategic sophistication, Sutter et al. (2013) reports that groups are strategically more sophisticated than individuals.[3]

Summarizing the main lessons from recent experimental studies on group decision making, Charness and Sutter (2012) argues that overall, groups are cognitively more sophisticated and also more self-regarding than individuals. In another recent survey Kugler et al. (2012, p.477) concludes that "the majority of experimental findings reveal that group behavior in games is more in line with rational and selfish predictions than individual behavior is." For members of the beneficiary group, discussions with fellow members may increase their concerns for the material well-being of their in-group, so that a group acting in the role as the beneficiary may be less inclined to act against their material interest to challenge DAC than an individual. Furthermore, discussion among members of a leader group may make a leader group more likely to recognize how they can deter resistance than an individual leader. Thus compared to individual play of the CR game, repetition may be even more ineffective in deterring DAC under group play. Contrary to this hypothesis, however, our experiment reveals that group and individual play are statistically indistinguishable. We also use group communications to provide

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[3] Researchers have also compared individual to group decision making in games such as the gift exchange game (Kocher and Sutter, 2007), contests (Abbink et al., 2010), duopoly games (Müller and Tan, 2013), and auctions (Cox and Hayne, 2006), among others. We refer the reader to this work and the references cited there, as well as the two recent literature reviews by Charness and Sutter (2012, including the on-line appendix) and Kugler et al. (2012) for more references and detailed description of each of the games studied in this literature. Most of this literature is published in economics, psychology and organizational studies journals, and this question of whether groups behave differently than individuals in the same strategic interaction has not received much attention in the political science literature. For example, no contribution to the recent *Cambridge Handbook of Experimental Political Science* (Druckman, et al., 2011) focuses on this question. We were also unable to find any paper that focuses on this question either in the *American Political Science Review* or the *American Journal of Political Science* from 2000 to the most recent issue (as of October 2014).

some direct evidence of strategic reasoning.

2. Experimental Design and Procedures

2.1   Experimental Design

Table 1 summarizes the four treatments of the experimental design. In the *Between Responder*

Communication (hereafter BRC) condition, the responders have the opportunity to send free

form messages through a chat window after they observe the choice made by the leader but

before they make their actual choices. The leader does not observe these messages. In the *Group*

condition each decision is made by a three-person group, and within each group all individuals

earn the same payoff displayed in Figure 1. Group decisions are determined through a unanimity

voting rule, following private, intra-group chats. If group members disagree on their choice, they

have 5 more voting rounds to reach a unanimous decision, but with no additional opportunity to

chat during these rounds.[4] After every voting round subjects learned each group member's vote

so they could observe whether they were in the majority or minority. The vast majority of group

decisions were made in the first voting round (see Appendix B). In the Group treatment the intra-

group chats followed the Between Responder Communication.

    Each session was separated into three, 12-period finitely-repeated games. The treatment

interventions occurred in the middle games (Periods 13-24) of each session. The first and last

repeated games (Periods 1-12 and Periods 25-36) always included baseline individual-agent CR

games. The first game was intended to familiarize subjects with this strategic environment, and

the last game was to investigate whether the intervening treatment manipulations had a persistent

influence on behavior. Leader and Responder roles remained unchanged throughout each

experimental session.

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[4] Failure to reach a decision across these rounds resulted in a random selection from one of the group members'
preferred choices.

Each matching group consisted of 9 subjects, who all interacted in the Group condition in the 9-person game during Periods 13-24. In the early- and late-period individual-agent CR games subjects were matched into new 3-person groups, and never with individuals who were fellow group members in the middle periods. This was explained in the experiment instructions, which are available in the online supplemental materials. Each session had 18 participants, so two independent matching groups of 9 were present in the lab simultaneously.

Table 1: Experimental Design (450 Subjects, 50 Statistically Independent Observations)

	Individual	Groups of Three
Between Responder Communication	14 matching groups (126 Subjects) *I-BRC*	12 matching groups (108 Subjects) *G-BRC*
No Communication	8 matching groups (72 Subjects) *I-NC*	16 matching groups (144 Subjects) *G-NC*

2.2   Procedural Details

Sessions were conducted at Purdue and Monash Universities, using inexperienced subjects, and they were fully computerized using zTree (Fischbacher, 2007).[5] The experiment instructions (see Appendix A) employed neutral terminology. For example, the leaders chose "earnings square" A, B, C or D—which was the transgression decision—and then the responders simultaneously selected either X or Y—which was the challenge decision. Subjects' earnings were designated in "experimental francs." They were paid for all periods, converted to either Australian or U.S. dollars at exchange rates that resulted in earnings that considerably exceeded their opportunity

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[5] The literature that compares individual and group play in games also mainly uses college students as subjects. Studies using student subjects can provide a useful baseline for future work. If a researcher believes that specific considerations can make certain non-student decision makers behave differently than students in a particular game, the underlying reasons can be articulated and tested in new experiments. For example, if one believes that because experienced political actors are more used to exercise their power than students and hence are more likely to practice DAC transgressions than students, one can conduct CR game experiments using experienced political actors as leaders. Note that because students play important roles in coordinated challenges against leaders, student subjects are no less appropriate than non-student subjects for the role of responders in the CR game. For a discussion of the issues and scientific merits of using student subjects to study political behavior, see Druckman and Kam (2011).

costs. The per-person earnings typically ranged between US$25 and US$40 for the Purdue sessions and between A$30 and A$60 for the Monash sessions.[6]

2.3   Content Analysis

We use content analysis to quantify the statements made by subjects in the chat rooms. We employed two coders, who were undergraduate students at Purdue and Monash Universities, to classify all the statements (25,836 lines of messages in 1,656 chat rooms). These coders were trained using pilot data and they coded the chat statements independently. They were unaware of the research questions addressed in this study and did not know the leaders' or responders' decisions. The coders judged whether each individual line fit into 50 to 60 different specific meaning categories and subcategories (shown in Appendix C), depending on the treatment. Individual chat lines could be assigned to multiple categories. We use Cohen's Kappa (Krippendorff, 2003; Cohen, 1960) to assess category classification reliability.

3. Experimental Results

3.1   Group and Individual Behavior

Figure 2 presents the leader transgression rates for the three, 12-period supergames in the four treatments.[7] Appendix B presents the complete time series of transgression and resistance rates for each of the 36 periods for the four treatments. Recall that the first and last supergame always included only individual decision-makers, and no communication. No statistically significant

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[6] The exchange rate between U.S. and Australian dollars was approximately 1 AUD = 0.75 USD when the experiment was conducted.
[7] The vast majority of transgressions are the divide-and-conquer type. Leaders sometimes attempt to transgress against both responders during the first few periods of the first supergame. This type of transgression is usually met with coordinated, joint resistance, and the rate of this joint transgression quickly drops below 10 percent. In the middle supergame that is our primary interest, transgressions against both responders occur less than 5 percent of the time in all treatments.

differences exist across the four treatments in the first and last supergames. As indicated on the figure, the treatment interventions only occur during the middle supergame (periods 13-24). In this middle supergame the transgression rate is not significantly different between the Group and Individual treatments with No Communication (nonparametric Mann-Whitney test p-value=0.71), nor is it significantly different between the Group and Individual treatments with Between-Responder Communication (p-value=0.76). Allowing for Between-Responder Communication, however, lowers the leaders' transgression rate significantly both for Individuals and for Groups (both Mann-Whitney p-values<0.01).

Figure 2: Transgression Rates for the 12-Period Supergames
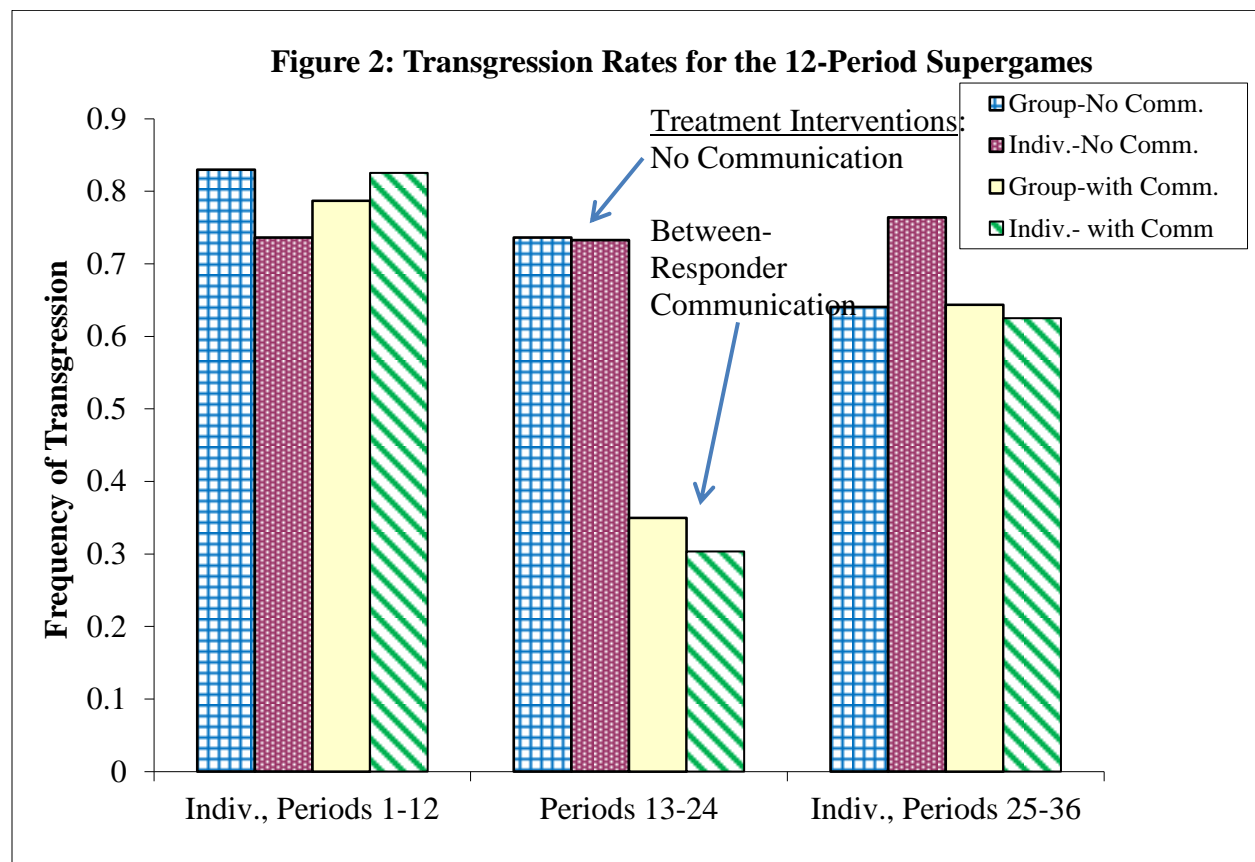
Communication lowers the transgression rate and also significantly increases the responder resistance rate. Figure 3 summarizes the transgression and DAC resistance rates for

the middle supergame, subdivided into the early 6 and late 6 periods to highlight the within-game time trend. The transgression rate shown on the far left declines across the supergame in all treatments. Victims of DAC transgression resist more frequently than do the beneficiaries who receive a monetary transfer from the leaders. Joint resistance occurs when both responders simultaneously resist the DAC transgression. The far right of Figure 3 shows that this occurs only 10 to 20 percent of the time when the responders cannot communicate. Joint resistance is always significantly higher with Between-Responder Communication (Mann-Whitney p-value<0.01 for individuals and p-value=0.02 for groups). As with the transgression rates, no type of resistance (victim, beneficiary or joint) is significantly different between the Group and Individual treatments, with or without communication. The only apparent difference between groups and individuals is that individuals' resistance rates always decline on average across the supergame while groups' resistance rates often increase from the early to the late periods.

Figure 3: Transgression and Resistance in Middle (Treated) Supergame
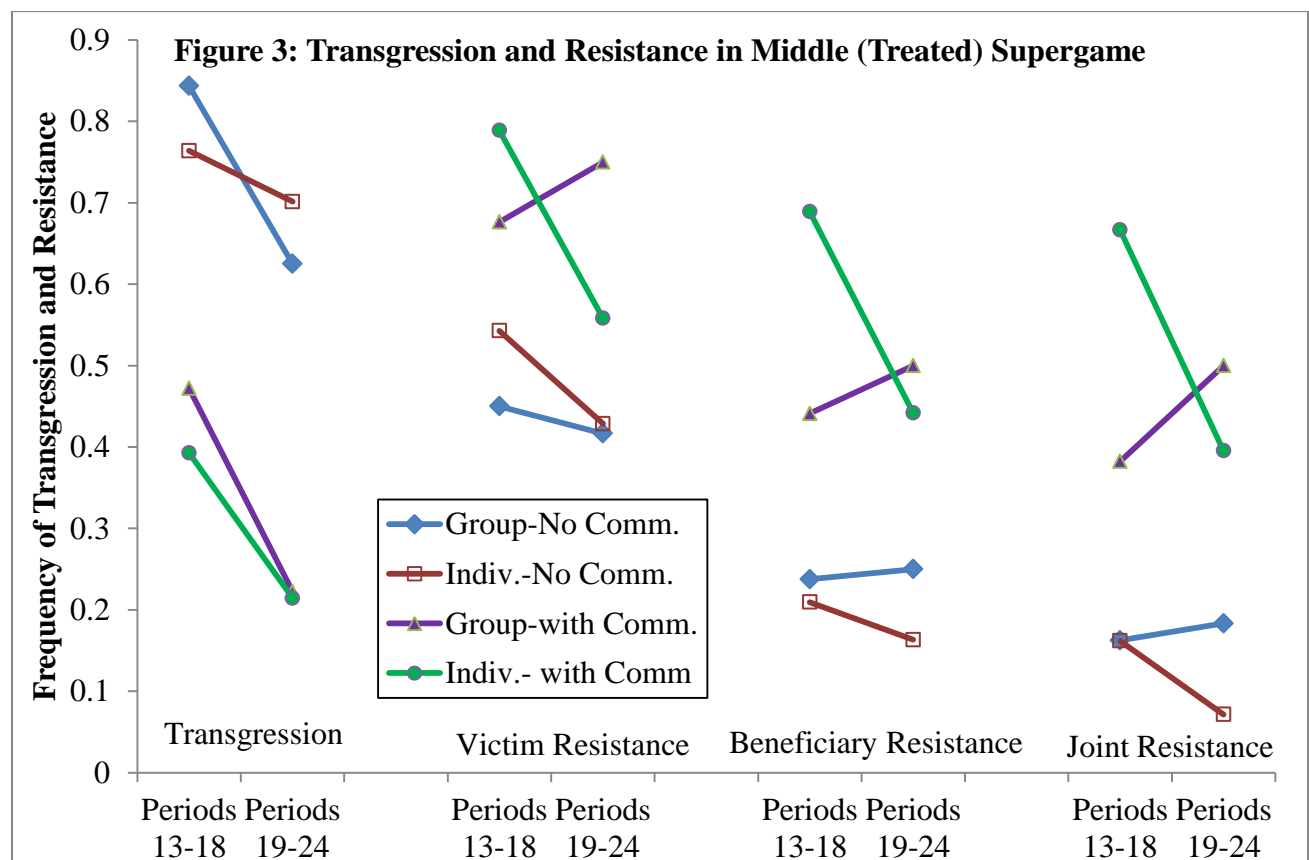
3.2　Content of Group Chats

The group discussions provide insight into the strategic factors that leaders and responders consider when choosing whether to transgress and resist. Moreover, since behavior is similar between the individual and group treatments, the group chats can provide suggestive evidence about how individuals reason in this game. In the following discussion we consider only the types of chat statements that are coded reliably. Additional details are provided in Appendix C.

In the Group treatment without responder communication, leaders who transgress discuss strategies that are used in repeated interactions more frequently than leaders who do not transgress. In particular, leaders who transgress discussed strategies and expectations that involved repeated interactions in 54% of the chat rooms, compared to 33% for the leaders who chose to not transgress. These repeated game strategies included alternating between transgressing against the two groups, as well as more sophisticated proposals that include direct evidence of leaders targeting responders who previously challenge DAC, such as: "If one of the 2 groups goes y [resist], we'll choose another in their favro [sic] another round … see if we can gang up on one team."

The leaders in this treatment also discuss responder decisions more often (42% of the chat rooms) compared to leaders in the treatment with responder communication (24%). These leaders facing responders who cannot communicate also more frequently (6%) express positive concerns about the well-being of responder groups compared to the treatment with responder communication (1%). Overall, however, leaders do not frequently express either positive or negative concerns about responders' welfare.

Similarly, responder groups rarely discuss explicitly either positive or negative concerns for the welfare of the other responders or the leaders (generally well below 10% of all chat rooms). In the treatment without responder communication, significant differences in

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communication exist between victims and beneficiaries of DAC transgression. Victim groups chat more actively, typing on average 15% more lines than beneficiary groups. Victims also more frequently discuss the decisions made by the other groups (67%) compared to beneficiaries (42%), and they discuss strategies relevant for repeated interactions (36% of chat rooms) more often than do beneficiaries (22%).

Charness and Sutter (2012) and Sutter et al. (2013) argue that groups are strategically more sophisticated than individuals. Although the group chats provide a window into their strategic reasoning and sophistication, we cannot directly compare this with individuals' strategic reasoning. A comparison of the inter-responder chat communications in the Individual and Group treatments, however, does indicate the strategy information that responders share with the other responder. The groups tend to be more specific in their chats. For example, members of beneficiary groups explicitly communicate to the victim group that they intend to resist or acquiesce 62% and 49% of the time, respectively; individual beneficiaries make these intentions explicit only 36% and 27% of the time. (These are per-subject percentages for the statements so they can be meaningfully compared across the individual and group chats.) Beneficiary groups also more frequently reference the leader's choice (19%) than do beneficiary individuals (5%). These differences are consistent with the view that groups use the chats to coordinate their actions more intensively than individuals.

4. Concluding Remarks

This paper compares group and individual behavior in the repeated CR game in two empirically important settings, namely, when all decision-makers are individuals and when all decision-makers are groups. We find that transgression and resistance rates do not differ across the individual and group repeated CR games. As in the individual CR game, repetition alone is of

limited effectiveness in deterring DAC in the group CR game, and adding communication helps deter DAC even in the presence of repetition.

Besides the *single-type decision-makers* environment in which every decision-maker is either an individual or a group, a *mixed decision-makers* environment that features both individual and group decision-makers is also empirically important. For example, sometimes the transgression decision is made by a single leader who dominates all other elites, while one or all citizen decision makers are groups. Furthermore, when moving from an all-individual decision-maker to an all-group decision-maker environment, two things occur. First, the decision-maker changes from an individual to a group. Second, the decision maker now faces an opponent who is a group instead of an individual. The existing literature—including this study—largely focuses on the single-type decision-makers environment.[8] In the current study, we find that behavior does not change when moving from the all-individual to an all-group decision-maker environment. This could be due to the fact that both effects are zero, or that these two effects are offsetting. Future research can consider the repeated CR game with mixed decision-makers to evaluate these two competing hypothesis.

While the literature that compares individual and group behavior in games is sizable, most existing work conducts this comparison for one-shot games. Some recent notable exceptions exist, but all these studies consider two player games, while the CR game considered here is a three player game that has interesting role asymmetry endogenously determined by the first-mover.[9] In particular, Cason and Mui (2014) points out that repetition can enable the leader to deter coordinated challenge by threatening to punish a challenging beneficiary. This possibility of "dynamic divide-and-conquer" may be the dominant force in the repeated CR

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[8] Appendix D reviews recent notable exceptions that consider the mixed-decision makers environment.
[9] Appendix D reviews recent notable exceptions that compare individual and group decision-making in repeated games.

game. This could explain why possible differences between group and individual behavior—for example, even if a group beneficiary is more self-regarding than an individual beneficiary—are not strong enough to be detected in a repeated game setting.

Our objective was to study whether *repetition* is also of limited effectiveness in deterring DAC transgression in the empirically important setting when all decision makers are groups. It was therefore natural to consider the group *repeated* CR game and compare it to the individual *repeated* CR game. In light of the findings reported here, however, future research can also compare the one-shot group CR game to the one-shot individual CR game. By removing the potential dominance of dynamic divide-and-conquer in a repeated game, such comparison may provide a better test of whether groups are more self-regarding than individuals in the CR game.

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Appendix A: Experiment Instructions

(Group and Between-Responder Communication Treatment)

Instructions – Part I (Periods 1-12)

This is an experiment in the economics of multi-person strategic decision making. The National Science Foundation has provided funds for this research. If you follow the instructions and make appropriate decisions, you can earn an appreciable amount of money. The currency used in the experiment is francs. Your francs will be converted to U.S. Dollars at a rate of 8 francs to one dollar. At the end of today's session, you will be paid in private and in cash.

It is important that you remain silent and do not look at other people's work. If you have any questions, or need assistance of any kind, please raise your hand and an experimenter will come to you. If you talk, laugh, exclaim out loud, etc., you will be asked to leave and you will not be paid. We expect and appreciate your cooperation.

The experiment consists of 36 decision making periods. The experiment is divided into three parts, and each part consists of 12 decision making periods. We are now reading the instructions for Part I, and instructions for the other parts will be made available later. The 18 participants in today's experiment will be randomly split between three equal-sized groups, designated as **Person 1**, **Person 2** and **Person 3** groups. If you are designated as a Person 1, then you remain in this same role throughout all the three parts of the experiment. Participants who are not designated as a Person 1 switch randomly between the Person 2 and Person 3 roles at specific points in the experiment when the participants are re-grouped, as explained later.
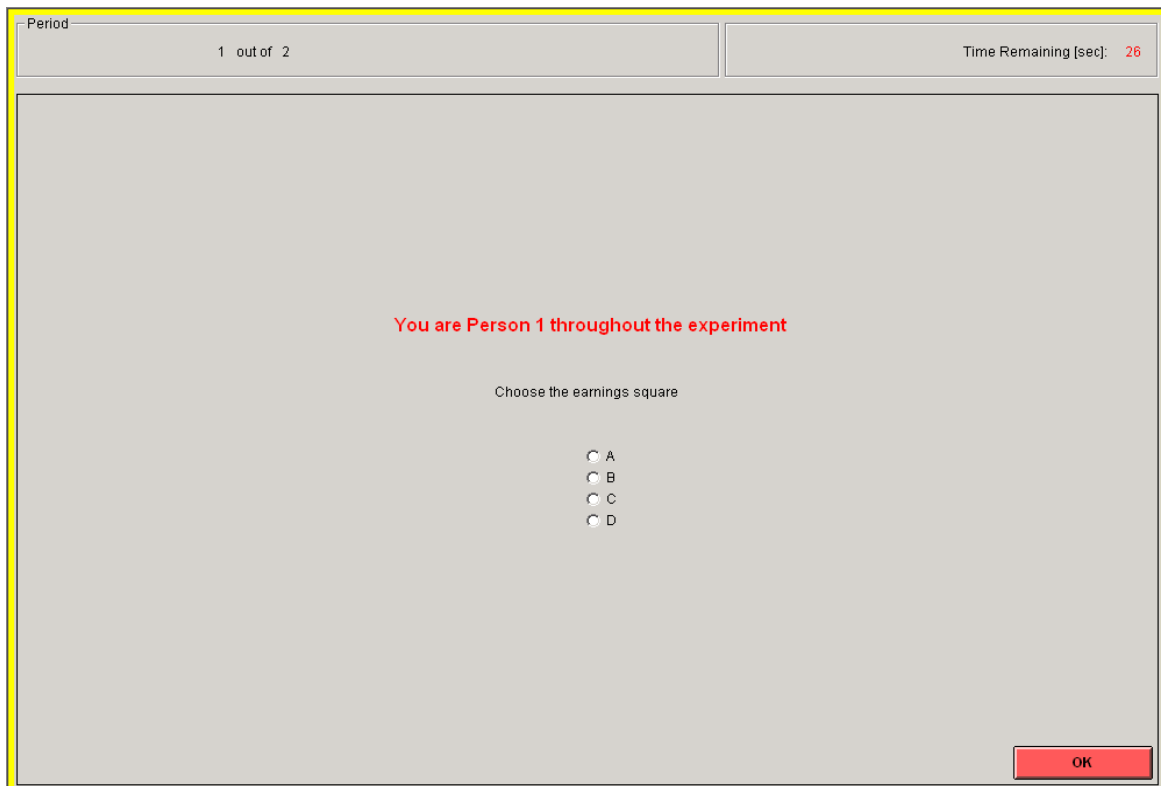
At the beginning of this experiment you will be randomly grouped with two other participants to form a three-person group, with one person of each type in each group. You will be grouped with these same two participants for 12 periods throughout Part I of the experiment. At the end of the 12th period, all participants will be re-grouped, as explained later after the completion of Part I of the experiment.

Your Choice in Part I

During each period, you and all other participants will make one choice. Earnings tables are provided on separate papers which tell you the earnings you receive given the choices that you and others in your group make during Part I of the experiment. If you are **Person 1** then you choose the earnings square, either **A**, **B**, **C** or **D**. You make this choice before the other two

people in your group make their choice, on a decision screen as shown in Figure 1 on the next page.

After learning which earnings square the Person 1 chose, then **Persons 2 and 3** make their choices, on a decision screen as shown in Figure 2 on the next page. They make this choice simultaneously; for example, if you are Person 2 then you do not learn the choice of Person 3 until after you make your choice. Both Persons 2 and 3 may choose either **X** or **Y**.

Period

1 out of 2   Time Remaining [sec]: 26

You are Person 1 throughout the experiment

Choose the earnings square

C A
C B
C C
C D

OK

Decision Screen for Person 1

Decision Screen for Person 2 (Person 3's is very similar)

Your earnings from the choices each period are found in the box determined by you and the other two people in your group. If both Persons 2 and 3 choose **X**, then earnings are paid as shown in the box in the upper left on the screen. If both Persons 2 and 3 choose **Y**, then earnings are paid as shown in the box in the lower right on the screen. The other two boxes indicate earnings when one chooses **X** and the other chooses **Y**. To illustrate with a random example: if Person 1 chooses earnings square **A**, Person 2 chooses **X** and Person 3 chooses **Y**, then Person 1 earns 12, Person 2 earns 2, and Person 3 earns 1. You can find these amounts by looking at the appropriate square and box in your page of earnings tables.

<u>The End of the Period in Part I</u>

After everyone has made choices for the current period you will be automatically switched to the outcome screen, as shown below. This screen displays your choice as well as the choices of the people in your group. It also shows your earnings for this period and your earnings for Part I of the experiment so far.

A-3

Example Outcome Screen (Shown for Person 2)

Once the outcome screen is displayed you should record your choice and the choice of the others in your group on your Personal Record Sheet for Part I. Also record your current and cumulative earnings for this period. Click on the *OK* button on the lower right of your screen when the experimenter instructs you.

The Ending to Part I

Recall that Part I will last for 12 periods, that is, from periods 1-12 of the experiment. You will be grouped with the same two participants for 12 periods throughout Part I of the experiment. At the end of the 12th period, the current grouping for Part I will be terminated.

We will now pass out a questionnaire to make sure that all participants understand how to read the earnings tables and understand other important features of these instructions for Part I of the experiment. Please fill it out now. Raise your hand when you are finished and we will collect it. If there are any mistakes on any questionnaire, I will summarize the relevant part of the instructions again. Do not put your name on the questionnaire.

Earnings Tables– Person 1

Earnings Square A:

		Person 3's Choice	
		X	**Y**
Person 2's Choice:	**X**	Person 1 receives 12 Person 2 receives 2 Person 3 receives 2	Person 1 receives 12 Person 2 receives 2 Person 3 receives 1
	Y	Person 1 receives 12 Person 2 receives 1 Person 3 receives 2	Person 1 receives 0 Person 2 receives 7 Person 3 receives 7

Earnings Square B:

		Person 3's Choice	
		X	**Y**
Person 2's Choice:	**X**	Person 1 receives 8 Person 2 receives 2 Person 3 receives 9	Person 1 receives 8 Person 2 receives 2 Person 3 receives 8
	Y	Person 1 receives 8 Person 2 receives 1 Person 3 receives 9	Person 1 receives 0 Person 2 receives 7 Person 3 receives 7

Earnings Square C:

		Person 3's Choice	
		X	**Y**
Person 2's Choice:	**X**	Person 1 receives 8 Person 2 receives 9 Person 3 receives 2	Person 1 receives 8 Person 2 receives 9 Person 3 receives 1
	Y	Person 1 receives 8 Person 2 receives 8 Person 3 receives 2	Person 1 receives 0 Person 2 receives 7 Person 3 receives 7

Earnings Square D:

		Person 3's Choice	
		X	**Y**
Person 2's Choice:	**X**	Person 1 receives 6 Person 2 receives 8 Person 3 receives 8	Person 1 receives 6 Person 2 receives 8 Person 3 receives 7
	Y	Person 1 receives 6 Person 2 receives 7 Person 3 receives 8	Person 1 receives 0 Person 2 receives 7 Person 3 receives 7

Earnings Tables - Use this sheet when designated as Person 2

Earnings Square A:

		Person 3's Choice	
		X	**Y**
You	**X**	Person 1 receives 12 You receive 2 Person 3 receives 2	Person 1 receives 12 You receive 2 Person 3 receives 1
	Y	Person 1 receives 12 You receive 1 Person 3 receives 2	Person 1 receives 0 You receive 7 Person 3 receives 7

Earnings Square B:

		Person 3's Choice	
		X	**Y**
You	**X**	Person 1 receives 8 You receive 2 Person 3 receives 9	Person 1 receives 8 You receive 2 Person 3 receives 8
	Y	Person 1 receives 8 You receive 1 Person 3 receives 9	Person 1 receives 0 You receive 7 Person 3 receives 7

Earnings Square C:

		Person 3's Choice	
		X	**Y**
You	**X**	Person 1 receives 8 You receive 9 Person 3 receives 2	Person 1 receives 8 You receive 9 Person 3 receives 1
	Y	Person 1 receives 8 You receive 8 Person 3 receives 2	Person 1 receives 0 You receive 7 Person 3 receives 7

Earnings Square D:

		Person 3's Choice	
		X	**Y**
You	**X**	Person 1 receives 6 You receive 8 Person 3 receives 8	Person 1 receives 6 You receive 8 Person 3 receives 7
	Y	Person 1 receives 6 You receive 7 Person 3 receives 8	Person 1 receives 0 You receive 7 Person 3 receives 7

Personal Record Sheet for a <u>Person 2 or 3-Part I (Periods 1-12)</u>

Period	Person 1's Choice (circle one)	Your Person Number (circle)	Your choice (circle)	Other Person 2 or 3's choice	Your earnings this period	Total earnings in Part I of the experiment so far
1	A B C D	2 3	X Y	X Y		
2	A B C D	2 3	X Y	X Y		
3	A B C D	2 3	X Y	X Y		
4	A B C D	2 3	X Y	X Y		
5	A B C D	2 3	X Y	X Y		
6	A B C D	2 3	X Y	X Y		
7	A B C D	2 3	X Y	X Y		
8	A B C D	2 3	X Y	X Y		
9	A B C D	2 3	X Y	X Y		
10	A B C D	2 3	X Y	X Y		
11	A B C D	2 3	X Y	X Y		
12	A B C D	2 3	X Y	X Y		

Total earnings in Part I: _____(Francs)

At the beginning of the 13th period, you will be randomly grouped with eight other participants to form a nine-person group. Each nine-person group will consist of three of those participants who were randomly chosen to be person 1 in the beginning of the experiment, and six of those participants who were chosen as persons 2 or 3 in the beginning of the experiment. The three person 1 participants will form a three member Team 1 for Part II of the experiment. Three of the other six participants who were chosen as persons 2 or 3 in the beginning of the experiment will be randomly grouped together to form a Team 2, and the remaining other three participants will be grouped together to form a Team 3. You will be grouped with these same eight participants for 12 periods throughout Part II of the experiment, that is, from periods 13-24 of the experiment, and you will always belong to the same three-person team that you are randomly assigned to in the beginning of Part II of the experiment. At the end of the 24th period, all participants will be re-grouped, as explained later at the beginning of Part III.

Your Choice in Part II

During each period, you and all other participants will make one choice. Earnings tables for Part II are provided on separate papers, which tell you the earnings each participant receives given the choices that your team and the other two teams in your group make. Your earning in each period will be one-third of your team's earning in that period. **Team 1** chooses the earnings square, either **A**, **B**, **C** or **D**. **Team 1** make this choice before the other Teams 2 and 3 make their choice. Before making their team's actual choice, members in Team 1 have an opportunity to privately communicate with each other for 1 minute in a chat window. (After period 16 of the experiment this chat period will be reduced to 40 seconds.) After the communication, each member of Team 1 will indicate the earning square he/she wants his/her team to choose in an individual decision screen for members of Team 1 shown in the figure below.

Participant ID: 2

You are in **Team 1** throughout the experiment

Indicate the earnings square that you want your team to choose

○ A
○ B
○ C
○ D

OK

Decision Screen for a member of Team 1

If all members of Team 1 agree on a particular earning square, then the computer will implement this as the action chosen by Team 1. If there is disagreement, then members of Team 1 will have 5 more rounds to reach a unanimous decision, but with no additional opportunity to chat during these rounds. During each round, members of Team 1 will be asked to indicate the earning square that he/she wants his/her team to choose. If a unanimous decision is reached in any round, then that unanimous decision will be implemented by the computer. If members of Team 1 fail to reach a unanimous decision after 6 rounds, the computer will randomly choose one of the earning squares among those that were indicated as preferred choices by members of Team 1 in the last (that is, the 6th) round.

After learning which earnings square **Team** 1 chose, then **Teams 2 and 3** make their choices simultaneously. That is, if you are a member of Team 2 then you do not learn the choice of Team 3 until after you make your choice. Both Teams 2 and 3 may choose either **X** or **Y**. However, after learning **Team** 1's earnings square choice but before making their team's actual choice, the *six* participants who are designated as members of Team 2 or Team 3 will have the

opportunity to privately communicate among themselves in a chat window for 90 seconds.(After period 16 of the experiment this chat period will be reduced to 1 minute.). Although we will record the messages that you send, only you and the other participants who are designated as members of Team 2 or Team 3 in your nine-person group will see them. The participants who are designated as members of Team 1 will not observe these chat messages.

After the six participants who are designated as members of Team 2 or Team 3 privately communicate among themselves, each member in Team 2 and Team 3 has an opportunity to privately communicate with other members in his/her own three-person team for 1 minute in a separate chat window. (After period 16 of the experiment this chat period will be reduced to 40 seconds.) That is, this communication will only take place separately in two chat windows among *the three members of a Team 2 or Team 3.* After this communication, each member of a Team 2 or Team 3 will indicate the action he/she wants his/her team to choose in an individual decision screen as shown in the figure below.

Decision Screen for a member of Team 2 (Team 3 member's is very similar)

If all members of a Team 2 or Team 3 agree on a particular action, then the computer will implement this as the action chosen by the team. If there is disagreement, then members of a Team 2 or Team 3 will have 5 more rounds to reach a unanimous decision, but with no additional opportunity to chat during these rounds. During each round, members of a Team 2 or Team 3 will be asked to indicate the action he/she wants his/her team to choose. If a unanimous decision is reached in any round, then that unanimous decision will be implemented by the computer. If members of Team 2 or Team 3 fail to reach a unanimous decision after 6 rounds, the computer will randomly choose one of the actions among those that were indicated as preferred choices by members of the team in the last (that is, the 6$^{\text{th}}$) round.

To sum up, regardless of what team you are in, before you indicate your preferred choice for your team, you will have the opportunity to privately communicate with the other two persons *in your own team*. Although we will record the messages that you send, *only you and the other two persons in your own team will see them.* For example, if you are a member of Team 1, you will be communicating with the other two members in your team, but members in Team 2 and Team 3 will not observe your chat messages. In addition*,* after learning **Team** 1's earnings square choice, the six participants who are members of Team 2 or Team 3 will have the opportunity to privately communicate among themselves. The participants who are members of Team 1 will not observe these chat messages. This communication between the six participants who are members of Team 2 or Team 3 will take place after they learn **Team** 1's earnings square choice but before the separate communication that will take place between the three members of a Team 2 or Team 3.   Note, in sending messages back and forth between you and the other persons we request that you follow two simple rules: (1) Be civil to each other and use no profanity and (2) Do not attempt to identify yourself in any way.

The End of the Period in Part II

After every team has made choices for the current period you will be automatically switched to the outcome screen, as shown on the next page. This screen displays each team's choice as well as the choices of the other teams in your group. It also shows your team's earnings and your earnings for this period and your earnings for Part II of the experiment so far. Once the outcome screen is displayed you should record the relevant information on your Personal Record Sheet for Part II.

You are in Team 2 this period

Team 1 chose earnings square   A
Your Team chose   X
Team3 chose   X

Your earnings this period   2
Your cumulative earnings in PART II of the experiment   2

Team 1's earnings this period   36
Your Team's earnings this period   6
Team 3's earnings this period   6

OK

Example Outcome Screen (Shown for a member of Team 2)

The Ending to Part II

Recall that Part II will last for 12 periods, that is, from periods 13-24 of the experiment. You will be grouped with the same eight participants throughout Part II, and you always remain in the same team. At the end of the 24th period, the current grouping for Part II will be terminated.

We will now pass out a questionnaire to make sure that all participants understand how to read the earnings tables and understand other important features of these instructions for Part II of the experiment. Please fill it out now. Raise your hand when you are finished and we will collect it. If there are any mistakes on any questionnaire, I will summarize the relevant part of the instructions again. Do not put your name on the questionnaire.

Instructions--Part III (Periods 25-36)

At the beginning of the 25th period, you will be randomly grouped with two other participants to form a three-person group, with one person of each type in each group. You will be grouped with these same two participants for 12 periods throughout Part III of the experiment, that is, from periods 25-36 of the experiment. You will make choices according to the same rules as those in Parts I and II, however *you will not be matched with any of the two participants that you were matched with in either Part I or Part II to form the three person group in this last Part of the experiment*.

Appendix B: Group Voting and Time Series of Transgression and Resistance

1.   Time Series of Transgression and Resistance Rates

Figures B-1 through B-4 present the transgression and resistance rates for each of the 36 periods for the four treatments. With the exception of Periods 1-12, transgression rates (Figure B-1) tend to decline across the 12-period blocks, with discrete changes sometimes indicated when switching treatment conditions. (These treatment changes are designated by the straight vertical lines after periods 12 and 24.) Note the large treatment effect due to responder communication in the treated periods 13-24, already documented in Figure 2 of the paper.

Responder resistance rates (Figures B-2 through B-4) also tend to decline within each 12-period supergame, except for the group treatments in periods 13-24 when group decisions were implemented. The time series detail also reveals large increases in resistance when switching treatments after periods 12 and 24 ("Restart" effects).

Figure B-1:

Leader Transgression Rate by Period

Figure B-2:

Victim Resistance Rate by Period

Figure B-3:

Beneficiary Resistance Rate by Period

Figure B-4:

Joint Resistance Rate by Period
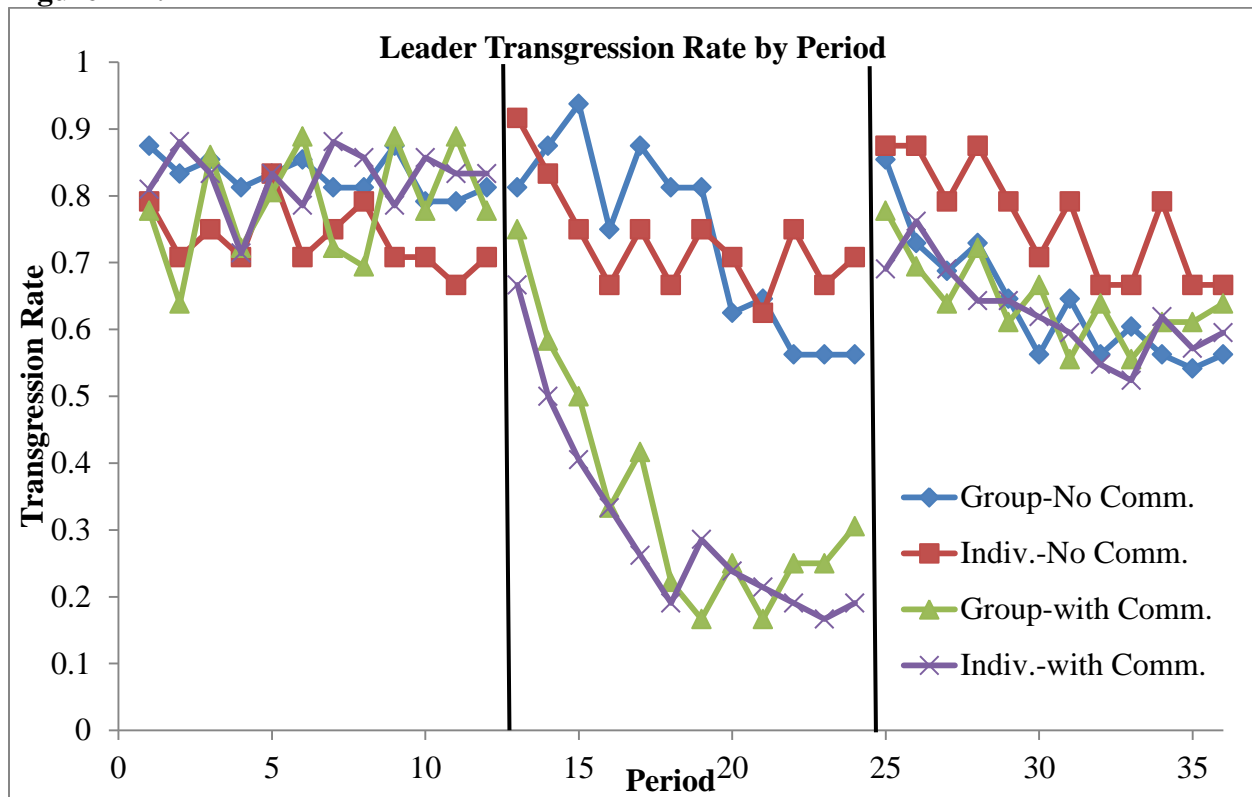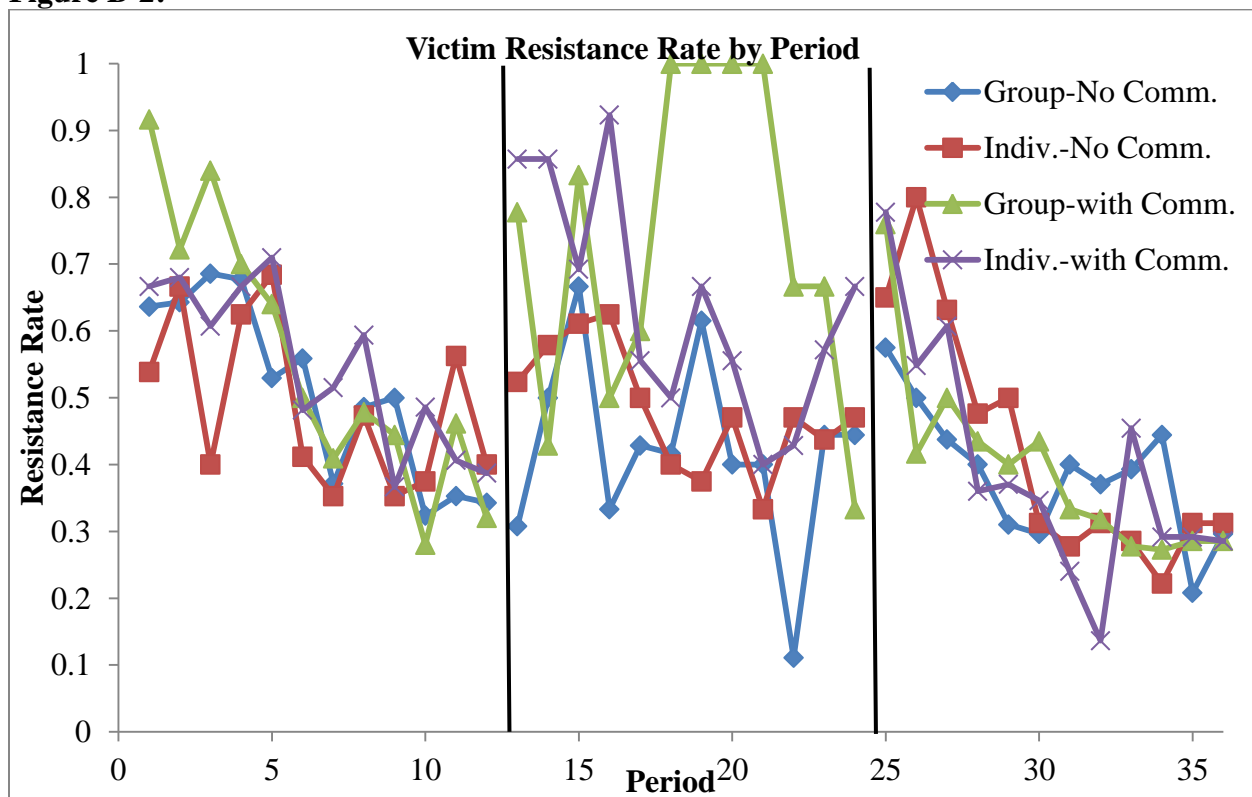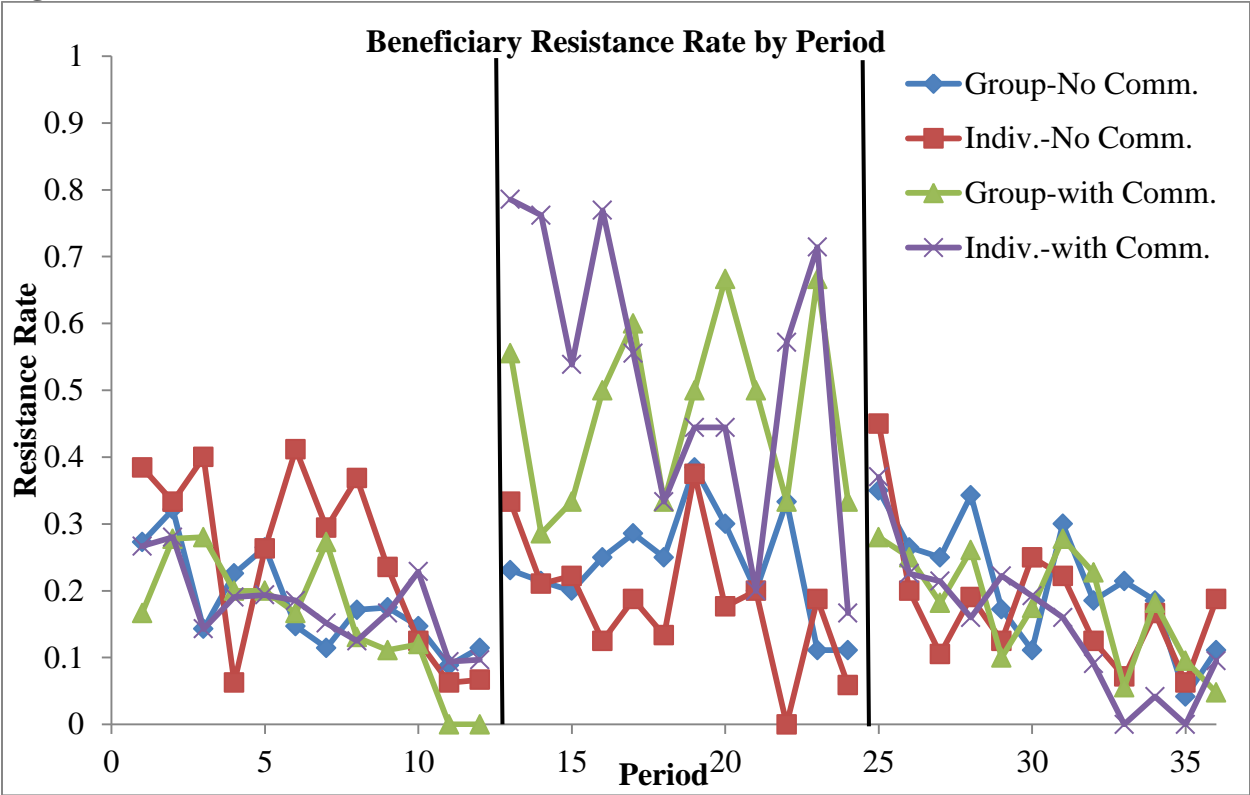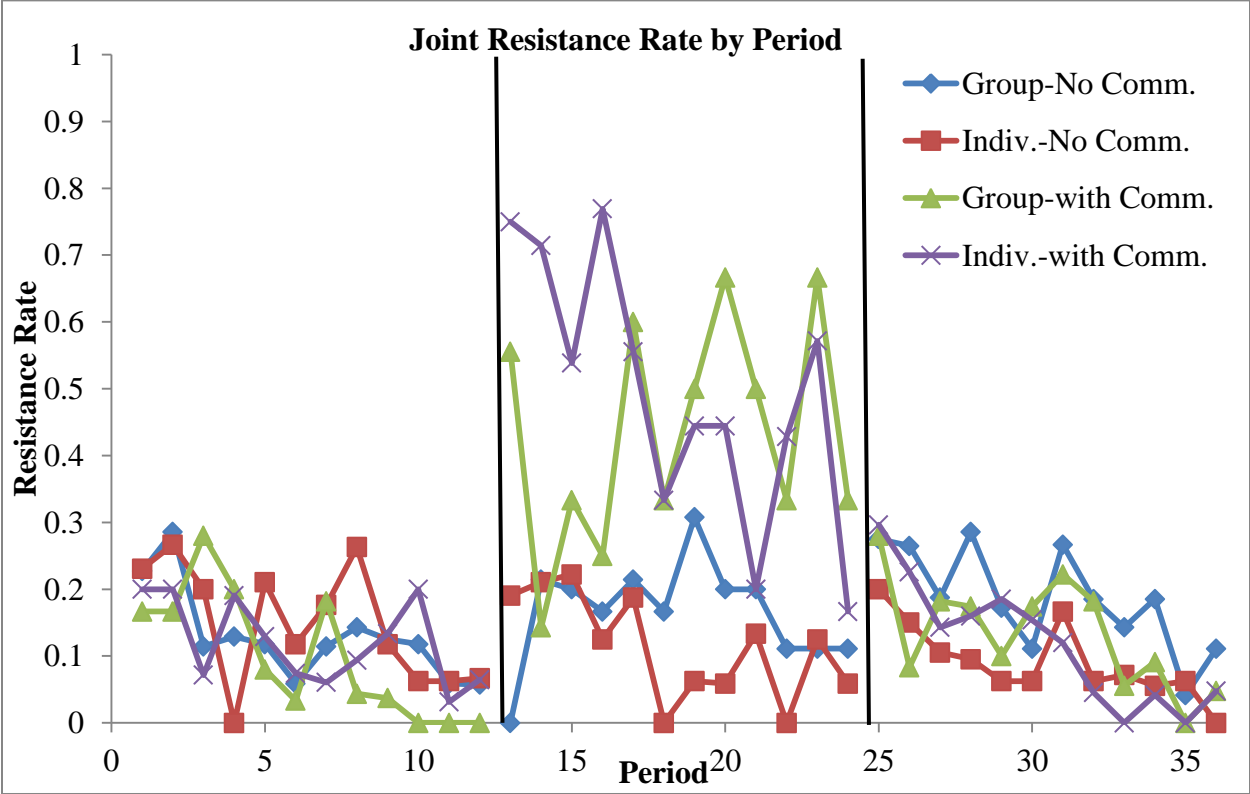
2.   Voting Rounds Required to Reach Unanimity

Recall that groups reached their decisions by a unanimous voting rule. Voting occurred immediately at the conclusion of each period's chat communication. If they failed to reach an agreement on their first or subsequent votes, groups had up to 5 additional rounds of voting to reach unanimity but with no additional communication opportunities in these extra rounds. At the conclusion of each voting round, subjects received feedback about each group member's vote so they could observe whether they were in the majority or minority. In the rare event that groups never reached a unanimous agreement, one of the group members' preferred choices (as indicated by their votes) was selected at random for implementation.

Figures B-5 and B-6 indicate that it was very uncommon for groups to need to vote in multiple rounds, and they rarely failed to reach a unanimous decision eventually. In three of the four cases unanimous group votes occurred in the first voting round over 90 percent of the time. In the one case where this did not occur (when leaders face between-responder communication), groups reached unanimous agreement after two voting rounds over 90 percent of the time.

Figure B-5:

Voting Rounds Leaders Required to Reach Unanimous Decision

Figure B-6:

Voting Rounds Responders Required to Reach Unanimous Decision
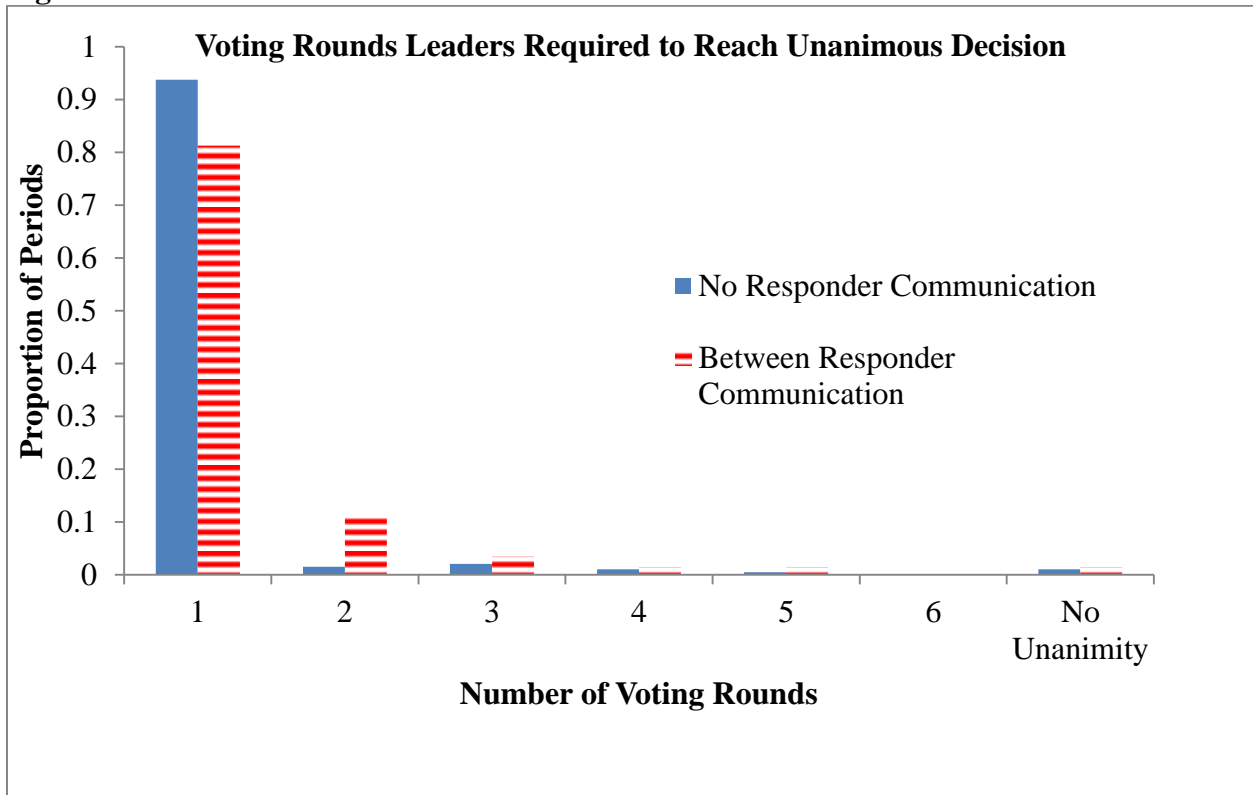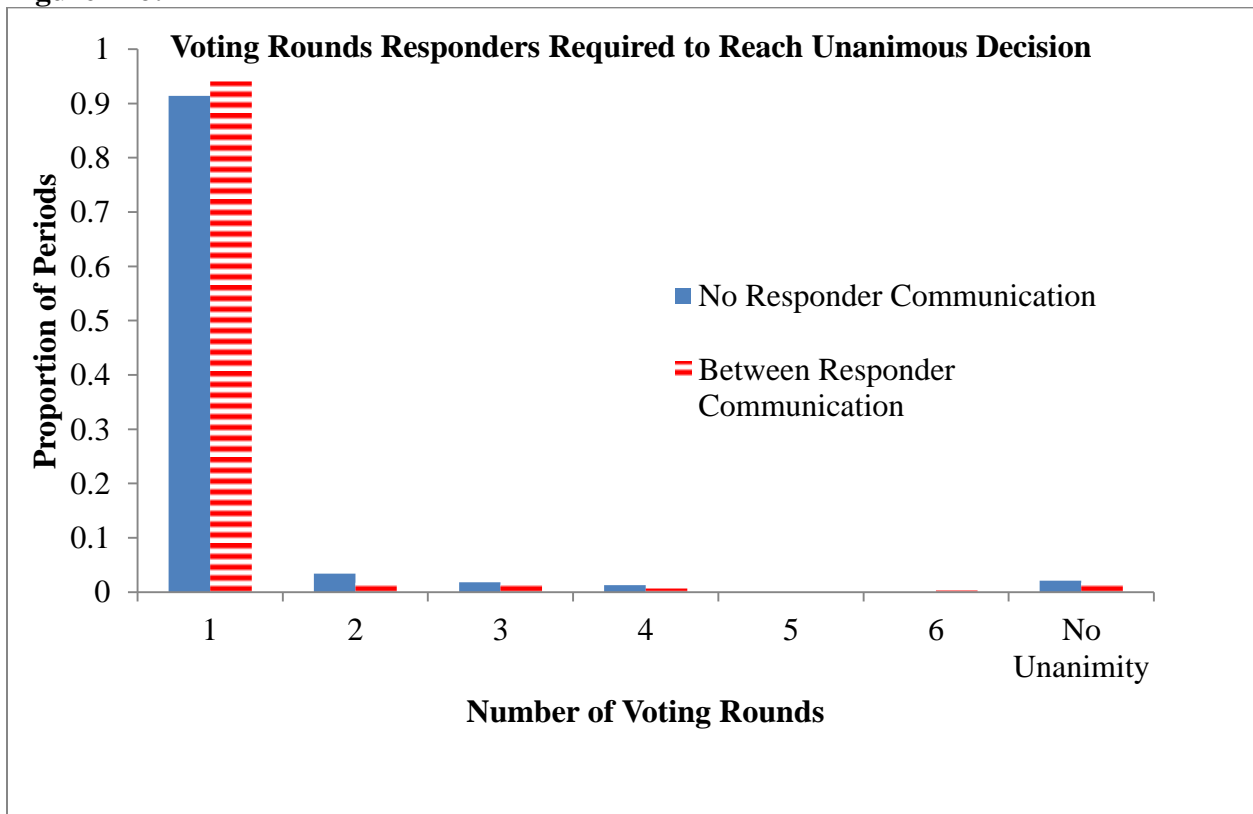
3. "Return to Baseline" Comparison of Periods 25-36 to Periods 1-12

For each treatment our design includes two, 12-period baseline supergames with individual decisions and no between responder communication during periods 1-12 and 25-36. This allows us to determine if any of the treatment interventions in periods 13-24 had a lasting impact on behavior in the later supergame, and which conditions led to a "return to baseline" with outcomes not significantly different from the first supergame.

Table B-1 reports p-values for pairwise, two-tailed nonparametric Wilcoxon signed-rank tests comparing transgression and resistance rates in the first and last supergames. Transgression rates tend to be lower in the final supergame than the first supergame, except for the individual-no communication treatment in which treatment conditions were left unchanged during the middle supergame. None of the three types of resistance rates are statistically significantly different between the first and last supergame, consistent with the visual impression seen in Figures B-2 through B-4. The only exception is a marginally significant decline in successful joint resistance for the individual-no communication treatment.

Table B-1: Wilcoxon Signed-Rank Test p-values Comparing First and Last Supergames

| | Divide-and-Conquer Transgressions | | |
	Transgression	Victim Resistance	Beneficiary Resistance	Successful Joint Resistance
Group – No Communication	0.052	0.605	0.148	0.115
Individual – No Communication	0.674	0.401	0.263	0.069
Group – With Communication	0.083	0.209	0.272	0.146
Individual – With Communication	0.010	0.221	0.730	0.246

Note: All p-values are two-sided.

Appendix C: Additional Details of Chat Communication Content Analysis

1.   Content Categories and Reliability

Tables C-1 through C-3 present the message coding categories for the three treatments with communication. This includes some example statements and additional instructions provided to the coders. Not all categories were reliably coded, which we assessed after the coding using Cohen's Kappa (Krippendorff, 2003; Cohen, 1960). This measure is preferable to the simple correlation of classifications across coders, since it adjusts for the level of agreement that would occur simply by chance. Our analysis only considered reliably-coded categories with a Kappa of at least 0.41, which is often considered to be the threshold for a "Moderate" level of agreement (Landis and Koch, 1977). The rightmost column in Tables C-1 through C-3 report the Kappa statistic for all categories.

2.   Chat communication analysis within treatments

2.1   Group-No Communication

Table C-4 reports the frequency of some reliably-coded message categories in the Group-No Communication treatment. For the Leaders (Panel A) these frequencies are also presented separately depending on the kind of transgression chosen by the Leader group for that period. There are some interesting differences in chat statements for the (lower 111) "repeated interactions" classification, with a greater frequency of discussions about some alternating (111e) or repeated (111f) DAC transgressions. Note that few statements are classified in the social preferences categories (i.e., 102e through 102l), and little difference in rates of those statements depending on what the leader group chose. Leaders who transgress, however, are considerably

more likely to express a goal to coordinate for the benefit of the Leader group involved in the chat (102m) compared to leaders who do not transgress.

Panel B or Table C-4 summarizes classification frequencies for the Responder group chats. These are only for the DAC subgames, which are by far the most common (and the only interesting) subgames. Many differences exist in what the Victim and Beneficiary groups discuss, as assessed through random effects poisson count regressions.[1] Victims communicate overall more frequently than Beneficiaries communicate, and they more often propose to resist (1b). Interestingly, Beneficiaries more frequently express negative preferences towards leaders (2h), and at a marginal (10%) significance level they also more frequently express positive concerns towards the Victim group (2e). Victim groups, however, more frequently discuss other group's decisions (3, 3a, 3d) and more frequently discuss repeated game strategies (11, 11b, 11p).

2.2   Group with Between Responder Communication

Table C-5 reports the message frequencies for the Group-Between Responder Communication treatment. For the leaders' chats, on the right side of Panel A we display some chat content frequencies separately for leaders depending on their initial transgression in the first period of the individual choice condition. This first choice of the experiment can be interpreted as a rough measure of the leader's "type," before he or she learns whether transgressions will be successful. The statistical tests summarized on the far right reveal that leaders who initially chose to transgress against both responders are less likely to propose No Transgression (101d); leaders who initially chose DAC are more agreeable to others' proposals (101h); and leaders who initially chose not to transgress against any responder are more likely to make reference to a

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[1] Similar statistical tests are not conducted in Panel A because the Leader's choice of whether and how to transgress is their own endogenous choice.

particular responder group's choice (13c), suggesting perhaps that they think more strategically.

Two types of chats occur among the Responders in this treatment. Panel B of Table C-5 distinguishes between the Inter-Responder (6-person) chats that take place before the Intra-Responder chats using _inter and _intra suffixes. The differences in the beneficiaries and victims chat statements tend to be greater in their intra-group chats, compared to the 6-person inter-group chats. Ten of the 15 statistically significant differences in chat content occur for the 3-person intra-group chats. In these chats, for example, victims more frequently propose to resist (1b, 1be), express negative preferences towards the leader (2h) and express pro-social concerns for others in the group (2k). Beneficiaries make more statements about maximizing profits (2a, 2ab) and how their choice may influence the decision of leader group (3b).

This table also uses bold in the all transgressions frequency column to indicate significant differences in chat statements for the intra- and inter-group chat statements (using the 5% significance threshold). There is generally more chat in the inter-group chat rooms (3 compared to 2.5 messages), but importantly this communication is more focused specific topics, such as choosing resistance (1b, 1be); reasoning about choices (2); negative social preferences towards to the Leaders (2h); coordinating choices to benefit chatting group members (2m); reference to the leader's choice (3a); influence of the responders' choice on the leader's decision (3b); reference to previous periods (6); and proposing long-term plan to always resist except when leader chooses not to transgress (11c). In all cases, these types of statements are more frequently observed in the inter-group chats than in the intra-group chats.

2.3   *Individual with Between Responder Communication*

Table C-6 displays the frequency of message statements for divide-and-conquer transgressions among the individual responders in the Individual-Between Responder

Communication treatment. There are only a few statistically significant differences in the statements that victims and beneficiaries chat about; not surprisingly, victims more frequently propose to resist (1be) and suggest a long-term strategy to resist except when leader chooses not to transgress (11c).. One reason that few differences are statistically significant is that transgressions are rather rare in this treatment with inter-responder communication.

3.   Chat analysis across treatments

Fortunately, a similar set of message classification categories are reliable across treatments, so that they can be reliably compared. The results summarized below are based on those categories that are reliably classified in *multiple* treatments. As for the within-treatment statistical comparisons reported in the previous section, we employ random effects poisson count regressions to compare message frequencies.

3.1   Leader Chats, with and without Between Responder Communication

Table C-7 summarizes the frequencies for the leader chats, and indicates which types of statements are significantly different across treatments. Most classifications are significantly different, in part because the leaders are behaving very differently in the treatments. For example, as documented in the results the leaders are generally *not* transgressing with between responder communication, so they propose to not transgress (101d) more often and propose DAC transgression (101b, 101c) less often. Nevertheless, it is interesting that without responder communication the leaders tend to indicate agreement more (101h), discuss more the importance of their coordination (102m), discuss the responders decisions (13), and plan for repeated interactions (111 and subcategories). This may reveal more "strategic thinking" when responders

cannot communicate, since with between responder communication the resistance rate is high and the transgression rate is low.

3.2   Responder Intra-Group Chats, with and without Between Responder Communication

Table C-8 provides a similar comparison for the 3-person intra-group responder chats. These chat frequencies are for DAC subgames only. (Results are unchanged when controlling for whether the beneficiary or the victim is making the statements.) When no between responder communication is possible, groups more frequently propose to acquiesce (1a), refer to the leader's choice (3a), refer to previous periods (6), discuss repeated game strategies (11) and propose doing the same thing as the last period (11d). Groups who cannot communicate with the other responder group also more frequently express negative social preferences towards the leader group (2h), although only at a marginal 10 percent significance level. As with the leaders, the responders appear to conduct more strategic discussions in the more demanding environment in which they cannot communicate with the other responder group.

3.3   Inter-Responder Chats, Groups compared to Individuals

Table C-9 displays the chat content frequencies for the communication between responders, separately for the treatment with individual decision-makers and for three-person group. Again, these figures are for the DAC subgames only. The statistical significance is generally weaker, so the table also notes differences that are marginally significant at the ten-percent level. This weaker significance is due in part to the substantially smaller sample size, since transgression is relatively rare in these treatments with inter-responder communication. It appears that groups are more explicit about proposing both acquiescence (1a) and resistance (1b), and modestly less likely to refer to maximizing profit (2ab). Groups are are more likely to

indicate negative attitudes the leader (2h) and refer to the leaders' choice (3a), and they less frequently propose to resist in all future periods (11b).

4.   Communication within groups reveals strategies in the coordinated resistance game

A main conclusion of this experiment is that behavior is similar between the individual and group treatments. Therefore, the group discussions can provide insight into the strategic factors that leaders and responders consider when choosing whether to transgress and resist, and might even be revealing about the unobserved strategic thought process of individuals in this collective resistance game. Some of these observations are discussed in the body of the paper (Section 3.2). Here we provide some brief additional discussion, focusing on the treatment without between responder communication.

Not surprisingly, the most common chat statements expressed by the leader groups tend to focus on coordinating their common decision (101 and 102m). For their reasoning about why they should make a particular choice, they express a goal of maximizing profit in about 5% of the chats (102ab). They express concern for the well-being of responder groups (102g) at a low (6%) and similar rate that they express negative preferences toward the responders (102h; 7%). They also indicate concern about the riskiness of their choice (102n, 8%; 102o, 5%).

Leaders discuss responder decisions quite frequently (13; 42%), and also frequently refer to previous periods (6; 25%). On average they made statements in 49% of the chats that were classified as strategies and expectations concerning repeated interactions (111), with proposing to alternate between the two DAC transgressions (111e; 10%) and repeating the previous period's choice (111f; 9%) being the most common.

When facing DAC transgression, beneficiaries and victims focus on different issues and plans in their chats. Victims more frequently propose to resist, of course, as also reflected in their actual choices (1b; 48% vs. 29%). Beneficiary groups more frequently express a concern for the well-being of the other responder group (2e; 5% vs. 3%) and they also indicate significantly more statements expressing negative views towards the leader group (2h; 6.4% vs. 4.9%).

Victim groups more frequently discuss the leader's choice (3a; 28% vs. 20%) and the other responder group's choice (3d; 22% vs. 9%), and more frequently refer to previous periods (6; 14% vs. 8%). They also more frequently make statements that are classified as strategies and expectations concerning repeated interactions (11; 36% vs. 22%), particularly an expectation that the other responder group will choose to acquiesce in the future (11p; 8.4% vs. less than 0.1%).

Table C-1, Panel A (Leader Team Coding Categories in Group-No Communication Treatment)			
Category	**Description**	**Examples**	**Additional Instructions**	**Kappa**
101	Coordination on the decisions *for the current period*			0.646
101a	Propose to choose A or inform others you choose A	go for A	A proposal that the team should choose earnings square A	0.71
101b	Propose to choose B or inform others you choose B	Let's choose B	A proposal that the team should choose earnings square B	0.751
101c	Propose to choose C or inform others you choose C	C this time	A proposal that the team should choose earnings square C	0.788
101d	Propose to choose D or inform others you choose D	better take D	A proposal that the team should choose earnings square D	0.833
101e	THIS CODE INTENTIONALLY LEFT BLANK			
101f	Questioning another person's proposal/ pushing for consensus	are you going to go B for sure?	Should be referring, at least implicitly through context, to a specific proposal	0.371
101g	Disagree with another person's proposal	No, I don't think so	An explicit disagreement, not just questioning the others' proposal	0.591
101h	Agree with another person's proposal / confirmation of agreement	Sounds good		0.683
101i	Ask for opinion or advice	what do you think	Used, for example, to ask others to make a proposal	0.259
102	Reasoning about why should choose A, B, C or D			0.362
102a	Maximizing profit for current period	A, we will make the most		0.443
102b	Maximizing profit in the long-run	Go with me and we will make more later on, and not just this one time		0.291
102ab	Maximizing profit (a and b combined)			0.419
102c	Appeal to equilibrium reasoning	So we need to choose the equilibrium to get the most consistently		NA
102d	Appeal to knowledge in economics	its all about game theory		0.666
102e	Being nice to / concern for well-being of team 2			0.385
102f	Being nasty to team 2			0.373
102g	Being nice to / concern for well-being of team 3	at least we're not being mean *(can only be interpreted in full context)*		0.589
102h	Being nasty to team 3	yea well i want team 3 to suffer		0.434
102i	Concern for well-being of one's own team	at least we get something that way		0
102j	Concern that other team(s) are getting more than one's own team	they're getting more than us		0.214
102k	Concern for well-being of the whole group of 9 people (all 3 teams)			0.595
102l	Appeal to another team member to be fair	let's be fair and go D		0.216
102m	Group coordination for the benefit of all 3 people who are participating in the chat			0.419
102n	Concern about the riskiness of a particular action			0.413
102o	Argue that a particular action is safe			0.499
102p	Threat	I don't like people who want to mess up the other person		0
102q	Reference to the reasoning of others without indicating agreement or disagreement	that's an interesting idea	If the statement also indicates an agreement or disagreement for action, then should use 101g or 101h	0.121
13	Discussion of team 2's or team 3's decisions			0.596
13a	Reference to the choice of team 2	team 2 seems to be playing it safe		0.594
13b	Influence of team 1's choices on team 2's decision	yeah but that will teach team 2 to choose x so that we all get the optimal amount		0.38
13c	Reference to the choice of team 3			0.52
13d	Influence of team 1's choices on team 3's decision			0.378
13e	Reference to the choice of team 2 and/or team 3, not distinguishable	they are killing us	Use 13e and 13f if the statement may be referring to both teams, or perhaps to only one	0.443
13f	Influence of team 1's choices on team 2 and/or team 3's decision (not distinguishable)	yeah but that will teach them to choose x so that we all get the optimal amount	team but which team is not distinguishable by the statement and context	0.334
13g	Influence of team 2 and/or team 3's decision on team 1's choices			0.284

4	Questioning other team members' choices made in previous periods			0
5	Greeting (both hello and goodbye greetings)	hey		0.752
6	Reference to the previous periods	this is the third time in a row I've had this one so that's good		0.479
7	Discussions about the experiment in general	it's nice we get to talk since we can tell others what not to pick and make bad decisions	Statements about things occurring in this experiment that are not otherwise classifiable	0.648
8	Games, movies, food, chain letters, how to spend money	See any good movies lately		0.237
9	Other discussion of experiment earnings	how muh you got so far	Used only when experiment earnings are mentioned and there is NO other classification for it	0.356
10	Other		Used sparingly--only when there is no other way to classify a statement	0.622
111	Discussion about strategies and expectations in repeated interactions			0.525
111a	Propose to choose A all the time in the future			NA
111b	Propose to choose B all the time in the future			0.49
111c	Propose to choose C all the time in the future			0.561
111d	Propose to choose D all the time in the future	D all the way!		0.752
111e	Propose to alternate between B and C in the future			0.645
111f	Proposal to do the same (A, B, C, or D) as in the last period			0.491
111g	Proposals regarding what team 1 should choose in the future other than 111a-111f		This referes to other proposals not covered by 111a-111f, for example, "let us play A for the next two times."	0.302
111h	Indicate an expectation that teams 2 and 3 will choose X in the future			0.134
111i	Indicate an expectation that teams 2 and 3 will choose Y in the future		Sometimes this may not take an explicit statement of "they are going to choose Y." So need to be mindful about the context	0.571
111j	Indicate an expectation that team 2 and/or team 3 will make the same choice (X or Y) as in the last period			0
111k	Indicate an expectation regarding how team 2 and 3 will behave other than 111h or 111j	team 2 will choose X but team 3 will choose Y		0.299
12	Discussion about the implications of group decision making			0
12a	Discussion about how the group of 3 people should make its final decision			0
88	Early line of a multi-line single message	Use this when you think that a line is an *early* line of a multi-line single message		0.355
99	Concludng line of a multi-line single message	Use this when you think that a line is the *concluding* line of a multi-line single message		0.41

Table C-1, Panel B (Responder Team Coding Categories in Group-No Communication Treatment)

Category	Description	Examples	Additional Instructions	Kappa
1	Coordination on the decisions *for the current period*			0.703
1a	Propose to choose X or inform others you choose X	x it is	A proposal that the team should choose X	0.882
1b	Propose to choose Y or inform others you choose Y	choose Y	A proposal that the team should choose Y	0.818
1c	THIS CODE INTENTIONALLY LEFT BLANK			
1d	THIS CODE INTENTIONALLY LEFT BLANK			
1e	THIS CODE INTENTIONALLY LEFT BLANK			
1f	Questioning another person's proposal/ pushing for consensus	why y	Should be referring, at least implicitly through context, to a specific proposal	0.409
1g	Disagree with another person's proposal	No, I don't think so	An explicit disagreement, not just questioning the others' proposal	0.547
1h	Agree with another person's proposal / confirmation of agreement	Sounds good		0.702
1i	Ask for opinion or advice	what do you think	Used, for example, to ask others to make a proposal	0.354
2	Reasoning about why should choose X (or Y)			0.381
2a	Maximizing profit for current period	X, we will make the most		0.449
2b	Maximizing profit in the long-run	Go with me so that you make more later on, and not just this one time		0.219
2ab	Maximizing profit (a and b combined)			0.459
2c	Appeal to equilibrium reasoning	So we need to choose the equilibrium to get the most consistently		0
2d	Appeal to knowledge in economics	its all about game theory		0.361
2e	Being nice to / concern for well-being of the other team 2/3	i'm serious - i will pick it because i will have a really guilty conscience if i don't	A person expressing concerns for the welfare of the other team that he/she does not belong to when participating in the 3 people chat	0.561
2f	Being nasty to other team 2/3		A person expressing desire to be nasty to the other team that he/she does not belong to when participating in the 3 people chat	0.542
2g	Being nice to / concern for well-being of team 1	at least we're not being mean *(can only be interpreted in full context)* -OR- being team 1 has to suck		0.381
2h	Being nasty to team 1	yea well i dont want team 1 to get anything		0.489
2i	Concern for well-being of one's own team			0
2j	Concern that other team(s) are getting more than one's own team	they're getting more than us		0.173
2k	Concern for well-being of the whole group of 9 people (all 3 teams)	this will benefit all 9 of us		0.575
2l	Appeal to other team 2/3 members to be fair	let's be fair and both go Y		0.27
2m	Group coordination for the benefit of all 3 people who are participating in the chat	united we stand divided we fall		0.48
2n	Concern about the riskiness of a particular action			0.283
2o	Argue that a particular action is safe			0.227
2p	Threat	I don't like people who want to mess up the other person		NA
2q	Reference to the reasoning of others without indicating agreement or disagreement	that's an interesting idea	If the statement also indicates an agreement or disagreement for action, then should use 1g or 1h	0.064
3	Discussion of other teams' decisions			0.609
3a	Reference to the choice of team 1	team 1 seems to be playing it safe		0.531
3b	Influence of team 2's and team 3's X and Y choices on team 1's decision	yeah but that will teach them to choose d so that we all get the optimal amount		0.243
3c	Influence of the choice of a team 2/3 on the choice of the other team 2/3	let's go y again…eventually the other team will understand		0.38
3d	Reference to the choice of the other team 2/3 not covered by 3b and 3c			0.518

4	Questioning other team members' choices made in previous periods			0
5	Greeting (both hello and goodbye greetings)	hey		0.752
6	Reference to the previous periods	this is the third time in a row I've had this one so that's good		0.479
7	Discussions about the experiment in general	it's nice we get to talk since we can tell others what not to pick and make bad decisions	Statements about things occurring in this experiment that are not otherwise classifiable	0.648
8	Games, movies, food, chain letters, how to spend money	See any good movies lately		0.237
9	Other discussion of experiment earnings	how muh you got so far	Used only when experiment earnings are mentioned and there is NO other classification for it	0.356
10	Other		Used sparingly--only when there is no other way to classify a statement	0.622
11	Discussion about strategies and expectations in repeated interactions			0.575
11a	Propose that all people participating in the chat should choose X in the future	n we will choose x from now on	Sometimes need to look at the context. For example, consider the statement " thats true cuz team 1 knows we will unite" by one member after the other says "DEFINATELY X."	0.3
11b	Propose that all people participating in the chat should choose Y in the future			0.537
11c	Propose that the team chooses Y, except chooses X when Team 1 chooses D	yeah choose x if they take d and y otherwise		0.531
11d	Proposal to do the same (X or Y) as in the last period			0.562
11e	Propose that all people participating in the chat do something in the future other than 11a-d	we stick to x till 9 period		0.448
11f	THIS CODE INTENTIONALLY LEFT BLANK			
11g	THIS CODE INTENTIONALLY LEFT BLANK			
11h	Indicate an expectation that team 1 will choose A in the future			0
11i	Indicate an expectation that team 1 will choose B in the future			0
11j	Indicate an expectation that team 1 will choose C in the future			0.434
11k	Indicate an expectation that team 1 will choose D in the future	i think team 1 will always choose d only		0.332
11l	THIS CODE INTENTIONALLY LEFT BLANK			
11m	Indicate an expectation that team 1 will alternate between B and C in the future			0.633
11n	Indicate an expectation that team 1 will make the same choice (A, B, C, or D) in the future as in the current period			0
11o	Indicate an expectation regarding how team 1 will behave other than 11h-11n			0.204
11p	Indicate an expectation that the other team 2/3 will choose X in the future			0.673
11q	Indicate an expectation that the other team 2/3 will choose Y in the future			0.401
11r	Indicate an expectation that the other team 2/3 will make the same choice (X or Y) as in the last period			0
11s	Indicate an expectation regarding how the other team 2/3 will behave other than 11p-11r			0.221
12	Discussion about the implications of group decision making			0
12a	Discussion about how the group of 3 people should make its final decision	member 3, your call		0
88	Early line of a multi-line single message	Use this when you think that a line is an *early* line of a multi-line single message		0.355
99	Concludng line of a multi-line single message	Use this when you think that a line is the *concluding* line of a multi-line single message		0.41

Table C-2, Panel A (Leader Team Coding Categories in Group-Between Responder Communication Treatment)

Category	Description	Examples	Additional Instructions	Kappa
101	Coordination on the decisions *for the current period*			0.717
101a	Propose to choose A or inform others you choose A	go for A	A proposal that the team should choose earnings square A	0.829
101b	Propose to choose B or inform others you choose B	Let's choose B	A proposal that the team should choose earnings square B	0.744
101c	Propose to choose C or inform others you choose C	C this time	A proposal that the team should choose earnings square C	0.834
101d	Propose to choose D or inform others you choose D	better take D	A proposal that the team should choose earnings square D	0.775
101e	THIS CODE INTENTIONALLY LEFT BLANK			
101f	Questioning another person's proposal/ pushing for consensus	are you going to go B for sure?	Should be referring, at least implicitly through context, to a specific proposal	0.294
101g	Disagree with another person's proposal	No, I don't think so	An explicit disagreement, not just questioning the others' proposal	0.399
101h	Agree with another person's proposal / confirmation of agreement	Sounds good		0.681
101i	Ask for opinion or advice	what do you think	Used, for example, to ask others to make a proposal	0.333
102	Reasoning about why should choose A, B, C or D			0.339
102a	Maximizing profit for current period	A, we will make the most		0.111
102b	Maximizing profit in the long-run	Go with me and we will make more later on, and not just this one time		0.362
102ab	Maximizing profit (a and b combined)			0.298
102c	Appeal to equilibrium reasoning	So we need to choose the equilibrium to get the most consistently		NA
102d	Appeal to knowledge in economics	its all about game theory		NA
102e	Being nice to / concern for well-being of team 2			0.568
102f	Being nasty to team 2			0.281
102g	Being nice to / concern for well-being of team 3	at least we're not being mean *(can only be interpreted in full context)*		0.44
102h	Being nasty to team 3	yea well i want team 3 to suffer		0.393
102i	Concern for well-being of one's own team	at least we get something that way		0
102j	Concern that other team(s) are getting more than one's own team	they're getting more than us		0.077
102k	Concern for well-being of the whole group of 9 people (all 3 teams)			0.541
102l	Appeal to another team member to be fair	let's be fair and go D		0.425
102m	Group coordination for the benefit of all 3 people who are participating in the chat			0.445
102n	Concern about the riskiness of a particular action			0.274
102o	Argue that a particular action is safe			0.395
102p	Threat	I don't like people who want to mess up the other person		NA
102q	Reference to the reasoning of others without indicating agreement or disagreement	that's an interesting idea	If the statement also indicates an agreement or disagreement for action, then should use 101g or 101h	0.117
13	Discussion of team 2's or team 3's decisions			0.627
13a	Reference to the choice of team 2	team 2 seems to be playing it safe		0
13b	Influence of team 1's choices on team 2's decision	yeah but that will teach team 2 to choose x so that we all get the optimal amount		0.666
13c	Reference to the choice of team 3			0.539
13d	Influence of team 1's choices on team 3's decision			0
13e	Reference to the choice of team 2 and/or team 3, not distinguishable	they are killing us	Use 13e and 13f if the statement may be referring to both teams, or perhaps to only one	0.377
13f	Influence of team 1's choices on team 2 and/or team 3's decision (not distinguishable)	yeah but that will teach them to choose x so that we all get the optimal amount	team but which team is not distinguishable by the statement and context	0.245
13g	Influence of team 2 and/or team 3's decision on team 1's choices			0.563

4	Questioning other team members choices made in previous periods			0.187
5	Greeting (both hello and goodbye greetings)	hey		0.885
6	Reference to the previous periods	this is the third time in a row I've had this one so that's good		0.171
7	Discussions about the experiment in general	it's nice we get to talk since we can tell others what not to pick and make bad decisions	Statements about things occurring in this experiment that are not otherwise classifiable	0.628
8	Games, movies, food, chain letters, how to spend money	See any good movies lately		0
9	Other discussion of experiment earnings	how muh you got so far	Used only when experiment earnings are mentioned and there is NO other classification for it	0.425
10	Other		Used sparingly--only when there is no other way to classify a statement	0.596
111	Discussion about strategies and expectations in repeated interactions			0.614
111a	Propose to choose A all the time in the future			NA
111b	Propose to choose B all the time in the future			1
111c	Propose to choose C all the time in the future			0
111d	Propose to choose D all the time in the future	D all the way!		0.664
111e	Propose to alternate between B and C in the future			0.541
111f	Proposal to do the same (A, B, C, or D) as in the last period			0.615
111g	Proposals regarding what team 1 should choose in the future other than 111a-111f		This referes to other proposals not covered by 111a-111f, for example, "let us play A for the next two times."	0.434
111h	Indicate an expectation that teams 2 and 3 will choose X in the future			0.595
111i	Indicate an expectation that teams 2 and 3 will choose Y in the future		Sometimes this may not take an explicit statement of "they are going to choose Y." So need to be mindful about the context	0.642
111j	Indicate an expectation that team 2 and/or team 3 will make the same choice (X or Y) as in the last period			0
111k	Indicate an expectation regarding how team 2 and 3 will behave other than 111h or 111j	team 2 will choose X but team 3 will choose Y		0
12	Discussion about the implications of group decision making			0
12a	Discussion about how the group of 3 people should make its final decision			0
88	Early line of a multi-line single message	Use this when you think that a line is an *early* line of a multi-line single message		0.345
99	Concludng line of a multi-line single message	Use this when you think that a line is the *concluding* line of a multi-line single message		0.403

Table C-2, Panel B (Responder Team Coding Categories in Group-Between Responder Communication Treatment, 6-person Inter-Team Chats)

Category	Description	Examples	Additional Instructions	Kappa
1	Coordination on the decisions *for the current period*			0.741
1a	Propose that teams 2 and 3 choose (X, X)	all of us must choose x	Should refer to an *explicit* statement that both teams 2 and 3 choose X	0.347
1b	Propose that teams 2 and 3 choose (Y, Y)	let us all choose y	Should refer to an *explicit* statement that both teams 2 and 3 choose Y	0.658
1c	THIS CODE INTENTIONALLY LEFT BLANK			
1d	Inform the others of your intended choice X	I'm going X	The speaker indicates that he/she will choose X, or proposes X. If a choice between 1a and 1d becomes necessary, choose 1a only if there is an explicit statement that both teams 2 and 3 choose X	0.02
1e	Inform the others of your intended choice Y	I'm going Y	The speaker indicates that he/she will choose Y, or proposes Y. If a choice between 1b and 1e becomes necessary, choose 1b only if there is an explicit statement that both teams 2 and 3 choose Y	0
1ad	Either 1a or 1d (propose or inform choice X)			0.812
1be	Either 1b or 1e (propose or inform choice Y)			0.767
1f	Questioning another person's proposal/ pushing for consensus	so do v all agree on y	Should be referring, at least implicitly through context, to a specific proposal	0.593
1g	Disagree with another person's proposal	No, I don't think so	An explicit disagreement, not just questioning the anothers' proposal	0.567
1h	Agree with another person's proposal / confirmation of agreement	Sounds good		0.624
1i	Ask for opinion or advice	what do you think	Used, for example, to ask others to make a proposal	0.316
2	Reasoning about why should choose X (or Y)			0.434
2a	Maximizing profit for current period	X, we will make the most		0.45
2b	Maximizing profit in the long-run	Go with me so that you make more later on, and not just this one time		0.295
2ab	Maximizing profit (a and b combined)			0.506
2c	Appeal to equilibrium reasoning	So we need to choose the equilibrium to get the most consistently		NA
2d	Appeal to knowledge in economics	its all about game theory		0
2e	Being nice to / concern for well-being of the other team 2/3	i'm serious - i will pick it because i will have a really guilty conscience if i don't	A person expressing concerns for the welfare of the team that he/she does not belong to when participating in the 6 people chat	0.207
2f	Being nasty to other team 2/3		A person expressing desire to be nasty to the other team that he/she does not belong to when participating in the 6 people chat	0.128
2g	Being nice to / concern for well-being of team 1	at least we're not being mean *(can only be interpreted in full context)* -OR- being team 1 has to suck		0.403
2h	Being nasty to team 1	yea well i dont want team 1 to get anything		0.511
2i	Concern for well-being of one's own team			0
2j	Concern that other team(s) are getting more than one's own team			0
2k	Concern for well-being of the whole group of 9 people (all 3 teams)	this will benefit all 9 of us		0.476
2l	Appeal to other team 2/3 members to be fair	let's be fair and both go Y		0.203
2m	Group coordination for the benefit of all 3 people who are participating in the chat	united we stand divided we fall		0.479
2n	Concern about the riskiness of a particular action			0.399
2o	Argue that a particular action is safe			0.499
2p	Threat	I don't like people who want to mess up the other person		0.499
2q	Reference to the reasoning of others without indicating agreement or disagreement	that's an interesting idea	If the statement also indicates an agreement or disagreement for action, then should use 1g or 1h	0.073
3	Discussion of team 1's decisions			0.643
3a	Reference to the choice of team 1	they chose d again		0.646
3b	Influence of team 2's and team 3's X and Y choices on team 1's decision	yeah but that will teach them to choose d so that we all get the optimal amount		0.417
3c	THIS CODE INTENTIONALLY LEFT BLANK			
3d	Reference to the choice of the other team 2/3 not covered by 3b and 3c			0.147

4	Questioning other team members' choices made in previous periods			0.289
5	Greeting (both hello and goodbye greetings)	hey		0.807
6	Reference to the previous periods	this is the third time in a row I've had this one so that's good		0.523
7	Discussions about the experiment in general	it's nice we get to talk since we can tell others what not to pick and make bad decisions	Statements about things occurring in this experiment that are not otherwise classifiable	0.671
8	Games, movies, food, chain letters, how to spend money	See any good movies lately		0.15
9	Other discussion of experiment earnings	how muh you got so far	Used only when experiment earnings are mentioned and there is NO other classification for it	0.419
10	Other		Used sparingly--only when there is no other way to classify a statement	0.525
11	Discussion about strategies and expectations in repeated interactions			0.686
11a	Propose that all people participating in the chat should choose X in the future	so we should always x also	Sometimes need to look at the context. For example, consider the statement " thats true cuz team 1 knows we will unite" by one member after the other says "DEFINATELY X."	0.243
11b	Propose that all people participating in the chat should choose Y in the future			0.692
11c	Propose that teams 2 and 3 choose (Y, Y) or just Y, except choose (X, X) or just X when Team 1 chooses D			0.779
11d	Proposal to do the same (X or Y) as in the last period			0.662
11e	Propose that all people participating in the chat do something in the future other than 11a-d	we stick to x till 9 period		0.127
11f	THIS CODE INTENTIONALLY LEFT BLANK			
11g	THIS CODE INTENTIONALLY LEFT BLANK			
11h	Indicate an expectation that team 1 will choose A in the future			0
11i	Indicate an expectation that team 1 will choose B in the future			0
11j	Indicate an expectation that team 1 will choose C in the future			0
11k	Indicate an expectation that team 1 will choose D in the future	i think team 1 will always choose d only		0.377
11l	THIS CODE INTENTIONALLY LEFT BLANK			
11m	Indicate an expectation that team 1 will alternate between B and C in the future			0.799
11n	Indicate an expectation that team 1 will make the same choice (A, B, C, or D) in the future as in the current period			NA
11o	Indicate an expectation regarding how team 1 will behave other than 11h-11n			0.666
11p	THIS CODE INTENTIONALLY LEFT BLANK			
11q	THIS CODE INTENTIONALLY LEFT BLANK			
11r	THIS CODE INTENTIONALLY LEFT BLANK			
11s	THIS CODE INTENTIONALLY LEFT BLANK			
12	Discussion about the implications of group decision making			0
12a	Discussion about how the group of 6 people should make its final decision	member 3, your call		0
88	Early line of a multi-line single message	Use this when you think that a line is an *early* line of a multi-line single message		0.311
99	Concludng line of a multi-line single message	Use this when you think that a line is the *concluding* line of a multi-line single message		0.311

Table C-2, Panel C (Responder Team Coding Categories in Group-Between Responder Communication Treatment, 3-person Intra-Team Chats)

Category	Description	Examples	Additional Instructions	Kappa
1	Coordination on the decisions *for the current period*			0.778
1a	Propose to choose X or inform others you choose X	x it is	A proposal that the team should choose X	0.829
1b	Propose to choose Y or inform others you choose Y	choose Y	A proposal that the team should choose Y	0.811
1c	THIS CODE INTENTIONALLY LEFT BLANK			
1d	THIS CODE INTENTIONALLY LEFT BLANK			
1e	THIS CODE INTENTIONALLY LEFT BLANK			
1f	Questioning another person's proposal/ pushing for consensus	why y	Should be referring, at least implicitly through context, to a specific proposal	0.355
1g	Disagree with another person's proposal	No, I don't think so	An explicit disagreement, not just questioning the others' proposal	0.649
1h	Agree with another person's proposal / confirmation of agreement	Sounds good		0.64
1i	Ask for opinion or advice	what do you think	Used, for example, to ask others to make a proposal	0.553
2	Reasoning about why should choose X (or Y)			0.448
2a	Maximizing profit for current period	X, we will make the most		0.629
2b	Maximizing profit in the long-run	Go with me so that you make more later on, and not just this one time		0.497
2ab	Maximizing profit (a and b combined)			0.598
2c	Appeal to equilibrium reasoning	So we need to choose the equilibrium to get the most consistently		NA
2d	Appeal to knowledge in economics	its all about game theory		0
2e	Being nice to / concern for well-being of the other team 2/3	i'm serious - i will pick it because i will have a really guilty conscience if i don't	A person expressing concerns for the welfare of the other team that he/she does not belong to when participating in the 3 people chat	0.518
2f	Being nasty to other team 2/3		A person expressing desire to be nasty to the other team that he/she does not belong to when participating in the 3 people chat	0.291
2g	Being nice to / concern for well-being of team 1	at least we're not being mean *(can only be interpreted in full context)* -OR- being team 1 has to suck		0.262
2h	Being nasty to team 1	yea well i dont want team 1 to get anything		0.624
2i	Concern for well-being of one's own team			0
2j	Concern that other team(s) are getting more than one's own team	they're getting more than us		0
2k	Concern for well-being of the whole group of 9 people (all 3 teams)	this will benefit all 9 of us		0.535
2l	Appeal to other team 2/3 members to be fair	let's be fair and both go Y		0
2m	Group coordination for the benefit of all 3 people who are participating in the chat	united we stand divided we fall		0.49
2n	Concern about the riskiness of a particular action			0.176
2o	Argue that a particular action is safe			0.441
2p	Threat	I don't like people who want to mess up the other person		0
2q	Reference to the reasoning of others without indicating agreement or disagreement	that's an interesting idea	If the statement also indicates an agreement or disagreement for action, then should use 1g or 1h	0.138
3	Discussion of other teams' decisions			0.688
3a	Reference to the choice of team 1	team 1 seems to be playing it safe		0.572
3b	Influence of team 2's and team 3's X and Y choices on team 1's decision	yeah but that will teach them to choose d so that we all get the optimal amount		0.614
3c	Influence of the choice of a team 2/3 on the choice of the other team 2/3	both teams are better off. i hope they get it this time		0.436
3d	Reference to the choice of the other team 2/3 not covered by 3b and 3c			0.583

4	Questioning other team members' choices made in previous periods			0.58
5	Greeting (both hello and goodbye greetings)	hey		0.701
6	Reference to the previous periods	this is the third time in a row I've had this one so that's good		0.42
7	Discussions about the experiment in general	it's nice we get to talk since we can tell others what not to pick and make bad decisions	Statements about things occurring in this experiment that are not otherwise classifiable	0.712
8	Games, movies, food, chain letters, how to spend money	See any good movies lately		0.308
9	Other discussion of experiment earnings	how muh you got so far	Used only when experiment earnings are mentioned and there is NO other classification for it	0.462
10	Other		Used sparingly--only when there is no other way to classify a statement	0.678
11	Discussion about strategies and expectations in repeated interactions			0.686
11a	Propose that all people participating in the chat should choose X in the future	n we will choose x from now on	Sometimes need to look at the context. For example, consider the statement " thats true cuz team 1 knows we will unite" by one member after the other says "DEFINATELY X."	0.327
11b	Propose that all people participating in the chat should choose Y in the future			0.57
11c	Propose that the team chooses Y, except chooses X when Team 1 chooses D	yeah choose x if they take d and y otherwise		0.797
11d	Proposal to do the same (X or Y) as in the last period			0.619
11e	Propose that all people participating in the chat do something in the future other than 11a-d	we stick to x till 9 period		0
11f	THIS CODE INTENTIONALLY LEFT BLANK			
11g	THIS CODE INTENTIONALLY LEFT BLANK			
11h	Indicate an expectation that team 1 will choose A in the future			NA
11i	Indicate an expectation that team 1 will choose B in the future			0
11j	Indicate an expectation that team 1 will choose C in the future			0
11k	Indicate an expectation that team 1 will choose D in the future	i think team 1 will always choose d only		0.295
11l	THIS CODE INTENTIONALLY LEFT BLANK			
11m	Indicate an expectation that team 1 will alternate between B and C in the future			1
11n	Indicate an expectation that team 1 will make the same choice (A, B, C, or D) in the future as in the current period			0
11o	Indicate an expectation regarding how team 1 will behave other than 11h-11n			217
11p	Indicate an expectation that the other team 2/3 will choose X in the future			0.524
11q	Indicate an expectation that the other team 2/3 will choose Y in the future			0.398
11r	Indicate an expectation that the other team 2/3 will make the same choice (X or Y) as in the last period			0
11s	Indicate an expectation regarding how the other team 2/3 will behave other than 11p-11r			0.331
12	Discussion about the implications of group decision making			0.175
12a	Discussion about how the group of 3 people should make its final decision	member 3, your call		0.194
88	Early line of a multi-line single message	Use this when you think that a line is an *early* line of a multi-line single message		0.355
99	Concluding line of a multi-line single message	Use this when you think that a line is the *concluding* line of a multi-line single message		0.388

Table C-3, (Responder Individual Coding Categories in Group-Between Responder Communication Treatment)

Category	Description	Examples	Additional Instructions	Kappa
1	Coordination on the decisions *for the current period*			0.745
1a	Propose to choose (X, X)	we should both choose X	Should refer to an *explicit* statement that both teams 2 and 3 choose X	0.741
1b	Propose to choose (Y, Y)	we both choose y, we both get 7	Should refer to an *explicit* statement that both teams 2 and 3 choose Y	0.719
1c	THIS CODE INTENTIONALLY LEFT BLANK			
1d	Inform the other person of your intended choice X	I'm going X	To indicate that the "speaker" (only) will choose X. If a choice between 1a and 1d becomes necessary, choose 1a only if there is an explicit statement that both 2 and 3 choose X	0.798
1e	Inform the other person of your intended choice Y	I'm going Y	To indicate that the "speaker" (only) will choose Y. If a choice between 1b and 1e becomes necessary, choose 1b only if there is an explicit statement that both 2 and 3 choose Y	0.646
1ad	Either 1a or 1d (propose or inform choice X)			0.893
1be	Either 1b or 1e (propose or inform choice Y)			0.832
1f	Questioning another person's proposal/ pushing for consensus	are u choosing Y	Should be referring, at least implicitly through context, to a specific proposal	0.466
1g	Disagree with another person's proposal	No, I don't think so	An explicit disagreement, not just questioning the anothers' proposal	0.52
1h	Agree with another person's proposal / confirmation of agreement	Sounds good		0.764
1i	Ask for opinion or advice	what do you think	Used, for example, to ask others to make a proposal	0.443
2	Reasoning about why should choose X (or Y)			0.29
2a	Maximizing profit for current period	X, we will make the most		0.451
2b	Maximizing profit in the long-run	Go with me so that you make more later on, and not just this one time		0.346
2ab	Maximizing profit (a and b combined)			0.419
2c	Appeal to equilibrium reasoning	So we need to choose the equilibrium to get the most consistently		0
2d	Appeal to knowledge in economics	its all about game theory		0.399
2e	Being nice to / concern for well-being of the other person 2/3	i'm serious - i will pick it because i will have a really guilty conscience if i don't		0.183
2f	Being nasty to other person 2/3			0.666
2g	Being nice to / concern for well-being of person 1	is it unfaire fro person 1?		0.733
2h	Being nasty to person 1	yea well i dont want person 1 to get anything		0.457
2i	Concern for one's own well-being			0.025
2j	Concern that other person(s) are getting more than oneself			0
2k	Concern for well-being of the whole group of 3 people (persons 1, 2, and 3)	x again, he gets 6, we get 8, everyones happy		0.77
2l	Appeal to other person 2/3 to be fair	let's be fair and both go Y		0.349
2m	Group coordination for the benefit of person 2 and person 3 who are participating in the chat	Those of us who aren't number 1s have to work together		0.086
2n	Concern about the riskiness of a particular action			1
2o	Argue that a particular action is safe			0.399
2p	Threat	I don't like people who want to mess up the other person		0
2q	Reference to the reasoning of others without indicating agreement or disagreement	that's an interesting idea	If the statement also indicates an agreement or disagreement for action, then should use 1g or 1h	0.064
3	Discussion of person 1s' decisions			0.678
3a	Reference to the choice of person 1	person 1 is smart this time		0.528
3b	Influence of person 2's and person 3's X and Y choices on team 1's decision	yeah but that will teach him to choose d so that we all get the optimal amount		0.549
3c	THIS CODE INTENTIONALLY LEFT BLANK			
3d	THIS CODE INTENTIONALLY LEFT BLANK			

4	Questioning the other peron's choices made in previous periods			NA
5	Greeting (both hello and goodbye greetings)	hey		0.705
6	Reference to the previous periods	this is the third time in a row I've had this one so that's good		0.373
7	Discussions about the experiment in general	it's nice we get to talk since we can tell others what not to pick and make bad decisions	Statements about things occurring in this experiment that are not otherwise classifiable	0.632
8	Games, movies, food, chain letters, how to spend money	See any good movies lately		0.404
9	Other discussion of experiment earnings	how muh you got so far	Used only when experiment earnings are mentioned and there is NO other classification for it	0.413
10	Other	Person 1 must be so bored	Used sparingly--only when there is no other way to classify a statement	0.697
11	Discussion about strategies and expectations in repeated interactions			0.662
11a	Propose that both 2 and 3 choose X in the future	n we will choose x from now on	Sometimes need to look at the context. For example, consider the statement " thats true cuz team 1 knows we will unite" by one member after the other says "DEFINATELY X."	0.395
11b	Propose that both 2 and 3 choose Y in the future			0.43
11c	Propose to choose (Y, Y) or just Y, except choose (X, X) or just X when person 1 chooses D	yeah choose x if they take d and y otherwise		0.66
11d	Proposal to do the same (X or Y) as in the last period			0.79
11e	Propose that both 2 and 3 do soemthing in the future other than 11a-d	we stick to x till 9 period		0.219
11f	THIS CODE INTENTIONALLY LEFT BLANK			
11g	THIS CODE INTENTIONALLY LEFT BLANK			
11h	Indicate an expectation that person 1 will choose A in the future			0
11i	Indicate an expectation that person 1 will choose B in the future			NA
11j	Indicate an expectation that person 1 will choose C in the future			NA
11k	Indicate an expectation that person 1 will choose D in the future	i think team 1 will always choose d only		0.456
11l	THIS CODE INTENTIONALLY LEFT BLANK			
11m	Indicate an expectation that person 1 will alternate between B and C in the future			0
11n	Indicate an expectation that person 1 will make the same choice (A, B, C, or D) in the future as in the current period			0
11o	Indicate an expectation regarding how person 1 will behave other than 11h-n			0
11p	THIS CODE INTENTIONALLY LEFT BLANK			
11q	THIS CODE INTENTIONALLY LEFT BLANK			
11r	THIS CODE INTENTIONALLY LEFT BLANK			
11s	THIS CODE INTENTIONALLY LEFT BLANK			
12	THIS CODE INTENTIONALLY LEFT BLANK			
88	Early line of a multi-line single message	Use this when you think that a line is an *early* line of a multi-line single message		0.44
99	Concludng line of a multi-line single message	Use this when you think that a line is the *concluding* line of a multi-line single message		0.419

Table C-4, Panel A (Leader Communication Frequencies in Group-No Communication Treatment)								
	All Periods		When Transgressing against only A		When Transgressing against only B		When Not Transgressing	
Message Category	Number	Frequency	Number	Frequency	Number	Frequency	Number	Frequency
number of messages	576	4.049	171	4.515	249	4.201	153	3.255
101	576	2.082	171	2.614	249	2.058	153	1.484
101a	576	0.046	171	0.035	249	0.024	153	0.078
101b	576	0.386	171	1.056	249	0.131	153	0.062
101c	576	0.439	171	0.146	249	0.863	153	0.052
101d	576	0.230	171	0.117	249	0.078	153	0.608
101g	576	0.082	171	0.096	249	0.076	153	0.069
101h	576	0.759	171	1.038	249	0.705	153	0.533
102a	576	0.036	171	0.047	249	0.028	153	0.029
102ab	576	0.051	171	0.061	249	0.040	153	0.052
102d	576	0.003	171	0.009	249	0.000	153	0.000
102g	576	0.058	171	0.064	249	0.084	153	0.010
102h	576	0.066	171	0.076	249	0.052	153	0.078
102k	576	0.014	171	0.009	249	0.018	153	0.013
102m	576	0.336	171	0.398	249	0.390	153	0.183
102n	576	0.076	171	0.076	249	0.066	153	0.088
102o	576	0.050	171	0.076	249	0.028	153	0.059
13	576	0.418	171	0.418	249	0.408	153	0.438
13a	576	0.048	171	0.047	249	0.070	153	0.013
13c	576	0.046	171	0.044	249	0.072	153	0.007
13e	576	0.173	171	0.170	249	0.108	153	0.281
5	576	0.088	171	0.099	249	0.127	153	0.013
6	576	0.248	171	0.249	249	0.215	153	0.301
7	576	0.275	171	0.155	249	0.263	153	0.435
10	576	0.503	171	0.456	249	0.677	153	0.281
111	576	0.485	171	0.518	249	0.560	153	0.330
111b	576	0.022	171	0.053	249	0.012	153	0.003
111c	576	0.035	171	0.006	249	0.068	153	0.013
111d	576	0.050	171	0.015	249	0.020	153	0.141
111e	576	0.102	171	0.158	249	0.112	153	0.026
111f	576	0.087	171	0.099	249	0.116	153	0.026
111i	576	0.039	171	0.041	249	0.040	153	0.036

Table C-4, Panel B (Responder Communication Frequencies, Group-No Comm. Treatment)

Message Category	All DAC Transgressions		Victim Groups		Beneficiary Groups		
	Number	Frequency	Number	Frequency	Number	Frequency	
number of messages	840	2.967	420	3.179	420	2.755	**
1	840	1.639	420	1.774	420	1.504	**
1a	840	0.565	420	0.544	420	0.586	
1b	840	0.385	420	0.480	420	0.289	**
1g	840	0.046	420	0.052	420	0.040	
1h	840	0.571	420	0.625	420	0.517	
2a	840	0.045	420	0.050	420	0.039	
2ab	840	0.055	420	0.061	420	0.049	
2e	840	0.043	420	0.035	420	0.052	
2f	840	0.030	420	0.029	420	0.032	
2h	840	0.057	420	0.049	420	0.064	*
2k	840	0.011	420	0.013	420	0.008	
2m	840	0.129	420	0.140	420	0.117	
3	840	0.542	420	0.667	420	0.418	**
3a	840	0.241	420	0.277	420	0.205	*
3d	840	0.156	420	0.223	420	0.089	**
5	840	0.030	420	0.023	420	0.038	
6	840	0.110	420	0.139	420	0.081	**
7	840	0.180	420	0.165	420	0.195	*
10	840	0.267	420	0.265	420	0.269	
11	840	0.292	420	0.364	420	0.219	**
11b	840	0.015	420	0.020	420	0.011	*
11c	840	0.007	420	0.008	420	0.005	
11d	840	0.063	420	0.069	420	0.057	
11e	840	0.038	420	0.042	420	0.033	
11j	840	0.010	420	0.010	420	0.010	
11m	840	0.015	420	0.010	420	0.020	
11p	840	0.044	420	0.085	420	0.004	**

Note: * (**) denotes a significant difference between Victim and Beneficiary groups (5% and 1% significance levels, respectively; random effects poisson count regressions).

Table C-5, Panel A (Leader Communication Frequencies in Group-Between Responder Communication Treatment)

Message Category	All Periods		When Transgressing against only A		When Transgressing against only B		When Not Transgressing		Individual Period 1: Not Transgress		Individual Period 1: DAC Transgression		Individual Period 1: Transgress v. both		
	Number	Frequency	Number	Frequency	Number	Frequency	Number	Frequency	Number	Frequency	Number	Frequency	Number	Frequency	
number of messages	432	2.306	78	2.526	72	2.806	282	2.117	96	2.198	144	2.694	192	2.068	
101	432	1.397	78	1.897	72	1.938	282	1.121	96	1.219	144	1.757	192	1.216	
101a	432	0.035	78	0.045	72	0.063	282	0.025	96	0.010	144	0.000	192	0.073	
101b	432	0.207	78	0.904	72	0.090	282	0.044	96	0.193	144	0.215	192	0.208	
101c	432	0.225	78	0.186	72	0.931	282	0.055	96	0.156	144	0.302	192	0.201	
101d	432	0.463	78	0.128	72	0.194	282	0.624	96	0.536	144	0.667	192	0.273	*
101h	432	0.387	78	0.615	72	0.535	282	0.285	96	0.266	144	0.524	192	0.344	*
102e	432	0.008	78	0.032	72	0.007	282	0.002	96	0.000	144	0.017	192	0.005	
102g	432	0.010	78	0.026	72	0.007	282	0.007	96	0.000	144	0.007	192	0.018	
102k	432	0.015	78	0.032	72	0.028	282	0.007	96	0.036	144	0.007	192	0.010	
102l	432	0.012	78	0.006	72	0.049	282	0.004	96	0.026	144	0.003	192	0.010	
102m	432	0.166	78	0.192	72	0.132	282	0.167	96	0.177	144	0.201	192	0.133	
13	432	0.240	78	0.256	72	0.215	282	0.241	96	0.328	144	0.264	192	0.177	
13b	432	0.006	78	0.026	72	0.000	282	0.002	96	0.000	144	0.003	192	0.010	
13c	432	0.013	78	0.026	72	0.007	282	0.011	96	0.047	144	0.003	192	0.003	*
13g	432	0.027	78	0.045	72	0.014	282	0.025	96	0.047	144	0.024	192	0.018	
5	432	0.068	78	0.160	72	0.104	282	0.034	96	0.078	144	0.038	192	0.086	
7	432	0.193	78	0.032	72	0.090	282	0.264	96	0.297	144	0.146	192	0.177	
9	432	0.120	78	0.006	72	0.146	282	0.145	96	0.135	144	0.135	192	0.102	
10	432	0.168	78	0.103	72	0.153	282	0.190	96	0.188	144	0.156	192	0.167	
111	432	0.262	78	0.308	72	0.201	282	0.264	96	0.302	144	0.319	192	0.198	
111b	432	0.002	78	0.013	72	0.000	282	0.000	96	0.000	144	0.007	192	0.000	
111d	432	0.056	78	0.013	72	0.007	282	0.080	96	0.089	144	0.059	192	0.036	
111e	432	0.034	78	0.090	72	0.069	282	0.009	96	0.021	144	0.049	192	0.029	
111f	432	0.050	78	0.083	72	0.042	282	0.043	96	0.068	144	0.049	192	0.042	
111g	432	0.046	78	0.019	72	0.035	282	0.057	96	0.010	144	0.087	192	0.034	*
111h	432	0.012	78	0.013	72	0.000	282	0.014	96	0.010	144	0.014	192	0.010	
111i	432	0.034	78	0.038	72	0.021	282	0.035	96	0.063	144	0.035	192	0.018	

Note: * denotes a significant difference in messages for Leaders who chose not to transgress in Period 1 and those who did transgress in Period 1 (5% significance; random effects poisson count regressions).

Table C-5, Panel B (Responder Comm. Frequencies, Group-Between Responder Comm. Treatment)

Message Category	All DAC Transgressions		Victim Groups		Beneficiary Groups		
	Number	Frequency	Number	Frequency	Number	Frequency	
number of messages_inter	300	**3.017**	150	3.153	150	2.880	
number of messages_intra	300	**2.530**	150	2.533	150	2.527	
1_inter	300	**1.788**	150	1.837	150	1.740	
1_intra	300	**1.638**	150	1.633	150	1.643	
1ad_inter	300	0.367	150	0.243	150	0.490	**
1a_intra	300	0.427	150	0.313	150	0.540	**
1be_inter	300	**0.743**	150	0.870	150	0.617	**
1b_intra	300	**0.505**	150	0.577	150	0.433	*
1g_inter	300	0.023	150	0.033	150	0.013	
1g_intra	300	0.033	150	0.013	150	0.053	*
1h_inter	300	0.568	150	0.563	150	0.573	
1h_intra	300	0.518	150	0.510	150	0.527	
2_inter	300	**0.828**	150	0.897	150	0.760	
2_intra	300	**0.463**	150	0.437	150	0.490	
2a_inter	300	0.053	150	0.053	150	0.053	
2a_intra	300	0.062	150	0.040	150	0.083	*
2_ab_inter	300	0.077	150	0.077	150	0.077	
2ab_intra	300	0.080	150	0.050	150	0.110	*
2h_inter	300	**0.115**	150	0.147	150	0.083	*
2h_intra	300	**0.030**	150	0.023	150	0.037	
2k_inter	300	0.030	150	0.047	150	0.013	*
2k_intra	300	0.023	150	0.040	150	0.007	*
2m_inter	300	**0.322**	150	0.297	150	0.347	
2m_intra	300	**0.093**	150	0.057	150	0.130	
2o_inter	300	0.000	150	0.000	150	0.000	
2o_intra	300	0.008	150	0.013	150	0.003	
3_inter	300	0.308	150	0.340	150	0.277	
3_intra	300	0.307	150	0.333	150	0.280	
3a_inter	300	**0.228**	150	0.267	150	0.190	*
3a_intra	300	**0.087**	150	0.050	150	0.123	**
3b_inter	300	**0.047**	150	0.057	150	0.037	
3b_intra	300	**0.023**	150	0.010	150	0.037	*
5_inter	300	0.060	150	0.053	150	0.067	
5_intra	300	0.045	150	0.020	150	0.070	*
6_inter	300	**0.152**	150	0.153	150	0.150	
6_intra	300	**0.043**	150	0.037	150	0.050	
7_inter	300	0.090	150	0.087	150	0.093	
7_intra	300	0.112	150	0.147	150	0.077	
9_inter	300	0.072	150	0.067	150	0.077	
9_intra	300	0.053	150	0.060	150	0.047	
10_inter	300	0.087	150	0.087	150	0.087	
10_intra	300	0.113	150	0.083	150	0.143	*
11_inter	300	**0.228**	150	0.203	150	0.253	
11_intra	300	**0.165**	150	0.127	150	0.203	
11b_inter	300	0.023	150	0.020	150	0.027	
11b_intra	300	0.032	150	0.027	150	0.037	
11c_inter	300	**0.115**	150	0.087	150	0.143	
11c_intra	300	**0.018**	150	0.010	150	0.027	
11d_inter	300	0.032	150	0.033	150	0.030	
11d_intra	300	0.025	150	0.020	150	0.030	
11m_inter	300	0.008	150	0.017	150	0.000	
11m_intra	300	0.003	150	0.000	150	0.007	

Notes: Inter-team (6-person) chat precedes the intra-team (3-person) chat each period. * (**) denotes a significant difference between Victim and Beneficiary groups (5% and 1% significance levels, respectively). Bold frequencies in the third column indicate differences between inter- and intra-group chats at the 5% significance level (all random effects poisson count regressions).

Table C-6 (Responder Comm. Frequencies, Individual-Between Responder Comm. Treatment)

Message Category	All DAC Transgressions		Victim Groups		Beneficiary Groups		
	Number	Frequency	Number	Frequency	Number	Frequency	
number of messages	266	2.338	133	2.489	133	2.188	
1	266	1.436	133	1.477	133	1.395	
1ad	266	0.212	133	0.154	133	0.271	
1be	266	0.468	133	0.575	133	0.361	**
1f	266	0.118	133	0.147	133	0.090	
1g	266	0.053	133	0.064	133	0.041	
1h	266	0.477	133	0.444	133	0.511	
1i	266	0.308	133	0.327	133	0.289	
2a	266	0.034	133	0.030	133	0.038	
2ab	266	0.098	133	0.079	133	0.117	
2f	266	0.004	133	0.000	133	0.008	
2g	266	0.030	133	0.038	133	0.023	
2h	266	0.047	133	0.053	133	0.041	
2k	266	0.009	133	0.004	133	0.015	
2n	266	0.004	133	0.008	133	0.000	
3	266	0.077	133	0.068	133	0.086	
3a	266	0.049	133	0.045	133	0.053	
3b	266	0.026	133	0.023	133	0.030	
5	266	0.158	133	0.165	133	0.150	
7	266	0.115	133	0.132	133	0.098	
9	266	0.109	133	0.124	133	0.094	
10	266	0.182	133	0.218	133	0.147	
11	266	0.179	133	0.180	133	0.177	
11b	266	0.056	133	0.045	133	0.068	
11c	266	0.038	133	0.053	133	0.023	*
11d	266	0.045	133	0.045	133	0.045	
11k	266	0.006	133	0.008	133	0.004	

Note: * (**) denotes a significant difference between Victim and Beneficiary groups (5% and 1% significance levels, respectively; random effects poisson count regressions).

Table C-7 (Leader Communication Frequencies, with and without Between Responder Communication)			
	No Communication	With Between Responder Communication	Statistical Significance
Message Category	Ave. Frequency	Ave. Frequency	
number of messages	4.049	2.306	**
101	2.082	1.397	**
101a	0.046	0.035	
101b	0.386	0.207	**
101c	0.439	0.225	**
101d	0.230	0.463	**
101h	0.759	0.387	**
102g	0.058	0.010	**
102k	0.014	0.015	
102m	0.336	0.166	**
13	0.418	0.240	*
13c	0.046	0.013	*
5	0.088	0.068	
7	0.275	0.193	
10	0.503	0.168	**
111	0.485	0.262	**
111d	0.050	0.056	
111e	0.102	0.034	**
111f	0.087	0.050	*
111i	0.039	0.034	
Note: * (**) denotes a significant difference between treatments (5% and 1% significance levels, respectively; random effects poisson count regressions).			

Table C-8 (Intra-Group Responder Communication Frequencies, with and withouth Between Responder Communication)

Message Category	No Communication	With Between Responder Communication	Statistical Significance
	Ave. Frequency	Ave. Frequency	
number of messages	2.967	2.530	*
1	1.639	1.638	
1a	0.565	0.427	*
1b	0.385	0.505	
1g	0.046	0.033	
1h	0.571	0.518	
2a	0.045	0.062	
2ab	0.055	0.080	
2h	0.057	0.030	(<10%)
2k	0.011	0.023	
2m	0.129	0.093	
3	0.542	0.307	**
3a	0.241	0.087	**
5	0.030	0.045	
6	0.110	0.043	**
7	0.180	0.112	
10	0.267	0.113	**
11	0.292	0.165	**
11b	0.015	0.032	
11d	0.063	0.025	*

Note: * (**) denotes a significant difference between treatments (5% and 1% significance levels, respectively; random effects poisson count regressions). Frequencies compared for the divide-and-conquer subgames only.

Table C-9 (Inter-Responder Communication Frequencies, Individual and Group Treatments)			
	Individuals	Groups	Statistical Significance
Message Category	Ave. Frequency	Ave. Frequency	
number of messages	2.338	3.017	(<10%)
1	1.436	1.788	(<10%)
1a	0.212	0.367	(<10%)
1b	0.468	0.743	(<10%)
1g	0.053	0.023	
1h	0.477	0.568	
2a	0.034	0.053	
2ab	0.098	0.077	(<10%)
2h	0.047	0.115	(<10%)
3	0.077	0.308	**
3a	0.049	0.228	**
5	0.158	0.060	
7	0.115	0.090	
10	0.182	0.087	*
11	0.179	0.228	
11b	0.056	0.023	*
11d	0.045	0.032	

Note: * (**) denotes a significant difference between treatments (5% and 1% significance levels, respectively; random effects poisson count regressions). Frequencies compared for the divide-and-conquer subgames only.

Coding Instructions for the I-FR-I, IGI, and the IG'I sessions
(Provided to Research Assistant Coders)

Purpose: To study how communication affects the play of the game.

Game: Refer to the attached instructions for the experiment.

Coding Rules:

1) If a message is deemed to contain the relevant category (or sub-categories, please see point 3 below) of content, enter the code for the category/sub-categories in the relevant column beside the message.

2) A message can be coded under *multiple* categories (or sub-categories). That is, each message can be coded under as many or few categories/sub-categories as you deem appropriate. Enter the additional codes in columns to the right.

3) A number of the categories have sub-categories. When applicable, it is preferable to use the relevant specific sub-category (categories) than the super-category. You are free to code a message under as many or few sub-categories as you desire. Enter the code(s) of the sub-categories in the relevant columns. You do not need to write the super-category (for example, if you code a message as 1d, you do not need to also code it as 1).

4) Some categories, such as 7, 9 and 10, would typically be used only when more specific categories are not possible. Be careful to consider other possibilities before resorting to 7, 9 or 10.

5) You should try to go through the list of all possible codes in your head for each statement to make sure you have included every appropriate code.

6) It will sometimes be important to look at the timing and context of a message to properly interpret and code it. Sometimes, a particular message is covered across multiple lines, and may also be "interrupted" by others' messages. The unit of observation is the message, not the line. You should, however, enter a coding for every line of messages. If you think a line is part of a multi-line single message, then use the special code 88 or 99 for this line. The code 88 should be used when you think that a line is an *early* line of a multi-line single message. The code 99 should be used when you think that a line is the *concluding* line of a multi-line single message.

7) For any line of messages that you coded as 88, you should use the following procedure to determine the coding for such a line: (i) Determine whether this particular line should be considered meaningless by itself. For example, a person may type "I want to" in the first line of a multi-line message, then "choose X" in the second line of this multi-line message. In this case, the first line may be meaningless, and you do not need to enter any code besides 88. *This option, however, should only be used when you really believe that this particular line of what you consider to be a multi-line message is truly meaningless by itself.* (ii) If you think a particular line that is coded as 88 means something by itself, then also enter the code for the categories/sub-categories in the relevant column beside this line of message according to the above rules. In particular, any such line that you coded as 88, can be coded under as many or few categories/sub-categories as you deem appropriate.

8) For the concluding line of a multi-line message, besides the code of 99 also enter the code for the categories/sub-categories in the relevant column beside this line that you think describe the *final content of the entire multi-line message*. Again, this final content of the entire multi-line message can be coded under as many or few categories/sub-categories as you deem appropriate.

9) Category 7 refers to subjects' discussion about the current experiment that they are participating in. Subjects may sometimes talk about past experiments they participated in before (e.g., "I made $40 in my last experiment.") If they are *only* discussing such past experiments, then the statement should be coded as 10. However, if the statement refers to both past and current experiments, then it should be coded as 7 (if it does not refer to earnings) or 9 (if earnings are mentioned).

10) You should **independently** code all messages. Do not discuss with anyone about which statements should fall into which categories.

11) Your job is to capture what had been said rather than why it was said or what effect it had. Think of yourself as a "coding machine."

12) Only when you find messages that cannot be coded under any categories, code them as "other." (code 10). (See also point 2 above.)

13) When you complete the coding for a session, go through the entire session a second time to (1) review all your codings and revise them if needed for accuracy; (2) make sure the coding was entered into the correct spreadsheet line and check that every statement has at least one code; (3) add additional code categories if appropriate.

14) Unless otherwise instructed, code the sessions in the chronological order that the sessions were conducted, as explained and presented by your coding supervisor.

15) In all these three kinds of sessions, chat only takes place in Part II of a session.

16) For the I-FR-I sessions, use the coding table for the I-FR-I sessions.

17) For the IGI sessions, for the three person chats among team 1 members, use the coding table entitled "3 person chat team 1" in the coding tables file for the IGI sessions. For the three person chats among team 2/3 member, use the coding table entitled "3 person within teams 2 or 3" in the same file.

18) For the IG'I sessions, for the three person chats among team 1 member, use the coding table entitled "3 person chat team 1" in the coding tables file for the IG'I sessions. For the six person chats among teams 2 and 3 member, use the coding table entitled "6 Person chats teams 2 and 3" in the same file. For the three person chats among team 2/3 member, use the coding table entitled "3 person within teams 2 or 3."

19) In both the IGI and IG'I sessions, in Part II, subjects 1, 2, 3, 10, 11, and 12 are members of team 1 (in the pilots, subjects 1, 2, and 3 are members of team 1)

20) For both the IGI and IG'I sessions, in the relevant coding tables for any communication that involves members of team 2 and/or team 3, category 1 refers to coordination *for the current period*. That is, category 1 and its sub-categories should be used for statements that are relevant for *the current period only*.

21) Similarly, in the coding table for the I-FR-I sessions, category 1 and its sub-categories should be used for statements that are relevant for the current period only.

22) For both the IGI and IG'I sessions, in the relevant coding tables for any communication that involves members of team 2 and/or team 3, category 11 and its sub-categories should be used to cover discussion about strategies and expectations in *repeated interactions*. Note that whenever you choose 11h- 11o, you should also select 3a. But 3a can also be

used alone, such as when referring to past choices of team 1. Remember, a message can be coded under *multiple* categories (or sub-categories). Likewise, in both the IGI and IG'I sessions, for the three person chats among team 2/3 member, 11p- 11s will usually imply some sub-categories of 3 other than 3a. But these sub-categories, for example, 3c, can also be used alone or in combination with other codes.

23) For the I-FR-I sessions, whenever you choose 11h - 11o, you should also select 3a. But 3a can also be used alone or in combination with other codes.

24) For both the IGI and IG'I sessions, in the relevant coding tables for communication that involves members of team 1, category 101 refers to coordination for the current period. That is, category 101 and its sub-categories should be used for statements that are relevant for the current period only.

25) For both the IGI and IG'I sessions, for communication that involves members of team 1, category 111 should be used to cover discussion about strategies and expectations in repeated interactions. Note that whenever you choose 111h- 111k you should also select the relevant sub-categories in 13, in particular from 13a, 13c, 13e and 13g. But these sub-categories of 13 can also be used alone, such as when referring to past choices of team 2, or in combination with other codes.

26) For both the IGI and IG'I sessions, in the relevant coding tables for any communication that involves members of team 2 and/or team 3, 2m should usually be coded also whenever you code something as 11a -11e. And that 2m could also be used at additional times when the need to coordinate for the benefit of the "relevant group" is discussed, even when specific actions are not referred to.

27) Similarly, for the I-FR-I sessions, 2m should usually be included whenever you code something as 11a – 11e. And that 2m could also be used at additional times when the need to coordinate for the benefit of the "relevant group" is discussed, even when specific actions are not referred to.

28) For both the IGI and IG'I sessions, for communication that involves members of team 1, 102m should usually be included whenever you code something as 111a -111g. And that 102m could also be used at additional times when the need to coordinate is discussed, even when specific actions are not referred to.

Please track the time you spend on coding the messages and training. You will be paid for each hour working on this project.

Thanks a lot for your participation in the coding task!

Appendix D: Supplementary References to Footnotes 8 and 9

1. Supplementary References to Footnotes 2 and 8: Mixed Decision-Maker Environment

The existing literature—including this study—focuses on the single-type decision-maker environment in which *all* decision-makers are either individuals or groups. Some notable recent exceptions, however, introduced mixed decision-maker treatments and compare them to all-individuals and all-groups treatments.

Wildschut et al. (2007) finds that in a prisoner's dilemma, behavior is most competitive in the group vs. group condition, least competitive in the individual vs. individual condition, and in between in the group vs. individual condition. Morgan and Tindale (2002), however, does not find the same result in their study of the prisoner's dilemma with the individual vs. individual, group vs. group, and group vs. individual treatments. Using a 2x2 design for the trust game that allows the trustor and trustee both to be either individual or groups, Kuglar et al. (2007) finds that group trustors behave the same when playing against individual and group trustees, and group trustees also behave the same when playing against individual and group trustors.

Abbink et al. (2010) reports a repeated contest experiment that involves one individual playing against another individual, one individual playing against a four-member team, and a four-member team playing against another four-member team. They find that both teams and individuals adjust their behavior depending on their opponent's choice when their opponent is an individual but not when their opponent is a team, and they suggest that this may reflect decision-makers conjecture that a team opponent will display more erratic and inconsistent behaviour than an individual opponent. Ahn et al. (2011) reports repeated contest games with very similar design as Abbink et al. (2010) but with five-member teams, and finds that individuals did not alter their behaviour based upon being matched with individuals or teams.

All of these studies consider two-player games, and the three-player CR game allows for a rich possibility of different mixed decision-makers environments that can be investigated in future studies.

Some studies do not directly compare behavior in a mixed decision-maker environment to the behavior in a single-type decision-maker environment, but instead vary the size of the groups involved to study the effect of changing group sizes. Sutter (2005) finds that in a beauty-contest game played by an individual, a two-member team, and a four-member team, teams with four members outperform teams with two members and single persons significantly, but the two-member teams and individuals do not perform differently. Bornstein et al. (2008) conducts a repeated Bertrand price competition experiment played between two individuals, two two-member groups, and two three-member groups. They find that individuals are better able to achieve a high collusive price than groups, while there is no difference in the price across the two-member and three-member group treatments.

Herbst et al. (2014) consider endogenous alliance formation in contests that involve a mixed decision-maker design. Their experiment considers both a contest played by three individual players, as well as an environment in which two of the three individual decision-makers can endogenously form an alliance, and then the contest will be played between one individual and a two-member alliance. They find that subjects who expend higher-than-average efforts when acting as an individual, choose to stand alone instead of joining an alliance.

References

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2. Supplementary References to Footnote 9: Individual versus Group Play in Repeated Games

While the literature that compares individual and group behavior in games is sizable, most existing work conducts this comparison for one-shot games. Some recent notable exceptions exist. Abbink et al. (2010) finds that groups are more competitive and invest more in their finitely repeated experimental contest game. The work by Ahn et al. (2011) discussed in section 1 of this appendix also compares individual and group play in repeated contest games. Kroll et al. (2013) finds that in the finitely repeated prisoner's dilemma, "representative democracy" groups in which group members elect a representative among competing candidates to represent them are more cooperative than individuals. In Kagel and McGee (2014), decision-makers play multiple finitely repeated prisoner's dilemma. They find that teams cooperate less than individuals in the first repeated PD. However, after the first repeated PD, teams cooperate at

the same or higher levels than individuals, with significantly higher levels of cooperation in later repeated games.

As discussed in section 1 of this appendix, in their repeated Bertrand price competition game experiment, Bornstein et al. (2008) finds that individuals are better able to achieve a high collusive price than groups, while there is no difference in the price across the two-member and three-member group treatments. In contrast, Müller and Tan (2013) finds that groups behave more collusively than individuals in a finitely repeated Stackelberg quantity competition game.

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