**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]](#footnote-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 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%).









































**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!

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. [↑](#footnote-ref-1)