Online Appendix to "Multigame Contact: A Double-Edged Sword for Cooperation"

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A. Supplementary Tables

Table A1—Cooperation as Subgame-Perfect Equilibrium (SPE) and Risk-Dominant (RD) strategy

	Simultaneous			Sequential
Continuation prob.	$\delta = 0.1$	$\delta = 0.5$	$\delta = 0.9$	$\delta = 0.5$
- *1Partner*				
- *easy* game	-	SPE & RD	SPE & RD	SPE & RD
- *hard* game	-	SPE & RD	SPE & RD	SPE & RD
- *2Partner*				
- *easy* game	-	SPE & RD	SPE & RD	SPE & RD
- *hard* game	-	-	SPE & RD	-

Note: Simultaneous: $\delta^{SPE}_{easy} = 0.11$, $\delta^{RD}_{easy} = 0.24$, $\delta^{SPE}_{pool} = 0.38$, $\delta^{RD}_{pool} = 0.44$, $\delta^{SPE}_{hard} = 0.52$, $\delta^{RD}_{hard} = 0.56$
Sequential: $\delta^{SPE}_{easy} = 0.11$, $\delta^{RD}_{easy} = 0.24$, $\delta^{SPE}_{pool} = 0.06$, $\delta^{RD}_{pool} = 0.12$, $\delta^{SPE}_{hard} = 0.52$, $\delta^{RD}_{hard} = 0.56$

Table A2—Summary of the sessions

	$\delta = 0.1$, Sim.		$\delta = 0.5$, Sim.		$\delta = 0.9$, Sim.		$\delta = 0.5$, Seq.	
	1Part.	*2Part.*	*1Part.*	*2Part.*	*1Part.*	*2Part.*	*1Part.*	*2Part.*
Sessions	3	6	3	6	2	3	3	6
Matching gr.	6	6	6	6	5	5	6	6
Subjects	60	116	58	114	34	54	44	84
Decisions	6,030	11,754	5,924	11,574	3,752	5,800	4,496	8,580

Note: Number of sessions, matching groups, subjects, and decisions by treatment. We count one decision each time a subject has to take a decision in both games, i.e. this is equivalent to the total number of rounds played by all the subjects.

Table A3—Linkage in the sequential games

	Dep. var.: cooperation in *hard* (c_t)		
	(1)	(2)	(3)
2Partner	−0.116	−0.060	−0.002
	(0.044)	(0.021)	(0.026)
$(C,C)_{t-1}$ [cooperative outcome in *hard*]		0.518	0.325
		(0.029)	(0.051)
$(C,C)_{t-1} \times$ *2Partner*			0.207
			(0.056)
$(c,c)_{t-1}$ [cooperative outcome in *easy*]		0.066	0.306
		(0.026)	(0.027)
$(c,c)_{t-1} \times$ *2Partner*			−0.293
			(0.032)
Constant	0.550	0.222	0.189
	(0.044)	(0.024)	(0.028)
Time controls	Yes	Yes	Yes
χ^2-test	183.7	2274.5	3646.9
p	0.000	0.000	0.000
R^2	0.117	0.386	0.394
N	13,076	9,796	9,796

Note: Random effects estimates. Dependent variable is cooperation in *hard*. Independent variables are a dummy for the treatments with two partners (with one partner as baseline case); $(C,C)_{t-1}$ indicates a cooperative outcome in *hard* in the previous round of the supergame; $(c,c)_{t-1}$ indicates a cooperative outcome in *easy* in the previous round of the supergame. Time controls are dummies for the first and second round of the supergame and the supergame round, as well as the overall round in the experiment. Robust standard errors, clustered on Matching group, in parentheses.

B. Supplementary Figures

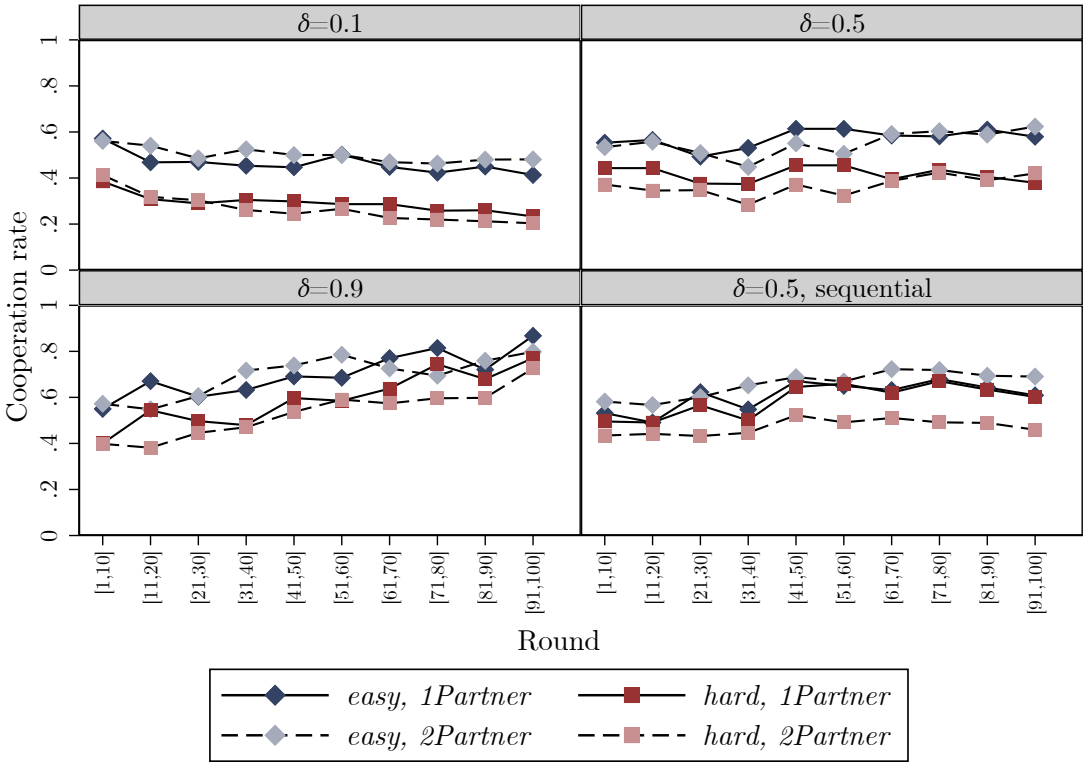


FIGURE B1. COOPERATION RATES IN *hard* AND *easy* OVER TIME BY TREATMENT.

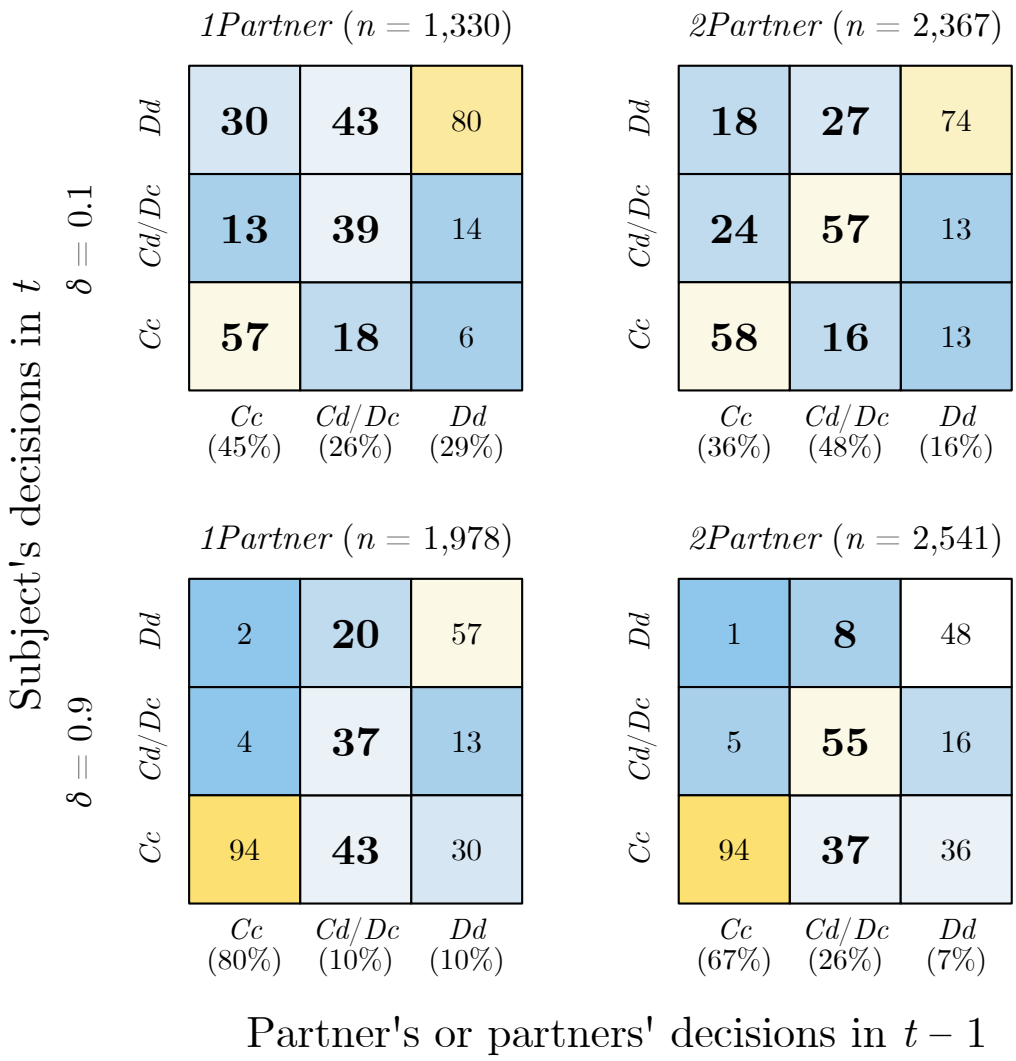


FIGURE B2. REACTION BY SUBJECTS WHO PLAYED Cc IN $t-1$ TO PARTNERS' DECISIONS IN $t-1$ FOR $\delta = 0.1$ (UPPER HALF), AND $\delta = 0.9$ (LOWER HALF).

Note: Numbers and colors indicate the frequency of subjects' decisions in t within each column (blue for values close to 0, and gold for values close to 100). A bold column indicates a significant difference between *1Partner* and *2Partner* (RS-tests). The frequency of each partners' decision is shown below the labels.

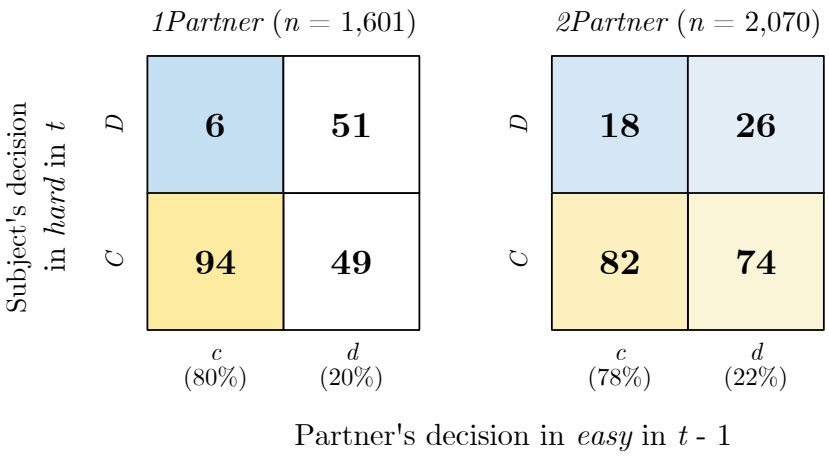


FIGURE B3. REACTION IN *hard* IN t BY SUBJECTS WHO ACHIEVED (C, C) IN *hard* AND PLAYED c IN *easy* IN $t-1$.

Note: Numbers and colors indicate the frequency of subjects' decisions in t within each column (blue for values close to 0, and gold for values close to 100). A bold column indicates a significant difference between *1Partner* and *2Partner* (RS-tests). The frequency of each partners' decision is shown below the labels.

C. Experimental procedures

Matching procedure. — Subjects in a session are randomly allocated to matching groups and only interact with the other subjects in their matching group. All matching groups (and therefore all subjects) in a session play the same treatment. We vary matching group sizes (6 to 20 subjects) across treatments to keep the number of times a subject interacts with another subject in her matching group comparable. Because the lower the continuation probability, the more supergames a subject plays, matching group size gets smaller as the continuation probability increases. Similarly, subjects in *2Partner* always interact with two different partners, whereas subjects in *1Partner* only interact with one partner at a time. Therefore, *2Partner* requires larger matching groups than *1Partner*. See columns 4 and 5 of Table C1 for information about the matching groups.

Stopping procedure and supergames' duration. — The first three rounds of a supergame are played for certain and at the end of the third round, a computerized stopping rule is introduced. From round three onward, the supergame either proceeds to the next round (with continuation probability δ), or it stops and subjects move to a new supergame. Rather than randomly stopping after each round greater or equal than 3, the computer generates a sequence of supergames at the beginning of the session. The duration of each supergame is drawn from a geometric distribution and a new supergame is added to the sequence up until the total number of rounds exceeds 100. We wanted to let matching groups within a session go through independent sequences of supergame durations. Subjects in a matching group go through the same sequence of supergames. At the end of each round, subjects have to wait until all the subjects in their session, irrespective of their matching group, have taken their decisions and observed the results before moving to the next round. This spreads out waiting out times more evenly throughout the session.

Since the total number of rounds played by a matching group is random, matching groups within a session do not necessarily finish at the same time. To avoid having subjects in matching groups, which are not last to finish, wait on others and possibly infer with whom they interacted, we make those matching groups play a last supergame of finite duration. The duration of the matching group's finite supergame is chosen to ensure that all matching groups within a session finish at the same time. To illustrate this, consider matching groups 71 and 72 in Table C1, which were the only two in session 7. The computer drew 33 and 34 supergames summing up to 101 and 102 rounds for matching groups 71 and 72, respectively. Since matching group 71 would have played one round less than matching group 72, we add a supergame of one round to matching group 71. Subjects who play a finite supergame are informed about the finite character of the game and its duration. Data from these finite supergames are not part of the analysis. To avoid any effects on the main part of the experiment we do not mention the possibility of playing a supergame of finite length in the instructions.

For the second experiment, we did not generate the supergame durations on the spot, but used the realizations of the six matching groups of the first experiment at $\delta = 0.5$ in *1Partner* for all treatments. The goal was to maximize comparability between the two experiments.

Table C1—Supergames' duration by matching group

Treatment			Match. gr.		Supergames duration						Statistics supergames					
δ	Sim.	*2P*	ID	Subj.	3	4	5	6–8	9–11	12+	N	Mean	Min	Max	Total	Finite
0.1	1	0	21	10	29	2	1	0	0	0	32	3.1	3	5	100	0
			22	10	32	1	0	0	0	0	33	3.0	3	4	100	0
			71	10	31	2	0	0	0	0	33	3.1	3	4	101	1
			72	10	34	0	0	0	0	0	34	3.0	3	3	102	0
			221	10	32	1	0	0	0	0	33	3.0	3	4	100	0
			222	10	28	4	0	0	0	0	32	3.1	3	4	100	0
		1	11	20	31	2	0	0	0	0	33	3.1	3	4	101	0
			81	20	26	6	0	0	0	0	32	3.2	3	4	102	0
			141	20	31	2	0	0	0	0	33	3.1	3	4	101	0
			191	18	27	5	0	0	0	0	32	3.2	3	4	101	0
			211	18	30	3	0	0	0	0	33	3.1	3	4	102	0
			231	20	28	3	1	0	0	0	32	3.2	3	5	101	0
0.5	1	0	61	10	10	8	1	2	1	1	23	4.4	3	12	102	1
			62	8	13	7	3	3	0	0	26	4.0	3	8	103	0
			151	10	13	7	3	3	0	0	26	3.9	3	7	102	0
			152	10	15	7	3	2	0	0	27	3.8	3	8	102	0
			171	10	12	7	4	3	0	0	26	4.0	3	7	103	0
			172	10	15	6	1	4	0	0	26	3.9	3	8	101	2
		1	51	20	13	5	5	3	0	0	26	4.0	3	7	104	0
			91	20	10	7	1	4	1	0	23	4.4	3	11	101	0
			101	18	12	9	2	3	0	0	26	3.9	3	8	102	0
			121	18	11	5	3	5	0	0	24	4.2	3	8	101	0
			181	20	11	7	4	3	0	0	25	4.0	3	8	101	0
			201	18	14	3	1	5	1	0	24	4.2	3	9	100	0
	0	0	251	8	10	8	1	2	1	1	23	4.4	3	12	102	1
			252	6	13	7	3	3	0	0	26	4.0	3	8	103	0
			281	8	13	7	3	3	0	0	26	3.9	3	7	102	0
			282	8	15	7	3	2	0	0	27	3.8	3	8	102	0
			301	8	12	7	4	3	0	0	26	4.0	3	7	103	0
			302	6	15	6	1	4	0	0	26	3.9	3	8	101	2
		1	241	16	10	8	1	2	1	1	23	4.4	3	12	102	0
			261	16	13	7	3	3	0	0	26	4.0	3	8	103	0
			271	12	13	7	3	3	0	0	26	3.9	3	7	102	0
			291	16	15	7	3	2	0	0	27	3.8	3	8	102	0
			311	10	12	7	4	3	0	0	26	4.0	3	7	103	0
			321	14	15	6	1	4	0	0	26	3.9	3	8	101	0
0.9	1	0	31	6	0	1	1	1	0	4	7	15.4	4	48	108	11
			32	6	2	0	0	2	0	4	8	12.6	3	29	101	18
			33	6	0	0	1	6	2	3	12	9.9	5	21	119	0
			131	8	0	1	2	2	0	4	9	13.2	4	30	119	0
			132	8	1	1	5	0	3	2	12	8.7	3	24	104	15
		1	41	10	1	2	1	1	1	4	10	11.1	3	29	111	0
			42	10	0	2	0	2	2	3	9	11.9	4	28	107	4
			111	14	2	1	0	1	1	5	10	10.5	3	19	105	0
			161	10	0	1	1	1	3	4	10	10.9	4	21	109	0
			162	10	1	2	0	2	0	2	7	15.1	3	65	106	3

Note: Summary of the supergames duration for each matching group. The first three columns show the treatment played. *2P* is a binary variable taking the value 1 for *2Partner* and 0 for *1Partner*. Sim. is a binary variable taking the value 1 if the *easy* and *hard* games were played simultaneously and 0 if they were played sequentially. The last digit of a matching group ID is its number in the session and the other digits form the session ID (e.g., 21 refers to matching group 1 in session 2 and 222 refers to matching group 2 in session 22). There are up to 3 matching groups within a session. Subj. is the number of subjects in the matching group. Columns 6 to 11 show frequencies of supergames duration for six selected intervals. Columns 12 to 16 show summary statistics for supergame duration.

D. Instructions

The instructions were originally written in French. Depending on the treatment, minimum changes were made to the instructions. What follows are the translated instructions for the treatment *2Partner* at $\delta = 0.5$ when both games are played simultaneously.

Instructions

General information

You are going to participate to a study financed by the Swiss National Science Foundation (SNSF). Depending on your decisions, you will have the opportunity to earn a substantial amount of money. Please read the following instructions carefully.

These instructions are exclusively reserved for your usage. You are not allowed to communicate with the other participants. If you violate this rule, you will be banned from the experiment and receive no payment.

Throughout the study, we will not speak in CHF but in points. At the end of the study, your gains will be converted to CHF. The exchange rate between CHF and points is CHF 1 = 1000 points. Once the study is finished, you will receive your gains in cash plus a show-up fee of CHF 10.

The study is divided into matches. For each match, you are paired with two other randomly drawn participants in the room. These participants are called your partners. You will interact with these same two partners for several rounds. We will see later what determines the length of a match. Once a match is over, two new partners are randomly drawn. The figure below shows the difference between matches and rounds:

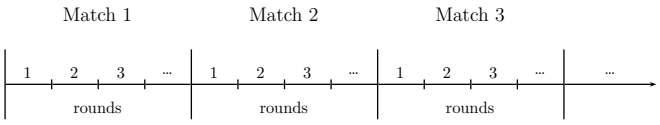


Figure 1: Matches and rounds

Your identity will never be revealed and you will never receive information about your partners.

You will play several matches and your partners will change between each match. You do not know how many matches you will play.

Rules of the game

Below, you can see the decisions screen. The header shows the current match number as well as the round number in the current match. Here you have the example of round 1 in match 2.

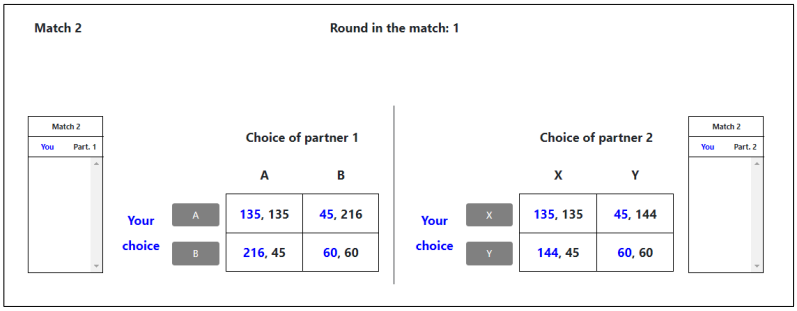


Figure 2: Decisions screen

The body of the screen is divided into two parts by a vertical line. At each round, you have two decisions to take. Specifically, you have to take one decision for the left part of the screen and one for the right part. The two tables in the middle show the possible gains for you and your partners. The decision for each table consists of choosing between the first line and the second line. In the left table, click on the gray button **A** or **B** to choose the first or second line. The decision is similar for the right part clicking the gray button **X** or **Y**. Your partner 1 does the same either choosing column **A** or column **B** on the left part and your partner 2 either chooses column **X** or column **Y** on the right part.

Each table contains four cells. The first number in blue of each cell is your gain for the round if this cell is the result of your decision and the one of your partner. The second number in black of each cell is your partner's gain. The following lines shows the four possible cases for the table on the left.

- You - **A** / Partner 1 - **A** → You - 135 Points / Partner 1 - 135 Points
- You - **A** / Partner 1 - **B** → You - 45 Points / Partner 1 - 216 Points
- You - **B** / Partner 1 - **A** → You - 216 Points / Partner 1 - 45 Points
- You - **B** / Partner 1 - **B** → You - 60 Points / Partner 1 - 60 Points

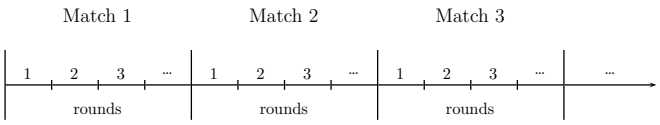
The reasoning is similar for the table on the right.

The tables on the very left and right parts of the screen remind you of your decisions and those of your respective partner for each half of the screen. Only the decisions of the current match are shown. Since the example is for round 1, the summary tables are still empty.

To take your decisions, you have to click on the gray buttons for each of the two tables in the middle. By clicking on a button, it becomes blue. Once you have taken your two decisions, a green button "Validate" appears in the lower right corner. By clicking this button, you move to the results screen. This screen will inform you about the choice of each of your partners. The results will be highlighted and your gain for each part will be displayed. If the match continues, you move to the next decisions screen and play the same game with the same two partners. If the match ends, a new screen will appear and inform you that two new partners will be randomly drawn.

Length of a match

Finally, we are going to look what determines the length of a match.



A match lasts at least 3 rounds. That means you are going to interact at least three times in a row with the same two partners.

From round 3 on, the match will stop randomly. More precisely, the match can stop at the end of round 3 with a probability of 1 chance out of 2. If the game does not stop, you move to a round 4 and there is again 1 chance out of 2 the match will stop at the end of round 4. The reasoning is identical for rounds 5 on, the match stopping at the end of each round with 1 chance out of 2. The computer randomly determines the stopping of a match.

To summarize, a match lasts at least 3 rounds. Starting from the end of round 3, the match stops at the end of each round with a probability of 1 chance out of 2.

The results screen will inform you whether the match continues or stops. Once a match is over, you move to the next one. As a reminder, two new partners are randomly drawn for the next match.

Make sure you understand the instructions. If something is not clear, please raise your hand and the organizer will come to help.