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**Working Paper**

## Reputation transmission without benefit to the reporter: A behavioral underpinning of markets in experimental focus

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Supplementary Online Appendix for Kamei and Putterman,  
“Reputation Transmission without Benefit to the Reporter:  
a Behavioral Underpinning of Markets in Experimental Focus”  
Kenju Kamei and Louis Putterman<sup>1</sup>

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## Appendix A: Theoretical Analysis

### A.1. Deriving Condition (1)

Under the “pessimistic” assumption, decision-maker  $i$  assumes that an individual free to revise her second choice always selects Y. As shown in Table A.1, the combined expected payoffs of subject  $i$  from cooperating or defecting, respectively, in the two interactions, can then be expressed as

$$E[\pi_i(XX)] = 8 + 12a_i - 5a_ib_i + c_i - a_ic_i (= 4 + 6a_i + 4 + 6a_i - 5a_ib_i + c_i - a_ic_i)$$

and

$$E[\pi_i(YY)] = 10 + 12a_i - 6a_ic_i (= 5 + 6a_i + 5 + 6a_i - 6a_ic_i).$$

Since a selfish player would choose XX (YY) if  $E[\pi_i(XX)] > (<) E[\pi_i(YY)]$ , we obtain the payoff-maximization condition:

$$\text{cooperate (defect) if } 5a_i(c_i - b_i) + c_i > (<) 2. \quad (1)$$

Player  $i$  is indifferent between cooperating and defecting if  $5a_i(c_i - b_i) + c_i = 2$ .

**Table A.1.** Expected Payoff for Each of Initial Choices (XX or YY)

## (1) Expected Payoffs in the First Interaction

Own Decision	First Partner's Decision	Probability	Payoff	Expected Payoff
XX	XX	$a_i$	10	$4 + 6a_i$
	YY	$1 - a_i$	4	
YY	XX	$a_i$	11	$5 + 6a_i$
	YY	$1 - a_i$	5	

## (2) Expected Payoffs in the Second Interaction

Initial Decision	Second Partner's Decision	Player Receiving Report	Outcome	Probability	Payoff	Expected Payoff
XX	X	None	X, X	$a_i(1-b_i)^2$	10	$4 + 6a_i - 5a_ib_i + c_i - a_ic_i$
		Only subject	Y, X	$a_ib_i(1-b_i)$	11	
		Only partner	X, Y	$a_ib_i(1-b_i)$	4	
		Both	Y, Y	$a_ib_i^2$	5	
	Y	None	X, Y	$(1-a_i)(1-b_i)(1-c_i)$	4	
		Only subject	Y, Y	$(1-a_i)(1-b_i)c_i$	5	
		Only partner	X, Y	$(1-a_i)b_i(1-c_i)$	4	
		Both	Y, Y	$(1-a_i)b_ic_i$	5	
YY	X	None	Y, X	$a_i(1-b_i)(1-c_i)$	11	$5 + 6a_i - 6a_ic_i$
		Only subject	Y, X	$a_ib_i(1-c_i)$	11	
		Only partner	Y, Y	$a_i(1-b_i)c_i$	5	
		Both	Y, Y	$a_ib_ic_i$	5	
	Y	None				
		Only subject	Y, Y	$1 - a_i$	5	
		Only partner				
		Both				

Notes:  $a_i$  indicates the fraction of subjects in the session that subject  $i$  believes will select XX.  $b_i$  indicates the fraction of subjects she believes will engage in reporting those who select XX.  $c_i$  indicates the fraction of subjects she believes will engage in reporting those who select YY.

**A.2. Revising Condition (1) Based on the Optimistic Belief that Cooperators Cooperate with Cooperators given Free 2<sup>nd</sup> Choices**

Subject  $i$  chooses XX if  $E[\pi_i(XX)] > E[\pi_i(YY)]$ , i.e.,

$$4 + 6a_i + 4 + 6a_i + a_i b_i + c_i - a_i c_i > 5 + 6a_i + 5 + 6a_i - 6a_i c_i.$$

That is,  $5a_i c_i + a_i b_i + c_i > 2$ .

This means the higher is subject  $i$ 's belief  $a_i$ , the more likely subject  $i$  is to choose XX. Also, we learn that the higher is subject  $i$ 's belief  $c_i$ , the more likely subject  $i$  is to choose XX. The expected payoffs of subject  $i$  in the first interaction are as in Panel (1) of Table 1. Those in the second interaction are summarized in Table A.1 below.

**Table A.2:** Revised Expected Material Payoffs in the Second Interaction using optimistic assumption about XX-choosers' free 2<sup>nd</sup> choices

Own Initial Decision	Second Partner's Decision	Player Receiving Report	Outcome	Probability	Payoff	Expected Payoff	
XX	X	None	X, X	$a_i(1-b_i)^2$	10	$4 + 6a_i + a_i b_i + c_i - a_i c_i$	
		Only subject	Y, X	$a_i b_i(1-b_i)$	11		
		Only partner	X, X	$a_i b_i(1-b_i)$	10		
		Both	Y, X	$a_i b_i^2$	11		
	Y	None	X, Y	$(1-a_i)(1-b_i)(1-c_i)$	4		
		Only subject	Y, Y	$(1-a_i)(1-b_i)c_i$	5		
		Only partner	X, Y	$(1-a_i)b_i(1-c_i)$	4		
		Both	Y, Y	$(1-a_i)b_i c_i$	5		
YY	X	None	Y, X	$a_i(1-b_i)(1-c_i)$	11	$5 + 6a_i - 6a_i c_i$	
		Only subject	Y, X	$a_i b_i(1-c_i)$	11		
		Only partner	Y, Y	$a_i(1-b_i)c_i$	5		
		Both	Y, Y	$a_i b_i c_i$	5		
	Y	None					
		Only subject	Y, Y	$1 - a_i$	5		
		Only partner					
		Both					

Notes:  $a_i$  indicates the fraction of subjects in the session that subject  $i$  believes will select XX.  $b_i$  indicates the fraction of subjects she believes will engage in reporting those who select XX.  $c_i$  indicates the fraction of subjects she believes will engage in reporting those who select YY. The decision-maker  $i$  performing this calculation is self-interested and hence chooses Y when given a free 2<sup>nd</sup> choice, but  $i$  “optimistically” assumes that others who select XX initially will choose X in a free 2<sup>nd</sup> choice if meeting another XX chooser; that is, all XX-choosers other than (possibly)  $i$  are assumed to have a social preference or other reason for choosing X in their 2<sup>nd</sup> interaction, if they meet another cooperator.

### A.3. Conditions under which an Inequity-Averse Subject $i$ Chooses XX.

If we assume that a subject  $i$  is an inequity-averse agent, her payoff matrix is expressed as below:

**Figure:** Amended Payoff Matrix incorporating Inequity-Averse Preferences into Figure 1 of the paper.

		Subject $j$	
		X with prob. $a_i$	Y with prob. $1 - a_i$
Subject $i$	X	$\underline{10 + E[XX]}, 10 + E[XX]$	$\underline{4 + E[XX] - \alpha_i \cdot (11 + E[YY] - 4 - E[XX])},$ $11 + E[YY] - \beta_j \cdot (11 + E[YY] - 4 - E[XX])$
	Y	$\underline{11 + E[YY] - \beta_j \cdot (11 + E[YY] - 4 - E[XX])},$ $4 + E[XX] - \alpha_i \cdot (11 + E[YY] - 4 - E[XX])$	$\underline{5 + E[YY]}, 5 + E[YY]$

*Note:* The underlined payoffs are the payoffs of subject  $i$ . We assume that subject  $i$  considers inequality with her first-interaction partner (subject  $j$ ) only. Subject  $i$  believes that she meets with a cooperator with a probability  $a_i$ .

In the payoff matrix,  $E[XX]$  ( $E[YY]$ ) is the expected payoff in the second period when choosing XX (YY) based on subject  $i$ 's beliefs. Under the assumption of pessimistic beliefs,  $E[XX]$  and  $E[YY]$  are given by Panel (2) of Table A.1. Under the assumption of optimistic beliefs,  $E[XX]$  and  $E[YY]$  are given by Table A.2.

The expected payoff of subject  $i$  when choosing XX is:

$$\pi(XX) = a_i \cdot (10 + E[XX]) + (1 - a_i) \cdot (4 + E[XX] - \alpha_i \cdot (11 + E[YY] - 4 - E[XX])).$$

By contrast, the expected payoff of subject  $i$  when choosing YY is:

$$\pi(YY) = a_i \cdot (11 + E[YY] - \beta_j \cdot (11 + E[YY] - 4 - E[XX])) + (1 - a_i) \cdot (5 + E[YY]).$$

Subject  $i$  chooses XX (YY) if  $\pi(XX) > (<) \pi(YY)$ . In other words,

$$\begin{aligned} \pi(XX) - \pi(YY) \\ = E[XX] - E[YY] - 1 + (7 + E[YY] - E[XX]) \cdot (a_i \beta_j - \alpha_i (1 - a_i)) > (<) 0. \end{aligned} \quad (A1)$$

Case 1: The Pessimistic Beliefs

From condition (A1) and Panel (2) of Table 1, we have: subject  $i$  chooses  $XX$  ( $YY$ ) if and only if

$$5a_i \cdot (c_i - b_i) + c_i > (<) 2 - (8 - 5a_i \cdot (c_i - b_i) - c_i) \cdot (a_i \cdot \beta_i - (1 - a_i) \cdot \alpha_i) \quad (A2)$$

Case 2: The Optimistic Beliefs

From condition (A1) and Table A.1, we have: subject  $i$  chooses  $XX$  ( $YY$ ) if and only if

$$5a_i \cdot c_i + a_i b_i + c_i > (<) 2 - (8 - 5a_i \cdot c_i - a_i b_i - c_i) \cdot (a_i \cdot \beta_i - (1 - a_i) \cdot \alpha_i) \quad (A3)$$



#### A.4. Reporting Decisions of an Inequity-Averse Subject

##### A.4.1. Case 1 – A cooperator meets another cooperator in period 1

PROPOSITION A1: *Suppose that  $\beta < 1$ . Also suppose that a cooperator  $i$  forms the pessimistic belief. Then, the cooperator reports (does not report) her matched cooperator if and only if the following two conditions hold (do not hold):*

$$6a_i > \rho \text{ and } -\rho + ((\alpha_i + \beta_i)b_i - \beta_i)(6a_i - \rho) > 0.$$

*Suppose instead that the cooperator forms the optimistic belief. Then, the cooperator never reports her matched cooperator.*

Proof:

Suppose that subject  $i$  has been matched with subject  $j$  in period 1 and both subjects select XX. Then, subjects  $i$  and  $j$  each receive a payoff of 10 points in that period. We examine the conditions under which cooperator  $i$  reports her matched cooperator  $j$ . We consider the two assumptions on  $i$ 's beliefs.

(a) Suppose that cooperator  $i$  forms the pessimistic belief. Under this assumption, from Table A.1,  $i$ 's total expected payoff in the experiment is calculated as:

$$\pi_i(XX) = 14 - \rho \cdot 1_{report} + 6a_i - 5a_i b_i + c_i - a_i c_i.^2 \quad (A7)$$

By contrast,  $i$ 's belief about  $j$ 's material payoff is dependent on whether  $i$  reports  $j$  or not:

(i) If  $i$  reports  $j$ :

$$\pi_j|reported = 10 - \rho b_i + (\text{Expected payoff of } j \text{ in period 2 if } i \text{ reports } j)$$

*Expected payoff of  $j$  in period 2 if  $i$  reports  $j$*

$$\begin{aligned} &= a_i b_i (5) + a_i (1 - b_i) (4) + (1 - a_i) (c_i) (5) + (1 - a_i) (1 - c_i) (4) \\ &= 4 + a_i b_i + c_i - a_i c_i. \end{aligned}$$

This expected payoff is calculated based on Table A.3 below.

Thus, we have:

$$\pi_j|reported = 14 - \rho b_i + a_i b_i + c_i - a_i c_i. \quad (A8)$$

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<sup>2</sup>  $1_{report} = 1$  if  $i$  reports  $j$ ; 0 otherwise.  $\rho = 1, 0.5$  and  $0.05$  for the HC, MC and LC treatments, respectively.

Table A.3. Cooperator  $i$ 's Belief about Cooperator  $j$ 's Expected Material Payoff in Period 2 if  $i$  Reports  $j$  (Pessimistic Assumption)

$j$ 's Initial Decision	Second Partner's Decision	Recipient of Report	Outcome	Probability	Payoff	Expected Payoff
XX	X	Only $j$ 's next partner	X,Y	$a_i(1-b_i)$	4	$4+a_i b_i + c_i - a_i c_i$
		Both $j$ and $j$ 's next partner	Y,Y	$a_i b_i$	5	
	Y	Only $j$ 's next partner	X,Y	$(1-a_i)(1-c_i)$	4	
		Both $j$ and $j$ 's next partner	Y,Y	$(1-a_i)c_i$	5	

(ii) If  $i$  does not report  $j$ :

$$\pi_j|not\ reported = 10 - \rho b_i + (\text{Expected payoff of } j \text{ in period 2 if } i \text{ does not report } j)$$

$$\text{Expected payoff of } j \text{ in period 2 if } i \text{ does not report } j = 4 + 6a_i + a_i b_i + c_i - a_i c_i.$$

This expected payoff in period 2 is calculated based on Table A.4 below.

Thus, we have:

$$\pi_j|not\ reported = 14 - \rho b_i + 6a_i + a_i b_i + c_i - a_i c_i. \quad (A9)$$

Table A.4. Cooperator  $i$ 's Belief about Cooperator  $j$ 's Expected Material Payoff in Period 2 if  $i$  Does Not Report  $j$  (Pessimistic Assumption)

$j$ 's Initial Decision	Second Partner's Decision	Recipient of Report	Outcome	Probability	Payoff	Expected Payoff
XX	X	None	X,X	$a_i(1-b_i)$	10	$4+6a_i+a_i b_i - a_i c_i + c_i$
		Only $j$	Y,X	$a_i b_i$	11	
	Y	None	X,Y	$(1-a_i)(1-c_i)$	4	
		Only $j$	Y, Y	$(1-a_i)c_i$	5	

From equations (A7), (A8) and (A9), we find that if cooperator  $i$  reports cooperator  $j$ ,  $i$ 's material payoff ( $j$ 's material payoff) is bigger if  $6a_i > \rho$  ( $6a_i < \rho$ ). To see this:

$$\begin{aligned} \pi_i|report - \pi_j|reported &= 6(a_i - a_i b_i) - \rho(1 - b_i) \\ &= (6a_i - \rho)(1 - b_i), \end{aligned}$$

which is positive (negative) if  $6a_i > \rho$  ( $6a_i < \rho$ ).

If cooperator  $i$  does not report cooperator  $j$ ,  $i$ 's material payoff ( $j$ 's material payoff) is bigger if  $6a_i < \rho$  ( $6a_i > \rho$ ). To see this,

$$\pi_i|not\ report - \pi_j|not\ reported = \rho b_i - 6a_i b_i = (\rho - 6a_i)b_i,$$

which is positive (negative) if  $6a_i < \rho$  ( $6a_i > \rho$ ).

In summary, we need to consider the following two possible situations:

- (i)  $6a_i < \rho$  ( $j$ 's material payoff is bigger if  $i$  reports  $j$ ;  $i$ 's material payoff is bigger if  $i$  does not report  $j$ )
- (ii)  $6a_i > \rho$  ( $i$ 's material payoff is bigger if  $i$  reports  $j$ ;  $j$ 's material payoff is bigger if  $i$  does not report  $j$ )

Suppose first that  $6a_i < \rho$ . Then, cooperator  $i$ 's Fehr-Schmidt expected utility when  $i$  chooses to report is:

$$\begin{aligned} u(\pi_i|\pi_j) |report &= \pi_i|report - \alpha_i \max\{\pi_j|reported - \pi_i|report, 0\} \\ &= 14 - \rho + 6a_i - 5a_i b_i + c_i - a_i c_i - \alpha_i(\rho - \rho b_i - 6a_i + 6a_i b_i). \end{aligned}$$

By contrast,  $i$ 's Fehr-Schmidt expected utility when  $i$  chooses not to report is:

$$\begin{aligned} u(\pi_i|\pi_j) |not\ report &= \pi_i|not\ report - \beta_i \max\{\pi_i|not\ report - \pi_j|not\ reported, 0\} \\ &= 14 + 6a_i - 5a_i b_i + c_i - a_i c_i - \beta_i(\rho b_i - 6a_i b_i). \end{aligned}$$

In other words,  $i$  will report  $j$  if and only if:

$$\begin{aligned} -\rho - \alpha_i(\rho - \rho b_i - 6a_i + 6a_i b_i) &> -\beta_i(\rho b_i - 6a_i b_i), \text{ or} \\ -\rho + [\beta_i b_i - \alpha_i(1 - b_i)](\rho - 6a_i) &> 0. \end{aligned}$$

This condition does not hold as we are assuming that  $0 \leq \beta_i \leq \alpha_i < 1$ . This is because:

$$\begin{aligned} \text{the left-hand side} &= -\rho + [\beta_i b_i - \alpha_i(1 - b_i)](\rho - 6a_i) < -\rho + [\beta_i b_i - \alpha_i(1 - b_i)](\rho - 6a_i)|_{\alpha_i=0, \beta_i=1} \\ &= -\rho + b_i(\rho - 6a_i) \\ &< -\rho + b_i(\rho - 6a_i)|_{b_i=1} = -6a_i. \end{aligned}$$

Suppose instead that  $6a_i > \rho$ . Then, cooperator  $i$ 's Fehr-Schmidt expected utility when  $i$  chooses to report is calculated as:

$$\begin{aligned} u(\pi_i|\pi_j) |report &= \pi_i|report - \beta_i \max\{\pi_i|report - \pi_j|reported, 0\} \\ &= 14 - \rho + 6a_i - 5a_i b_i + c_i - a_i c_i - \beta_i(-\rho + \rho b_i + 6a_i - 6a_i b_i). \end{aligned}$$

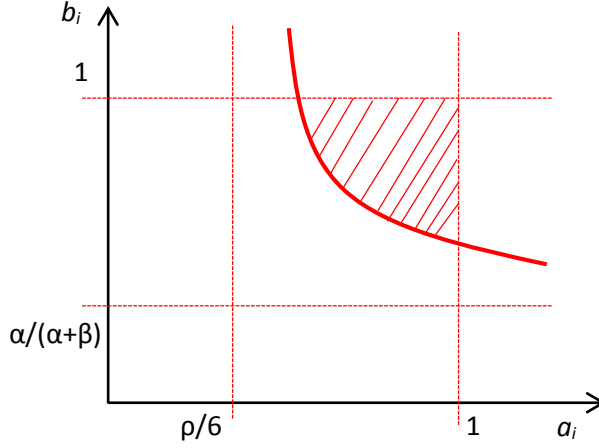
By contrast,  $i$ 's Fehr-Schmidt expected utility when  $i$  chooses not to report is expressed as:

$$\begin{aligned} u(\pi_i|\pi_j) |not\ report &= \pi_i|not\ report - \alpha_i \max\{\pi_j|not\ reported - \pi_i|not\ report, 0\} \\ &= 14 + 6a_i - 5a_i b_i + c_i - a_i c_i - \alpha_i(6a_i b_i - \rho b_i). \end{aligned}$$

In other words,  $i$  will report  $j$  if and only if:

$$\begin{aligned} -\rho - \beta_i(-\rho + \rho b_i + 6a_i - 6a_i b_i) &> -\alpha_i(6a_i b_i - \rho b_i), \text{ or} \\ -\rho + (-\beta_i + \beta_i b_i + \alpha_i b_i)(6a_i - \rho) &> 0. \end{aligned} \tag{A10}$$

This suggests that the higher  $b$  cooperator  $i$  has, the more likely  $i$  is to report  $j$ .



	LHS of Condition (A10)	Condition of $b$ for a cooperator to report her matched cooperator, given $a$ and $\rho$ .
$\alpha_i = 0, \beta_i = 0$	$-\rho$	Reporting never happens
$\alpha_i = 0.5, \beta_i = 0.25$	$-\rho + (-.25 + .75b_i)(6a_i - \rho)$	$b_i > 1/3 + (4/3) \cdot \rho / (6a_i - \rho)$
$\alpha_i = 1, \beta_i = 0.6$	$-\rho + (-.6 + 1.6b_i)(6a_i - \rho)$	$b_i > 3/8 + (5/8) \cdot \rho / (6a_i - \rho)$

(b) Suppose next that cooperator  $i$  forms the optimistic belief. Under this assumption, from Table A.2,  $i$ 's total expected payoff is calculated as:

$$\pi_i(XX) = 10 - \rho \cdot 1_{report} + (\text{Expected payoff of } i \text{ in period 2}),$$

$$\text{where Expected payoff of } i \text{ in period 2} = 4 + 6a_i + a_i b_i + c_i - a_i c_i.$$

Thus, we have:

$$\pi_i(XX) = 14 - \rho \cdot 1_{report} + 6a_i + a_i b_i + c_i - a_i c_i.$$

Cooperator  $i$ 's belief about  $j$ 's material payoff depends on whether  $i$  reports  $j$  or not:

(a) If  $i$  reports  $j$ :

$$\pi_j|reported = 10 - \rho b_i + (\text{Expected payoff of } j \text{ in period 2 if } i \text{ reports } j),$$

$$\text{where Expected payoff of } j \text{ in period 2 if } i \text{ reports } j = 4 + 6a_i + c_i - a_i c_i.$$

Here, the expected payoff of  $j$  in period 2 is calculated based on Table A.5.

Thus we have:

$$\pi_j|reported = 14 - \rho b_i + 6a_i + c_i - a_i c_i.$$

Table A.5: Cooperator  $i$ 's Belief about Cooperator  $j$ 's Expected Material Payoff in Period 2 if  $i$  Reports  $j$  (Optimistic Assumption)

$j$ 's Initial Decision	Second Partner's Decision	Recipient of Report	Outcome	Probability	Payoff	Expected Payoff
XX	X	Only $j$ 's next partner	X,X	$a_i(1-b_i)$	10	$4+6a_i+c_i - a_i c_i$
		Both $j$ and $j$ 's next partner	X,X	$a_i b_i$	10	
	Y	Only $j$ 's next partner	X,Y	$(1-a_i)(1-c_i)$	4	
		Both $j$ and $j$ 's next partner	Y, Y	$(1-a_i)c_i$	5	

(b) If  $i$  does not report  $j$ :

$$\pi_j | \text{not reported} = 10 - \rho b + (\text{Expected payoff of } j \text{ in period 2 if } i \text{ does not report } j),$$

$$\text{where Expected payoff of } j \text{ in period 2 if } i \text{ does not report } j = 4 + 6a_i + c_i - a_i c_i.$$

Thus we have:

$$\pi_i | \text{not reported} = 14 - \rho b_i + 6a_i + c_i - a_i c_i.$$

Table A.6: Cooperator  $i$ 's Belief about Cooperator  $j$ 's Expected Material Payoff in Period 2 if  $i$  Does Not Report  $j$  (Optimistic Assumption)

$j$ 's Initial Decision	Second Partner's Decision	Recipient of Report	Outcome	Probability	Payoff	Expected Payoff
XX	X	None	X,X	$a_i(1-b_i)$	10	$4+6a_i+c_i - a_i c_i$
		Only $j$	X,X	$a_i b_i$	10	
	Y	None	X,Y	$(1-a_i)(1-c_i)$	4	
		Only $j$	Y, Y	$(1-a_i)c_i$	5	

Regarding income inequality between  $i$  and  $j$ , if  $i$  reports  $j$ ,  $i$ 's material payoff is larger than  $j$ 's if:

$$\begin{aligned} \pi_i | \text{report} &> \pi_j | \text{reported}, \text{ or} \\ -\rho + a_i b_i &> -\rho b_i, \text{ or} \\ a_i b_i &> \rho(1 - b_i). \end{aligned} \tag{A11}$$

By contrast, if  $i$  does not report  $j$ ,  $i$ 's material payoff is bigger than  $j$ 's if:

$$\begin{aligned} \pi_i | \text{not report} &> \pi_j | \text{not reported}, \text{ or} \\ a_i b_i &> -\rho b_i, \text{ or} \\ a_i b_i + \rho b_i &> 0. \end{aligned} \tag{A12}$$

Condition (A12) always holds unless  $i$ 's beliefs (and/or  $\rho$ ) are altogether zero. Thus, we only need to consider two cases:  $a_i b_i > \rho(1 - b_i)$  and  $a_i b_i < \rho(1 - b_i)$ .

Suppose first that  $a_i b_i > \rho(1 - b_i)$ . Whether  $i$  reports  $j$  or not,  $i$ 's material payoff is bigger than  $j$ 's. In this situation, cooperator  $i$ 's Fehr-Schmidt expected utility when  $i$  chooses to report  $j$  is:

$$\begin{aligned} u(\pi_i|\pi_j) | \text{report} &= \pi_i | \text{report} - \beta_i \max\{\pi_i | \text{report} - \pi_j | \text{reported}, 0\} \\ &= 14 - \rho + 6a_i + a_i b_i + c_i - a_i c_i - \beta_i(-\rho + a_i b_i + \rho b_i). \end{aligned}$$

By contrast, cooperator  $i$ 's Fehr-Schmidt expected utility when  $i$  chooses not to report is:

$$\begin{aligned} u(\pi_i|\pi_j) | \text{not report} &= \pi_i | \text{report} - \beta_i \max\{\pi_i | \text{not report} - \pi_j | \text{not reported}, 0\} \\ &= 14 + 6a_i + a_i b_i + c_i - a_i c_i - \beta_i(a_i b_i + \rho b_i). \end{aligned}$$

We see that  $i$  does not report  $j$  as we are assuming that  $\beta_i < 1$ . This is because:

$$u(\pi_i|\pi_j) | \text{report} - u(\pi_i|\pi_j) | \text{not report} = -\rho - \beta_i(-\rho) = \rho(\beta_i - 1) < 0.$$

Suppose instead that  $a_i b_i < \rho(1 - b_i)$ . In this situation, cooperator  $i$ 's Fehr-Schmidt expected utility when  $i$  chooses to report  $j$  is:

$$\begin{aligned} u(\pi_i|\pi_j) | \text{report} &= \pi_i | \text{report} - \alpha_i \max\{\pi_j | \text{reported} - \pi_i | \text{report}, 0\} \\ &= 14 - \rho + 6a_i + a_i b_i + c_i - a_i c_i - \alpha_i(-\rho b_i + \rho - a_i b_i). \end{aligned}$$

Thus, in this case,  $i$  reports  $j$  if and only if:

$$\begin{aligned} u(\pi_i|\pi_j) | \text{report} - u(\pi_i|\pi_j) | \text{not report} &> 0, \text{ or} \\ -\rho - \alpha_i(-\rho b_i + \rho - a_i b_i) + \beta_i(a_i b_i + \rho b_i) &> 0, \text{ or} \\ (\alpha_i + \beta_i)a_i b_i - (1 + \alpha_i)\rho + \rho b_i(\alpha_i + \beta_i) &> 0, \text{ or} \\ (\alpha_i + \beta_i)(a_i b_i + \rho b_i) &> (1 + \alpha_i)\rho. \end{aligned}$$

Suppose that  $0 \leq \beta_i < 1$ . Then, this condition implies:

$$(\alpha_i + \beta_i)(a_i b_i + \rho b_i) > (1 + \alpha_i)\rho > (\beta_i + \alpha_i)\rho,$$

which means that:

$$a_i b_i > \rho(1 - b_i).$$

This cannot be held as we are assuming that  $a_i b_i < \rho(1 - b_i)$ .

In other words, cooperator  $i$  never reports  $j$  if  $0 \leq \beta_i < 1$  and  $i$  forms the optimistic belief.  $\square$

**COROLLARY A1:** *Suppose that  $\beta_i < 1$ . Then, subject  $i$  engages in more costly reporting in Case 2 ( $i$  chooses XX; and then meets with a defector) than in Case 1.*

Proof:

As discussed in the manuscript, when a cooperator  $i$  meets with a defector  $j$ ,  $i$  reports  $j$  if and only if:

$$a_i > \frac{\rho}{6} + \frac{\rho}{6\alpha_i}.$$

This condition is obtained by re-arranging Equation (3) of the manuscript. Recall that this condition holds regardless of which assumption, pessimistic or optimistic, we impose.

From Proposition A1, if cooperator  $i$  forms the pessimistic belief and meets with another cooperator  $k$ ,  $i$  reports  $k$  if and only if:

$$6a_i > \rho \text{ and } -\rho + ((\alpha_i + \beta_i)b_i - \beta_i)(6a_i - \rho) > 0.$$

Here, we see that an additional requirement that  $i$  will report  $k$  is:  $b_i > \frac{\beta_i}{\alpha_i + \beta_i}$ ; otherwise,  $-\rho + ((\alpha_i + \beta_i)b_i - \beta_i)(6a_i - \rho) \leq 0$ .

The condition of  $-\rho + ((\alpha_i + \beta_i)b_i - \beta_i)(6a_i - \rho) > 0$  in Proposition A1 is stronger than  $a_i > \frac{\rho}{6} + \frac{\rho}{6\alpha_i}$ . To see this, re-arranging the condition:  $-\rho + ((\alpha_i + \beta_i)b_i - \beta_i)(6a_i - \rho) > 0$ , we obtain:

$$a_i > \frac{\rho}{6} + \frac{\rho}{6[(\alpha_i + \beta_i)b_i - \beta_i]},$$

whose right hand side is greater than or equal to:  $\frac{\rho}{6} + \frac{\rho}{6[(\alpha_i + \beta_i)b_i - \beta_i]}|_{b_i=1} = \frac{\rho}{6} + \frac{\rho}{6\alpha_i}$ . This means that costly reporting is more likely to be realized in Case 2 than in Case 1 under the pessimistic assumption.

Suppose instead that cooperator  $i$  forms the optimistic belief. Then, when  $i$  meets with a cooperator  $k$ ,  $i$  will never report  $k$  (as shown in Proposition A1), unlike the situation in which  $i$  meets with a defector.

□

#### A.4.2. Case 2 – A cooperator meets a defector in period 1.

PROPOSITION A2: *Regardless of which belief, either pessimistic or optimistic, a cooperator  $i$  forms, a cooperator reports (does not report) her matched defector if and only if the following condition hold (do not hold):*

$$-\rho + (6a_i - \rho)a_i > 0$$

Proof:

Suppose that subject  $i$  chose XX and has been matched with subject  $j$  who selected YY in period 1. Then, cooperator  $i$  received a payoff of 4 points in that period; defector  $j$  received a payoff of 11 points in that period. We examine the conditions under which cooperator  $i$  reports his matched defector  $j$ .

Suppose that subject  $i$  has the utility function defined in Eq. (2). Subject  $i$  reports subject  $j$  if and only if  $u_i(\pi_i | \pi_j) | \text{report} > u_i(\pi_i | \pi_j) | \text{not report}$  (i.e.,  $i$ 's utility when  $i$  reports  $j$  is greater than  $i$ 's utility when  $i$  does not report  $j$ ).

The cooperator  $i$ 's totally expected payoff is:

$$\begin{aligned} \pi_i &= (\text{Period 1 payoff}) - \rho \cdot 1_{\text{report}} + (\text{Expected payoff in period 2}) \\ &= 4 + (\text{Expected payoff in period 2}) - \rho \cdot 1_{\text{report}}. \end{aligned} \quad (\text{A13})$$

By contrast, cooperator  $i$ 's belief about defector  $j$ 's material payoff is dependent on whether  $i$  reports  $j$  or not:

(a) When  $i$  reports  $j$ :

$$\begin{aligned} \pi_j | \text{reported} &= (\text{Period 1 payoff}) - \rho b_i + (\text{Expected payoff in period 2 if } i \text{ reports } j) \\ &= 11 - \rho b_i + 5 \\ &= 16 - \rho b_i. \end{aligned} \quad (\text{A14})$$

(b) When  $i$  does not report  $j$ :

$$\begin{aligned} \pi_j | \text{not reported} &= (\text{Period 1 payoff}) - \rho \cdot b_i + (\text{Expected Payoff in period 2 if } i \text{ does not report } j) \\ &= 11 - \rho b_i + 11 \cdot a_i + 5 \cdot (1 - a_i) \\ &= 16 + 6a_i - \rho b_i. \end{aligned} \quad (\text{A15})$$

Here, the utility of subject  $i$  is calculated using (A13) and (A14) or (A15).

(i) The utility of cooperator  $i$  when reporting defector  $j$ :

$$\begin{aligned} u_i(\pi_i | \pi_j) | \text{report} &= \pi_i | \text{report} - \alpha_i \cdot \max\{\pi_j | \text{reported} - \pi_i | \text{report}, 0\} \\ &= 4 + (\text{Expected payoff in period 2}) - \rho - \alpha_i \cdot [(16 - \rho b_i) - (4 + (\text{Expected payoff in period 2}) - \rho)]. \end{aligned}$$

(ii) The utility of cooperator  $i$  when not reporting defector  $j$ :

$$\begin{aligned} u_i(\pi_i | \pi_j) | \text{not report} &= \pi_i | \text{not report} - \alpha_i \cdot \max\{\pi_j | \text{not reported} - \pi_i | \text{not report}, 0\} \\ &= 4 + (\text{Expected payoff in period 2}) - \alpha_i \cdot [(16 + 6a_i - \rho \cdot b_i) - (4 + (\text{Expected payoff in period 2}))] \end{aligned}$$

Here, cooperator  $i$  decides to report defector  $j$  if  $u_i(\pi_i | \pi_j) | \text{report} > u_i(\pi_i | \pi_j) | \text{not report}$ . In other words,

$$u_i(\pi_i | \pi_j) | \text{report} - u_i(\pi_i | \pi_j) | \text{not report} = -\rho - \alpha_i \cdot [-6a_i - (-\rho)]$$



$$= 6\alpha_i \cdot a_i - (1 + \alpha_i) \cdot \rho > 0.$$

Thus, we have:  $\alpha_i > \frac{\rho}{6a_i - \rho}$ .

Note that this condition is not affected by whether  $i$  “optimistically” assumes that a cooperator selects X when presented with a free 2<sup>nd</sup> choice and meeting another cooperator or “pessimistically” assumes that all players select Y when presented with a free 2<sup>nd</sup> choice.

Reporting Cost ( $\rho$ )	$\alpha_i$	Minimum $a_i$ that makes reporting her YY-choosing counterpart utility maximizing
1.0	0.5	0.500
0.5	0.5	0.250
0.05	0.5	0.025
0.00	0.5	0.000
1.0	1.0	0.333
0.5	1.0	0.167
0.05	1.0	0.017
0.00	0.5	0.000

#### A.4.3. Case 3 – A defector meets a cooperator in period 1

**PROPOSITION A3:** *Suppose that  $\beta_i < 1$ . Then, regardless of which belief (either pessimistic or optimistic) a defector  $i$  forms, the defector never reports her matched cooperator.*

Proof:

Suppose that subject  $i$  chose YY and has been matched with subject  $j$  who selected XX in period 1. Then, defector  $i$  received a payoff of 11 points in that period; cooperator  $j$  received a payoff of 4 points in that period. We examine the conditions under which defector  $i$  reports his matched cooperator  $j$ . We consider the two assumptions on her beliefs.

(a) Suppose that defector  $i$  forms the pessimistic belief. Under this assumption, defector  $i$ 's total expected payoff is calculated as:

$$\begin{aligned}\pi_i(XX) &= 11 - \rho \cdot 1_{report} + (\text{Expected payoff in period 2}) \\ &= 16 - \rho \cdot 1_{report} + 6a_i - 6a_i c_i.\end{aligned}$$

By contrast, defector  $i$ 's belief about cooperator  $j$ 's material payoff if is dependent on whether  $i$  reports  $j$  or not:

(i)  $i$  reports  $j$ :

$$\pi_j|reported = 4 - \rho c_i + (\text{Expected payoff of } j \text{ in period 2 if } i \text{ reports } j)$$

where *Expected payoff of  $j$  in period 2 if  $i$  reports  $j$*

$$\begin{aligned}&= a_i b_i (5) + a_i (1 - b_i) (4) + (1 - a_i) (c_i) (5) + (1 - a_i) (1 - c_i) (4) \\ &= 4 + a_i b_i + c_i - a_i c_i \text{ (See Table A.3).}\end{aligned}$$

Thus, we have:

$$\pi_j|reported = 8 - \rho c_i + a_i b_i + c_i - a_i c_i.$$

(ii)  $i$  does not report  $j$ :

$$\pi_j|not\ reported = 4 - \rho c_i + (\text{Expected payoff of } j \text{ in period 2 if } i \text{ does not report } j)$$

where *Expected payoff of  $j$  in period 2 if  $i$  does not report  $j$*

$$\begin{aligned}&= 11(a_i b_i) + 10(a_i)(1 - b_i) + 5c_i(1 - a_i) + 4(1 - a_i)(1 - c_i) \\ &= 4 + 6a_i + a_i b_i + c_i - a_i c_i \text{ (See Table A.4).}\end{aligned}$$

Thus, we have:

$$\pi_j|not\ reported = 8 - \rho c_i + 6a_i + a_i b_i + c_i - a_i c_i.$$

First, we find that defector  $i$ 's material payoff is always bigger than cooperator  $j$ 's if  $i$  reports  $j$ . This is because:

$$\pi_i|report - \pi_j|reported = 8 - [\rho(1 - c_i) + a_i(b_i - c_i) + c_i - 6a_i(1 - c_i)] > 0.$$

Second, we also find that  $i$ 's material payoff is always bigger than  $j$ 's if  $i$  does not report  $j$ . This is because:

$$\begin{aligned}\pi_i|not\ report - \pi_j|not\ reported &= 8 - [6a_i c_i - \rho c_i + a_i b_i - a_i c_i + c_i] \\ &= 8 - [6a_i c_i + c_i(1 - \rho) - a_i(c_i - b_i)] > 0.\end{aligned}$$

In other words, regardless of whether  $i$  reports  $j$  or not, defector  $i$ 's material payoff is always bigger than cooperator  $j$ 's.

Defector  $i$ 's Fehr-Schmidt expected utility when  $i$  chooses to report  $j$  is calculated as:

$$\begin{aligned} u(\pi_i|\pi_j) |report &= \pi_i|report - \beta_i \max\{\pi_i|report - \pi_j|reported, 0\} \\ &= 16 - \rho + 6a_i - 6a_i c_i - \beta_i(8 - \rho + 6a_i - 6a_i c_i + \rho c_i - a_i b_i - c_i + a_i c_i). \end{aligned}$$

By contrast,  $i$ 's Fehr-Schmidt expected utility when he chooses not to report  $j$  is calculated as:

$$\begin{aligned} u(\pi_i|\pi_j) |not report &= \pi_i|not report - \beta_i \max\{\pi_i|not report - \pi_j|not reported, 0\} \\ &= 16 + 6a_i - 6a_i c_i - \beta_i(8 - 6a_i c_i + \rho c_i - a_i b_i + a_i c_i - c_i). \end{aligned}$$

Here,  $i$  reports  $j$  if and only if:

$$\begin{aligned} u(\pi_i|\pi_j) |report - u(\pi_i|\pi_j) |not report &> 0, \text{ or} \\ \rho \beta_i &> \rho + 6a_i \beta_i. \end{aligned} \tag{A17}$$

Condition (A17) does not hold (i.e., a defector would not report a cooperator) as we are assuming that  $\beta_i < 1$ .

(b) Suppose that defector  $i$  forms the optimistic belief. Then, defector  $i$ 's total expected payoff is calculated as:

$$\begin{aligned} \pi_i(XX) &= 11 - \rho \cdot 1_{report} + (\text{Expected payoff of } i \text{ in period 2}) \\ &= 16 - \rho \cdot 1_{report} + 6a_i - 6a_i c_i. \end{aligned}$$

Here, the expected payoff of  $i$  in period 2 obtained from Table A2.

By contrast,  $i$ 's belief about cooperator  $j$ 's material payoff may be dependent on whether  $i$  reports  $j$  or not.

(i)  $i$  reports  $j$ :

$$\pi_j|reported = 4 - \rho c_i + (\text{Expected payoff of } j \text{ in period 2 if } i \text{ reports } j)$$

where

$$\begin{aligned} \text{Expected payoff of } j \text{ in period 2 if } i \text{ reports } j &= 10a_i + (1 - a_i)(c_i)(5) + (1 - a_i)(1 - c_i)4 \\ &= 4 + 6a_i + c_i - a_i c_i \text{ (see Table A.5).} \end{aligned}$$

Thus, we have:

$$\pi_j|reported = 8 - \rho c_i + 6a_i + c_i - a_i c_i.$$

(ii)  $i$  does not report  $j$ :

$$\pi_j|not reported = 4 - \rho c_i + (\text{Expected payoff of } j \text{ in period 2 if } i \text{ does not report } j)$$

where *Expected payoff of  $j$  in period 2 if  $i$  does not report  $j$*

$$\begin{aligned} &= 10a_i + (1 - a_i)(c_i)(5) + (1 - a_i)(1 - c_i)4 \\ &= 4 + 6a_i + c_i - a_i c_i \text{ (See Table A.6).} \end{aligned}$$

Thus, we have:

$$\pi_j|reported = 8 - \rho c_i + 6a_i + c_i - a_i c_i.$$

Therefore, we find that the expected payoff of cooperator  $j$  is the same, whether  $i$  reports  $j$  or not. This is because even if  $i$  reports  $j$ , due to optimistic belief, another cooperator will choose the same action if she is matched with  $j$  in period 2.

Defector  $i$ 's material payoff is bigger than  $j$ 's if  $i$  reports  $j$ . This is because:

$$\pi_i|report - \pi_j|reported = 8 - [\rho(1 - c_i) + (1 - a_i)c_i + 6a_i c_i] > 0.$$

Likewise,  $i$ 's material payoff is bigger than  $j$ 's if  $i$  does not report  $j$ . This is because:

$$\pi_i|not\ report - \pi_j|not\ reported = 8 - [(1 - \rho)c_i + 5a_i c_i] > 0.$$

Defector  $i$ 's Fehr-Schmidt expected utility when  $i$  chooses to report  $j$  is calculated as:

$$\begin{aligned} u(\pi_i|\pi_j) |report &= \pi_i|report - \beta_i \max\{\pi_i|report - \pi_j|reported, 0\} \\ &= 16 - \rho + 6a_i - 6a_i c_i - \beta_i(8 - \rho - 5a_i c_i + \rho c_i - c_i). \end{aligned}$$

By contrast, defector  $i$ 's Fehr-Schmidt expected utility when  $i$  chooses not to report  $j$  is calculated as:

$$\begin{aligned} u(\pi_i|\pi_j) |not\ report &= \pi_i|not\ report - \beta_i \max\{\pi_i|not\ report - \pi_j|not\ reported, 0\} \\ &= 16 + 6a_i - 6a_i c_i - \beta_i(16 + 6a_i - 6a_i c_i - 8 + \rho c_i - 6a_i - c_i + a_i c_i) \\ &= 16 + 6a_i - 6a_i c_i - \beta_i(8 - 5a_i c_i + \rho c_i - c_i). \end{aligned}$$

We show that  $i$  never reports  $j$  as we are assuming that  $\beta_i < 1$ . To see this,

$$u(\pi_i|\pi_j) |report - u(\pi_i|\pi_j) |not\ report = -\rho - \beta_i(-\rho) = \rho(\beta_i - 1) < 0.$$

□

#### A.4.4. Case 4 – A defector meets a defector in period 1

PROPOSITION A4: *Suppose that  $\beta_i < 1$ . Then, regardless of which belief, either pessimistic or optimistic, a defector  $i$  forms, a defector reports (does not report) her matched defector if and only if the following two conditions hold (do not hold):*

$$6a_i > \rho \text{ and } -\rho + ((\alpha_i + \beta_i)c_i - \beta_i)(6a_i - \rho) > 0.$$

Proof:

Suppose that subject  $i$  has been matched with subject  $j$  in period 1 and both subjects select YY. Then, subjects  $i$  and  $j$  each receive a payoff of 5 points in that period. We examine the conditions under which defector  $i$  reports his matched defector  $j$ .

Defector  $i$ 's total expected payoff is calculated as:

$$\begin{aligned}\pi_i(YY) &= 5 - \rho \cdot 1_{\text{report}} + (\text{Expected payoff of } i \text{ in period 2}) \\ &= 10 - \rho \cdot 1_{\text{report}} + 6a_i - 6a_i c_i.\end{aligned}$$

Defector  $i$ 's belief about  $j$ 's material payoff is dependent on whether  $i$  reports  $j$  or not.

(i) If  $i$  reports  $j$ :

$$\pi_j|\text{reported} = 5 - \rho c_i + (\text{Expected payoff of } j \text{ in period 2 if } i \text{ reports } j)$$

where *Expected payoff of  $j$  in period 2 if  $i$  reports  $j$*  = 5.

Thus, we have:

$$\pi_j|\text{reported} = 10 - \rho c_i.$$

(ii) If  $i$  does not report  $j$ :

$$\pi_j|\text{not reported} = 5 - \rho c_i + (\text{Expected payoff of } j \text{ in period 2 if } i \text{ does not report } j)$$

where

$$\text{Expected payoff of } j \text{ in period 2 if } i \text{ does not report } j = 11a_i + (1 - a_i)5.$$

Thus, we have:

$$\pi_j|\text{not reported} = 10 + 6a_i - \rho c_i.$$

We claim that if  $i$  reports  $j$ ,  $i$ 's material payoff is bigger than  $j$ 's if  $6a_i > \rho$ . To see this,

$$\pi_i|\text{report} - \pi_j|\text{reported} = [-\rho + 6a_i(1 - c_i)] - (-\rho c_i) = (6a_i - \rho)(1 - c_i) > 0 \text{ if and only if } 6a_i > \rho.$$

If  $i$  does not report  $j$ ,  $i$ 's material payoff is bigger than  $j$ 's if  $\rho > 6a_i$ . This is because:

$$\pi_i|\text{not report} - \pi_j|\text{not reported} = \rho - 6a_i > 0 \text{ if and only if } \rho > 6a_i.$$

Thus, we need to consider the two cases:  $6a_i > \rho$  and  $6a_i < \rho$ .

Suppose that  $\rho > 6a_i$ . Then, defector  $i$ 's Fehr-Schmidt expected utility when  $i$  chooses to report  $j$  is calculated as:

$$\begin{aligned}
u(\pi_i|\pi_j) |report &= \pi_i|report - \alpha_i \max\{\pi_j|reported - \pi_i|report, 0\} \\
&= 10 - \rho + 6a_i - 6a_i c_i - \alpha_i(-\rho c_i + \rho - 6a_i + 6a_i c_i).
\end{aligned}$$

By contrast,  $i$ 's Fehr-Schmidt expected utility when  $i$  chooses not to report is calculated as:

$$\begin{aligned}
u(\pi_i|\pi_j) |not\ report &= \pi_i|not\ report - \beta_i \max\{\pi_i|not\ report - \pi_j|not\ reported, 0\} \\
&= 10 + 6a_i - 6a_i c_i - \beta_i(-\rho + 6a_i - 6a_i c_i + \rho c_i).
\end{aligned}$$

Therefore,  $i$  reports  $j$  if and only if:

$$\begin{aligned}
u(\pi_i|\pi_j) |report - u(\pi_i|\pi_j)|not\ report &> 0, \text{ or} \\
-\rho - \alpha_i(-\rho c_i + \rho - 6a_i + 6a_i c_i) &> -\beta_i(-\rho + 6a_i - 6a_i c_i + \rho c_i),
\end{aligned}$$

a condition that never holds as this condition can be re-arranged as:

$$-\rho > (\alpha_i + \beta_i)(1 - c_i)(\rho - 6a_i),$$

but the right-hand side is non-negative. In other words,  $i$  does not report  $j$  if  $\rho > 6a_i$ .

Suppose instead that  $\rho < 6a_i$ . Then, defector  $i$ 's Fehr-Schmidt expected utility when  $i$  chooses to report  $j$  is calculated as:

$$\begin{aligned}
u(\pi_i|\pi_j) |report &= \pi_i|report - \beta_i \max\{\pi_i|report - \pi_j|reported, 0\} \\
&= 10 - \rho + 6a_i - 6a_i c_i - \beta_i(-\rho + 6a_i - 6a_i c_i + \rho c_i).
\end{aligned}$$

By contrast,  $i$ 's Fehr-Schmidt expected utility when  $i$  chooses not to report  $j$  is calculated as:

$$\begin{aligned}
u(\pi_i|\pi_j) |not\ report &= \pi_i|not\ report - \alpha_i \max\{\pi_j|not\ reported - \pi_i|not\ report, 0\} \\
&= 10 + 6a_i - 6a_i c_i - \alpha_i(-\rho c_i + 6a_i c_i).
\end{aligned}$$

Thus, we find:  $i$  reports  $j$  if and only if:

$$\begin{aligned}
u(\pi_i|\pi_j) |report - u(\pi_i|\pi_j)|not\ report &> 0, \text{ or} \\
-\rho - \beta_i(-\rho + 6a_i - 6a_i c_i + \rho c_i) &> -\alpha_i(-\rho c_i + 6a_i c_i), \text{ or} \\
-\rho - \beta_i(1 - c_i)(-\rho + 6a_i) &> -\alpha_i c_i(-\rho + 6a_i), \text{ or} \\
-\rho + (-\rho + 6a_i)((\alpha_i + \beta_i)c_i - \beta_i) &> 0.
\end{aligned}$$

This means that only when  $c_i$  is sufficiently large and also when  $a_i$  is large enough that  $6a_i > \rho$ , a defector reports her matched defector.

□

COROLLARY A4: Suppose that  $\beta_i < 1$ . Then, subject  $i$  engages in more costly reporting in Case 4 than in Case 1 if  $b_i < c_i$  (subject  $i$  engages in more costly reporting in Case 1 than in Case 4 if  $b_i > c_i$ ).

Proof:

From Proposition A4, an additional requirement that defector  $i$  reports another defector  $j$  is that:  $c_i > \frac{\beta_i}{\alpha_i + \beta_i}$ ; otherwise,  $-\rho + ((\alpha_i + \beta_i)c_i - \beta_i)(6a_i - \rho) \leq 0$ .

The condition:  $-\rho + ((\alpha_i + \beta_i)c_i - \beta_i)(6a_i - \rho) > 0$  in Proposition A4 can be re-arranged to:

$$a_i > \frac{\rho}{6} + \frac{\rho}{6[(\alpha_i + \beta_i)c_i - \beta_i]}. \quad (\text{A18})$$

The right hand side of condition (A18) is less (greater) than  $\frac{\rho}{6} + \frac{\rho}{6[(\alpha_i + \beta_i)b_i - \beta_i]}$  when  $b_i < c_i$  ( $b_i > c_i$ ). This means that condition (A18) is weaker (stronger) than the condition:  $-\rho + ((\alpha_i + \beta_i)b_i - \beta_i)(6a_i - \rho) > 0$  in Proposition A1. This means, we observe more (less) costly reporting in Case 4 than in Case 1 if  $b_i < c_i$  ( $b_i > c_i$ ).

## Appendix B: Additional Tables and Figures

**Table B.1:** Summary of the subjects' initial choices (XX vs. YY) and reporting decisions

### (A) Decision Data

	Treatment by Reporting Cost				
	HC	MC	LC	Subtotal (Costly reporting)	NC
Reporting Cost	\$1.00	\$0.50	\$0.05	----	\$0.00
(i) Number of Subjects	38 (100%)	38 (100%)	40 (100%)	116 (100%)	36 (100%)
(ii) Number of Cooperators (percentage)	23 (60.5%)	19 (50.0%)	21 (52.5%)	63 (54.3%)	23 (63.9%)
<i>Number of Cooperators being reported [percentage]</i>	0 [0.0%]	1 [5.3%]	2 [9.5%]	3 [4.8%]	12 [52.2%]
<i>Number of Cooperators that report [percentage]</i>	6 [26.1%]	7 [36.8%]	7 [33.3%]	20 [31.7%]	16 [69.6%]
• <i>Number of Cooperators that face Cooperators [percentage]</i>	14 [60.9%]	10 [52.6%]	10 [47.6%]	34 [54.0%]	14 [60.9%]
<i>Number of Cooperators that report Cooperators (percentage of reporting)</i>	0 (0.0%)	1 (10.0%)	2 (20.0%)	3 (8.8%)	8 (57.1%)
• <i>Number of Cooperators that face Defectors [percentage]</i>	9 [39.1%]	9 [47.4%]	11 [52.4%]	29 [46.0%]	9 [39.1%]
<i>Number of Cooperators that report Defectors (percentage of reporting)</i>	6 (66.7%)	6 (66.7%)	5 (45.5%)	17 (58.6%)	8 (88.9%)
(iii) Number of Defectors (percentage)	15 (39.5%)	19 (50.0%)	19 (47.5%)	53 (45.7%)	13 (36.1%)
<i>Number of Defectors being reported [percentage]</i>	7 [46.7%]	8 [42.1%]	6 [31.6%]	21 [39.6%]	11 [84.6%]
<i>Number of Defectors that report [percentage]</i>	1 [6.67%]	2 [10.5%]	1 [5.26%]	4 [7.5%]	7 [53.9%]
• <i>Number of Defectors that face Cooperators [percentage]</i>	9 [60.0%]	9 [47.4%]	11 [57.9%]	29 [54.7%]	9 [69.2%]
<i>Number of Defectors that report Cooperators (percentage of reporting)</i>	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	4 (44.4%)
• <i>Number of Defectors that face Defectors [percentage]</i>	6 [40.0%]	10 [52.6%]	8 [42.1%]	24 [45.3%]	4 [30.8%]
<i>Number of Defectors that report Defectors (percentage of reporting)</i>	1 (16.7%)	2 (20.0%)	1 (12.5%)	4 (16.7%)	3 (72.5%)



(B) Tests of equality of percentages of cooperators or defectors being reported, across treatments

B.1. Costly reporting treatments versus no cost (NC) reporting treatment

	HC vs. NC treatment	MC vs. NC treatment	LC vs. NC treatment	The three costly reporting treatments vs. NC treatment
(i) The % of Cooperators being reported	.0001***	.0011***	.0024***	.0000***
• <i>The % of Cooperators being reported by XX choosers</i>	.0008***	.0187**	.0688*	.0003***
• <i>The % of Cooperators being reported by YY choosers</i>	.0233**	.0233**	.0134**	.0001***
(ii) The % of Defectors being reported	.0366**	.0162**	.0031***	.0036***
• <i>The % of Defectors being reported by XX choosers</i>	.2568	.2568	.0428**	.0945*
• <i>The % of Defectors being reported by YY choosers</i>	.0651*	.0524*	.0304**	.0126**

Notes: Panel (B) reports two-sample test of proportion results. The numbers are  $p$ -values (two-sided). \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05 level and at the .01 level, respectively.

## B.2. Comparison of reporting frequency by defectors vs. by cooperators, within treatments

	HC treatment	MC treatment	LC treatment	Three costly reporting treatments	NC treatment
• The % of defectors being reported by XX choosers versus the % of defectors being reported by YY choosers	.0572*	.0397**	.1271	.0019***	.5218
• The % of defectors being reported by XX choosers versus the % of cooperators being reported by XX choosers	.0004***	.0106**	.2165	.0000***	.1063
• The % of defectors being reported by XX choosers versus the % of cooperators being reported by YY choosers	.0027***	.0027***	.0110**	.0000***	.0455**
• The % of defectors being reported by YY choosers versus the % of cooperators being reported by XX choosers	.1171	.5312	.5312	.3665	.5182
• The % of defectors being reported by YY choosers versus the % of cooperators being reported by YY choosers	.2049	.1561	.2283	.0222**	.3077
• The % of cooperators being reported by XX choosers versus the % of cooperators being reported by YY choosers	n.a. <sup>#1</sup>	.3297	.1189	.1012	.5518

Notes: Panel (B) reports two-sample test of proportion results. The numbers are  $p$ -values (two-sided). \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05 level and at the .01 level, respectively.

<sup>#1</sup> All subjects in these case did not report their counterparts' decisions.

## (C) Comparison of cooperation frequency across the treatments

		Treatment			
		HC	MC	LC	NC
Treatment	HC	----	.3561	.4749	.7656
	MC	----	----	.8253	.2281
	LC	----	----	----	.3153
	Subtotal (HC,MC,LC)	----	----	----	3111

Notes: Panel (C) reports two-sample test of proportion results. The numbers are  $p$ -values (two-sided). \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05 level and at the .01 level, respectively.

**Table B.2:** Tests of Prediction H-SRC

(a) The fraction of cooperators (H-SRC predicts no cooperation)

	Costly Reporting Treatments				NC
	HC	MC	LC	Subtotal	
<i>p</i> -value (two-sided) <sup>1</sup>	.000***	.000***	.000***	.000***	.000***

*Notes:* Binomial probability test results. We adopt the conservative null hypothesis that the probability of choosing XX equals 5%, assuming that errors occur with a probability of 5%. \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05 level and at the .01 level, respectively. The hypothesis that not more than 5% cooperate is rejected at the .01 level in all treatments.

(b) The fraction of cooperators that report XX-choosing counterparts (H-SRC predicts no reporting in HC, MC and LC)

	Costly Reporting Treatments				NC
	HC	MC	LC	Subtotal	
<i>p</i> -value (two-sided) <sup>1</sup>	1.000	.401	.086*	.241	.000***

*Notes:* Binomial probability test results. We adopt the conservative null hypothesis that the probability that cooperators report the initial choices of their XX-choosing partners equals 5%, assuming that errors occur with a probability of 5%. \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05 level and at the .01 level, respectively. The hypothesis of no reporting apart from error is not rejected in HC and MC and in the costly reporting treatments when pooled, and is rejected at the 10% level only in LC treatment.

(c) The fraction of cooperators that report YY-choosing counterparts (H-SRC predicts no reporting in HC, MC and LC)

	Costly Reporting Treatments				NC
	HC	MC	LC	Subtotal	
<i>p</i> -value (two-sided) <sup>1</sup>	.000***	.000***	.000***	.000***	.000***

*Notes:* Binomial probability test results. We adopt the conservative null hypothesis that the probability that cooperators report the initial choices of their YY-choosing partners equals 5%, assuming that errors occur with a probability of 5%. \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05 level and at the .01 level, respectively. The prediction of no reporting apart from errors is rejected at the .01 level in all cases.

(d) The fraction of defectors that report XX-choosing counterparts (H-SRC predicts no reporting in HC, MC and LC)

	Costly Reporting Treatments				NC
	HC	MC	LC	Subtotal	
<i>p</i> -value (two-sided) <sup>1</sup>	1.000	1.000	1.000	.401	.001***

*Notes:* Binomial probability test results. We adopt the conservative null hypothesis that the probability that defectors report the initial choices of their XX-choosing partners equals 5%, assuming that errors occur with a probability of 5%. \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05 level and at the .01 level, respectively. The hypothesis of no reporting apart from errors is not rejected in the costly reporting treatments, but a hypothesis of no reporting in NC (which is not part of H-SRC as such) would be rejected in the case of NC treatment.

(e) The fraction of defectors that report YY-choosing counterparts (H-SRC predicts no reporting in HC, MC and LC)

	Costly Reporting Treatments				NC
	HC	MC	LC	Subtotal	
<i>p</i> -value (two-sided) <sup>1</sup>	.265	.086*	.337	.0298**	.000***

*Notes:* Binomial probability test results. We adopt the conservative null hypothesis that the probability that defectors report the initial choices of their YY-choosing partners equals 5%, assuming that errors occur with a probability of 5%. \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05 level and at the .01 level, respectively. The hypothesis that there is no reporting except for errors is rejected at the 5% level for the pooled costly reporting treatments, but at the 10% level only for the MC treatment taken alone. A hypothesis of no costly reporting (not part of H-SRC as such) would be rejected in the case of NC treatment.

**Table B.3.** Cooperation decisions & predictions assuming payoff maximization and self-reported beliefs

	Treatment by Reporting Cost					
	HC	MC	LC	Subtotal	NC	Total
<b>Number of XX-choosers</b>	23	19	21	63	23	86
(i) Number of subjects for whom LHS of (1) > 2 <sup>a</sup>	6 (15.8%)	8 (21.1%)	13 (32.5%)	27 (23.3%)	11 (30.6%)	38 (25.0%)
(i-1) Number of subjects who chose XX: <i>Average belief <math>a_i</math> for those in (i-1) – #1</i>	6 82.2%	6 84.5%	13 78.5%	25 80.8%	10 80.5%	35 80.7%
(i-2) Subjects who select XX and have LHS of (1) > 2 <sup>a</sup> as share of all subjects who select XX	26.1%	31.6%	61.9%	39.7%	43.5%	40.7%
(ii) Subjects who select XX and have LHS of (1') > 2 <sup>b</sup> but not LHS of (1) > 2	4 (17.4%)	6 (31.6%)	6 (28.6%)	16 (25.4%)	8 (34.8%)	24 (27.9%)
(iii) Subjects not in (i-1) or (ii) for whom FS model predicts cooperation (based on condition (4)) if $\alpha = 1$ , $\beta = 0.6$	4 (17.4%)	4 (21.1%)	1 (4.8%)	9 (14.3%)	1 (4.3%)	10 (11.6%)
(iv) Subjects not in (i-1), (ii) or (iii) for whom FS model predicts cooperation (based on condition (4)) if $\alpha = 1$ , $\beta = 1$	2 (8.7%)	0 (0.0%)	1 (4.8%)	3 (4.8%)	1 (4.3%)	4 (4.7%)
(v) Same as (iv) except assuming $\alpha = 0$ , $\beta = 1$	6 (26.1%)	3 (15.8%)	0 (0.0%)	9 (14.3%)	3 (13.0%)	12 (14.0%)
(vi) Subject who select XX but not in (i-1) to (v)	1 (4.3%)	0 (0.0%)	0 (0.0%)	1 (1.6%)	0 (0.0%)	1 (1.2%)
(vii) Number of subjects in (i) who chose YY: <i>Average belief <math>a_i</math> for those in (i-2)</i>	0 [0.0%] <i>n.a.</i>	2 [25.0%] 55.0%	0 [0.0%] <i>n.a.</i>	2 [7.4%] 55.0%	1 [9.1%] 60.0%	3 [7.9%] 56.7%
<b>Number of YY-choosers</b>	15	19	19	53	13	66
(viii) Number of subjects for whom LHS of (1) < 2	32	30	26	88	25	113
(viii-1) Number of subjects who chose XX: <i>Average belief <math>a_i</math> for those in (viii-1) – #2</i>	17 [53.1%] 59.9%	13 [43.3%] 69.2%	8 [30.8%] 76.5%	38 [43.2%] 66.6%	13 [52.0%] 66.2%	51 [45.1%] 66.5%
(viii-2) Number of subjects who chose YY: <i>Average belief <math>a_i</math> for those in (viii-2) – #3</i>	15 41.5%	17 38.8%	18 <sup>c</sup> 27.7%	50 35.6%	12 23.5%	62 33.2%
(viii-3) Subjects selecting YY and having LHS of (1) < 2 as share of all subjects who choose YY	100%	89.5%	94.7%	94.5%	92.3%	94.1%
Two sample test of proportion <sup>1</sup>						
H <sub>0</sub> : % of those who chose YY among (i) = % of those who chose XX among (viii)	.0163**	.3459	.0282**	.001***	.0150**	0.000***
Mann-Whitney tests <sup>1</sup>						
H <sub>0</sub> : term (#1) = term (#2)	.0676*	.0933*	.7977	.0141**	.0861*	.0033***
H <sub>0</sub> : term (#2) = term (#3)	.0850*	.0010***	.0005***	.0000***	.0003***	.0000***

Notes: <sup>1</sup> The numbers are *p*-values (two-sided). \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05, and at the .01 level respectively. <sup>a</sup> LHS of (1) > 2 is the condition for cooperation to be payoff maximizing given the individual's self-reported beliefs and assuming those free to choose select defect for second interaction. <sup>b</sup> LHS of (1') > 2 is the condition for cooperation to be payoff maximizing given the individual's self-reported beliefs and assuming that initial cooperators (XX-choosers) free to revise their decision choose to cooperate in second interaction if get report that counterpart cooperated. <sup>c</sup> There was one subject whose LHS of (1) is equal to 2 (with a = 20, b = 0 and c = 100) and who selected YY.

**Table B.4:** Average beliefs ( $a_i$ ,  $b_i$  and  $c_i$ ) and tests for differences, with cooperators and defectors distinguished

(i) Average Beliefs

	Costly Reporting Treatments				NC
	HC	MC	LC	Subtotal (HC,MC,LC)	
(i.1) Cooperators					
[1] Average $a_i$	65.7%	74.0%	77.7%	72.2%	72.4%
[2] Average $b_i$	21.0%	27.9%	29.7%	26.0%	39.3%
[3] Average $c_i$	39.8%	52.4%	75.6%	55.5%	75.1%
(i.2) Defectors					
[4] Average $a_i$	41.5%	40.5%	27.3%	36.0%	26.3%
[5] Average $b_i$	32.5%	28.4%	27.2%	29.1%	49.9%
[6] Average $c_i$	26.1%	35.8%	25.4%	29.3%	67.9%

(ii) Test Results<sup>1</sup>

We tested the difference in the beliefs of cooperators vs. those of defectors, by treatment. A significant result means beliefs of cooperators differ significantly from those of defectors.

	HC	MC	LC	Subtotal (HC,MC,LC)	NC
[1] = [4]	.0174**	.0000***	.0000***	.0000***	.0000***
[2] = [5]	.1298	.5650	.6930	.4575	.2817
[3] = [6]	.2805	.1610	.0000***	.0001***	.2184

Notes: <sup>1</sup> Mann-Whitney test results. The numbers are  $p$ -values (two-sided). \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05, and at the .01 level respectively. The test results comparing beliefs across the treatments are found in Appendix Table B.5.

**Table B.5:** Comparison of the subjects' beliefs across treatments by initial choice (XX or YY)  
(Supplementing Table B.4 of this Appendix)

(1) Belief  $a_i$

We tested the differences in the average belief  $a$  between the treatments, for cooperators (panel 1a) and for defectors (panel 1b).

(1a) Cooperators

		Treatment			
		HC	MC	LC	NC
Treatment	HC	----	.3480	.1569	.4276
	MC	----	----	.7639	.7320
	LC	----	----	----	.4778
	Subtotal (HC,MC,LC)	----	----	----	.9415
	NC	----	----	----	----

(1b) Defectors

		Treatment			
		HC	MC	LC	NC
Treatment	HC	----	.9445	.1386	.1959
	MC	----	----	.0514*	.0766*
	LC	----	----	----	.8024
	Subtotal (HC,MC,LC)	----	----	----	.2752
	NC	----	----	----	----

*Notes.* Two-sided individual-level Mann-Whitney tests. Numbers in panels are  $p$ -values. \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05 level and at the .01 level, respectively. The insignificant results for most cases means that beliefs of cooperators (defectors) about the % that would cooperate do not tend to differ across treatments.

(2) Belief  $b_i$

We tested the differences in the average belief  $b$  between the treatments for cooperators (panel 2a) and defectors (panel 2b).

(2a) Cooperators

		Treatment			
		HC	MC	LC	NC
Treatment	HC	----	.6938	.4504	.0317**
	MC	----	----	.7958	.1543
	LC	----	----	----	.2830
	Subtotal (HC,MC,LC)	----	----	----	.0513*

(2b) Defectors

		Treatment			
		HC	MC	LC	NC
Treatment	HC	----	.6745	.3294	.0970*
	MC	----	----	.5672	.0307**
	LC	----	----	----	.0269**
	Subtotal (HC,MC,LC)	----	----	----	.0158**

*Notes.* Two-sided individual-level Mann-Whitney tests. Numbers in the panels are  $p$ -values. \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05 level and at the .01 level, respectively. Results indicate that defectors especially had higher expectations of share of cooperators that would be reported in the no cost than in the various costly reporting treatments.



### (3) Belief $c_i$

We tested the differences in the average belief  $c$  between the treatments for each of the cooperators and the YY choosers. [RETURN HERE](#)

#### (3a) For cooperators

		Treatment			
		HC	MC	LC	NC
Treatment	HC	----	.2492	.0005***	.0004***
	MC	----	----	.0687*	.0334**
	LC	----	----	----	.7765
	Subtotal (HC,MC,LC)	----	----	----	.0118**

#### (3a) For defectors

		Treatment			
		HC	MC	LC	NC
Treatment	HC	----	.2645	.4634	.0006***
	MC	----	----	.1420	.0037***
	LC	----	----	----	.0010***
	Subtotal (HC,MC,LC)	----	----	----	.0001***

*Notes.* Two-sided, individual-level Mann-Whitney tests. Numbers in the panels are  $p$ -values. \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05 level and at the .01 level, respectively.

**Table B.6:** The Subjects' Initial Choices of XX or YY and their Three Kinds of Beliefs  
(Supplementing Panel (ii) of Table B.4 of this Appendix)

In this table, we conducted a regression analysis to explore the relationship between the subjects' initial choices and their beliefs, instead of performing non-parametric tests as shown in Panel (ii) of Table B.5.

Dependent Variable: A dummy that equals 1 if a subject choose to play XX; 0 otherwise

Variables	(1)	(2)	(3)	(4)
Belief $a_i$ (Belief of subject $i$ about the fraction of Cooperators in his or her session)	.011*** (.0011)	----	----	.010*** (.0011)
Belief $b_i$ (Belief of subject $i$ about the fraction of Cooperators being reported)	----	-.0012 (.0015)	----	-.0013 (.0011)
Belief $c_i$ (Belief of subject $i$ about the fraction of Defectors being reported)	----	----	.0049*** (.0011)	.0020** (.00095)
Constant	-0.054*** (.066)	.60*** (.061)	.32*** (.067)	-.066 (.077)
# of Observation	152	152	152	152
F	110.73	.65	19.91	39.51
Prob > F	.0000	..4202	.0000	.0000
Adjusted R-squared	.4209	-.0023	.1113	.4334

Notes: Linear regressions. Observations of all reporting treatments (HC, MC, LC and NC) are included in the regressions. \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05 level and at the .01 level, respectively.

**Table B.7:** The Deviation of Prediction H-SPO (Supplementing Appendix Table B.3 of this manuscript)

	Treatment by Reporting Cost					
	Costly Reporting Treatments					
	HC	MC	LC	Subtotal	NC	Total
(i) Number of subjects whose $E[\pi_i(XX)] - E[\pi_i(YY)] > 0$	6	8	13	27	11	38
Number of subjects who chose YY:	0 [0.0%]	2 [25.0%]	0 [0.0%]	2 [7.4%]	1 [9.1%]	3 [7.9%]
$p$ -value (two-sided) for binomial probability tests to the null that a subject commits this error with a probability of 5% (i.e., s/he chooses YY with a 5% probability even if $E[\pi_i(XX)] - E[\pi_i(YY)] > 0$ ).	1.000	.057*	1.000	.394	.431	.438
(ii) Number of subjects whose $E[\pi_i(YY)] - E[\pi_i(XX)] > 0$	32	30	26	88	25	113
Number of subjects who chose XX:	17 [53.1%]	13 [43.3%]	8 [30.8%]	38 [43.2%]	13 [52.0%]	51 [45.1%]
$p$ -value (two-sided) for binomial probability tests to the null that a subject commits this error with a probability of 5% (i.e., s/he chooses XX with a 5% probability even if $E[\pi_i(YY)] - E[\pi_i(XX)] > 0$ ).	.000***	.000***	.000***	.000***	.000***	.000***

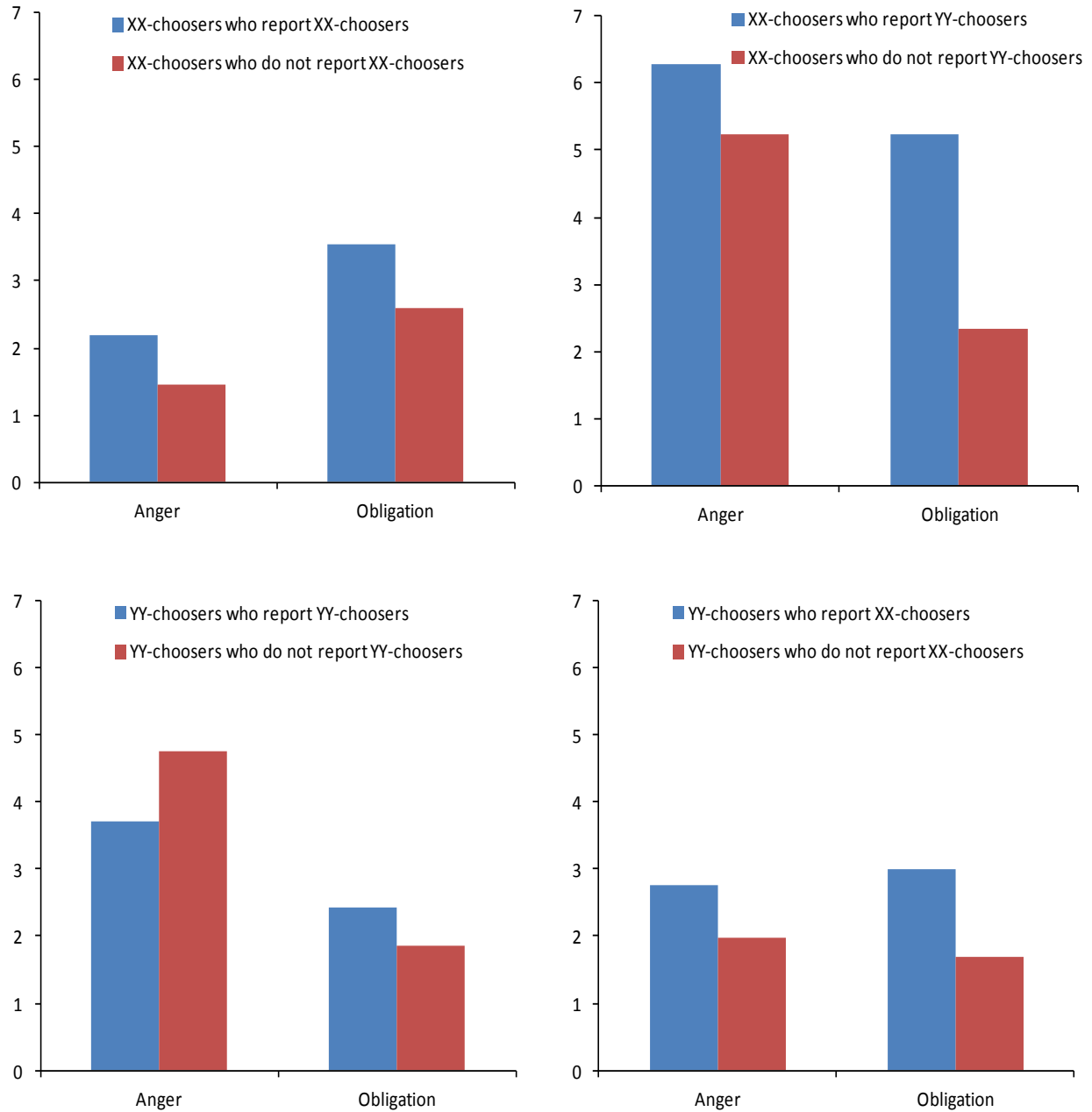
Notes: \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05 level and at the .01 level, respectively.

**Table B.8:** The Determinants of Reporting Decisions in the Costly Reporting Treatments

Independent Variable	Case 1: Cooperators face XX choosers (1)	Case 2: Cooperators face YY choosers (2)	Case 4: Defectors face YY choosers (3)
Belief $a_i$ [%]	.0014 (.0016)	.0010 (.0051)	-.0037 (.0041)
Belief $b_i$ [%]	.0087*** (.0013)	-.00047 (.0035)	-.0039 (.0039)
Belief $c_i$ [%]	.00015 (.0011)	.0084*** (.0029)	.013** (.0047)
HC treatment dummy {= 1 for HC treatment; 0 otherwise}	-.027 (.092)	.38 (.22)	-.26 (.22)
MC treatment dummy {= 1 for MC treatment; 0 otherwise}	-.037 (.087)	.38* (.21)	-.21 (.20)
Constant	-.20 (.15)	-.21 (.50)	.23 (.17)
# of Observations	34	29	24
The number of reporting events	3	17	4
F	10.72	2.16	1.82
Prob > F	.0000	.0943	.1590
Adjusted R-Squared	.5955	.1715	.1518

*Notes:* Linear regressions. There were no reporting event for Case 3 (Defectors face XX choosers) in the HC, MC and LC treatments. \*, \*\*, and \*\*\* indicate significance at the .10 level, at the .05, and at the .01 level respectively.

**Fig. B.1:** Average Anger Level and the Feeling of Obligation to Help a Third Person



*Notes:* The Anger variable is a subject's response to the following question: "How did you feel about your first counterpart's decision? Please rate on a scale from 1 = very pleased to 7 = very angry." The Obligation variable is a subject's response to the following question: "Did you feel a sense of obligation to help your first counterpart's next counterpart by sending a report? Please rate on a scale from 1 = did not feel obligated at all, to 7 = felt strongly obligated."

## **Appendix C: Instructions for the LC treatment**

### **Instructions**

You are participating in a decision-making experiment in which you will earn an amount of money that depends on your decisions and on the decisions of other participants.

Please switch off your cell phone. During the experiment, you are not allowed to communicate with other participants.

In the experiment, you will be engaging in two interactions, each with a different, randomly selected, counterpart. Each interaction has the same basic structure, including the amounts of money at stake. Your decisions are anonymous. You will not be told the identities of either of the participants with whom you interact in the experiment, nor will those with whom you interact know your identity. Your decisions will be recorded without any identifiers, and thus, the experimenters also cannot match your decisions with your name. We can assure you that your payoffs will be based only on your own decisions and on the decisions of other actual participants in today's experiment, and that neither a computer program nor members of the experiment team will ever be substituted for other participants. Details will follow after we first explain the nature of the interaction.

#### *Basic Feature of Interactions*

In each of two interactions, each of the two participants who are paired for it decides between two alternative decisions, called X and Y. The amount of money that you will earn from the interaction depends only on your choice and on the choice of the person you are paired with. There are four possibilities:

- (a) If you choose X and your counterpart also chooses X, you earn \$10.
- (b) If you choose Y and your counterpart also chooses Y, you earn \$5.
- (c) If you choose X and your counterpart chooses Y, you earn \$4.
- (d) If you choose Y and your counterpart chooses X, you earn \$11.

(Your counterpart has the same earning formula as you.)

The second interaction is exactly like the first one. In other words, you will be engaging in the identical type of interaction twice, each time with a different counterpart.

A more schematic way of visualizing the possible choices of your counterpart and yourself and the payoffs that would result under each possible set of choices is shown in the table on the last page of these instructions. Please review that table and the instructions so far, and raise your hand if you have a question before we go on with the instructions.

*Your first decision: choosing XX or YY*

You will be asked to make your choices, either X or Y, for both your first and your second interaction at the outset. Even though the two interactions are separate and are conducted with different counterparts, you are required to make the identical choice for both of them. In other words, you can decide to choose X in both interactions, which we call “XX”, or you can decide to choose Y in both interactions, which we call “YY.” You cannot select “X, then Y” or “Y, then X.”

*Your second decision: choosing whether to report your counterpart’s action*

Once you have made your initial choice of either XX or YY, you will be randomly paired with a first counterpart and your earnings from your first interaction will be calculated. (The pairing is completely random and cannot be influenced by either your own or your counterpart’s initial choice.) The computer will then inform you of the outcome of your interaction with this first randomly assigned counterpart. The screen in question will remind you of your initial decision of XX or YY, will tell you about your counterpart’s initial choice of XX or YY, and will indicate your and your counterpart’s earnings from the first interaction based on those two sets of decisions.

Following this, and before moving on to the second interaction, you will be asked to decide whether you wish to spend five cents (\$0.05) of your earnings to reveal your first interaction counterpart’s choice **to that person’s next interaction counterpart**. If you choose to report your first counterpart’s action, then that individual’s choice of XX or YY plus his or her earnings in her interaction with you will be made known to his or her partner in the second interaction, potentially affecting their earnings in that interaction as explained next.

Once each participant submits their decision to report or not report the action of their first counterpart, the computer will randomly match you with another participant with whom you’ll engage in Phase 2. (There is zero chance that your second counterpart is the same individual with whom you interacted the first time.)

Please consider the instructions so far, and raise your hand if you have a question.

## **Second Interaction**

*The no report case:*

Your interaction with your second counterpart will proceed exactly like that with your first counterpart unless at least one of the two of you, yourself or your new counterpart, has been sent a report by the first participant you or he/she interacted with. Specifically, if neither of you are sent a report, neither you nor your counterpart has a new decision to make. The computer will

simply take your initial choice of XX or YY and your counterpart's initial choice of XX or YY, will calculate the appropriate payoffs for that pair of choices, and will credit you with those earnings.

Example: You selected XX, your first counterpart selected YY, your second counterpart selected XX, and neither you nor your second counterpart receives a report about first interaction behavior by one another's initial counterparts. Therefore, neither you nor your second counterpart can alter your decisions. You earn \$4 and your first counterpart earns \$11 from your first interaction. You earn \$10 and your second counterpart earns \$10 from your second interaction. Your total earnings are  $\$4 + \$10 = \$14$ , which, together with the participation fee of \$5, gives you earnings of \$19. Your total earnings are \$18.95 if you chose to report your counterpart's action and \$19.00 if you chose not to report it.

#### *The case of reporting:*

To restate, new choices are possible in your second interaction only if at least one of the two participants in question, yourself or your new counterpart, has received a report about the other's initial action.

A participant who receives a report has a new decision to make.

If you receive a report about your second counterpart's initial action thanks to the decision of their original counterpart, you will be told

- whether your new counterpart had chosen XX or YY
- what your new counterpart earned in his or her first interaction
- whether your new counterpart is in a position to make a fresh decision (like you are) or is unable to make a fresh decision (i.e., is not in receipt of a report from your own first counterpart).

Regardless of whether only you, or both you and your new counterpart, are able to make a fresh decision, your next step is to decide whether to keep to your original choice of X or Y, or to change your choice (from X to Y or from Y to X). If only you can change your choice, then you know your counterpart's decision will be the one he or she made originally, so you can determine the consequence of whatever choice you make with certainty. If both you and your counterpart can change your choices, you will be deciding what to do knowing that your counterpart is simultaneously making a decision and has information about what your initial decision was.

Example 1: You receive the report that your new counterpart chose YY, earned \$11 in his or her first interaction, and is unable to make a new decision. You can choose X for the second interaction, in which case you earn \$4 and your new counterpart earns \$11, or you can choose Y for the second interaction, in which case both you and your new counterpart earn \$5. You can



choose either X or Y in this second interaction, regardless of whether your original choice was XX or YY.

Example 2: Your choice in your first interaction was XX and you do not receive a report. Your counterpart's choice was also XX but your counterpart receives a report about your initial choice. You will be told that you have no decision to make and must wait while your counterpart and (perhaps) others make their choices. If your counterpart selects X for the second interaction, you both earn \$10. If your counterpart selects Y, you earn \$4 and he or she earns \$11.

Example 3: Both you and your counterpart receive reports and can therefore make a fresh decision of either X or Y for your second interaction. Knowing one another's initial choices, you each choose either X or Y and earn the payoffs indicated by Table 1.

### *Summary*

You will be asked to choose between actions XX or YY that will be taken in consecutive interactions with two different, anonymous, randomly chosen counterparts, each time generating earnings as shown in Table 1. After learning the outcome of your first interaction, you'll have the opportunity to report on your first counterpart's action at a cost to you of five cents. Second interactions proceed without fresh decisions, each individual's action being automatically the one initially chosen, unless the first interaction partner of either you or your new counterpart or both paid for reporting. If you receive a report about your new interaction partner's initial action and earnings, you'll be able to take a new decision and you'll also be told whether your new interaction partner received a report enabling him or her to take a new decision. If your new counterpart but not you receives a report, you will be informed of this and will simply wait while he or she makes their decision, after which the outcome will be reported to you.

### *Final details*

Once both interactions are completed and all participants have reviewed their final information screens, the main portion of the experiment will be over. At that point, you will be asked to answer some questions your answers to which will have no effect on your earnings. Remember that neither information about your decisions during the experiment nor your responses to these questions can be linked to you as an individual, since your decisions are recorded under a random identification number only. An experimenter will come to you with your payment in a closed envelope and you are then free to leave. No other participant will be told how much you earned in the experiment, and no participant will learn the identities of the two other participants with whom they were matched during the experiment.

Note that some further questions may appear on your screen while the decision portion of the experiment is in progress. In some cases, you may have an opportunity to add to your payoff by the accuracy of your answers.

## Comprehension questions

Before you make your decisions, we want to ask you some questions, which will appear in a moment on your computer screen. We hope that these questions will help you to check your understanding of the possible consequences of various choices. Please answer to the best of your ability. Your answers will not affect your earnings from the experiment, they will not prevent you from making any choice you wish to in the payoff-determining portion of the experiment, and they will have no impact on what participants the computer randomly assigns to interact with you.

(1) In the experiment, you are going to interact with two different participants in sequence. What is your first decision in this experiment?

(i) Choosing X or Y for interactions 1 and 2 from the set XX, XY, YX or YY, where the letter on the left (right) is the choice for the first (second) interaction. [            ]

(ii) Choosing X or Y for interactions 1 and 2 from among XX or YY only. [            ]

(iii) Making a choice of X or Y for the first interaction only. The choice for the second interaction comes later.

(2) Once every participant in the session has made their initial decision(s), you are given the opportunity to spend some amount of your earnings to reveal your first interaction partner's choice.

(2a) How much does it cost you to reveal your first interaction partner's choice? \_\_\_\_

(2b) Who in particular will find out your first interaction partner's choice if you decide to reveal it?

(i) Every participant in the session [            ]

(ii) Your first interaction partner's counterpart in the second interaction [            ]

(3) Suppose you reach the beginning of the second interaction. Suppose that you initially chose XX and that you are assigned to a counterpart for the second interaction who initially chose YY. Please answer the following questions.

a) Suppose that neither you nor your counterpart receives a report. What will you earn in the second interaction? \_\_\_\_\_ What will your counterpart earn in the second interaction? \_\_\_\_\_

b) Suppose, instead, that your new counterpart's first interaction partner chose to reveal information to you, but your own first interaction partner did not choose to reveal information to your new counterpart. You are free to change your choice of X or Y, but your counterpart is not free to change his or her choice of X or Y. What action do you think

that you would choose, knowing that your counterpart's choice is still Y? \_\_\_\_ What would you earn? \_\_\_\_ What would your counterpart earn? \_\_\_\_

(4) This question concerns initial decisions and their consequences for both interactions.

- a) What are your total earnings today (including \$5 for participation) if you and everyone else select XX and no reporting takes place? \$\_\_\_\_
- b) What are your total earnings today (including \$5 for participation) if you and everyone else select YY and no reporting takes place? \$\_\_\_\_.
- c) Suppose that all participants other than you choose XX. Given that that is the case, what should you choose if you want to earn as much as possible in the experiment as a whole and assuming that
  - (i) a participant who selects YY will be reported with high likelihood? \_\_\_\_\_
  - (ii) a participant who selects YY is very unlikely to be reported? \_\_\_\_\_
- d) Suppose that all participants other than you choose YY. Given that that is the case, what should you choose if you want to earn as much as possible in the experiment as a whole and
  - (i) a participant who selects XX will be reported with high likelihood? \_\_\_\_\_
  - (ii) a participant who selects XX is very unlikely to be reported? \_\_\_\_\_

**Table 1. Choices and Earnings from Each Interaction**

<b>If You Choose</b>	<b>&amp; Your Counterpart Chooses</b>	<b>You Earn</b>	<b>Your Counterpart Earns</b>
<b>X</b>	<b>X</b>	<b>\$10</b>	<b>\$10</b>
<b>Y</b>	<b>Y</b>	<b>\$5</b>	<b>\$5</b>
<b>X</b>	<b>Y</b>	<b>\$4</b>	<b>\$11</b>
<b>Y</b>	<b>X</b>	<b>\$11</b>	<b>\$4</b>